Global Personality Dysfunction and the Relationship of Pathological and Normal Trait Domains in the

DSM-5 Alternative Model for Personality Disorders

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Abstract

Objective: The DSM-5 Alternative Model of Personality Disorders distinguishes core personality dysfunction common to all personality pathology from maladaptive traits that are specific variants of disorder. Previous research shows convergence between maladaptive and normal range trait domains as well as substantial correlations between maladaptive traits and core dysfunctions, leading some to conclude that personality traits and dysfunction are redundant. This study sought to examine the potential utility of the concept of core dysfunctions as a means of clarifying the nature of the relationship between maladaptive and normal-range traits.

Method: Three non-clinical samples (n=178, 307, and 1,008) were evaluated for personality dysfunction, maladaptive traits, and normal-range traits and normative traits using different measures.

Results: Results indicate that: (1) normal trait domains and core dysfunction contribute independently to understanding maladaptive traits; (2) the correlation of a normal trait domain with its putative maladaptive equivalent is consistently accounted for in part by core dysfunction; and (3) the multi-trait multi-method matrices of normal and maladaptive personality trait domains demonstrate appreciable discriminant validity problems that are clarified by a consideration of core dysfunction.

Conclusion: These results suggest that maladaptive traits reflect the distinguishable contributions of core personality dysfunction (problems) and normal range personality traits (person).

Keywords: Personality Disorder, Personality Trait, Five Factor Model, Dysfunction, AMPD, LPFS

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The Alternative Model of Personality Disorders (AMPD) in the Diagnostic and Statistical Manual

of Mental Disorders (DSM-5; American Psychiatric Association, 2013) was designed to improve upon and

ultimately replace the categorical model of personality disorders (PDs) that has been in use with little

change since the publication of DSM-III in 1980. A prominent feature of the AMPD is the distinction

between personality dysfunction and maladaptive traits. Personality dysfunction (Criterion A) defines

what all PDs have in common, and is used to describe the overall level of severity in personality

functioning that serves as the basis for diagnosing a "disorder". Maladaptive traits (Criterion B) are used

to articulate the specific manner in which problems are expressed among people with significant

personality dysfunction.

Research on the AMPD maladaptive traits has shown a marked convergence with the five factor

model (FFM) of normal range personality features (Gore & Widiger, 2013; Thomas et al., 2013; Wright &

Simms, 2014). However, unlike normal range features, the maladaptive traits are saturated with aspects

of personality difficulties, which may increase both the intercorrelations among putatively distinct

domains (Wright et al., 2012) but also their validity with respect to clinical outcomes (Morey et al.,

2007). A significant question regarding the AMPD involves the nature of the relationship between

normal range personality, personality dysfunction, and maladaptive traits (Bastiaansen et al., 2016; Few

et al., 2013; Hopwood, 2011; Oltmanns & Widiger, 2016; Zimmermann et al., 2015).

This study was designed to examine the degree to which maladaptive trait variance reflects the

joint contribution of core personality dysfunction and normal range FFM traits. We specifically test three

hypotheses. First, does personality dysfunction contribute additional variance above and beyond

normal range FFM traits, either independently or in interaction, in explaining maladaptive traits?

Second, in addition to any independent contribution, might personality dysfunction partially account for

the relationship between normal range and maladaptive traits? Third, does removing personality

dysfunction variance from the intercorrelations of maladaptive traits reduce their intercorrelations,

thereby improving their discriminant validity and making them more comparable to normal range traits?

DSM-5 Alternative Model of Personality Disorders

Problems with the categorical model of PDs were well-documented when the DSM-5 Personality

and Personality Disorder Work Group took up the task of proposing a new diagnostic scheme (Clark,

2007; Skodol, 2012). One of the clearest mandates from the research literature and clinical community

was the need to move toward a dimensional model (Bernstein et al., 2007). The FFM was a natural

candidate given its robust representation in the research literature (Widiger & Trull, 2007), capacity to

integrate different dimensional perspectives (Widiger & Simonsen, 2005), and established connections

to PDs (Samuel & Widiger, 2008). One potential limitation of the FFM was that it was based on normal

range personality characteristics, and instruments designed to measure FFM traits in the normal range

could not fully capture the level of dysfunction apparent in individuals with PD diagnoses (Morey et al.,

2007; Samuel, Simms, Clark, Livesley, & Widiger, 2010).

A separate literature showed that many of the problems associated with PDs could be

summarized with a single composite which related so strongly to most clinical outcomes that traits could

not appreciably augment it in terms of incremental validity (Bornstein, 1998; Hopwood et al., 2011;

Tyrer, 2005). A literature parallel to the one on personality traits had contributed a variety of measures

of general personality dysfunction (Bender, Morey, & Skodol, 2011) that appeared to have promise for

capturing commonalities among individuals with PD, as well as differences from individuals without PD

(Morey et al., 2011).

The AMPD represents the efforts of the DSM-5 Personality and Personality Disorders Work Group to integrate these two lines of research. Criterion A in the AMPD was designed to describe personality dysfunction, with contents based on the literature describing what all PDs have in common (Bender et al., 2011). Criterion B was designed to assess maladaptive traits, which turned out to approximate a maladaptive variant of the FFM (Krueger, Derringer, Markon, Watson, & Skodol, 2012). PD assessment was thus based on a two-step process, whereby a clinician would first determine whether the patient met a level of dysfunction that would merit a diagnosis (Criterion A), and if so, would describe the specific form of that dysfunction using the maladaptive trait model (Criterion B).

The contents of Criterion A were based on a literature review of various approaches to assessing personality dysfunction (Bender et al., 2011). This literature suggested that most models converged around the notion that there are two interpenetrating self and interpersonal aspects to personality dysfunction. That is, PD could be defined as problems related to how the self functions in relation to others. Elements of self dysfunction included identity and self-direction. A person with a compromised identity could not maintain equilibrium and a sense of coherence across interpersonal situations, whereas a person with deficits in self-direction could not establish and pursue prosocial goals. Elements of interpersonal dysfunction included intimacy and empathy. A person with intimacy difficulties could not establish close and mutually satisfying relationships, whereas a person with empathy problems would have difficulties seeing things from others' perspective. The idea is that all of these kinds of issues would make it difficult for individuals to adapt to social situations, and thus to the extent that they were sufficiently severe, they would be characterized as having a PD.

Although there is considerable empirical evidence that different trait models converge around the FFM (Markon, Kreuger, & Watson, 2005; Widiger & Simonsen, 2005), the contents of Criterion B did not set out to identify a five factor model. Instead, the work group identified 37 more basic (lower-order) traits that underlie the symptoms in the DSM-IV categories. A questionnaire was constructed to

measure those traits, and in the process of refining that instrument, these 37 traits were reduced to 25

(Krueger et al., 2012). Factor analyses of these highly correlated traits indicated five factors with clear

resemblance to the FFM (Gore & Widiger, 2013; Thomas et al., 2013; Wright & Simms, 2014). However,

unlike the domains of the normal range FFM trait, these maladaptive traits tend to be highly

intercorrelated (Morey et al., 2015; Wright et al., 2012). The premise of the current paper is that these

intercorrelations reflect that all of these traits have considerable saturation of personality dysfunction in

common, meaning that rather than being merely extreme variants of the FFM domains, the Criterion B

maladaptive traits reflect the combination of normal range FFM traits plus Criterion A personality

dysfunction.

Maladaptive traits = normal range traits + personality dysfunction

The notion that maladaptive traits reflect a combination of normal range traits plus personality

dysfunction contrasts with other conceptualizations of the relationships between these constructs. For

example, one view posits that the maladaptive traits may reflect the extreme tails of normal trait

distributions (Haigler & Widiger, 2001; Samuel et al., 2011; Suzuki, Samuel, Pahlen, & Krueger, 2015).   In

these studies, IRT models have been used to show that integrative normal-maladaptive trait models can

be fit, such that items from maladaptive measures tend to have higher threshold parameters than items

from normal range measures, such that the items from the two types of instruments assess the same

construct in different (albeit overlapping) ranges. For example, an agreeableness item from the

International Personality Item Pool NEO is: "I respect others" whereas an antagonism (i.e., low

agreeableness) item from the Personality Inventory for DSM-5 is "I enjoy making people in control look

stupid". The idea is that enjoying making people in control look stupid is an extreme and maladaptive

form of disrespecting others.

Although we would concur that the latter item is more "extreme" than the former, our

perspective postulates that part of this extremity reflects global personality pathology that is not trait

specific. The finding that maladaptive traits tend to be much more strongly correlated with one another than are normal range traits is not consistent with an assumption that the former are simply extreme variants of the latter, because the extremes of linear normal range traits should continue to diverge in multidimensional space as they get farther from the origin. The relatively higher intercorrelations observed in measures of maladaptive trait domains might be explained if indeed these measures share a saturation of core personality dysfunction, a central thesis to be tested in this paper.

A second view that has been discussed in the literature involves the extent to which Criterion A and Criterion B might be redundant. Relevant research has typically examined the incremental validity of Criterion A and B personality features with respect to variables such as DSM-IV/DSM-5 Section II PD diagnoses, or other clinically relevant outcome variables. Some studies find that personality dysfunction provides incremental validity over maladaptive traits for predicting such outcomes (Hopwood, Thomas, Markon, Wright, & Krueger, 2012; Bastiaansen et al., 2016), whereas other studies do not (Anderson & Sellbom, 2016; Few et al., 2013). Because both the A and B criteria of the AMPD include significant maladaptive content, it may not be surprising that the incremental contribution of each is somewhat limited even when present. However, our perspective seeks to address a different question, one involving potential mechanisms that may differentially account for these maladaptive trait variants. Thus, whereas most previous research on the incremental validity of personality dysfunction and maladaptive traits treats maladaptive traits as an independent variable, we instead seek to understand maladaptive traits as a dependent variable. Specifically, we seek to explore the thesis that maladaptive traits reflect a combination of normal range traits and personality dysfunction, components of personality that may differ appreciably in stability and etiology (e.g., Wright, Hopwood, Morey, & Skodol, 2016).

In this study, we tested three hypotheses related to this premise in three distinct samples using different measures of normal and maladaptive traits. First, we hypothesized that measures of

personality dysfunction and normal range traits would explain independent sources of variation in maladaptive traits. This would establish that maladaptive traits capture more than variation in putatively independent normal range personality dimensions, they also share core dysfunctional behaviors related to PD. In these analyses, we also explored the possibility that normal traits and core dysfunctions may interact in their relationship to maladaptive traits--for example, perhaps both extreme levels of a normal trait *and* dysfunction might be necessary to produce maladaptive traits.   Second, we hypothesized that personality dysfunction partially accounts for the relationship between normal range and maladaptive traits. This finding would suggest that some of the observed impact of normal range personality variation on maladaptive trait expression occurs due to personality dysfunction. In other words, not only do certain personality styles lead to certain maladaptive traits, but some of these styles might also be predisposed to a more general dysfunction, and when this dysfunction occurs, it further exacerbates the expression of a maladaptive trait.

Third, we hypothesized that the strong intercorrelations between maladaptive traits reflect their saturation with core personality pathology, and that removing personality dysfunction from maladaptive trait measures will appreciably reduce these intercorrelations, making their structure resemble more closely the normative FFM. While the FFM traits are not orthogonal (Digman, 1997; DeYoung, 2006), their correlations are quite modest relative to those typically observed among measures of maladaptive traits (Wright et al., 2012). We hypothesized that this is because the maladaptive traits share personality dysfunction, which is largely absent from measures of normal range traits. Thus, removing that portion of maladaptive traits attributable to personality dysfunction should add distinctiveness to the multitrait/multimethod matrix (Campbell & Fiske, 1959) of maladaptive and normal range traits.

Method

Participants

Three different samples were included in this study to examine the replicability of findings across different sample characteristics (student vs. general community) and different instruments to assess normative and pathological traits. All participants provided consent prior to participation and this research was approved by the appropriate Institutional Review Board. Preregistration for this study can be found at https://osf.io/ezws9/. These samples included:

Student sample. Student participants included 178 college students recruited from an introductory psychology participant pool who received course credit for participation.   The average age of the sample was 20.8 years (s.d. = 2.4 years); 75% were women, whereas 25% were men.   A majority (61%) of the sample was European-American, with the remainder primarily Latinx (22%), Asian-American (7%), African-American (5%) or other (5%).

mTurk Sample 1. This sample included 307 participants recruited from Amazon MTurk to complete a personality survey in exchange for US $6.   The survey was restricted to nonrepeating US residents (based on ownership of a U.S. bank account and computer IP address) who were at least 18 years of age.   The sample averaged 36.0 years of age (SD = 12.1) and ranged from ages 18 to 70; 46% were women, whereas 54% were men. The sample was 80% white non-Hispanic, 7% African-American, 7% Latinx, and 5% Asian-American.

mTurk Sample 2. This sample included 1008 participants recruited from Amazon MTurk to complete a personality survey in exchange for US $6. The survey was restricted to nonrepeating English-speaking participants who were at least 18 years of age; 93% of participants resided in the US, 4% were from India, and small percentages were from other countries. The sample averaged 35.4 years of age (SD = 11.2) and ranged from ages 18 to 82; 45% were women, whereas 55% were men. The sample was 77% white, 8% black/African-American, 11% Asian, and 4% other races; 8% identified Latinx ethnicity. Associations between the personality traits and dysfunction from this sample were previously reported by Hopwood, Good, and Morey (2018).

Instruments

Level of Personality Functioning Scale-Self Report (LPFS-SR; Morey, 2017). The LPFS-SR was

administered to all participants. Each LPFS-SR item is answered on a 4-point scale ranging from "Totally

False, not at all True" to "Very True". Each item is weighted according to its putative severity within the

LPFS conceptualization. Because the DSM-5 LPFS level 0 indicators imply "little or no impairment"

whereas all other indicators imply some impairment, the items on the LPFS-SR were weighted as

follows: level 0 items are weighted -.5, level 1 ("some impairment") are weighted +.5, level 2

("moderate impairment") weighted +1.5, level 3 ("severe impairment") weighted +2.5, and level 4

("extreme impairment") items are weighted +3.5. As in the DSM-5 AMPD, the LPFS-SR is used in this

study as a single (total) score reflecting a unitary dimension of personality dysfunction.   Internal

consistencies were .932 for the student sample, .959 for mTurk sample 1, and .951 for mTurk sample 2.

International Personality Item Pool-NEO Scales (IPIP: Goldberg, 1999). The IPIP is a set of

personality questionnaire items that is freely available for research; scales from the IPIP have been

developed and studied to assess many different personality constructs. In this study, the 50 items

measuring the Five Factor Model as represented by the NEO (Costa & McCrae, 1992) were used, with 10

item scales measuring each domain of the FFM.   The IPIP-NEO was administered to both the student

sample and to mTurk sample 1 as the measure of the FFM constructs.   Internal consistency estimates

for these samples were: Neuroticism (N, students = .893, mTurk = .920), Extraversion (E, students =

.856, mTurk = .901), Agreeableness (A, students = .673, mTurk = .817), Conscientiousness (C, students =

.812, mTurk = .879) and Openness to Experience (O, students = .769, mTurk = .779).

Big Five Inventory-2 (BFI-2; Soto & John, 2017).   The BFI-2 is a 60-item measure of normal range

FFM personality traits.   The internal consistency of the BFI-2 scales assessing the five normative trait

domains was Neuroticism = .931, Extraversion = .881, Agreeableness = .850, Conscientiousness = .909,

and Open-mindedness = .884.   The BFI-2 was administered to mTurk sample 2.

Personality Inventory for DSM-5 (PID-5: Krueger et al., 2012). The PID-5 is a 220-item self-report

questionnaire developed to assess the five DSM-5 AMPD maladaptive trait domains and their respective

facets. Domain scores for the full PID-5 are calculated as an average of the facet scores included in that

domain. Also available is a 25-item version of the PID-5, the PID-5 Brief Form (PID-5-BF; APA, 2013) that

was developed by extracting core PID-5 items from the five maladaptive trait domains, and assess only

the five domains of the AMPD trait model and not the individual facets. To measure the AMPD

maladaptive trait domains, the PID-5-BF was administered to the student sample, while the full PID-5

was administered to mTurk sample 1. Internal consistency estimates for these samples were: Negative

Affectivity (students = .757, mTurk = .939), Detachment (students = .697, mTurk = .971), Antagonism

(students = .693, mTurk = .959), Disinhibition (students = .814, mTurk = .907), and Psychoticism

(students = .805, mTurk = .962).

Computer Adaptive Test of Personality Disorder (*CAT-PD; Simms et al., 2011*). The CAT-PD is a

212-item self-report measure of 33 maladaptive personality traits. For this study, DSM-5 AMPD

maladaptive trait domain scores for the CAT-PD were created by combining all CAT-PD scales that

demonstrated a minimum factor loading of .40 on pathological trait domain factors derived by Wright

and Simms (2014), who conducted a conjoint EFA of the CAT-PD in combinations with scales from the

NEO and the PID-5. Thus, for example, the Negative Affectivity domain as measured by the CAT-PD

combined scores from the CAT-PD Anger, Affective Lability, Anxiousness, Depressiveness, Mistrust,

Rigidity, Relationship Insecurity, Health Anxiety, Perfectionism, and Anhedonia scales. The internal

consistency of the resulting CAT-PD items assessing the five maladaptive trait domains were: Negative

Affectivity = .963; Detachment = .910; Psychoticism = .899; Antagonism = .959; and Disinhibition = .947.

The CAT-PD was administered to mTurk sample 2.

Personality Assessment Inventory Infrequency scale (PAI-INF; Morey, 2007). The PAI-INF scale is

a response validity scale with questions that are endorsed very infrequently in normative studies. It was

administered to all three samples to detect participants who may have produced data of questionable

quality.

Procedure

For the student sample, all participants completed all tasks in a computer laboratory in private

work cubicles supervised by research assistants. All tasks and all instructions were presented by

computer, with research assistants present primarily to obtain consent and address any questions. For

the two mTurk samples, study questionnaires were completed online at the participants'

convenience. For all three samples, any individuals obtaining a raw score of 9 or above on PAI-INF, the

standard cutoff for a valid protocol in PAI interpretation (Morey, 2007), were excluded from analyses

because of possible inattentiveness in responding. This resulted in the elimination of 1.7% of

participants from the student sample, 5.5% in mTurk sample 1, and 3.6% in mTurk sample 2. The type 1

error rate was set at .01 for all analyses.

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Results

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The first set of analyses sought to examine the contribution of personality dysfunction to each

maladaptive trait, independent of any contribution from the putatively corresponding normal range

trait.   For example, if Detachment (a maladaptive trait) is simply extreme Introversion (a normal range

trait), then there would be little if any independent contribution from a measure of severity of

personality dysfunction. These analyses also sought to examine potential interactions between traits

and personality dysfunction. Significant ($p < .01$) interactions would suggest that normal range traits are

more strongly related to maladaptive traits in the presence of personality dysfunction. Five regression

models were constructed with LPFS-SR score, specific FFM normative trait score, and their interaction

predicting the corresponding DSM-5 Criterion B trait domain measure.

Results of these analyses in the three samples are presented in Table 1. These results indicate

that in nearly every instance, the LPFS provided a significant and independent contribution to the

maladaptive trait domain, above and beyond that provided by the corresponding normal range trait.

The one exception was observed in one of the mTurk samples, where personality dysfunction did not

make a contribution to predicting Disinhibition independent of Conscientiousness. However, in this

particular analysis personality dysfunction did significantly interact with Conscientiousness in predicting

Disinhibition, with the negative beta coefficient indicating that the normative/maladaptive trait

associations were stronger in individuals with greater personality dysfunction (the same trend observed

in any significant interactions that were obtained). It is also important to note that in six instances,

including all three examinations of the Openness/Psychoticism relationship, that the independent

relationship of the LPFS to the maladaptive trait was greater than that between the pathological trait

and the corresponding FFM normative domain.   These results strongly support the contention that the

maladaptive trait domains in the AMPD are best described as combinations of normal range personality

traits and core personality dysfunction.

---Insert Table 1 about here---

The next set of analyses sought to test the hypothesis that, in addition to making an

independent contribution to the prediction of maladaptive trait domain scores, personality dysfunction

would also at least partially account for the relationship between normative and maladaptive traits.

These analyses used an approach described by Dudley, Benuzillo, and Carrico (2004) that implements

the Sobel test for determining the influence of an intervening variable on an outcome, and also provides

an estimate of the percentage of the observed effect between the predictor (here, normative trait) and

outcome variables (maladaptive trait) that is accounted for by a third, potentially intervening variable

(personality dysfunction). We note that although this model resembles typical mediational analyses, we

do not assume mediation in the causal sense, but rather seek to determine the degree to which

variation in maladaptive traits can be understood as a statistical combination of variation in normal

traits and personality dysfunction. These models were constructed for the five trait domains across the

three study samples, with results presented in Table 2. This table includes the Beta coefficient for the

total effect and indirect effect, the Sobel test statistic to test the significance of the intervening variable

of core dysfunction, and the portion of the effect of the normal trait that was accounted for by level of

personality dysfunction.

These results indicate that for Neuroticism, Extraversion, and Agreeableness, a significant ($p <$

.01) percentage of the relationship between the normative trait and the maladaptive trait was

accounted for by level of personality dysfunction across every sample. For Conscientiousness, this effect

was significant for two of the three samples. For Openness, no significant effect upon Psychoticism was

observed in two of the three samples and thus there was no effect to explain; in the third sample, a

modest total effect was observed with little evidence of any impact of core dysfunction. Thus, level of

personality dysfunction appeared to serve as a significant intervening variable in nearly all instances

where a relationship between normal and maladaptive traits was observed, with an average of 21.2% of

the effect accounted for by core dysfunction in these instances.

---Insert Table 2 about here---

The third set of analyses sought to determine whether accounting for level of personality

dysfunction might help to clarify the convergent and discriminant validity of measures of normal and

pathological personality traits. This approach involved examining the multitrait-multimethod (MTMM)

matrices comparing the measures of the five normative FFM traits with the measures of the five

maladaptive trait domains of the AMPD. These matrices were examined with an analysis-of-variance

approach (King, Hunter & Schmidt, 1980; Schmitt & Stults, 1986) that sought to model the observed

variables as combinations of (1) a general factor that underlies all measures of a person across traits and

methods, often described as "person" variance in this approach but here potentially corresponding to a

general level of personality dysfunction; (2) a "trait" dimension on which all measures locate the person

relative to her/his location on the general factor, which here should correspond to the five putatively

common traits; and (3) a "method" factor that estimates the influence of the particular measurement

method; the remainder of observed variances is assumed to be random measurement error. The

procedures described by Schmitt and Stults (1986) to estimate these sources of variance were applied to

two sets of MTMM matrices. The first set involved the zero-order correlations between the measures of

the normative and pathological trait domains; the second set involved correlations between the

normative trait measures with residualized scores for the maladaptive trait measures, with the latter

controlling for the variance associated with level of personality dysfunction (i.e., the LPFS-SR).   In other

words, the goal of this residualization was to determine whether removing the effect of personality

dysfunction would improve the discriminant validity of the pathological trait measures as they related to

normal trait markers of the five factor model.

The monotrait/heteromethod portion of these MTMM matrices are presented in Table 3. The

upper portion of this table, examining zero-order relationships among raw scores, reveals that although

the convergent correlations between the normal range and maladaptive trait domains tended to be

moderate to large, discriminant validity was poor across all three samples. For example, in the zero-

order associations, correlations between conceptually unrelated traits often exceeded .50 (e.g.

Extroversion with Disinhibition, Neuroticism with Detachment, Psychoticism, and/or Disinbition). By

comparison, although the convergent validity correlations with the residualized pathological trait scores

in the lower part of Table 3 tended to be lower, the discriminant validity of these relationships appeared

to be much more specific, with a majority of these off-diagonal associations below .20.

Table 4, which presents the percent of variance in these matrices accounted for by person, trait,

and method factors, underscores this point. In examining zero-order relationships between the

normative and maladaptive traits, only half of the explained variance in these matrices is attributable to

trait factors, with the other half largely explained by a general person factor that is related to all five traits. However, if the contribution of general personality dysfunction as measured by the LPFS-SR is removed from the maladaptive trait scores, most of the general person factor is removed from these relationships. The percent of variance explained by trait factors increases in all three data sets after level of personality dysfunction is controlled for, and the percent of explained variance in these matrices that is due to traits increases to roughly 70%. Thus, although the zero-order MTMM relationships show problematic discriminant validity, particularly for the pathological trait measures, this appears to stem from the fact that the maladaptive trait measures have an appreciable saturation of general personality dysfunction, and removing the contribution of this variable from these relationships results in a much more specific portrayal of the relationships between normative and maladaptive traits.

---Insert Tables 3 and 4 about here---

Discussion

The current study aimed to clarify the nature of the relationship between normal range personality traits such as those in the FFM, maladaptive traits such as those described in Criterion B of the AMPD, and core personality dysfunction common to PD as reflected in Criterion A of the AMPD. Concerns have been expressed about the overlap of personality dysfunction and maladaptive traits, which might be viewed as creating redundancy in the AMPD (e.g., Oltmanns & Widiger, 2017). Some findings (e.g., Anderson & Sellbom, 2016) have noted that the Criterion A features provide little incremental explanatory power over pathological traits in describing DSM-IV PD diagnoses, leading these authors to suggest that their results "call into question the utility of the measurement of impairment as a necessary component in assessing and diagnosing PDs" (Anderson & Sellbom, p. 10). However, our approach posits, and our results support, the contention that impairment in personality functioning provides a critical link between normal range and maladaptive traits.

One appealing feature of the AMPD maladaptive trait model lies in its potential to bridge

diagnostic nosology with decades of work investigating the structure of personality traits (Krueger &

Markon, 2014), particularly in its potential links to the FFM structure that have been the focus of

extensive research in the field of personality and individual differences (Widiger & Costa, 2012). Such

links have been supported in cross-sectional, correlational studies; for example, a number of joint factor

analyses have demonstrated connections between various instruments intended to operationalize

maladaptive traits and instruments assessing the normative FFM of personality. These studies have been

conducted with the NEO-PI-3 and the PID-5 (De Fruyt et al., 2013; Gore & Widiger, 2013), the PID-5 and

the Five Factor Model Rating Form (Thomas et al., 2013); and the NEO-PI-3, the PID-5, and the CAT-PD

(Wright & Simms, 2013).   Such findings have led investigators to draw conclusions that "the DSM-5

personality trait model can be well understood as a maladaptive extension of the five-factor model of

personality (FFM)" (Krueger & Markon, 2014, p. 489).

However, a number of consistent research findings suggest that this conceptualization is

incomplete. First, the intercorrelations between maladaptive trait domains tend to be much larger than

those observed between the domains of normal trait measures (Wright et al., 2012), counter to what

should be expected if these are extremes of independent continua.   Second, although there is an

extensive literature relating normal trait measures to traditional PD categories (e.g., O'Connor, 2005;

Saulsman & Page, 2004), longitudinal data consistently suggests that these traits tend to be appreciably

more stable than the PD phenomena to which they have been linked (Morey et al., 2012; Morey &

Hopwood, 2013). Third, data indicate that a single dimension characterizing PD phenomena can often

explain a large percentage of the variance in important clinical outcomes (Hopwood et al., 2011; Tyrer et

al., 2005; Wright et al., 2016). Each of these findings runs counter to the assumption that the

maladaptive manifestations of personality can be understood solely as extreme extensions of five

normal range personality traits, instead suggesting that the nature of the relationship is more complex.

Krueger and Eaton (2010) described some of these issues, noting that "the domain-level resemblance

between the two models is not isomorphic in every respect" and that this imperfect mapping

constitutes an important topic for continued research.

These results explore some of the factors contributing to this imperfect mapping by clarifying

the contributions of general vs. specific features that tend to be confounded in AMPD trait model. First,

core personality dysfunction is related to maladaptive traits independent of their association with

normal traits, nearly always as a main effect and in some instances as an interaction. From the

perspective of this result, research demonstrating that measures of maladaptive traits and personality

dysfunction overlap should be interpreted as suggesting that maladaptive traits include personality

dysfunction. The independent examination of dysfunction provides an explanation as to why these

different maladaptive trait domains tend to be highly related, and provides a potential tool for the

researcher or clinician to distinguish trait from dysfunction, or severity from style of personality

problems (Hopwood et al., 2011; Pincus, 2005). The multitrait/multimethod analyses presented here

demonstrate that accounting for dysfunction improves the specific correspondence between the

normative and maladaptive trait measures, increasing the amount of variance explained by the traits

relative to method or severity factors. Finally, it also appears that even part of the relationship between

specific normal range and pathological traits is accounted for by general personality dysfunction,

suggesting that there is some general propensity toward maladaptive expression of these traits that is

shared across these conceptually distinct individual differences.

Although our findings are consistent with other research demonstrating that there is a degree of

cross-sectional redundancy in the indicators of Criterion A and B within the AMPD, it should be noted

that longitudinal data suggests the potential importance of distinguishing between shared dysfunctions

and stylistic differences in their manifestations, in order to better understand processes of change over

time (Hopwood et al., 2011; Wright et al., 2016). Wright et al. (2016), for example, note that the shared

general component of PD demonstrated considerably different patterns of absolute and differential

change over 10 years than did specific factors of PD. Other studies (Gunderson et al., 2011; Zanarini,

Frankenburg, Reich, & Fitzmaurice, 2012; Lenzenweger, 2006; Cohen, Crawford, Johnson, & Kasen.

2005) consistently demonstrate that despite clear cross-sectional relationships between personality

traits and symptomatic PD impairment, the latter tends to be appreciably less stable over time than the

former (Morey & Hopwood, 2013). Given such findings, an approach that disentangles general and trait

factors (as was demonstrated in the MTMM analyses presented here) could permit investigations into

potentially different etiological mechanisms underlying these processes. As one example, the consistent

findings around the heritability of personality traits (e.g., Krueger, South, Johnson, & Iacono, 2008)

might appear somewhat at odds with the limited stability of PD features (e.g., Gunderson et al., 2011),

but a separate consideration of personality dysfunction and personality traits provides a potential model

by which dynamic gene-environment interplay might be explored. An approach focusing exclusively on

maladaptive traits thus can serve to have strong utility as a predictive model with respect to important

clinical outcomes (e.g., Morey et al., 2012), but it may be less useful as an explanatory model with

respect to links to potentially different etiological mechanisms.

We would further note that assessing the maladaptive aspects of personality primarily in the

form of personality dysfunction would free up traits to capture both tails of a personality dimension. A

significant difference between most normal range and maladaptive trait measures is that the former

tend to be bipolar whereas the latter tend to be unipolar. From the perspective of our results, it would

be very difficult to fit a multivariate model with maladaptive personality dimensions, because the tails of

the dimensions in such a model would tend to collapse on one another, insofar as they all share

personality dysfunction. Indeed, previous research has shown that maladaptive bipolar trait data are too

complex to fit well to a five-factor model (Crego, Oltmanns, & Widiger, 2019). In contrast, bipolar

normal range-trait scales often fit five-factor models reasonably well.

Normal range trait models have a number of advantages, including closer continuity with basic personality research in personality psychology. The use of traits that are universal (e.g., the FFM) vs. pathological (e.g., AMPD Criterion B) may also permit the delineation of adaptive strengths that can have a moderating role on general impairments in predicting important outcomes and course (e.g., Cain et al., 2012; Thomas et al., 2014; Wildes et al., 2011; Wright et al., 2013) and that may serve important roles for tailoring effective treatment. A model in which personality dysfunction were assessed separately from normal range individual differences in personality expression would reduce the overlap problems characteristic of the AMPD, while retaining its predictive power (Morey et al., 2007) and providing a clearer framework for distinguishing personality severity from style in clinical formulations (Hopwood et al., 2011). In fact, it would be ideal to attempt to remove personality dysfunction from normal range traits as well, given that results using different samples and research designs (Bäckström, Björklund, & Larsson, 2009; Bleidorn et al., in press; Leising et al., 2018) consistently suggest that there is non-specific dysfunction in existing normal-range personality trait measures, albeit far less than in maladaptive trait measures.

In summary, we believe that the results presented here point the way towards an evidence-based and clinically useful assessment model that explicitly distinguishes global personality dysfunction from the stylistic expression of universal personality traits. We have reviewed some of its advantages for exploring the etiology of personality pathology, understanding differential patterns of stability in personality features, reducing the overlap of AMPD A and B criteria, enhancing the discriminant validity of traits, tying PD diagnosis more closely to basic personality research, and capturing personality strengths in addition to weaknesses. These results have important implications for potential revisions to the AMPD towards an evidence-based and clinically useful assessment model capable of distinguishing critical features of the person (i.e., normal range traits) from the person's problems (i.e., severity of personality pathology). More generally, further work should continue to examine assessment models for

personality pathology that distinguish personality pathology from personality style in terms of etiology,

stability, and clinical application.

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Table 1. Independent contributions of normative traits and personality dysfunction in predicting

maladaptive trait domain scores.

Sample	Predictor	Neuroticism -> Negative Affectivity	Extroversion -> Detachment	Openness -> Psychoticism	Agreeableness -> Antagonism	Conscientiousness -> Disinhibition
Student Sample	FFM Trait	.59*	-.27*	.14	-.34*	-.50*
	LPFS	.25*	.51*	.60*	.36*	.20*
	Interaction	-.02	.04	.11	-.09	-.10
mTurk Sample 1	FFM Trait	.60*	-.41*	.14*	-.29*	.64*
	LPFS	.27*	.60*	.67*	.18*	.02
	Interaction	-.02	-.03	.060	-.01	-.12*
mTurk Sample 2	FFM Trait	.64*	-.72*	.25*	-.47*	-.63*
	LPFS	.36*	.23*	.73*	.28*	.31*
	Interaction	.02	-.05*	.02	-.05	-.05

Note: Values reflect beta weights for normal trait, dysfunction, and their interaction in predicting maladaptive traits. * p < .01

Table 2. Tests of indirect effects of normal/maladaptive trait relations by level of personality dysfunction.

Sample	Normal Trait	Normal Trait -> Pathological Trait			
		Total effect	Indirect effect	Sobel test	% effect accounted for by dysfunction
Student Sample	Neuroticism	.73*	.14*	3.69*	20.19
	Extraversion	-.37*	-.10*	-2.71*	27.97
	Openness	.16*	.01	0.11	3.26
	Agreeableness	-.52*	-.17*	-4.32*	33.30
	Conscientiousness	-.64*	-.12*	-3.12*	18.62
mTurk Sample 1	Neuroticism	.77*	.16*	5.22*	22.90
	Extraversion	-.67*	-.16*	7.40*	38.70
	Openness	.016	---	---	---
	Agreeableness	-.39*	-.09*	2.82*	25.00
	Conscientiousness	-.70*	-.02	0.86	3.10
mTurk Sample 2	Neuroticism	.86*	.22*	15.92*	26.11
	Extraversion	-.81*	-.09*	-8.81*	11.54
	Openness	.01	---	---	---
	Agreeableness	-.62*	-.15*	-9.15*	24.91
	Conscientiousness	-.80*	-.16*	11.44*	20.41

Note: Values reflect beta coefficients for normal traits predicting pathological traits, before and after account for partial effects of dysfunction. * p < .01

Table 3. Multitrait-multimethod matrices for normative and maladaptive trait measures, zero-order and residualized for level of personality dysfunction.

sample	Normal trait	Maladaptive trait				
		Negative Affect	Detachment	Psychoticism	Antagonism	Disinhibition
Raw Scores						
Student	N	**.74**	.29	.38	.37	.30
	E	-.01	**.38**	.08	-.08	-.12
	O	.11	.07	**.16**	-.02	.01
	A	.30	.40	.35	**.52**	.33
	C	.33	.37	.51	.41	**.64**
mTurk 1	N	**.77**	.65	.43	.11	.24
	E	.38	**.67**	.28	-.23	.10
	O	-.11	-.21	**.02**	-.01	-.07
	A	.36	.63	.40	**.39**	.24
	C	.40	.50	.42	.13	**.70**
mTurk 2	N	**.86**	.58	.51	.23	.70
	E	.47	**.82**	.24	-.13	.60
	O	-.22	-.29	**.01**	-.17	-.31
	A	.58	.43	.41	**.62**	.40
	C	.50	.43	.48	.35	**.80**
Residualized Scores						
Student	N	**.47**	-.05	.03	.05	.00
	E	-.17	**.31**	-.06	-.23	-.26
	O	.14	.07	**.19**	-.02	.00
	A	.02	.17	.08	**.32**	.12
	C	.02	.09	.24	.15	**.43**
mTurk 1	N	**.44**	.21	.01	-.13	-.02
	E	.13	**.54**	.01	-.41	-.07
	O	.03	-.09	**.18**	.06	.00
	A	.02	.33	.07	**.23**	.03
	C	.08	.16	.13	-.05	**.54**
mTurk 2	N	**.61**	.30	.16	-.14	.40
	E	.27	**.71**	-.01	-.42	.47
	O	.06	-.15	**.30**	.02	-.13
	A	.26	.18	.08	**.40**	.07
	C	.18	.21	.20	.08	**.63**

Note. N = Neuroticism, E = Extraversion, O = Openness to Experience, A = Agreeableness, and C = Conscientiousness. E, A, and C were reverse scored for these analyses so that convergent correlations would be positive.

Table 4. Analysis of variance partitioning of MTMM matrices for normative and pathological trait measures.

	Source of Variance	Sample		
		Student	mTurk 1	mTurk 2
Raw Scores	Person	21.8%	23.1%	29.0%
	Method	7.6%	5.5%	2.5%
	Trait	26.8%	27.9%	33.3%
% explained variance due to trait		47.6%	49.5%	51.4%
Residualized Scores	Person	1.9%	2.6%	10.4%
	Method	14.9%	12.7%	5.6%
	Trait	32.6%	36.1%	42.3%
% explained variance due to trait		66.0%	70.2%	72.5%