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**Associations between Lower Order Facets of Personality and
Dimensions of Mental Disorder**

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Abstract

Although there is a plethora of research documenting the relations between broad personality traits and psychopathology, there is decidedly less on the relations between lower order facets and psychopathology. In the current study, we explored the associations between lower order personality traits and dimensions of mental disorder. A combined sample of undergraduates and outpatients completed self-reports of personality and mental disorder. Symptom counts of mental disorders were factor analyzed, and a higher order three-factor solution emerged. One factor was substance use disorder (SUD), and internalizing branched into distress and fear. These dimensions were regressed on facets from the Big Five model of personality. SUD was significantly predicted by high excitement-seeking from the extraversion domain and low self-discipline from conscientiousness. Distress and fear were indistinguishable from one another but showed a different pattern of relations from SUD. High anxiety and depression from neuroticism, low gregariousness from extraversion, high aesthetics and low actions from openness, low trust and high tender-mindedness from agreeableness, and low self-discipline from conscientiousness significantly predicted distress and fear. The findings demonstrate that lower order traits within a single domain have complex relations with psychopathology, which are shrouded when examining broad, higher order traits. Assessment and treatment implications are discussed.

The link between psychopathology and personality has long been discussed, dating back to ancient Greece and Hippocrates' discussion of the four humors. Contemporary psychologists continue to explore this association, benefiting from modern classification systems of mental illness, such as the *Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5)*; American Psychiatric Association, 2013) and the *International Classification of Diseases-10 (ICD-10)*; World Health Organization, 1992), and reliable and valid taxonomies of personality, such as the Big Five (McCrae & Costa, 2003). There is consensus that personality is hierarchically structured with broad traits subsuming more narrow traits, often referred to as facets (Markon, Krueger, & Watson, 2005). Costa and McCrae's (1995) Big Five model, for example, includes six facets within each of the five domains. For instance, neuroticism subsumes the facets of anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability. Whereas broad traits have the advantage of summarizing large amounts of information, facets allow for more nuanced description of personality while often allowing for increased predictive capability (Paunonen & Ashton, 2001; though, there are exceptions to this, cf. Morey et al., 2012). The objective of the current study was to explore whether and how these facets relate to dimensions of mental disorders.

Specific Mental Disorders and their Associations with Big Five Domains and Facets

There is a plethora of research documenting the relations between psychopathology and broad personality traits. Kotov and colleagues (Kotov, Gamez, Schmidt, & Watson, 2010) provided a comprehensive meta-analysis to summarize associations between mental disorders and broad personality traits, including the Big Five and the trait of disinhibition. Neuroticism had the strongest associations with psychopathology; these were positive for all disorders, and all were large and significantly different from zero. Conscientiousness and extraversion followed,

and these traits were negatively related to all disorders. Disinhibition better distinguished the disorders, with substance use disorders showing uniformly strong and positive relations whereas other disorders showed positive though weaker, near-zero, or negative relations. Links with agreeableness and openness were small for the most part.

Although the links between broad personality traits and specific mental disorders are well established, less attention has been paid to the links between more specific lower order traits and mental disorders. Ruiz and colleagues (2008) provided a meta-analysis of Big Five characteristics of two externalizing disorders, antisocial personality disorders and substance use disorder, and a subset of the studies included NEO PI-R (Costa & McCrae, 1992) facet-level information. Regarding antisocial personality disorder, the average effect sizes were uniformly strong and negative for the agreeableness and conscientiousness facets. The average effect sizes for the facets of neuroticism varied more; one was not significantly different from zero (anxiety), some ranged from .05 to .12 (depression, self-consciousness, and vulnerability), and others were much larger, ranging from .27 to .30 (hostility and impulsiveness). Although all of the extraversion facets were significantly different from zero, only the effect size for excitement-seeking was sizeable (.30), and the remaining effect sizes ranged from -.11 to .08. Assertiveness and activity had positive effect sizes, whereas the remaining facets had negative effect sizes. The pattern of effect sizes between the facets and substance use disorders had many similarities to the pattern observed for antisocial personality disorder. The average effect sizes were uniformly strong and negative for conscientiousness. Two agreeableness facets (modesty and tender-mindedness) were positive though small, whereas the remaining four were strong and negative. The extraversion facets again showed a wide array of associations, with only one positive (excitement-seeking) and the rest ranging from -.05 to -.23. Unlike antisocial personality

disorder, for which some neuroticism effect sizes were not significant or substantive, all facets were positively and strongly related to substance use disorders.

In addition to externalizing disorders, there is some research examining the associations between personality trait facets and mood and anxiety disorders. In a community sample, Naragon-Gainey and Watson (2014) reported the zero-order correlations between self-reported depression scores and Big Five facets derived from factor analysis. All neuroticism facets were significantly and positively correlated with depression, and all openness facets were near zero, but there was inconsistency within the remaining domains. Of the three agreeableness facets, one was positive whereas two were negative. All extraversion and conscientiousness facets' correlations were negative, though only positive emotionality (extraversion) and deliberation (conscientiousness) exceeded $-.20$. In an earlier study including students and psychiatric patients, which related depression and anxiety with only extraversion facets derived from factor analysis, Naragon-Gainey, Watson, and Markon (2009) found stronger correlations, all of which were negative and ranged from $-.20$ to $-.61$. Naragon-Gainey and Watson (2014) also fit regression models predicting depression from Big Five facets. Their findings indicated that some, but not all, facets within a single domain were significant predictors of depression. The significant facets were anger from the neuroticism domain, positive emotionality from extraversion, conventionality from conscientiousness, and culture from openness.

Naragon-Gainey and colleagues (Naragon-Gainey & Watson, 2014; Naragon-Gainey et al., 2009) studied facets derived from their factor analyses, but many researchers have relied on facets from the NEO PI-R (Costa & McCrae, 1992) of which there are 30 total, six for each of the five domains. In a sample of university students, neuroticism, extraversion, and openness facets were entered into a regression model to predict self-reported depressive symptoms

(Chioqueta & Stiles, 2005). Angry hostility and depression (neuroticism) positively predicted depressive symptoms, and positive emotions (extraversion) and actions (openness) negatively predicted them. In a combined sample of outpatients diagnosed with either bipolar disorder or unipolar depression (Bagby et al., 1996), the neuroticism facets of anxiety and self-consciousness had significant positive correlations with self-reported depression, whereas the openness facet of actions and the extraversion facet of excitement-seeking had significant negative correlations (refer to Bagby et al. for some differences between unipolar and bipolar patients).

In addition to correlational studies like those just described, facet scores in individuals with specific diagnoses have been compared with those with no diagnoses or with normative data (Bienvenu et al., 2004; Costa, Bagby, Herbst & McCrae, 2005; Rector, Hood, Richter, & Bagby, 2002). Community and outpatient samples with one of several anxiety and depressive disorder diagnoses scored particularly high on all neuroticism facets, most notably depression and vulnerability. Individuals with diagnoses tended to score lower on several extraversion and conscientiousness facets, particularly warmth, positive emotions, and gregariousness, and self-discipline and competence, respectively. Generally, few differences were observed for agreeableness or openness facets (Bienvenu et al., 2004; Rector et al., 2002), though Costa and colleagues (2005) reported relatively low trust and altruism but high modesty in their sample of depressed outpatients.

A key conclusion one can draw from these findings is that examination of broad traits disguises many important facet-level personality-psychopathology associations. For example, if you consider extraversion and its relation with antisocial personality disorder, the average effect size is a negligible .06 (Ruiz et al., 2008). However, one facet, warmth, has a small negative

effect size (-.11), and one facet, excitement-seeking has a moderate positive effect size (.30), which is among the strongest effects observed across all domains and facets in Ruiz and colleagues' meta-analysis. Across all studies reviewed here, not all facets within a single domain have consistent associations with a given mental disorder.

Although this general point is clear, there is still a dearth of research on the facets' (vs. broad traits') associations with mental disorders. Moreover, all studies reviewed here examined just one or two specific mental disorders, and if more than one disorder was examined, they often fell within the same spectrum of disorder. In the current study, not only did we assess multiple disorders, but we considered them as part of spectra of disorders.

Mental Disorder Dimensions and their Associations with Big Five Domains and Facets

For decades, dimensional models of psychopathology have been considered and have gained increasing empirical support (in contrast to the categorical classification system of the *DSM*, for example; Kotov et al., 2017). Two dimensions of internalizing and externalizing have long been discussed in the child literature (Achenbach & Edelbrock, 1978), and there is evidence that this two-factor structure persists into adulthood (Krueger, Caspi, Moffitt, & Silva, 1998). The internalizing factor accounts for comorbidity in mood and anxiety disorders characterized by negative emotion, whereas the externalizing factor accounts for comorbidity in disorders for which disinhibition is a hallmark, such as substance use disorders and antisocial personality disorder. Further attempts to delineate the structure of mental disorder suggest the internalizing factor has two subfactors, fear and distress (Watson, 2005). Fear encompasses disorders such as panic disorder and phobias, and distress encompasses major depression, dysthymia, and generalized anxiety disorder (Krueger, 1999; Krueger & Markon, 2006). These studies focused on common mental disorders, but more recent efforts have been made to place less common

disorders, such as eating disorders, into this dimensional framework (Forbush et al., 2010; Forbush & Watson, 2013) or expand the classification to include additional dimensions, such as a thought disorder dimension (Kotov et al., 2011a; Kotov et al., 2011b; Wright et al., 2013).

Broad personality traits have been linked to these dimensions of mental disorder. In addition to examining associations between specific disorders and broad traits, Kotov and colleagues examined the personality profiles of clusters of disorders. The fear and distress profiles were parallel, with distress showing slightly elevated scores on all traits but openness. The externalizing profile was decidedly distinct. The extraversion and neuroticism scores were lower than for fear and distress, but most notably, the disinhibition and (low) agreeableness scores were considerably elevated. Connections among the trait of disinhibition and substance use disorders, antisocial behavior, and even childhood disruptive disorders are commonly noted, and it has been argued that a common genetic liability can account for these associations (Iacono, Malone, & McGue, 2008; Krueger et al. 2002). To our knowledge, there is no research detailing the associations between dimensions of mental disorder and lower order personality traits, specifically from the Big Five model.

The Current Study

Our objective was to examine the associations between Big Five facets measured with the NEO PI-R and dimensions of mental disorder including a substance use disorder factor (SUD) and two subfactors of internalizing, fear and distress. Although this effort was largely exploratory, our review of prior research offered some hypotheses regarding the associations we expected to find.

We expected that SUD would be negatively related to most or all facets of conscientiousness and agreeableness. SUD was expected to be positively related to all

neuroticism facets, with particularly high relations with impulsiveness and angry hostility.

Associations between SUD and extraversion facets were expected to be more complex with no significant associations for most facets but a significant negative association with warmth and a significant positive association with excitement-seeking. No strong associations with openness facets were expected.

Distress was expected to be positively associated with all neuroticism facets, particularly depression. Less robust findings were expected for the other four personality domains. The following associations were expected: from extraversion, low positive emotions and gregariousness; from agreeableness, low trust; from conscientiousness, low self-discipline and competence. No strong associations with openness facets were expected.

Fear was also expected to be positively associated with all neuroticism facets. From the domains of extraversion and conscientiousness, low positive emotions and low self-discipline, respectively, were anticipated. No relations between fear and openness or agreeableness facets were expected.

Method

Participants

The data were collected as part of a larger study of personality and psychopathology. See Samar, Walton, and McDermut (2013) for additional details. The study was approved by the Institutional Review Board at the authors' university, and all participants provided written informed consent prior to their involvement.

Two samples were combined for the analyses to yield a total sample size of 240. The first sample ($n = 127$; 88 females; age $M = 19.5$, $SD = 4.8$, range 17-23 years, with three

nontraditional students aged 41-54) consisted of undergraduate students recruited through the Psychology Department participant pool who completed the study to fulfill a course requirement. The second sample ($n = 113$; 70 females; age $M = 36.0$, $SD = 13.0$, range 18-64 years) consisted of individuals who had previously been receiving or were currently receiving psychotherapy or outpatient treatment. They were recruited primarily through internet postings, but also through letters sent to clinicians at outpatient treatment agencies and word of mouth. We combined the samples to achieve a greater range of responses, particularly for our assessment of psychopathology, as a restricted range can hinder one's ability to detect associations among variables. The age range of combined sample was 17-64 years ($M = 27.2$, $SD = 12.6$), and 158 were female. Their self-reported race was: 37.1% White/non-Hispanic, 20.8% Black/African American, 15.8% Hispanic/Latino. The remainder selected a different race or "other." One individual was missing age and sex information, and three were missing race information.

Measures

Participants completed the Psychiatric Diagnostic Screening Questionnaire (PDSQ), a self-report measure designed to screen for 13 common *DSM-IV* Axis I disorders, including major depressive disorder, bulimia, posttraumatic stress disorder, panic disorder, agoraphobia, social phobia, generalized anxiety disorder, obsessive-compulsive disorder, alcohol abuse/dependence, drug abuse/dependence, somatization, hypochondriasis, and psychosis (Zimmerman & Mattia, 2001a, 2001b). Bulimia, somatization, hypochondriasis, and psychosis were excluded from analyses because it is not yet understood whether and how they fit into the two-factor internalizing-externalizing structure, and examining this was not our objective. The PDSQ consists of 125 true/false items. Items were standardized within each sample then the samples were merged before calculating Cronbach's alpha. In the combined sample, the nine scales used

in the current study all had high levels of internal consistency with Cronbach's alphas ranging from .77 to .90. The items assessing each disorder were summed, and these counts were used in the subsequent analyses. Although it might be advantageous to examine raw symptoms (Markon, 2010; Wright et al., 2013), our modest sample size did not allow us to do this as our ratio of people to items would be too low (240:99).

Participants also completed the NEO Personality Inventory-Revised (NEO PI-R), a widely used measure of the Big Five personality domains and their facets (Costa & McCrae, 1992). Each domain consists of six facets, yielding 240 total 5-point Likert items. Items were standardized within each sample then the samples were merged before calculating Cronbach's alpha. In the combined sample, 17 facet scales reached an acceptable level of internal consistency (Cronbach's alpha greater than .70), six had estimates in the .60-.69 range (self-consciousness, excitement-seeking, feelings, straightforwardness, compliance, and competence), and seven had estimates in the .44-.59 range (impulsiveness, activity, actions, values, tender-mindedness, order, and dutifulness). These values are comparable to those typically found (Costa & McCrae, 1992). Results involving the 13 scales with inadequate reliability should be interpreted with caution.

Analyses and Results

Descriptive Statistics and Group Differences

Means and standard deviations for the two samples on the Big Five and the PDSQ total score (i.e., the sum of the nine scales used in the current study), as well as tests for group differences, can be found in Table 1. In the interest of brevity, tests on all 30 NEO PI-R facets and all PDSQ scales are not presented. The two samples differed significantly on neuroticism,

extraversion, openness, and the PDSQ total score, and the effect sizes for these significant differences (Cohen's d) ranged from .43 to .61. Given that the two groups differed significantly on several scales, we standardized scale scores within each sample before merging the samples and conducting the subsequent analyses.

Factor Structure of Mental Disorders

We first fit a confirmatory factor model to the disorders with three factors. The three factors were SUD (alcohol and drug abuse/dependence), distress (major depressive disorder, generalized anxiety disorder, and posttraumatic stress disorder), and fear (panic disorder, social phobia, agoraphobia, and obsessive-compulsive disorder) with distress and fear loading onto a higher order internalizing factor. This model fit the data well (CFI = .97, TLI = .96, RMSEA = .05). This model fit marginally better than a two-factor internalizing-SUD model (CFI = .95, TLI = .94, RMSEA = .06; BIC = 5660.24 for two-factor model vs. 5655.11 for three-factor model). Given that this three-factor model has support in the literature and in our current data, and that we were interested in determining whether the fear and distress factors are distinguishable from one another in terms of their associations with personality traits, we used the factor scores derived from this model in the regression models discussed below.

Associations between Mental Disorders and Personality

Correlations between mental disorder dimensions and the Big Five. In addition to examining associations between mental disorder dimensions and Big Five facets, we wanted to examine the extent to which our data replicated findings reported in the literature concerning domain-level associations. To this end, we correlated the mental disorder factor scores with the Big Five (see Table 2). All dimensions were positively associated with neuroticism and

negatively with conscientiousness. Fear and distress were also significantly related to low extraversion. Although the direction of our observed effects was the same as what has been reported in prior literature (see Kotov et al., 2010), in some cases, the magnitude differed. For example, in our study, the correlation between distress and conscientiousness only reached $-.18$, which is lower than the average correlation Kotov and colleagues reported ($r = -.31$; major depressive disorder, generalized anxiety disorder, and posttraumatic stress disorder averaged). Likewise, Kotov and colleagues reported an average correlation of $-.38$ between conscientiousness and SUD (alcohol and drugs averaged), whereas our correlation only reached $-.20$. There are a few other instances in which our observed correlation exceeded (e.g., the correlation between neuroticism and fear) or did not reach (e.g., the correlation between agreeableness and SUD) the effects reported in prior literature. Despite some differences in magnitude, the direction of effect was uniformly consistent with prior literature.

Correlations between disorder symptom counts and Big Five facets. We next turned our attention to the Big Five facets and their connections with specific disorders and dimensions of disorders. Disorders within a common spectrum, such as alcohol and drug use problems, have been shown to have distinguishable connections with personality traits (McGue, Slutske, & Iacono, 1999), and the extent to which examining broad disorder dimensions can obscure important relations (as can be the case when examining broad trait dimensions) remains unclear. Thus, we examined the correlations between the facets and disorder symptom counts (Table 2). For the most part, the pattern of correlations within a dimension (i.e., distress, fear, and SUD) was consistent in terms of size and direction. There were a few exceptions worth noting. Though the direction was always the same, relative to other distress disorders, posttraumatic stress disorder had smaller correlations with the neuroticism facets, and major depressive disorder

tended to have larger correlations with the conscientiousness facets. Compared with the other fear disorders, social phobia had stronger associations with some extraversion facets, including warmth, assertiveness, and positive emotions. Whereas the fear disorders had positive (though not significantly different from zero) correlations with activity, social phobia had a significant negative correlation. On average, obsessive-compulsive disorder had smaller correlations with neuroticism facets, the most notable of which was anxiety. Finally, drug abuse/dependence had larger correlations with agreeableness facets than alcohol abuse/dependence. Given the strong similarity in the pattern of correlations within each dimension, and given that any differences were few in number and trivial in magnitude (e.g., posttraumatic stress disorder's deviation was among the largest, and it amounted to a difference of approximately 10% of variance explained), we proceeded to examine the mental disorder factors' associations with facets.

Associations between mental disorder dimensions and Big Five facets. Zero-order correlations between the facets and the three dimensions of mental disorder can be found in Table 2. Distress and fear were virtually indistinguishable in terms of their correlations with the facets. All three dimensions had uniformly positive correlations with neuroticism facets. They were also similarly negatively related to warmth, gregariousness, trust, order, self-discipline, and deliberation. SUD differed from distress and fear in some important ways. SUD was positively associated with excitement-seeking and negatively associated with straightforwardness, dutifulness, and achievement striving. Distress and fear were positively associated with tender-mindedness, aesthetics, and feelings, and negatively associated with actions.

The Big Five facet scores were regressed on SUD, distress, and fear factor scores to control for overlap between facets within a domain. We fit five regression models per outcome variable to reduce the number of predictors in a single model and to reduce the impact of

correlations between facets across different domains. Correlations among the higher order traits have been noted and handled in previous research (Kotov et al., 2010; Rector et al., 2002), and in the current study, we found that the facets have an average correlation (absolute value) of .16 with facets outside their domain. All statistics from the regression models can be found in Table 3.¹

Few facets were significant predictors of SUD. SUD was significantly predicted by high excitement-seeking from the domain of extraversion and low self-discipline from conscientiousness. Distress and fear were significantly predicted by the same facets with just one exception. Both dimensions were predicted by high anxiety and depression from neuroticism, low gregariousness from extraversion, high aesthetics and low actions from openness, low trust and high tender-mindedness from agreeableness, and low self-discipline from conscientiousness. Openness's feelings facet also negatively predicted distress.

It should be noted that although some facets were significant predictors of the mental disorder dimensions, all semi-partial correlations were fairly small (see Table 3). This is not surprising given the high degree of association among facets within a Big Five domain. In addition, in most cases a small portion of the variance in the dimensions can be accounted for by the facets. In some instances, though, close to one-third of the variance in a mental disorder dimension could be explained by the personality facets.

Controlling for Item-Symptom Overlap

We wanted to ensure that any observed associations were not solely the result of NEO PI-R item overlap with PDSQ symptoms. We carefully compared the content of the two measures and identified any item-symptom pairs that overlapped substantially in content. We identified ten

PDSQ symptoms that overlapped with at least one NEO PI-R item. The disorders and their number of overlapping symptoms were: obsessive-compulsive disorder, 1; social phobia, 1; major depressive disorder, 4; generalized anxiety disorder, 4. Eight of these symptoms were from the distress factor, more than 17% of the 46 total symptoms. Not surprisingly, most of the overlap occurred with the depression and anxiety facets of neuroticism. We removed the overlapping PDSQ symptoms, recalculated the distress factor scores, and refit the regression model, regressing distress on the neuroticism facets. No new significant associations appeared, and the anxiety and depression facets were still significant predictors of distress, thus we conclude that the associations we observed were not solely due to content overlap.

Discussion

With the current study, we extended the literature by offering the first examination of the Big Five facets' associations with domains of mental disorder, specifically, SUD, distress, and fear. Although a tremendous amount of research has identified the connections among broad personality traits and specific mental disorder diagnoses, considerably less has examined the connections among specific lower order personality traits and mental disorders, and no research has examined the connection between specific lower order personality traits from the Big Five model and dimensions of mental disorder, which is important given that increased emphasis is being placed on a dimensional classification system (American Psychiatric Association, 2013).

Our hypotheses concerning the facets' associations with SUD were largely supported with some slight exceptions, namely the associations with the agreeableness and conscientiousness facets, which were in the expected negative direction but were weaker than anticipated. Otherwise, associations were as expected; SUD was positively related to all

neuroticism facets and showed less robust and consistent relations with extraversion and openness facets.

Our findings for distress and fear were also in line with our hypotheses, though we did not expect fear and distress to be so highly similar in terms of their relations with the facets. Both were positively associated with all neuroticism facets whereas associations with the other four domains were less robust and in the expected directions. We did observe stronger relations with some openness facets than anticipated, and notably, the openness facets showed complex links with distress and fear with two facets showing a significant negative association and one showing a significant positive association. Distress and fear's association with positive emotions was weaker than expected. We were unable to pinpoint a methodological explanation for this. For example, the scale's internal reliability was high, and there was not a problem with restriction of range. Tender-mindedness was another trait that did not function as we anticipated, having positive associations with fear and distress. It is remarkable that this seemingly desirable trait was uniformly associated with internalizing.

There are several key findings worth highlighting. First, aside from neuroticism, the domains' facets exhibited inconsistent associations with a given disorder dimension (e.g., some agreeableness facets had a strong negative association, some had a nontrivial positive association, and others had a near-zero association with fear and distress). This point illustrates the need for examination of lower order facets. In the case of agreeableness, for example, considering only the broad domain's associations with fear ($r = -.07$) and distress ($r = -.09$) would mask unique facet-level associations as any opposite correlations are cancelled out. This is an example of important effects being masked by aggregation of personality trait facets. There are also instances of notable findings being masked by aggregation of disorders. Consider, for

example, the pattern of correlations between the distress disorders and conscientiousness. MDD has a relatively high correlation with conscientiousness ($r = -.33$) whereas GAD and PTSD have negligible correlations with conscientiousness. The distinctiveness of MDD's association with conscientiousness clearly would be disguised if examining only the distress dimension.

However, in many cases, facets within a single domain and disorders within a single dimension behave in more similar and expected ways. As mentioned above, for instance, all facets of neuroticism were uniformly related to all dimensions of mental disorder. In many of these cases, we observed aggregation effects where the correlations at the aggregate level exceeded most, if not all, facet-disorder correlations. Consider, for instance, the correlations among fear disorders and neuroticism facets, specifically anxiety. The correlations between anxiety and the specific fear disorders ranged from .14 to .39, yet the correlation between anxiety and the aggregated fear dimension reached .47, which clearly exceeds any lower level correlation. As a similar example, panic disorder had a higher correlation with the aggregated neuroticism trait ($r = .40$) than with any of the neuroticism facets. Finally, we see additional aggregation effects when we move up the hierarchy and compare the correlation between the broad neuroticism trait and the fear dimension ($r = .47$) with the facet-dimension ($r = .20$ to .47) or trait-disorder correlations ($r = .18$ to .41). The assumption that .47 represents the average association between neuroticism facets and fear disorders would be a faulty one.

A second key finding is that whereas some facets were related to all mental disorder dimensions, such as extraversion's gregariousness, others proved to be completely unrelated to any dimension of mental disorder. For example, fantasy and ideas from the domain of openness had near-zero correlations with the three dimensions. Third, for the most part, the facets related to the dimensions in predictable ways. These three findings support the assertion that examining

only broad personality traits disguises important associations. Finally, a facet-level analysis could help distinguish the SUD and internalizing dimensions as they had distinct personality profiles; however, the internalizing factors, fear and distress, were indistinguishable.

It is perhaps not surprising that fear and distress were indistinguishable in terms of their connections with the Big Five facets. Others have reported that facets do have differential associations with the two factors. For example, Naragon-Gainey and Watson (2009) found a distinct pattern of correlations for extraversion facets. However, based on their meta-analysis, Kotov and colleagues (2010) reported that no broad personality trait clearly distinguished fear from distress. Our findings, too, suggest that no specific lower order personality trait clearly distinguishes fear from distress. As Kotov and colleagues noted, further refinement of the internalizing spectrum is necessary to improve specificity. A sound factor solution is one that yields valid factors. In the absence of evidence to suggest that these two factors differentially relate to criteria in meaningful and clinically significant ways, the more parsimonious two-factor, internalizing-SUD, solution might be preferable. This remains to be seen, however, as more facet-level analyses need to be carried out.

Limitations and Future Directions

There are a few limitations of this study that should be acknowledged when interpreting the findings and when considering future research endeavors. First, a subset of our participants, the undergraduates, was a sample of convenience, and with the second subset, we had to rely on their self-reports of past or current involvement with psychotherapy or outpatient treatment. Moreover, the combined sample size was modest, prohibiting us from carrying out one of the analyses in the ideal manner. Specifically, we would have preferred to factor analyze the raw symptoms rather than symptom counts, which might better illuminate the latent structure of

mental disorders (Markon, 2010; Wright et al., 2013). Third, not all mental disorders assessed with the PDSQ were included in our modeling of disorders. Given that the primary focus of the paper was not on the latent structure of mental disorders but rather on their connections with lower order personality traits, we opted to include the more common mental disorders. Related, the PDSQ does not provide a comprehensive account of mental disorders. For example, antisocial personality disorder is not assessed; therefore, our externalizing dimension (SUD) was limited to substance use disorders. Finally, there is no strong consensus concerning the lower order structure of the Big Five (Naragon-Gainey & Watson, 2014; Naragon-Gainey et al., 2009), and we considered only the NEO PI-R facets.

Finally, we relied on concurrent assessment of personality and psychopathology so although we can say that self-discipline predicts SUD, for example, this is in the statistical sense only, and this study does not inform us as to the reasoning behind the observed associations. Accruing research suggests that certain traits and disorders are part of a common spectrum. For example, it has been argued that conscientiousness joins substance use disorders as part of an externalizing spectrum (Eaton, South, & Krueger, 2010). This research needs to be extended to include lower order facets, which clearly relate to mental disorder in predictable and important ways. A full accounting of the personality-psychopathology meta-structure (Markon et al., 2005; Wright & Simms, 2015), one including lower order facets and a comprehensive set of mental disorders, is called for.

Conclusions and Implications

Despite some methodological limitations, this study provided a first look at how the lower order traits from the Big Five model relate to dimensions of mental disorder. It is crucial to know whether facets within a single broad domain relate to a given outcome in a uniform

manner. This was generally true for the lower order facets of some traits (e.g., neuroticism) but not for others (e.g., agreeableness). Moreover, it is worthwhile to know whether all facets within a given domain relate to the important outcome(s) in question, as was the case with neuroticism, or whether some facets are completely unrelated to the outcome(s). For example, in this case, assertiveness from the domain of extraversion was unrelated to any of the three dimensions. Such findings inform us as to whether a broad trait-level analysis is sufficient or whether a facet-level analysis is necessary, and if a facet-level analysis is necessary, whether all facets need to be assessed.

From an assessment standpoint, this would help researchers and clinicians tailor their assessments to conserve resources and reduce the burden on participants. From a treatment standpoint, this would help clinicians deliver treatments targeted at the appropriate personality features. For example, Nargaon-Gainey and Watson (2009) noted that their findings suggest that the extraversion facets of sociability, positive emotions, ascendance/assertiveness, and fun-seeking should all be targeted for social anxiety treatment, though commonly used treatments, such as cognitive behavioral group therapy, include only assertiveness and sociability interventions, missing other key facets. In contrast, it seems other therapeutic techniques do appropriately target key personality facets. Consider behavioral activation, an empirically validated intervention for depression, which includes interventions for avoidant behavior aimed at making patients more engaged with others and with activities they once enjoyed (Dimidjian, Barrera, Martell, Muñoz, & Lewinsohn, 2011; Lewinsohn, Biglan, & Zeiss, 1976). From the domain of extraversion, this includes the precise facets that were shown to correlate with major depressive disorder in the current study, namely, gregariousness, warmth, activity, and positive

emotions. These findings suggest that this type of treatment strategy is on target and may at least partially explain its effectiveness.

Compliance with Ethical Standards:

All authors declare that they have no conflict of interest.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

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Footnote

¹ Given that obsessive-compulsive disorder and posttraumatic stress disorder showed some dissimilar patterns of correlations with neuroticism compared to the other disorders within their respective dimensions, and that there is some question as to whether obsessive-compulsive disorder is best conceptualized as a fear disorder (Tackett, Quilty, Sellbom, Rector, & Bagby, 2008; Watson, 2005), we excluded these two disorders from their respective dimensions and fit the regression models a second time. The pattern of findings was largely unaltered.

Table 1

Descriptive statistics and tests of group differences

	<u>Clinical Sample</u>	<u>Student Sample</u>		
	<u><i>M (SD)</i></u>	<u><i>M (SD)</i></u>	<u><i>t</i></u>	<u><i>d</i></u>
Neuroticism	107.49 (22.16)	94.92 (20.63)	4.42*	.59
Extraversion	103.37 (22.99)	112.40 (18.66)	-3.25*	-.43
Openness	122.32 (18.70)	114.40 (17.67)	3.27*	.44
Agreeableness	116.40 (19.49)	113.70 (17.77)	1.08	.15
Conscientiousness	107.21 (22.71)	109.16 (18.56)	-.71	-.09
PDSQ Total	28.77 (17.96)	19.14 (13.49)	4.66*	.61

Note. * $p < .05$. d = Cohen's effect size. PDSQ Total = sum of nine Psychiatric Diagnostic Screening Questionnaire scales.

Table 2

Zero-order correlations between Big Five broad traits and facets and mental disorder dimensions and disorder symptom counts

	<u>SUD</u>	<u>AAD</u>	<u>DAD</u>	<u>Distress</u>	<u>MDD</u>	<u>GAD</u>	<u>PTSD</u>	<u>Fear</u>	<u>OCD</u>	<u>PD</u>	<u>Ag</u>	<u>SP</u>
<u>Neuroticism</u>	.30*	.17*	.12	.49*	.53*	.41*	.16*	.47*	.18*	.40*	.26*	.41*
anxiety	.20*	.07	.00	.51*	.37*	.53*	.18*	.47*	.14*	.39*	.32*	.35*
angry hostility	.16*	.08	.12	.26*	.26*	.22*	.08	.25*	.09	.22*	.21*	.08
depression	.28*	.17*	.11	.45*	.53*	.34*	.21*	.41*	.17*	.34*	.18*	.37*
self-consciousness	.20*	.14*	-.01	.31*	.35*	.24*	.06	.31*	.11	.24*	.11	.49*
impulsiveness	.22*	.15*	.21*	.19*	.26*	.12	.00	.20*	.06	.22*	.15*	.08
vulnerability	.19*	.10	.11	.33*	.42*	.26*	.09	.31*	.15*	.25*	.14*	.32*
<u>Extraversion</u>	-.07	-.02	-.06	-.16*	-.21*	-.08	-.06	-.16*	-.05	-.08	-.07	-.37*
warmth	-.15*	-.09	-.21*	-.12	-.12	-.08	-.07	-.12	-.04	-.02	-.07	-.28*
gregariousness	-.14*	-.06	-.08	-.25*	-.26*	-.14*	-.13	-.26*	-.13	-.19*	-.20*	-.31*
assertiveness	-.09	-.08	.04	-.09	-.09	-.06	-.01	-.11	-.08	-.03	.00	-.36*
activity	.05	.05	.05	-.01	-.13	.02	.02	.00	.08	.03	.08	-.25*
excitement-seeking	.12	.14*	.07	-.02	-.05	.00	-.02	-.02	.06	-.07	-.03	-.03
positive emotions	-.07	-.02	-.10	-.14*	-.21*	-.08	-.05	-.14*	-.09	-.03	-.07	-.29*
<u>Openness</u>	-.01	-.01	-.03	.03	.06	.00	.05	.03	-.00	.15*	-.06	-.09
fantasy	-.04	-.07	.00	.05	.14*	.03	.01	.03	.01	.08	-.11	.07
aesthetics	.07	.04	-.01	.15*	.07	.08	.20*	.16*	.10	.23*	.08	-.02
feelings	.06	.06	-.12	.16*	.09	.18*	.05	.15*	.04	.26*	.06	-.08
actions	-.06	.00	.02	-.22*	-.13	-.22*	-.03	-.23*	-.17*	-.15*	-.19*	-.19*
ideas	-.01	-.02	.01	-.01	.03	-.04	.00	.01	.01	.06	.03	-.10
values	-.08	-.06	-.04	-.08	-.02	-.07	-.10	-.08	-.07	.07	-.16*	-.07
<u>Agreeableness</u>	-.13	-.07	-.27*	-.09	-.09	-.09	-.03	-.07	-.10	.03	-.11	.04
trust	-.15*	-.07	-.13	-.28*	-.26*	-.28*	-.11	-.24*	-.10	-.14*	-.16*	-.20*

straightforwardness	-.15*	-.09	-.28*	-.09	-.10	-.06	-.07	-.08	-.15*	-.02	-.05	.05
altruism	-.11	-.08	-.26*	.02	-.02	.04	.01	.00	-.06	.11	-.05	-.05
compliance	-.03	.00	-.12	-.06	-.07	-.07	-.03	-.04	-.01	-.04	-.08	.16*
modesty	-.04	-.03	-.14*	.01	.08	-.05	.03	.02	-.03	.08	-.09	.14*
tender-mindedness	.02	.01	-.14*	.16*	.10	.14*	.15*	.14*	.00	.18*	.05	.12
<u>Conscientiousness</u>	-.20*	-.15*	-.21*	-.18*	-.33*	-.10	-.09	-.15*	-.04	-.08	-.04	-.15*
competence	-.06	-.03	-.09	-.09	-.20*	-.06	-.06	-.05	-.02	.02	.05	-.19*
order	-.12	-.07	-.07	-.17*	-.24*	-.15*	-.03	-.14*	-.06	-.10	-.07	-.09
dutifulness	-.11	-.09	-.20*	-.03	-.10	.01	-.07	-.01	.02	.02	.02	-.04
achievement striving	-.14*	-.12	-.15*	-.08	-.28*	-.02	-.01	-.06	.02	.03	-.01	-.16*
self-discipline	-.23*	-.15*	-.20*	-.25*	-.38*	-.16*	-.04	-.24*	-.11	-.18*	-.09	-.24*
deliberation	-.19*	-.16*	-.20*	-.12	-.20*	-.04	-.17*	-.10	.03	-.14*	-.06	.08

Note. * $p < .05$. Bold type is used to highlight the disorder dimensions. SUD = substance use disorder dimension, AAD = alcohol abuse/dependence, DAD = drug abuse/dependence, MDD = major depressive disorder, GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder, PD = panic disorder, Ag = agoraphobia, SP = social phobia.

Table 3

Regression of dimensions of mental disorder on Big Five facets

	<u>SUD</u>			<u>Distress</u>			<u>Fear</u>		
	β	t	sr^2	β	t	sr^2	β	t	sr^2
<u>Neuroticism</u>									
anxiety	.04	.53	.00	.39	5.72*	.10	.33	4.73*	.08
angry hostility	.04	.47	.00	.06	.93	.00	.06	.88	.00
depression	.18	1.84	.01	.25	3.01*	.03	.20	2.28*	.02
self-consciousness	.04	.52	.00	.00	.00	.00	.04	.56	.00
impulsiveness	.12	1.63	.01	-.06	-.96	.00	-.02	-.31	.00
vulnerability	-.01	-.08	.00	.01	.16	.00	.02	.19	.00
	$R^2 = .10, F = 3.80^*$			$R^2 = .32, F = 16.78^*$			$R^2 = .26, F = 12.80^*$		
<u>Extraversion</u>									
warmth	-.10	-1.17	.01	.06	0.62	.00	.07	.73	.00
gregariousness	-.15	-1.86	.01	-.28	-3.36*	.05	-.30	-3.65*	.06
assertiveness	-.07	-.99	.00	-.02	-0.31	.00	-.05	-.62	.00
activity	.13	1.73	.01	.09	1.17	.01	.12	1.49	.01
excitement-seeking	.24	3.21*	.04	.12	1.63	.01	.13	1.75	.01
positive emotions	-.08	-.91	.00	-.14	-1.53	.01	-.14	-1.56	.01
	$R^2 = .09, F = 3.28^*$			$R^2 = .08, F = 3.10^*$			$R^2 = .09, F = 3.65^*$		
<u>Openness</u>									
fantasy	-.05	-.60	.00	.04	.61	.00	.02	.23	.00
aesthetics	.09	1.10	.01	.20	2.45*	.02	.21	2.60*	.03
feelings	.09	1.15	.01	.17	2.15*	.02	.15	1.88	.01
actions	-.07	-.89	.00	-.28	-3.97*	.06	-.30	-4.18*	.07
ideas	-.02	-.30	.00	-.02	-.31	.00	-.01	-.10	.00
values	-.09	-1.12	.01	-.11	-1.48	.01	-.09	-1.16	.01
	$R^2 = .03, F = .96$			$R^2 = .13, F = 5.35^*$			$R^2 = .13, F = 5.27^*$		

<u>Agreeableness</u>									
trust	-.14	-1.89	.02	-.32	-4.55*	.08	-.28	-3.82*	.06
straightforwardness	-.15	-1.75	.01	-.11	-1.41	.01	-.11	-1.37	.01
altruism	-.08	-.99	.00	.06	.77	.00	.03	0.42	.00
compliance	.09	1.14	.01	.03	.41	.00	.05	0.64	.00
modesty	-.02	-.27	.00	-.02	-.32	.00	-.01	-0.13	.00
tender-mindedness	.11	1.41	.01	.23	3.10*	.04	.20	2.70*	.03
	$R^2 = .05, F = 1.95$			$R^2 = .14, F = 5.63^*$			$R^2 = .10, F = 4.06^*$		
<u>Conscientiousness</u>									
competence	.14	1.58	.01	-.01	-.05	.00	.03	.38	.00
order	.02	0.22	.00	-.08	-1.02	.00	-.06	-.71	.00
dutifulness	.02	0.28	.00	.12	1.47	.01	.11	1.39	.01
achievement striving	-.09	-.92	.00	.08	.86	.00	.09	.91	.00
self-discipline	-.21	-2.22*	.02	-.29	-3.06*	.04	-.31	-3.31*	.05
deliberation	-.15	-1.93	.02	-.06	-.74	.00	-.04	-.51	.00
	$R^2 = .08, F = 2.90^*$			$R^2 = .08, F = 3.18^*$			$R^2 = .08, F = 2.96^*$		

Note. * $p < .05$. SUD = substance use disorder dimension.