

Extraversion and Psychopathology: A Facet-Level Analysis

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The goal of this study was to explicate how the lower order facets of extraversion are related to psychopathology. We used a “bottom-up” approach in which specific extraversion scales from 3 comprehensive personality inventories were used to model these facets as latent factors. We collected both self-report and interview measures of a broad range of psychopathology from a large community sample. Replicating previous findings using a similar approach (Naragon-Gainey & Watson, 2014; Naragon-Gainey, Watson, & Markon, 2009), structural analyses yielded four factors: Positive Emotionality, Sociability, Assertiveness, and Experience Seeking. Scores on these latent dimensions were related to psychopathology in correlational analyses and in two sets of regressions (the first series used the four facets as predictors; the second included composite scores on the other Big Five domains as additional predictors). These results revealed a striking level of specificity. As predicted, Positive Emotionality displayed especially strong negative links to depressive symptoms and diagnoses. Sociability also was negatively related to psychopathology, showing particularly strong associations with indicators of social dysfunction and the negative symptoms of schizotypy (i.e., social anxiety, social aloofness, and restricted affectivity). Assertiveness generally had weak associations at the bivariate level but was negatively related to social anxiety and was positively correlated with some forms of externalizing. Finally, Experience Seeking had substantial positive associations with a broad range of indicators related to externalizing and bipolar disorder; it also displayed negative links to agoraphobia. These differential correlates demonstrate the importance of examining personality–psychopathology relations at the specific facet level.

Keywords: extraversion, facets, hierarchical models of personality, psychopathology, factor analysis

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Our primary goal in this article is to explicate how individual differences in introversion versus extraversion are related to psychopathology. Extraversion is a broad higher order trait that is a key component in virtually all major structural models of personality (Markon, Krueger, & Watson, 2005; Watson, Clark, & Chmielewski, 2008). It provides a particularly interesting focus of study for two reasons. First, extraversion shows much greater specificity than traits such as neuroticism: That is, although many disorders show substantial associations with this dimension, others do not. For instance, Kotov, Gámez, Schmidt, and Watson (2010)

conducted a meta-analysis comparing the mean Big Five scores of individuals with and without 14 *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 2000) mood disorder (e.g., major depression, dysthymic disorder), anxiety disorder (e.g., generalized anxiety disorder [GAD], posttraumatic stress disorder [PTSD]), and substance use disorder (e.g., alcohol use) diagnoses. Neuroticism and conscientiousness both were moderately to strongly related to every diagnosis, leading Kotov et al. (2010) to conclude that “there was little specificity in personality profiles among the disorders” (p. 805). In fact, only extraversion showed any real evidence of diagnostic specificity: It was most strongly related to dysthymic disorder and social phobia, and had weak associations with specific phobia and substance use.

Second, neuroticism has been described as “an almost ubiquitously elevated trait within clinical populations” (Widiger & Costa, 1994, p. 81). In marked contrast, extraversion does not display a clear, consistent directional trend. Whereas many disorders—including depression, social anxiety disorder, and schizophrenia—are associated with low levels of extraversion, others (e.g., bipolar disorder and histrionic personality disorder) have been linked to high scores on the trait (e.g., Samuel & Widiger, 2008; Watson & Naragon-Gainey, 2010, 2014). As one example, Watson and Naragon-Gainey (2014) examined the associations between the

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Big Five and symptoms of depression, anxiety, and bipolar disorder. They found that extraversion (a) had relatively strong negative associations with social anxiety/social phobia (r s ranged from $-.36$ to $-.54$); (b) essentially was unrelated to several types of symptoms, including insomnia (r s ranged from $-.03$ to $-.10$) and indicators of obsessive-compulsive disorder (OCD; r s ranged from $.00$ to $-.21$); and (c) was moderately to strongly positively correlated with bipolar symptom scales tapping content related to elevated positive mood and increased social engagement (r s ranged from $.25$ to $.59$).

Importance of Facet-Level Analyses

Over the past three decades, researchers have made considerable progress in understanding how higher order personality traits relate to psychopathology at both the diagnostic and symptom levels (see Kotov et al., 2010; Watson & Naragon-Gainey, 2014). However, evidence related to the specific, lower order level of the personality hierarchy has lagged far behind. Indeed, Kotov et al. (2010) were forced to restrict their meta-analysis to the general domain level of personality, stating: “Our review is necessarily limited to these broad dimensions because lower order traits have been studied less consistently and the available data are insufficient” (p. 770).

Paunonen (2003) has argued strongly for the value of facet-level analyses, stating:

Arithmetically combining several narrow trait or facet measures to derive a broad factor measure can have undesirable consequences. Some of the traits might be predictive of a criterion of interest, and others might not. When the predictive and nonpredictive facets are aggregated in the pursuit of their common variance, the trait-specific but criterion-valid variance that exists in the former can be canceled by the trait-specific but nonpredictive variance in the latter. (p. 413)

Supporting this argument, Reynolds and Clark (2001) found that specific facet scales were substantially better predictors of personality disorder ratings than were general domain scores.

We believe facet-level analyses can be particularly informative in clarifying the nature of the associations between extraversion and psychopathology. Indeed, as we show, individual facets of extraversion can be positively related, negatively related, or unrelated to the same symptom or disorder, even though they are positively correlated with each other.

A significant part of the problem in studying these relations at the lower order level is that we currently lack consensus regarding the specific facets that fall within the broad, higher order domains. For instance, the NEO Personality Inventory-3 (NEO-PI-3; McCrae, Costa, & Martin, 2005) divides extraversion into six facets; in contrast, the Faceted Inventory of the Five-Factor Model (FI-FFM; Simms, 2009; see also Naragon-Gainey et al., 2009; Watson, Stasik, Ro, & Clark, 2013) contains five extraversion facets and the HEXACO Personality Inventory—Revised (HEXACO-PI-R; Lee & Ashton, 2004) includes only four. Consequently, progress in this area requires, in part, clarifying the constituent elements that make up each higher order domain. In the current study, we use the lower order scales from all three inventories to model core extraversion facets as latent factors. This approach enables us to capture the shared variance among the narrow traits—such as assertiveness, sociability, and positive emotionality—that recur across

these instruments, thereby eliminating the unique, idiosyncratic features of any single measure.

Extraversion Facets and Psychopathology

Internalizing

Depression. Extraversion shows relatively strong negative associations with depressive symptoms and diagnoses (Kotov et al., 2010; Watson & Naragon-Gainey, 2010, 2014). Although most aspects of extraversion have significant links to depression, the evidence is strongest and most consistent for the positive emotionality component of the trait (e.g., Bagby, Joffe, Parker, Kalemka, & Harkness, 1995; Bagby et al., 1996; Bienvenu et al., 2004; Durbin, Klein, Hayden, Buckley, & Moerk, 2005; Rector, Bagby, Huta, & Ayearst, 2012; Rector, Hood, Richter, & Bagby, 2002). For example, Naragon-Gainey et al. (2009) examined relations between facet-level extraversion factors and symptoms of depression and social anxiety. After controlling for the influence of a higher order internalizing factor and the overlap among the extraversion facets, depression was substantially related only to low positive emotionality. Similarly, Naragon-Gainey and Watson (2014) found that low positive emotionality was the only component of extraversion to predict the development of depression symptoms prospectively.

Anxiety. At the domain level, extraversion shows considerable specificity in relation to indicators of *DSM-IV* anxiety disorders (in *Diagnostic and Statistical Manual of Mental Disorders* [5th ed.; *DSM-5*; American Psychiatric Association, 2013], these disorders now fall into three adjacent diagnostic classes: anxiety disorders, obsessive-compulsive and related disorders, and trauma- and stressor-related disorders): It has moderate to strong negative associations with social anxiety/social phobia and displays somewhat weaker associations with other anxiety symptoms and diagnoses (Kotov et al., 2010; Watson & Naragon-Gainey, 2010, 2014). For instance, Watson and Naragon-Gainey (2014) reported correlations between extraversion and a broad range of self-rated anxiety symptoms (see their Table 2). Extraversion correlated $-.54$ with self-reported social anxiety; in contrast, its associations with 12 other symptom measures ranged from only $-.08$ to $-.34$.

The limited available evidence suggests that social anxiety is broadly related to the various components of extraversion. Naragon-Gainey et al. (2009), for instance, found that social anxiety symptoms were broadly related to all four extraversion facets that were modeled in their analyses. Similarly, Bienvenu et al. (2004) examined relations between various *DSM-IV* anxiety diagnoses and the extraversion facets of the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). They reported that all six facets were significantly lower in individuals with social phobia than in controls with no anxiety or depressive disorder; they did note, however, that the mean scores for Warmth and Positive Emotions “were particularly low” (p. 94). With regard to other anxiety disorders, Bienvenu et al. (2004) found that diagnoses of agoraphobia were associated with lower levels of Warmth, Gregariousness, and Positive Emotions, whereas panic disorder was linked to low Positive Emotions. Analyses for GAD, OCD, and simple phobia revealed no significant effects.

Psychoticism

Schizophrenia/schizotypy. Extraversion consistently displays inverse relations with negative indicators of schizophrenia/schizotypy (e.g., constricted affect, social aloofness) but is only weakly related to positive symptoms of psychosis (e.g., magical thinking, unusual perceptions; Asai, Sugimori, Bando, & Tanno, 2011; Watson et al., 2008; Watson & Naragon-Gainey, 2010). For example, Chmielewski and Watson (2008) examined relations between extraversion and five symptom factors derived from the Schizotypal Personality Questionnaire (SPQ; Raine, 1991); trait scores correlated strongly with Social Anxiety ($r = -.60$ and $-.62$ at Time 1 and Time 2, respectively), moderately with Social Anhedonia ($r = -.29$ and $-.31$, respectively), and weakly with Eccentricity/Oddity, Mistrust, and Unusual Beliefs and Experiences (r s ranged from $-.07$ to $.10$).

The available data suggest that extraversion facets are differentially related to these negative indicators of psychoticism. Ross, Lutz, and Bailey (2002) reported relations between the NEO-PI-R facets and self-rated schizotypy. They found that scores on the Revised Social Anhedonia scale (Mishlove & Chapman, 1985) were more strongly related to Warmth, Gregariousness, and Positive Emotions (r s ranged from $-.42$ to $-.59$) than to Assertiveness, Activity, and Excitement Seeking (r s ranged from $-.11$ to $-.26$). Similarly, in their meta-analytic review, Samuel and Widiger (2008) reported that diagnoses of schizoid personality disorder—which is characterized primarily by social aloofness and flat, constricted affect—correlated more strongly with Warmth, Gregariousness, and Positive Emotions (r s ranged from $-.38$ to $-.48$) than with the three remaining facets (r s ranged from $-.21$ to $-.25$). These results suggest a particular affinity between negative indicators of psychoticism and the sociability and positive emotionality components of extraversion.

Bipolar disorder. Relatively few studies have examined the associations between personality and bipolar disorder diagnoses. The available evidence, however, indicates that individuals with bipolar disorder tend to report elevated levels of extraversion (Akiskal et al., 2006; Bagby et al., 1996, 1997; Barnett et al., 2011; Tackett, Quilty, Sellbom, Rector, & Bagby, 2008).

The symptom-level data are more complex, however. Watson and Naragon-Gainey (2014) found that bipolar symptom scales defined two very distinct factors. One factor appeared to tap individual differences in affective lability, restlessness, and cognitive manifestations of mania (e.g., pressure of speech); scores on this dimension correlated strongly with neuroticism ($r = .55$) and were unrelated to extraversion ($r = -.02$). In marked contrast, the second factor reflected individual differences in elation, excitement, and manic energy/activation; it had a strong positive correlation with extraversion ($r = .52$) and showed a modest negative association with neuroticism ($r = -.22$).

Very little facet-level data are available. However, Sellbom, Ben-Porath, and Bagby (2008) reported that Hypomanic Activation from the Minnesota Multiphasic Personality Inventory (MMPI)-2 Restructured Clinical (RC) scales (Tellegen et al., 2003) correlated much more strongly with NEO-PI-R Excitement Seeking ($r = .45$) than with the other extraversion facets (r s ranged from $-.08$ to $.25$). Johnson, Leedom, and Muhtadie (2012) summarized evidence linking bipolar disorder to the dominance behavioral system, which they conceptualize as “a biologically based

system that guides dominance motivation, dominant and subordinate behavior, and responsivity to perceptions of power and subordination” (p. 692). Taken together, these findings tentatively suggest that indicators of bipolar disorder are particularly related to the dominance/assertiveness and excitement seeking components of extraversion.

Externalizing

Extraversion has particularly complex associations with externalizing psychopathology. In studies using the NEO-PI-R, externalizing problems tend to be (a) positively related to Excitement Seeking, (b) negatively related to Warmth, and (c) weakly and inconsistently related to the other facets (e.g., Jones, Miller, & Lynam, 2011; Le Corff & Toupin, 2010). For example, in their meta-analytic review, Samuel and Widiger (2008) reported that diagnoses of antisocial personality disorder correlated $.25$ with Excitement Seeking and $-.13$ with Warmth; correlations for the four remaining facets ranged from only $-.09$ (Positive Emotions) to $.06$ (Assertiveness). Similarly, Ruiz, Pincus, and Schinka (2008) reported meta-analytic associations between the NEO-PI-R facets and both (a) antisocial behavior and (b) substance use pathology. They found that Warmth had significant negative associations with both types of externalizing ($r = -.11$ and $-.23$ with antisocial behavior and substance use, respectively), whereas Excitement Seeking was positively related to them ($r = .30$ and $.17$, respectively). Only two other associations exceeded $1.10I$: Assertiveness ($r = -.14$) and Positive Emotions ($r = -.17$) both were negatively linked to substance use pathology. These complex associations demonstrate the value of examining personality-psychopathology relations at the specific lower order level.

The Current Study

This study examined how lower order facets of extraversion are related to psychopathology. We used a “bottom-up” approach in which scales from three instruments—the NEO-PI-3, the FI-FFM, and the HEXACO-PI-R—were used to model these facets as latent factors. Based on two earlier studies that used this same basic strategy (Naragon-Gainey & Watson, 2014; Naragon-Gainey et al., 2009)—albeit with different sets of indicators—we expected our structural analyses to yield lower order factors reflecting individual differences in energy/positive affectivity (Positive Emotionality), gregariousness/affiliation (Sociability), dominance/ascendance (Assertiveness), and excitement seeking/venturesomeness (Experience Seeking). Scores on the latent dimensions that emerge in these analyses then will be related to various types of psychopathology.

This study extends the existing literature in three key ways. First, our battery contained a broader range of psychopathology than has been examined in previous facet-level research; for instance, Naragon-Gainey et al. (2009) reported relations only with depression and social anxiety. In contrast, we report results linking specific aspects of extraversion to multiple measures of internalizing, psychoticism, and externalizing. This expanded coverage provides a more complete view of how the components of extraversion relate to psychopathology.

Second, we were able to assess many forms of psychopathology using both self-report measures and clinical interviews. This ap-

proach allows us to examine the robustness of these associations across different methods of assessment.

Finally, extraversion facets are not pure measures of the higher order construct but also show significant relations with other Big Five traits (see Naragon-Gainey & Watson, 2014). We therefore include domain scores on neuroticism, openness, agreeableness, and conscientiousness as additional predictors of psychopathology in a series of regression analyses. This enables us to examine the incremental information provided by extraversion facets beyond that attributable to neuroticism and the other general domains of personality.

We made several predictions based on the evidence reviewed earlier. First, we expected that the positive emotionality facet of extraversion would show the strongest overall associations with depressive symptoms and diagnoses. Second, we predicted that extraversion facets would correlate more strongly with social anxiety than with other types of anxiety; it is unclear, however, whether some facets would show stronger associations with social anxiety than others. Third, we expected that extraversion would relate more strongly to negative than to positive symptoms of psychoticism/schizotypy; moreover, sociability and positive emotionality should relate particularly strongly to these symptoms. Fourth, based on limited evidence, we tentatively hypothesized that indicators of bipolar disorder would relate more strongly to assertiveness and experience seeking than to the other facets of extraversion. Finally, we predicted that externalizing would be positively associated with experience seeking and negatively related to sociability.

Method

Participants and Procedures

The participants were 438 adults from the Michiana area, a region that consists of several counties in northern Indiana and southwestern Michigan; this sample also has been used in two previous articles (Watson, Stasik, Chmielewski, & Naragon-Gainey, 2014; Watson, Stasik, Ellickson-Larew, & Stanton, in press).¹ Individuals who had provided their contact information from previous studies conducted at the Center for Advanced Measurement of Personality and Psychopathology (CAMPP) were recruited first; other adults were recruited through flyers posted in local mental health clinics and via word of mouth (participants could let other potentially eligible individuals know about the study). All potential participants were screened to ensure they met the following eligibility criteria: 18 years of age or older, able to read and write in English, and capable of providing consent to participate.

Participants were seen in two 3-hr sessions conducted at CAMPP; they were paid \$60 for each session. They were assessed in small group sessions that typically involved 3–10 individuals. Session 1 consisted of an extensive battery of personality measures, plus a portion of the clinical interview. Complete personality data are available on 431 participants (98.4%); data from these participants will be used in the initial structural analyses.

Session 2 was held roughly three weeks later (mean interval = 20.3 days). It consisted of an extensive battery of self-report psychopathology measures, plus the rest of the clinical interview. We examine personality–psychopathology relations on the 402

individuals (91.8% of the overall sample) who completed this second session (interview data are missing for one participant).

It should be noted that participants from previous studies primarily were outpatients recruited from various sources, such as the local community mental health center. Consequently, this sample is characterized by a relatively high level of psychopathology. In fact, nearly half of the sample ($N = 198$, 45.9%) answered “yes” to one or more of these three questions: “Are you currently receiving psychological counseling/therapy for mental health issues?”; “Have you received psychological counseling/therapy for mental health issues in the past?”; and “Are you currently taking medications to treat a mental illness?” Similarly, approximately half of the interviewed participants (194 of 401, or 48.4%) met criteria for at least one of the assessed *DSM* diagnoses.

The sample (age range = 18–77, mean age = 45.0 years) consisted of 138 men and 290 women (three participants did not specify their gender); it was 46.9% Black, 44.8% White, and 8.2% multiracial or other. In terms of marital status, 174 participants (40.4%) were single, 126 (29.2%) were married, 110 (25.5%) were divorced or separated, and 19 (4.4%) were widowed (data were missing for two individuals). Less than half of the sample ($N = 194$, 45.0%) was currently employed. Education levels ranged widely from dropping out of high school ($N = 55$, 12.8%) to receiving a doctorate ($N = 5$, 1.1%); only 96 participants (22.3%) had completed college.

Personality Measures

Overview. As noted, the participants completed three comprehensive personality inventories in the initial session. Internal consistency reliabilities (coefficient alphas) for all personality scales included in subsequent analyses are reported in Supplemental Table S1, which is available online.

NEO Personality Inventory-3. The NEO-PI-3 (McCrae et al., 2005) is an updated version of the widely used NEO-PI-R (Costa & McCrae, 1992). The only change was that 38 NEO-PI-R items were revised to lower the reading level and to make the instrument more appropriate for younger examinees and adults with lower educational levels (such as many of the participants in the current sample). The instrument consists of 240 items that are answered on a 5-point scale ranging from *strongly disagree* to *strongly agree*. Each higher order domain is assessed using six 8-item facet scales. We include the Extraversion facets—Warmth, Gregariousness, Assertiveness, Activity, Excitement Seeking, and Positive Emotions—in our structural analyses.

Faceted Inventory of the Five-Factor Model. The FI-FFM (Simms, 2009; see also Naragon-Gainey et al., 2009; Watson, Stasik, et al., 2013) is a factor analytically derived, 247-item self-report inventory that assesses specific lower order traits within the framework of the five-factor model. The items are sentences that are rated on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. The FI-FFM contains five Extraversion facet scales that were used in the structural analyses: Positive Temperament (8 items), Sociability (9 items), Ascendance (8 items), Venturesomeness (8 items), and Frankness (8 items).

¹ Fifty-five of these participants also were part of the outpatient sample described in Watson, Stasik, et al. (2013).

The FI-FFM also includes multiple facets assessing Neuroticism (Anxiety, Depression, Anger Proneness, Somatic Complaints, Envy), Agreeableness (Empathy, Trust, Straightforwardness, Modesty), Conscientiousness (Self-Discipline, Dutifulness, Deliberation, Achievement Striving, Order), and Openness (Intellectance, Novel Experience Seeking, Nontraditionalism). Scores on these facets are summed to produce overall domain scales.

HEXACO Personality Inventory—Revised. The HEXACO-PI-R (Lee & Ashton, 2004) contains 100 items that are rated using a 5-point response format ranging from *strongly disagree* to *strongly agree*. The instrument consists of 25 four-item scales that are organized into six higher order domains (Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness). Each domain consists of four facets; the final scale (Altruism) is interstitial and is not scored on any domain. We include the four Extraversion facets—Social Self-Esteem, Sociability, Social Boldness, and Liveliness—in our structural analyses.

Creation of the domain composites. We created composite scores for the other Big Five domains based on exploratory factor analytic results reported by Watson et al. (in press) in this same sample. Thus, the Neuroticism composite consisted of the NEO-PI-3 Neuroticism, FI-FFM Neuroticism, and HEXACO-PI-R Emotionality scales; Openness was composed of the NEO-PI-3, FI-FFM, and NEO-PI-R Openness scales; Agreeableness was assessed using the NEO-PI-3 Agreeableness, FI-FFM-Agreeableness, HEXACO-PI-R Agreeableness, and HEXACO-PI-R Honesty-Humility scales;² and Conscientiousness was measured by the NEO-PI-R, FI-FFM, and HEXACO-PI-R Conscientiousness scales. In each case, we initially standardized the scales so that the scores from each instrument would be equally weighted in the composite.

Self-Report Psychopathology Measures

Overview. The participants completed a lengthy battery of self-report psychopathology measures in the second session; this protocol (which consisted of more than 125 individual scales) is too extensive to examine in its entirety. We were guided by three basic considerations in selecting the measures to be presented here. First, to explicate fully the psychopathological correlates of extraversion, we selected a broad range of markers related to internalizing, externalizing, and psychotic symptoms. Second, we focused particularly on symptoms that have been linked to extraversion in several previous studies (e.g., depression, social anxiety, negative schizotypy). Third, we concentrated on constructs that also were assessed in the clinical interview; this enabled us to examine the robustness of observed relations across methods.

The assessment battery included many redundant, highly correlated scales. Whenever possible, we aggregated them into symptom composites; in each case, the variables were standardized before being combined so that they would be equally weighted. Coefficient alphas for all symptom scales used in these analyses—including both individual scales and aggregated composites—are reported in Supplemental Table S2, which is available online.

Internalizing symptoms. The Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) is a self-report measure of depressive symptoms; its items assess the nine *DSM-IV/DSM-5* criteria for major depressive disorder (MDD). The PHQ-9 can be used either as a diagnostic tool to identify a

probable diagnosis of MDD or as a continuous measure of symptom severity; we adopt the latter approach here.

The Expanded Version of the Inventory of Depression and Anxiety Symptoms (IDAS-II; Watson et al., 2012) contains six scales that jointly capture all of the symptom content for MDD. Dysphoria (10 items) contains items assessing depressed mood, loss of interest, worry, worthlessness, guilt, hopelessness, cognitive disturbance, and psychomotor problems; it therefore covers MDD criteria 1, 2, 5, 7, and 8. Suicidality (6 items) essentially represents *DSM-IV/DSM-5* Criterion 9; Insomnia (6 items) taps the corresponding portion of Criterion 4 (sleep disturbance); and Appetite Loss (3 items) and Appetite Gain (3 items) jointly define Criterion 3 (appetite disturbance). The final scale—Lassitude (6 items)—includes content related to both fatigue/nergia (Criterion 6) and the hypersomnia portion of Criterion 4.

We present data on seven measures of anxiety symptoms. First, the Generalized Anxiety Disorder Questionnaire-IV (GADQ-IV; Newman et al., 2002) was designed originally to provide an analogue diagnosis of GAD; therefore, it closely follows the diagnostic criteria for the disorder. However, the items also can be scored dimensionally, and this scoring was used in all analyses.

Next, we constructed a series of composites. First, the participants completed four measures of social anxiety: (a) the 5-item Social Phobia scale from the Fear Questionnaire (FQ; Marks & Mathews, 1979), (b) the 10-item Social Phobia scale from the Albany Panic and Phobia Questionnaire (APPQ; Rapee, Craske, & Barlow, 1994), (c) the 6-item IDAS-II Social Anxiety scale, and (d) a factor analytically derived 10-item Social Anxiety scale from the SPQ (Chmielewski & Watson, 2008). Correlations among these measures ranged from .54 to .69 (mean $r = .64$).

The battery contained three indicators of panic: (a) the IDAS-II Panic scale; (b) a reduced, 9-item version of the Anxious Arousal scale of the Mood and Anxiety Symptom Questionnaire (Watson et al., 1995); and (c) an abbreviated, 6-item version of the Panic Attack Symptom Questionnaire (Watson, 2000). These scales had correlations ranging from .59 to .68 (mean $r = .64$).

The participants completed two measures of PTSD symptoms: (a) the five intrusions items and two avoidance items from the PTSD Checklist—Civilian Version (Weathers, Litz, Herman, Huska, & Keane, 1993) and (b) an aggregate score based on the Traumatic Intrusions (4 items) and Traumatic Avoidance (4 items) scales of the IDAS-II. These scales correlated .74 with one another.

The battery included three indicators of OCD: (a) the 18-item Obsessive-Compulsive Inventory—Revised (Foa et al., 2002); (b) a total score based on the Obsessive Checking (14 items), Obsessive Cleanliness (12 items), Compulsive Rituals (8 items), and Hoarding (5 items) scales from the Schedule of Compulsions, Obsessions, and Pathological Impulses (SCOPI; Watson & Wu, 2005); and (c) a combined score based on the IDAS-II Checking (3 items), Ordering (5 items), and Cleaning (7 items) scales. Correlations among these scales ranged from .66 to .77 (mean $r = .71$).

² HEXACO-PI-R Honesty-Humility and Agreeableness had loadings of .69 and .63, respectively, on the Agreeableness factor in this sample (see Watson et al., in press, Table 2).

We created an Agoraphobia composite using the Agoraphobia scales from the APPQ (9 items) and the FQ (5 items). These measures correlated .67 with each other.

Finally, the 5-item IDAS-II Claustrophobia scale contains items reflecting both agoraphobia and situational phobia content. Watson et al. (2012) reported that scores on this scale correlated substantially with diagnoses of agoraphobia, specific phobia, and panic disorder.

Psychoticism. We report data on five measures broadly related to psychosis/schizotypy. First, the Personality Inventory for DSM-5 (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012) is a 220-item self-report instrument designed to provide a comprehensive assessment of personality pathology as organized in Section III of *DSM-5* (American Psychiatric Association, 2013). We formed a Positive Schizotypy composite by aggregating three PID-5 scales: Eccentricity (13 items), Cognitive and Perceptual Dysregulation (12 items), and Unusual Beliefs and Experiences (8 items). These indicators had correlations ranging from .66 to .80 (mean $r = .73$).

Second, we constructed a composite using three indicators of dissociation, a construct that is strongly linked to positive schizotypy (Watson, 2001): (a) the 33-item Dissociative Processes Scale (DPS; Harrison & Watson, 1992); (b) a total score based on the Amnesia (5 items) and Depersonalization (8 items) scales from the Curious Experiences Survey (Goldberg, 1999); and (c) a combined score based on the Depersonalization/Derealization (10 items), Disengagement (5 items), and Memory Disturbance (5 items) scales from the Multiscale Dissociation Inventory (Briere, 2002). Correlations among these measures ranged from .61 to .82 (mean $r = .73$).

Third, we combined two indicators into a Suspiciousness composite: (a) the 7-item PID-5 Suspiciousness scale and (b) the 7-item Paranoid Ideation scale from the Schizotypal Traits Questionnaire-Short Form (Jackson & Claridge, 1991). These scales correlated .60 with each other.

Fourth, we constructed a Social Aloofness composite by combining (a) the 10-item PID-5 Withdrawal scale and (b) a 9-item Social Anhedonia scale created from the SPQ (see Chmielewski & Watson, 2008). These scales correlated .70 with one another.

Fifth, the 7-item PID-5 Restricted Affectivity scale assesses the coldness, detachment, and flattened affect characteristic of schizoid and schizotypal personality disorders (e.g., "When it comes to my emotions, people tell me I'm a 'cold fish'"). Along with Social Aloofness, this scale provides a second indicator of the negative symptoms of schizotypy.

The battery also included two measures of bipolar symptoms: the 5-item Mania (e.g., "It felt like my mind was moving 'a mile a minute'") and the 5-item Euphoria (e.g., "I felt like I was 'on top of the world'") scales from the IDAS-II. Although these scales correlate moderately to strongly with each other ($r = .47$ in this sample), they tend to show very different correlates. Specifically, Mania is strongly associated with indicators of negative emotionality, whereas Euphoria is linked to elevated levels of positive emotionality (Watson et al., 2012). They therefore are analyzed separately here.

Externalizing. We used PID-5 scales to create two indicators of externalizing. First, we created an Antagonism composite by combining the PID-5 Callousness (14 items), Deceitfulness (10 items), Manipulativeness (5 items), Attention Seeking (8 items),

and Grandiosity (6 items) scales. Correlations among these scales ranged from .41 to .76 (mean $r = .55$). Second, we formed a Disinhibition composite by summing the PID-5 Impulsivity (6 items), Irresponsibility (7 items), and Risk Taking (14 items) scales. These scales had correlations ranging from .37 to .61 with one another (mean $r = .51$).

We report results on two indicators of substance use. First, we created an Alcohol Use composite by combining scores on the 10-item Alcohol Use Disorders Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) and the 10-item Short Michigan Alcoholism Screening Test (SMAST; Selzer, Vinokur, & van Rooijen, 1975). These scales correlated .65 with each other.

Second, the Drug Use Survey (DUS; Clark & Watson, 1999) assesses the overall frequency of drug use. Participants rate the 10 items on a 7-point scale, ranging from 1 (*never*) to 7 (*40 times or more*), indicating how many times they have used marijuana, cocaine, amphetamines, diet pills, tranquilizers, psychedelics, narcotics, amyl/butyl nitrates, inhalants, and ecstasy.

Interview Measures

The Mini-International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998) is a brief structured diagnostic interview that assesses symptoms of *DSM-IV* and *International Classification of Diseases* (10th ed.; *ICD-10*; World Health Organization, 1993) psychiatric disorders; we used an adapted version (with the authorization of the author) that incorporated diagnostic changes for *DSM-5*.³ The following modules were administered in the first session: panic disorder, agoraphobia, PTSD, social anxiety disorder, OCD, alcohol use disorder, and (nonalcohol) substance use disorder. In Session 2, the modules for dysthymic disorder, MDD (which permitted the assessment of both the overall diagnosis and the nine individual MDD symptom criteria), GAD, mania, and psychotic disorder (which provides diagnoses of both psychotic disorder and mood disorder with psychotic features) were administered. Prevalence rates for these interview variables are presented in Supplemental Table S3, which is available online.

Interviewers were graduate students ($N = 4$) and advanced undergraduate research assistants (RAs; $N = 8$) who underwent extensive training on the M.I.N.I. Graduate students had prior training in clinical interviewing and the use of the M.I.N.I., and served as trainers for the undergraduate RAs. Training included in-depth review of *DSM* criteria for each disorder being assessed, didactics on clinical interviewing skills and administration of a semistructured interview, and a detailed overview of the administration of each item in the interview. Each RA was required to observe three administrations of the interview by a graduate student and subsequently be observed administering the interview on three separate occasions.

To assess interrater reliability, the interviews were audiotaped; a second rater independently scored 39 of the Session 1 interviews and 34 of the Session 2 interviews (due to audiotape problems, $N = 38$ and 33, respectively, for some disorders). The kappa for psychotic disorder (.65) indicated good interrater reliability (see

³ This study was ongoing when *DSM-5* was finalized. The version we used included the proposed changes for GAD that later were rejected by the American Psychiatric Association. Thus, our version of the GAD diagnosis differs slightly from that in *DSM-5*.

Cicchetti, 1994); values for all other ratings were in the excellent range (Cicchetti, 1994), with kappas ranging from .77 to 1.00.⁴

Results

Factor Analyses

Determining the number of factors. To determine the number of factors to be extracted, we conducted an initial principal components analysis of the extraversion facet scales. Parallel analysis (Horn, 1965; O'Connor, 2000) and Velicer's (1976) minimum average partial (MAP) test were used to determine the optimal number of factors to extract. These methods are more objective than other approaches (e.g., scree plots) and typically produce better results (O'Connor, 2000).

First, in parallel analysis, the observed eigenvalues are compared with the eigenvalues of random datasets that contain the same numbers of variables and observations. We used O'Connor's (2000) SAS program to conduct this analysis ($N_{cases} = 431$, $N_{vars} = 15$, $N_{datasets} = 1,000$, $percent = 95$). The results indicated that the fourth eigenvalue from the principal components analysis (1.154) exceeded its random counterpart (1.152) but that the fifth eigenvalue did not (0.716 vs. 1.109).

Next, the MAP test is based on an analysis of residual correlation matrices. Specifically, the test involves computing the average squared partial correlation for a range of solutions reflecting an increasing number of factors; the optimal solution is the one that yields the lowest mean value. The MAP test on the current data indicated that the mean squared partial correlation decreased from the two-factor (.046) to the three-factor (.044) to the four-factor solution (.034), but then increased with the extraction of five (.048) and six (.061) factors. Consequently, the MAP test converged with the parallel analysis to indicate that four factors should be extracted.

The structure of extraversion. Next, we conducted a principal factor analysis, using squared multiple correlations as the initial communality estimates. Based on the results of the parallel analysis and MAP test, we extracted four factors and rotated them to oblique simple structure using promax (power = 3). This solution (shown in Table 1) yielded the hypothesized structure and closely replicated the results from two previous studies using this same basic strategy (Naragon-Gainey & Watson, 2014; Naragon-Gainey et al., 2009). We labeled these four factors Positive Emotionality (defined by such scales as NEO-PI-3 Activity and Positive Emotions, FI-FFM Positive Temperament, and HEXACO-PI-R Social Self-Esteem and Liveliness), Assertiveness (marked by NEO-PI-3 Assertiveness, HEXACO-PI-R Social Boldness, and FI-FFM Ascendancy and Frankness), Sociability (marked by NEO-PI-3 Gregariousness, FI-FFM Sociability, and HEXACO-PI-R Sociability), and Experience Seeking (defined by NEO-PI-3 Excitement Seeking and FI-FFM Venturesomeness), respectively. It is noteworthy that 14 of the 15 scales were clear, strong markers of a single factor, with loadings > .45; the only exception was that NEO-PI-3 Warmth split between Positive Emotionality (.52) and Sociability (.43).

Factor scores. We computed regression-based factor scores to model these four dimensions in subsequent analyses. Table 2 presents correlations between these factor scores. As would be expected, these facets of extraversion had moderate to strong positive correlations with one another, with coefficients ranging from .45 (between Experience Seeking and Positive Emotionality)

Table 1
Promax Factor Loadings of the Extraversion Scales

Scale	I	II	III	IV
HEXACO-PI-R Liveliness	.88	-.03	.01	-.03
FI-FFM Positive Temperament	.75	-.01	-.04	.28
HEXACO-PI-R Social Self-Esteem	.71	.12	-.00	-.14
NEO-PI-3 Positive Emotions	.71	.00	.12	-.00
NEO-PI-3 Warmth	.52	-.07	.43	-.08
NEO-PI-3 Activity	.49	.12	-.08	.26
NEO-PI-3 Assertiveness	.14	.82	-.02	-.05
FI-FFM Ascendancy	-.04	.76	.00	.21
HEXACO-PI-R Social Boldness	.01	.73	.21	-.14
FI-FFM Frankness	-.01	.50	-.11	.19
NEO-PI-3 Gregariousness	-.08	-.03	.83	.14
HEXACO-PI-R Sociability	.12	.08	.70	.02
FI-FFM Sociability	.09	.02	.69	.01
FI-FFM Venturesomeness	.00	.10	.15	.75
NEO-PI-3 Excitement Seeking	-.01	.00	.03	.73

Note. $N = 431$. Loadings $\geq |.40|$ are in bold. HEXACO-PI-R = HEXACO Personality Inventory—Revised; FI-FFM = Faceted Inventory of the Five-Factor Model; NEO-PI-3 = NEO Personality Inventory-3.

to .63 (between Sociability and Positive Emotionality). The average correlation was .55, indicating a strong level of association.

Table 2 also reports correlations between these facet scores and the four domain composites. Positive Emotionality clearly showed the strongest overlap with the other Big Five domains, displaying particularly strong associations with Conscientiousness ($r = .60$) and Neuroticism ($r = -.57$); no other facet-domain coefficient exceeded $|.40|$. These results indicate that the predictive power of Positive Emotionality will be most strongly affected by the inclusion of these domain scores in subsequent multivariate analyses.

Associations With Psychopathology

Overview. We report three series of analyses. First, we present bivariate relations with the individual extraversion facets. For the self-report psychopathology scales, these are standard Pearson product-moment correlations. For the dichotomous interview variables, however, we report polyserial correlations. Polyserial correlations estimate the linear association between two normally distributed latent continuous variables when one of the observed variables is ordinal and the other is continuous (Flora & Curran, 2004; Olsson, Drasgow, & Dorans, 1982). They retain the relative rank order information provided by Pearson correlations (i.e., the same scales will be relatively strong—or weak—predictors of particular variables) but are unaffected by differences in prevalence rates, thereby facilitating comparisons across dichotomous indicators of psychopathology. The interview variables were scored as 0 = *absent*, 1 = *present*, so that positive correlations indicate that higher scores on a factor were associated with an increased likelihood of receiving that rating.

To determine the unique incremental information provided by each extraversion facet, we report two series of regression analyses. In the initial series ("Series 1"), the four extraversion facets were included as

⁴ Kappas could not be computed for two low base-rate diagnoses—agoraphobia and mood disorder with psychotic features—because none of the rescored cases met criteria for these disorders.

Table 2
Correlations Among the Trait Scores

Factor	1	2	3	4	5	6	7	8
Extraversion facet scores								
1. Positive Emotionality	—							
2. Sociability	.63	—						
3. Assertiveness	.58	.56	—					
4. Experience Seeking	.45	.50	.55	—				
Big Five composites								
5. Neuroticism	-.57	-.32	-.35	-.20	—			
6. Openness	.31	.31	.32	.37	-.17	—		
7. Agreeableness	.37	.22	-.12	-.29	-.39	.06	—	
8. Conscientiousness	.60	.30	.31	.10	-.50	.14	.49	—

Note. $N = 431$. Correlations $\geq |.40|$ are in boldface.

predictors of each psychopathology measure; these analyses therefore establish the unique predictive power of each extraversion facet, controlling for the influence of the other three. The second, more stringent series ("Series 2") also included the domain composite scores in each analysis, such that there were a total of eight predictors overall (i.e., four extraversion facets and four domain scores); thus, these analyses also control for the influence of the remaining Big Five traits. For the self-report scales, we report standardized β weights from multiple regression analyses. For the dichotomous interview ratings, we present odds ratios (ORs) from logistic regression analyses. Note that an OR significantly less than 1.00 indicates that higher scores on a trait were associated with a reduced likelihood of receiving that rating (i.e., lower levels of psychopathology), whereas an OR significantly greater than 1.00 indicates that they were associated with an increased likelihood of receiving that rating (i.e., greater psychopathology).

Bivariate analyses. Correlations between the extraversion facets and psychopathology are reported in Tables 3 (self-ratings) and 4 (interview ratings). The results establish a striking degree of specificity in these associations. Overall, in fact, the correlations ranged from strongly negative ($r = -.63$ between Sociability and the Social Aloofness composite) to moderately positive ($r = .45$ between Experience Seeking and the Antagonism composite).

Positive Emotionality clearly showed the strongest and broadest associations with psychopathology in these analyses. Across the 47 analyses shown in Tables 3 and 4, Positive Emotionality had 28 correlations $\geq -.30$ (59.6%) and 18 coefficients $\geq -.40$ (38.3%). As predicted, it had the strongest overall associations with depression. Positive Emotionality had a substantial negative association with diagnoses of both dysthymic disorder ($r = -.45$) and MDD ($r = -.43$). At the symptom level, it showed particularly strong relations with depressive affect ($r = -.52$ with IDAS-II Dysphoria; $r = -.52$ and $-.51$ with interview ratings of depressed mood and worthlessness/guilt, respectively) and fatigue ($r = -.44$ with IDAS-II Lassitude; $r = -.54$ with interview ratings of fatigue); in contrast, it was more modestly related to sleep disturbance, psychomotor problems, and appetite disturbance (r s ranged from $-.12$ to $-.32$). Positive Emotionality also correlated moderately to strongly with social anxiety ($r = -.53$ with self-rated Social Anxiety; $r = -.43$ with social anxiety disorder diagnoses); the Social Aloofness ($r = -.52$) and Suspiciousness ($r = -.45$) composites; and diagnoses of mood disorder with psychotic features ($r = -.47$). Finally, it is noteworthy that 46 of its 47 associations (97.9%) were negative in direction; the

only exception is that it was positively related to IDAS-II Euphoria ($r = .26$). Thus, Positive Emotionality is an adaptive trait with broad, negative links to psychopathology.

Sociability also had substantial negative associations with psychopathology. It had 17 correlations $\geq -.30$ (36.2%) and six coefficients $\geq -.40$ (12.8%). Consistent with prediction, it displayed particularly strong associations with indicators of social anxiety and interpersonal withdrawal. Thus, it correlated strongly with the Social Aloofness composite ($r = -.63$), as well as with both self-rated symptoms ($r = -.51$) and diagnoses ($r = -.45$) of social anxiety disorder. It also had substantial relations with diagnoses of dysthymic disorder ($r = -.44$), mood disorder with psychotic features ($r = -.44$), and agoraphobia ($r = -.43$).

Assertiveness generally showed weak links to psychopathology. Across the 47 analyses, it had only four correlations $\geq |.30|$ (8.5%) and two $\geq |.40|$ (4.3%). As expected, it displayed consistently strong associations with both self-rated symptoms ($r = -.53$) and diagnoses ($r = -.46$) of social anxiety disorder; it also correlated negatively with the Social Aloofness composite ($r = -.31$). Finally, Assertiveness was moderately positively related to the Antagonism composite ($r = .32$)—and more weakly related to Disinhibition ($r = .15$)—establishing that it is associated with increased levels of some forms of externalizing.

Table 3
Correlations Between Extraversion Facet Factor Scores and Self-Rated Psychopathology

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
PHQ-9	-.51	-.33	-.19	-.15
IDAS-II Dysphoria	-.52	-.33	-.23	-.09
IDAS-II Lassitude	-.44	-.26	-.11	-.06
IDAS-II Suicidality	-.34	-.27	-.10	-.02
IDAS-II Insomnia	-.29	-.22	-.08	.02
IDAS-II Appetite Loss	-.30	-.24	-.14	-.04
IDAS-II Appetite Gain	-.12	-.06	-.04	.01
Social Anxiety composite	-.53	-.51	-.53	-.27
GADQ-IV	-.44	-.27	-.21	-.18
Panic composite	-.42	-.31	-.20	-.13
PTSD composite	-.34	-.21	-.13	-.07
Agoraphobia composite	-.26	-.28	-.29	-.29
IDAS-II Claustrophobia	-.24	-.27	-.11	-.08
OCD composite	-.21	-.22	-.11	.00
Psychoticism				
Social Aloofness composite	-.52	-.63	-.31	-.18
Suspiciousness composite	-.45	-.37	-.15	-.03
PID-5 Restricted Affectivity	-.30	-.34	-.12	.04
Dissociation composite	-.27	-.23	-.10	-.00
Positive Schizotypy composite	-.27	-.21	-.00	.10
IDAS-II Mania	-.17	-.11	-.00	.14
IDAS-II Euphoria	.26	.11	.25	.35
Externalizing				
Antagonism composite	-.05	.04	.32	.45
Disinhibition composite	-.14	-.03	.15	.40
Alcohol Use composite	-.13	-.08	-.01	.20
Drug Use Survey	-.07	-.07	.01	.15

Note. $N = 402$. Correlations $\geq |.30|$ are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; PHQ-9 = Patient Health Questionnaire-9; IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms; GADQ-IV = Generalized Anxiety Disorder Questionnaire-IV; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive-Compulsive Disorder; PID-5 = Personality Inventory for DSM-5.

Table 4
Polyserial Correlations Between Extraversion Facet Factor Scores and Interview Ratings

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
Dysthymic Disorder	-.45	-.44	-.23	-.30
Major Depressive Disorder	-.43	-.31	-.15	-.13
C1: Depressed mood	-.52	-.35	-.18	-.15
C2: Loss of interest	-.40	-.29	-.10	-.16
C3: Appetite disturbance	-.32	-.27	-.15	-.14
C4: Sleep disturbance	-.30	-.23	-.07	-.03
C5: Motor disturbance	-.32	-.26	-.11	-.09
C6: Fatigue/energy	-.54	-.33	-.21	-.24
C7: Worthlessness/guilt	-.51	-.35	-.22	-.13
C8: Cognitive problems	-.49	-.29	-.16	-.09
C9: Suicidal ideation	-.45	-.38	-.12	.00
Social Anxiety Disorder	-.43	-.45	-.46	-.27
GAD	-.34	-.16	-.13	-.03
Panic Disorder	-.30	-.23	-.17	-.27
PTSD	-.29	-.31	-.09	-.11
Agoraphobia	-.27	-.43	-.16	-.37
OCD	-.32	-.19	-.13	-.03
Psychoticism				
Psychotic Disorder	-.20	-.17	-.14	-.18
Mood Disorder–Psychotic	-.47	-.44	-.12	-.11
Mania	-.28	-.21	-.00	.07
Externalizing				
Alcohol Use Disorder	-.04	.03	.09	.35
Substance Use Disorder	-.07	.00	.10	.30

Note. $N = 401$. Correlations $\geq .1301$ are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; GAD = Generalized Anxiety Disorder; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive–Compulsive Disorder; Mood Disorder–Psychotic = Mood Disorder With Psychotic Features.

Finally, Experience Seeking provides an interesting contrast to the other traits. It had seven correlations $\geq .1301$ (14.9%); five of these associations were positive, indicating that higher scores on the trait were associated with elevated levels of psychopathology. Generally speaking, its strongest associations were with externalizing: It correlated substantially with self-ratings of Antagonism ($r = .45$) and Disinhibition ($r = .40$), as well as with diagnoses of alcohol use disorder ($r = .35$) and other substance use disorder ($r = .30$). It also correlated positively with IDAS-II Euphoria ($r = .35$). Its strongest negative associations were with dysthymic disorder ($r = -.30$) and with symptoms and diagnoses of agoraphobia ($r_s = -.29$ and $-.37$, respectively).

Series 1 regressions. Results from the initial series of regression analyses—in which the four extraversion facets jointly were used as predictors of psychopathology—are presented in Tables 5 (self-ratings) and 6 (interview ratings). Consistent with the bivariate results, Positive Emotionality clearly emerged as the strongest overall predictor of psychopathology in these analyses. It made a significant incremental contribution in 39 of the 47 regressions (83.0%), including all 18 analyses involving depression symptoms and diagnoses. Similar to the correlational results, 38 of these 39 significant effects (97.4%) were negative in direction, indicating that elevated Positive Emotionality was associated with reduced levels of psychopathology. Again, the sole exception was that it had a significant positive association with IDAS-II Euphoria ($\beta = .21$).

Sociability also had important negative links to psychopathology, making significant incremental contributions in 18 analyses overall (38.3%). It was a particularly strong predictor of self-rated symptoms, contributing significantly in 16 of 25 analyses (64.0%). Consistent with prediction, it added incrementally to self-rated social anxiety ($\beta = -.24$) and to the negative symptoms of schizotypy ($\beta = -.60$ and $-.39$ with the Social Aloofness composite and PID-5 Restricted Affectivity, respectively); however, its association with social anxiety disorder diagnoses failed to reach significance ($OR = 0.61$, $p < .13$).

Assertiveness provided significant incremental information in 11 analyses (23.4%). As would be expected—and consistent with the bivariate results—it had a significant negative association with both symptoms ($\beta = -.33$) and diagnoses ($OR = 0.54$) of social anxiety disorder. However, its other nine effects all represented positive links to psychopathology. Some of these associations are readily interpretable. For instance, as noted earlier, Assertiveness had significant positive correlations with both the Antagonism ($r = .32$) and Disinhibition ($r = .15$) composites at the bivariate level; it also contributed significantly to both variables in the multivariate analyses ($\beta = .35$).

Table 5
Standardized β Weights From Multiple Regression Analyses (Series 1)

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
PHQ-9	-.57	-.09	.15	.07
IDAS-II Dysphoria	-.58	-.09	.05	.19
IDAS-II Laisitude	-.56	-.07	.17	.13
IDAS-II Suicidality	-.35	-.21	.11	.19
IDAS-II Insomnia	-.34	-.16	.09	.20
IDAS-II Appetite Loss	-.29	-.15	.02	.16
IDAS-II Appetite Gain	-.16	-.00	.00	.08
Social Anxiety composite	-.26	-.24	-.33	.15
GADQ-IV	-.47	-.01	.07	.00
Panic composite	-.41	-.13	.06	.09
PTSD composite	-.39	-.04	.07	.09
Agoraphobia composite	-.07	-.10	-.12	-.15
IDAS-II Claustrophobia	-.16	-.26	.08	.08
OCD composite	-.16	-.22	.01	.18
Psychoticism				
Social Aloofness composite	-.28	-.60	.05	.22
Suspiciousness composite	-.47	-.28	.13	.25
PID-5 Restricted Affectivity	-.23	-.39	.06	.31
Dissociation composite	-.26	-.18	.05	.18
Positive Schizotypy composite	-.35	-.22	.17	.28
IDAS-II Mania	-.26	-.12	.06	.29
IDAS-II Euphoria	.21	-.23	.08	.32
Externalizing				
Antagonism composite	-.38	-.19	.35	.52
Disinhibition composite	-.38	-.16	.13	.59
Alcohol Use composite	-.21	-.13	-.03	.37
Drug Use Survey	-.10	-.15	.00	.27

Note. $N = 402$. Significant effects ($p < .05$) are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; PHQ-9 = Patient Health Questionnaire-9; IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms; GADQ-IV = Generalized Anxiety Disorder Questionnaire-IV; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive–Compulsive Disorder; PID-5 = Personality Inventory for DSM-5.

Table 6
Odds Ratios From Logistic Regression Analyses (Series 1)

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
Dysthymic Disorder	0.43	0.56	1.60	0.78
Major Depressive Disorder	0.36	0.76	1.51	1.13
C1: Depressed mood	0.26	0.81	1.60	1.16
C2: Loss of interest	0.40	0.78	1.77	0.91
C3: Appetite disturbance	0.60	0.75	1.22	1.02
C4: Sleep disturbance	0.53	0.74	1.34	1.26
C5: Motor disturbance	0.53	0.75	1.30	1.14
C6: Fatigue/anergia	0.27	0.99	1.54	0.86
C7: Worthlessness/guilt	0.29	0.80	1.27	1.35
C8: Cognitive problems	0.25	0.97	1.42	1.32
C9: Suicidal ideation	0.33	0.50	1.51	2.00
Social Anxiety Disorder	0.64	0.61	0.54	1.17
GAD	0.41	1.13	1.03	1.36
Panic Disorder	0.58	0.94	1.26	0.65
PTSD	0.63	0.49	1.59	1.11
Agoraphobia	0.99	0.31	1.87	0.56
OCD	0.43	0.89	1.09	1.44
Psychoticism				
Psychotic Disorder	0.72	0.95	1.07	0.77
Mood Disorder–Psychotic	0.34	0.33	2.06	1.63
Mania	0.47	0.60	1.59	1.74
Externalizing				
Alcohol Use Disorder	0.69	0.83	0.94	2.99
Substance Use Disorder	0.63	0.81	1.12	2.65

Note. $N = 401$. Significant effects ($p < .05$) are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; GAD = Generalized Anxiety Disorder; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive–Compulsive Disorder; Mood Disorder–Psychotic = Mood Disorder With Psychotic Features.

and .13, respectively). Thus, we see replicable evidence that Assertiveness is positively associated with some forms of externalizing. However, several other cases—such as those involving the PHQ-9, IDAS-II Lassitude, and Suspiciousness—appear to represent suppressor effects (Gaylord-Harden, Cunningham, Holmbeck, & Grant, 2010; Watson, Clark, Chmielewski, & Kotov, 2013), wherein weak, negative bivariate relations were transformed into significant positive associations in the regression results. These effects were not hypothesized and should be viewed with some caution.

Finally, Experience Seeking contributed significantly in 23 analyses (48.9%). It is noteworthy that 22 of these 23 effects (95.7%) represented positive associations; this includes all six analyses involving externalizing and all three regressions related to mania. Consequently, we see consistent evidence that the unique component of Experience Seeking is associated with elevated levels of externalizing and bipolar disorder. Its lone significant negative association was with self-rated Agoraphobia ($\beta = -.15$); Experience Seeking also was a negative predictor of agoraphobia diagnoses, but this effect only approached significance ($OR = 0.56, p < .08$).

Series 2 regressions. Results from the second series of regression analyses—in which the Big Five domain composites were included as additional predictors of psychopathology—are presented in Tables 7 (self-ratings) and 8 (interview ratings). As expected, the inclusion of the Big Five traits clearly reduced the overall predictive power of Positive Emotionality. Neverthe-

less, the facet still contributed significantly in 18 analyses (38.3%). Congruent with previous results, it displayed particularly strong associations with depression, contributing significantly in 11 of 18 analyses (61.1%). At the diagnostic level, it added to the prediction of MDD ($OD = 0.57$); at the symptom level, it was a consistent predictor of depressive affect ($\beta = -.27$ with IDAS-II Dysphoria; $OR = 0.36$ and 0.49 with interview ratings of depressed mood and worthlessness/guilt, respectively) and fatigue ($\beta = -.28$ with IDAS-II Lassitude; $OR = 0.32$ with interview ratings of fatigue). It also contributed incrementally in both analyses related to the negative symptoms of schizotypy ($\beta = -.14$ and $-.26$, respectively, with Social Aloofness and PID-5 Restricted Affectivity). Finally, it yielded four significant positive effects, including both analyses involving bipolar symptoms ($\beta = .48$ and $.18$ with IDAS-II Euphoria and Mania, respectively).

Sociability emerged as the strongest overall predictor of psychopathology in these analyses, adding significantly in 24 analyses (51.1%). As in the Series 1 regressions, it was a particularly strong predictor of self-rated symptoms, contributing significantly in 20 of 25 analyses (80.0%). Consistent with prediction—and with previous results—it added incrementally

Table 7
Standardized β Weights From Multiple Regression Analyses (Series 2)

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
PHQ-9	-.33	-.19	.26	.07
IDAS-II Dysphoria	-.27	-.19	.16	.17
IDAS-II Lassitude	-.28	-.14	.26	.10
IDAS-II Suicidality	-.18	-.22	.12	.12
IDAS-II Insomnia	-.07	-.19	.13	.13
IDAS-II Appetite Loss	-.11	-.16	.02	.09
IDAS-II Appetite Gain	.07	-.06	.06	.05
Social Anxiety composite	-.03	-.30	-.25	.14
GADQ-IV	-.22	-.11	.21	.04
Panic composite	-.13	-.18	.13	.05
PTSD composite	-.10	-.08	.14	.05
Agoraphobia composite	.23	-.11	-.07	-.21
IDAS-II Claustrophobia	.07	-.25	.09	.03
OCD composite	.04	-.20	.03	.15
Psychoticism				
Social Aloofness composite	-.14	-.58	.05	.17
Suspiciousness composite	-.10	-.25	.11	.09
PID-5 Restricted Affectivity	-.26	-.32	-.04	.20
Dissociation composite	.08	-.21	.08	.07
Positive Schizotypy composite	.02	-.22	.16	.12
IDAS-II Mania	.18	-.17	.12	.18
IDAS-II Euphoria	.48	-.17	.03	.20
Externalizing				
Antagonism composite	.05	-.05	.19	.22
Disinhibition composite	.13	-.20	.14	.40
Alcohol Use composite	.03	-.13	-.02	.29
Drug Use Survey	.16	-.18	-.00	.15

Note. $N = 402$. Significant effects ($p < .05$) are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; PHQ-9 = Patient Health Questionnaire-9; IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms; GADQ-IV = Generalized Anxiety Disorder Questionnaire-IV; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive–Compulsive Disorder; PID-5 = Personality Inventory for DSM-5.

Table 8
Odds Ratios From Logistic Regression Analyses (Series 2)

Measure	Pos Emot	Socia	Assert	Exper Seek
Internalizing				
Dysthymic Disorder	0.53	0.48	2.12	1.04
Major Depressive Disorder	0.57	0.64	1.83	1.15
C1: Depressed mood	0.36	0.65	2.03	1.32
C2: Loss of interest	0.55	0.69	1.96	0.88
C3: Appetite disturbance	0.81	0.73	1.24	0.89
C4: Sleep disturbance	0.90	0.66	1.47	1.07
C5: Motor disturbance	1.12	0.69	1.45	0.94
C6: Fatigue/anergia	0.32	0.75	2.03	0.96
C7: Worthlessness/guilt	0.49	0.63	1.62	1.41
C8: Cognitive problems	0.45	0.77	1.79	1.36
C9: Suicidal ideation	0.43	0.53	1.65	1.80
Social Anxiety Disorder	0.78	0.55	0.75	1.38
GAD	0.89	0.91	1.48	1.50
Panic Disorder	1.21	0.84	1.54	0.57
PTSD	1.19	0.54	1.74	0.80
Agoraphobia	1.96	0.32	2.09	0.44
OCD	0.57	0.85	1.63	2.04
Psychoticism				
Psychotic Disorder	1.24	1.02	0.86	0.47
Mood Disorder–Psychotic	0.52	0.25	4.49	3.55
Mania	1.55	0.45	2.28	1.36
Externalizing				
Alcohol Use Disorder	1.06	0.86	0.89	2.45
Substance Use Disorder	1.31	0.99	0.77	1.39

Note. $N = 401$. Significant effects ($p < .05$) are in bold. Pos Emot = Positive Emotionality; Socia = Sociability; Assert = Assertiveness; Exper Seek = Experience Seeking; GAD = Generalized Anxiety Disorder; PTSD = Posttraumatic Stress Disorder; OCD = Obsessive–Compulsive Disorder; Mood Disorder–Psychotic = Mood Disorder With Psychotic Features.

to self-rated social anxiety ($\beta = -.30$) and to the negative symptoms of schizotypy ($\beta = -.58$ and $-.32$, respectively, with the Social Aloofness composite and PID-5 Restricted Affectivity); however, its association with social anxiety disorder diagnoses only approached significance ($OR = 0.55$, $p < .07$).

Assertiveness had 22 significant effects (46.8%) in these analyses; only one of these represented a negative association. Once again, Assertiveness was inversely related to self-rated Social Anxiety ($\beta = -.25$); however, its association with diagnoses of social anxiety disorder now was nonsignificant ($OR = 0.75$, ns). As in the Series 1 regressions, many of its significant positive associations appear to represent suppressor effects that are difficult to interpret. Two notable exceptions are that Assertiveness again was a significant positive predictor of both the Antagonism ($\beta = .19$) and Disinhibition ($\beta = .14$) composites. Thus, the trait displays consistent positive links to some forms of externalizing.

Finally, Experience Seeking added significantly in 15 analyses (31.9%). Only three of these associations were negative. It is noteworthy, however, that the facet was a significant negative predictor of both symptoms ($\beta = -.21$) and diagnoses ($OR = 0.44$) of agoraphobia. With regard to its positive associations, Experience Seeking again was broadly related to externalizing and mania: It was a significant positive predictor in five of six analyses involving externalizing (the only exception was diagnoses of substance use disorder; $OR = 1.39$, ns) and in two of

three analyses related to mania (the sole exception involved diagnoses of mania; $OR = 1.36$, ns). Consequently, we see consistent evidence that the unique component of Experience Seeking is associated with elevated levels of externalizing and bipolar disorder.

Discussion

Summary and Integration of Results

Striking evidence of specificity. Our results establish a striking degree of specificity in the associations between extraversion and psychopathology. As noted earlier, the correlations ranged from strongly negative to moderately positive. Broken down by facet, our data reveal a particularly interesting pattern. Positive Emotionality (28 coefficients) and Sociability (17 coefficients) jointly produced 45 correlations $\geq .30$. All 45 coefficients were negative, establishing that these two components of extraversion largely are adaptive and generally are associated with better psychological functioning (albeit with a few exceptions that are discussed subsequently).

The data for Assertiveness and Experience Seeking offer a clear contrast. Assertiveness generally displayed weak associations with psychopathology. It only had four correlations $\geq .30$, and one of these was positive (with the Antagonism composite). Experience Seeking had seven coefficients $\geq .30$, and five of them (71.4%) represented positive associations. Clearly, these two facets yield patterns that are quite different from those observed with Positive Emotionality and Sociability. In particular, Experience Seeking is not clearly adaptive in character and, in fact, shows many positive associations with psychopathology.

What makes this pattern particularly interesting is that these facets all are moderately to strongly positively correlated with one another (see Table 2). Consequently, we have a curious situation in which positively related traits show highly divergent—and even in some cases opposite—associations with psychopathology. For instance, as shown in Table 3, the Disinhibition composite had significant positive links to Experience Seeking ($r = .40$) and Assertiveness ($r = .15$), a near zero correlation with Sociability ($r = -.03$), and a modest but significant negative association with Positive Emotionality ($r = -.14$).

In the following sections we summarize the relations for each individual facet. In discussing these findings, we focus primarily on associations that were consistent across all three sets of analyses (and, where applicable, across both self-report and interview ratings).

Positive Emotionality. Positive Emotionality showed considerable specificity in its relations. We hypothesized that it would show the strongest overall associations with depression; the results supported this prediction. At the bivariate level, Positive Emotionality had correlations $\geq -.30$ in 16 of 18 depression-related analyses (88.9%). It also made a significant incremental contribution in 29 of the 36 regressions (80.6%) involving depression. At the diagnostic level, it displayed robust associations with MDD. At the symptom level, it showed consistent associations with depressed mood, fatigue/lassitude, and suicidality that replicated across both self-report and interview ratings. Finally, it consistently was related to loss of interest, worthlessness/guilt, and cognitive problems in the interview data. Overall, our results are

congruent with previous evidence indicating that depression is associated with a particularly strong deficit in positive emotionality (Watson, 2009; Watson & Naragon-Gainey, 2010).

Positive Emotionality exhibited two other replicable effects. First, as predicted, it consistently was related to negative symptoms of schizotypy, as assessed by the Social Aloofness composite and the PID-5 Restricted Affectivity scale. Second, it had a significant positive association with IDAS-II Euphoria in all three analyses. This latter finding makes good sense, given that Euphoria assesses a pathological form of positive affect (Watson, Clark, et al., 2013; Watson et al., 2012). Thus, although high levels of positive emotionality generally are adaptive, the trait does show a replicable positive association with manic activation/elation.

Sociability. Sociability had particularly strong links to indicators of social dysfunction, especially in the self-report data. At the bivariate level, its three strongest associations were with the Social Aloofness composite, the Social Anxiety composite, and diagnoses of social anxiety disorder (r s ranged from $-.45$ to $-.63$). It maintained its significant associations with the self-report composites in the regression analyses; however, its relation with social anxiety disorder diagnoses became nonsignificant at the multivariate level due to the overlapping influence of competing traits such as Assertiveness. Other noteworthy effects were that Sociability was robustly related to (a) PID-5 Restricted Affectivity and (b) diagnoses of agoraphobia.

Its $-.63$ correlation with the Social Aloofness Composite—which was the strongest bivariate association in our data—merits some special attention. An inspection of the scales within the composite indicates that they tap content (e.g., PID-5 Withdrawal contains the item “I don’t like spending time with others”) that overlaps with that found on standard indicators of Sociability (e.g., the FI-FFM Sociability scale contains the item “I enjoy spending time with people”). Thus, this strong correlation does not simply represent an association between two different constructs but reflects, in part, the influence of shared content. Similar considerations also apply to many of the other associations we have examined.

Assertiveness. Of the four facets, Assertiveness clearly showed the weakest overall associations with psychopathology. Across the 47 individual analyses, Assertiveness produced only four correlations (8.5%) that were $|.30|$ or greater and only a few replicable associations. As expected, Assertiveness had a substantial negative association with both the Social Anxiety composite ($r = -.53$) and diagnoses of social anxiety disorder ($r = -.46$). It also consistently maintained these significant relations in the multivariate analyses, except that it failed to add to the prediction of social anxiety disorder diagnoses in the Series 2 regressions ($OR = 0.75, ns$).

The only other replicable effects were that Assertiveness had significant positive associations with both the Antagonism and Disinhibition composites in all three sets of analyses. Consequently, the trait displays robust positive associations with some forms of externalizing.

Experience Seeking. Experience Seeking showed one replicable negative association in our data. It had significant negative links to self-rated symptoms ($r = -.29$) and diagnoses ($r = -.37$) of agoraphobia at the bivariate level. These significant associations consistently were maintained in the multivariate analyses, except

that it failed to add significantly to the prediction of agoraphobia diagnoses in the Series 1 regressions ($OR = 0.56, p < .08$).

Unlike the other facets, however, Experience Seeking primarily exhibited positive links to psychopathology. Most notably, it displayed broad and robust associations with externalizing. At the bivariate level, it had significant positive associations with all six indicators of externalizing, with coefficients ranging from $.15$ to $.45$ (mean $r = .31$). Moreover, it yielded significant incremental effects in 11 of 12 regression analyses (91.7%); the sole exception was that it failed to predict substance use disorder diagnoses in the Series 2 regressions ($OR = 1.39, ns$). Taken together, our data establish that high levels of Experience Seeking are associated with a broad range of externalizing problems.

It also was positively related to self-rated bipolar symptoms. Experience Seeking had significant positive associations with both IDAS-II Euphoria ($r = .35$) and Mania ($r = .14$) at the bivariate level, and these relations remained significant in both sets of regressions. However, Experience Seeking was weakly and inconsistently related to mania diagnoses ($r = .07$). The fact that Experience Seeking was most strongly linked to IDAS-II Euphoria suggests that it specifically is related to the types of high arousal, reward seeking positive emotions that characterize bipolar disorder (Gruber, 2011).

Implications for Domain-Level Analyses

Our findings demonstrate the importance of examining personality–psychopathology relations at the specific lower order level. As noted earlier, Paunonen (2003) argued that if facets have very different criterion validities, they can largely cancel out each other’s influence when combined into domain-level scores. Our data provide some striking illustrations of this process, particularly in the area of externalizing. For example, the NEO-PI-3 Extraversion domain score correlated $.16$ with the Antagonism composite in our sample. Table 3, however, indicates this higher order association masks lower order correlations ranging from $-.05$ (Positive Emotionality) to $.45$ (Experience Seeking). Similarly, NEO-PI-3 Extraversion correlated $.12$ with diagnoses of alcohol use disorder, whereas the facet coefficients ranged from $-.04$ (Positive Emotionality) to $.35$ (Experience Seeking).

Moreover, facet data can play a valuable role in clarifying the nature of domain-level results. For instance, our results clearly establish that Experience Seeking is a robust positive predictor of externalizing psychopathology. As is shown in Table 1, the NEO-PI-3 (Experience Seeking) and FI-FFM (Venturesomeness) both contain clear markers of Experience Seeking, whereas the HEXACO-PI-R does not. Because of this, the HEXACO-PI-R Extraversion domain score can be expected to correlate somewhat differently with externalizing. Consistent with this expectation, HEXACO-PI-R Extraversion had a significant negative correlation ($r = -.13$) with the Disinhibition composite, whereas its counterparts in the NEO-PI-3 ($r = .09$) and FI-FFM ($r = .21$) did not. More generally, higher order scores invariably will reflect the influence of the specific facets that are used to create them (see McCrae, 2014), which will vary in nontrivial ways across instruments.

Limitations and Future Directions

This study has several strengths. First, we examined a broader range of psychopathology—including multiple measures of internalizing, psychoticism, and externalizing—than has been analyzed in previous facet-level research. It was particularly illuminating to be able to examine multiple indicators of both internalizing and externalizing in the same sample. Moreover, we were able to assess many forms of psychopathology using both self-reports and clinical interviews, which enabled us to establish the replicability of these associations across methods.

At the same time, however, our study has important limitations that need to be acknowledged. First, although our assessment of psychopathology was reasonably comprehensive, it still was incomplete. For example, our assessment of externalizing was somewhat limited, and we did not have interview measures of personality pathology. It therefore will be important for future research to examine extraversion facets in relation to additional symptoms and disorders.

Second, our study included only self-report measures of extraversion. In the future, it would be useful to supplement self-reports with informant ratings (see Connelly & Ones, 2010) or interview measures (e.g., Trull, Widiger, & Burr, 2001) of personality. In a related vein, it also will be helpful to supplement self-ratings and interview measures of psychopathology with other, more diverse methods (e.g., behavioral and biological markers; informant ratings).

Third, although we collected data over two different sessions separated by a relatively brief time interval, our study essentially was cross-sectional in nature. Longitudinal designs are needed to clarify the complex etiological bases of the relations between personality and psychopathology (Klein, Kotov, & Bufferd, 2011).

Fourth, our sample was unusual in several ways. For example, it included both outpatients and nonclinical participants. Moreover, its racial composition was atypical, consisting of roughly equal numbers of Blacks and Whites (and few others). Finally, more than half of our participants (55.2%) were unemployed. Consequently, it is unclear how well our results will replicate in other types of samples, including those more fully representative of the general population.

Despite these limitations, this study has helped to explicate how four facets of extraversion—Positive Emotionality, Sociability, Assertiveness, and Experience Seeking—are related to psychopathology. Our data have demonstrated an impressive level of specificity in these relations. Future work can build on these findings to articulate a more comprehensive framework for understanding how extraversion relates to psychopathology.

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