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Basic dimensions of temperament and their relation to anxiety and depression: A symptom-based perspective

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Abstract

We examine relations among neuroticism/negative emotionality (N/NE), extraversion/positive emotionality (E/PE), and the mood and anxiety disorders. We present data showing that E/PE correlates most strongly with anhedonia/depressed affect and social anxiety. Similarly, although N/NE is a general predictor of psychopathology, it correlates more substantially with subjective distress and dysphoria than with other types of dysfunction. Thus, it is most strongly related to disorders characterized by pervasive distress, moderately related to syndromes involving more limited forms of distress, and weakly related to disorders characterized primarily by behavioral avoidance. We demonstrate a similar pattern at the symptom level, examining the basic dimensions comprising PTSD, OCD, specific phobia, and depression. These systematic associations suggest a fundamental continuity between normal and abnormal psychological processes.

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1. Introduction

For several decades, studies of personality and psychopathology commingled in the pages of the old *Journal of Abnormal and Social Psychology*, which published the

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best basic research in social, personality, and clinical psychology. This integrative forum made it extremely easy for psychologists to keep abreast of ongoing developments in all of these fields. Beginning in 1965, however, the content of the old *Journal* was split between two serials: research in abnormal behavior was retained for the renamed *Journal of Abnormal Psychology*, whereas articles on personality and interpersonal processes were redirected to the newly created *Journal of Personality and Social Psychology*. Although this reorganization had many desirable consequences, it had the unfortunate effect of creating a chasm between studies of normal and abnormal behavior; the fields began to move further and further apart, so that eventually there was little connection between them (Watson & Clark, 1994).

In the 1990s, however, there was a renaissance of interest in the links between personality and psychopathology (Watson & Clark, 1994), and research in this area has flourished ever since. This line of research is important for several reasons, of which we will briefly mention three here. First, research in this area has identified important real-world correlates for many personality constructs, thereby demonstrating their predictive validity (Clark & Watson, 1995; Watson, *in press*). Indeed, we subsequently present evidence establishing that traits are strongly and systematically linked to psychopathology. Second, this research can play a key role in addressing basic diagnostic and taxonomic issues in psychopathology. Specifically, it can help to identify potential sources of comorbidity and to explicate the etiological bases of disorders. For example, as we discuss later, the broad trait of neuroticism/negative emotionality plays a key role in the comorbidity between the mood and anxiety disorders. Third, this research helps to clarify the boundaries of these domains by addressing the issue of continuity versus discontinuity: That is, do many of the maladaptive characteristics seen in clinical disorders represent pathologically extreme manifestations of basic personality processes, or are they fundamentally distinct phenomena (e.g., Widiger & Clark, 2000)? It is noteworthy that evidence of continuity indicates that these two domains are inherently interconnected, such that neither can be fully understood without reference to the other. We will revisit this issue after reviewing the relevant evidence.

2. The “Big Two” dimensions of temperament

In this paper, we will focus on two broad dimensions of individual differences. The basic traits of neuroticism and extraversion have been included in virtually every prominent trait model developed during the 20th century, and are key components in both the Big Three and the Big Five structures (Clark & Watson, 1999; Watson, Clark, & Harkness, 1994). Accordingly, these traits comprise a basic “Big Two” of personality.

As our understanding of these traits has increased, it has become clear that they represent basic dimensions of temperament (Clark & Watson, 1999). Two key features of temperaments are that they: (a) are at least partly attributable to innate biological factors and (b) have emotional processes as core, defining features (Digman, 1994). Allport (1937), for instance, stated that

Temperament refers to the characteristic phenomena of an individual's emotional nature, including his susceptibility to emotional stimulation, his customary strength and speed of response, the quality of his prevailing mood, and all peculiarities of fluctuation and intensity of mood; these phenomena being regarded as dependent on constitutional makeup and therefore largely hereditary in origin. (p. 54)

Neuroticism and extraversion clearly show both of these defining characteristics. First, Clark and Watson (1999) review extensive evidence establishing that both traits have a substantial genetic component. Heritability estimates based on twin studies typically fall in the .40 to .60 range, with a median value of approximately .50 (e.g., Eysenck, 1990; Finkel & McGue, 1997; Jang, Livesley, & Vernon, 1996; Plomin & Daniels, 1987). Adoption studies yield lower—yet still substantial—heritability estimates, but this may be due largely to their inability to model nonadditive genetic variance (Plomin, Corley, Caspi, Fulker, & DeFries, 1998).

Second, both traits have strong and systematic links to emotional experience. Specifically, neuroticism is strongly and broadly correlated with individual differences in negative affectivity, whereas extraversion is strongly associated with positive emotionality. For example, Watson, Wiese, Vaidya, and Tellegen (1999) analyzed combined samples with an overall sample size of 4457. They obtained a correlation of .58 between neuroticism and the trait form of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) Negative Affect scale. Extraversion had a parallel correlation of .51 with the trait form of the PANAS Positive Affect scale. In light of these strong associations, we will refer to these basic dimensions as neuroticism/negative emotionality (N/NE) and extraversion/positive emotionality (E/PE), respectively, in this paper.

3. The problem of comorbidity

In the remainder of this paper, we will examine how N/NE and E/PE are related to the mood disorders (which are characterized by prominent episodes of depression; American Psychiatric Association APA, 1994) and the anxiety disorders (which involve anxious mood and/or behavioral avoidance; APA, 1994). Interest in this topic has been stimulated by the key taxonomic problem of comorbidity. Comorbidity can be broadly defined as the co-occurrence of different disorders within the same individual (see Lilienfeld, Waldman, & Israel, 1994; Mineka, Watson, & Clark, 1998). The accumulating evidence indicates that N/NE and E/PE—particularly the former—are important vulnerability factors for psychopathology that are at least partly responsible for the comorbidity among disorders.

Comorbidity now is widely recognized to be a pervasive problem throughout the entire *Diagnostic and Statistical Manual of Mental Disorders* (DSM; APA, 1994) (Clark, Watson, & Reynolds, 1995; Widiger & Clark, 2000), including the mood and anxiety disorders (Mineka et al., 1998). We briefly note three types of comorbidity evidence. First, the mood disorders are strongly comorbid with the anxiety disorders,

and vice versa. For example, in analyses of lifetime *DSM-III-R* (APA, 1987) diagnoses in the National Comorbidity Survey (NCS), Kessler et al. (1996) reported that 58% of individuals with major depression also met criteria for a comorbid anxiety disorder. Conversely, most individuals with diagnosed anxiety disorders also meet criteria for depression (Clark, 1989; Mineka et al., 1998). Second, the various anxiety disorders are highly comorbid with each other (e.g., Brown, Campbell, Lehman, Gresham, & Mancill, 2001; Vollebergh et al., 2001). For instance, using lifetime diagnoses in the NCS data, Magee, Eaton, Wittchen, McGonagle, and Kessler (1996) reported that 74.1% of those with agoraphobia, 68.7% of those with simple phobia, and 56.9% of those with social phobia also met criteria for another anxiety disorder. Finally, the mood and anxiety disorders show extensive comorbidity with other types of psychopathology, including substance use disorders, somatoform disorders, eating disorders, and personality disorders (see Mineka et al., 1998).

4. Structural models of comorbidity

4.1. Earlier models

Why do we see such strong comorbidity between the mood and anxiety disorders? Drawing on extensive evidence from the basic mood literature, Watson, Clark, and Carey (1988) argued that these syndromes share a common component of general distress or negative affectivity. They further proposed that low levels of positive affectivity (i.e., anhedonia) were a specific feature of depression that distinguishes it from the anxiety disorders. Thus, in this two-factor model, general negative affectivity represents a nonspecific factor common to depression and anxiety, whereas low positive affectivity is a specific factor related primarily to depression.

Clark and Watson (1991) extended this model by proposing a second specific factor—physiological hyperarousal—that is relatively specific to anxiety. They therefore articulated a “tripartite model” that groups symptoms of anxiety and depression into three basic types. First, many symptoms are strong indicators of the general distress/negative affectivity dimension; this nonspecific group includes both anxious and depressed mood, as well as other symptoms (e.g., insomnia, poor concentration) that are prevalent in both the mood and anxiety disorders. In addition, however, each syndrome is characterized by its own cluster of symptoms: somatic tension and hyperarousal are unique to anxiety, whereas anhedonia/low positive affectivity are specific to depression.

This tripartite structure has received support in several studies (see Mineka et al., 1998; for a review). However, the accumulating data also exposed one crucial limitation of the model, namely, that it failed to account for the substantial heterogeneity among the anxiety disorders. Most notably, Brown, Chorpita, and Barlow (1998) found that the anxious arousal component of the tripartite model was not generally characteristic of the anxiety disorders, but instead represented the specific, unique component of panic disorder.

4.2. *The integrative hierarchical model*

4.2.1. *Basic features of the model*

In light of this evidence, Mineka et al. (1998) proposed an integrative hierarchical model that incorporated elements from both the tripartite model and Barlow's (1991; Zinbarg & Barlow, 1996) hierarchical organization of the anxiety disorders. In this expanded scheme, each individual syndrome is hypothesized to contain both a common and a unique component. Consistent with these earlier models, the shared component represents broad individual differences in general distress and negative affectivity; it is a pervasive higher order factor that is common to both the anxiety and mood disorders and primarily is responsible for the comorbidity problem that was discussed earlier. In addition, each disorder also includes a unique component that differentiates it from all of the others. For instance, anhedonia and low positive emotionality still comprise the specific, unique component of depression. In this revised model, however, anxious arousal no longer is viewed as broadly characteristic of anxiety, but instead assumes a more limited role as the specific component of panic disorder.

4.2.2. *Extending the model beyond the mood and anxiety disorders*

Mineka et al. (1998) discussed several additional points that are worth noting. First, consistent with the broader comorbidity evidence discussed previously, they argued that the influence of this general negative affectivity dimension was not restricted to the anxiety and mood disorders, but also characterized many other types of psychopathology. Among other things, they reviewed evidence establishing that elevated levels of N/NE are associated with a wide array of syndromes, including the substance use disorders, somatoform disorders, eating disorders, personality and conduct disorders, and schizophrenia (e.g., Krueger, Caspi, Moffitt, Silva, & McGee, 1996; Trull & Sher, 1994). In fact, consistent with this argument, Widiger and Costa (1994) concluded that “neuroticism is an almost ubiquitously elevated trait within clinical populations” (p. 81).

4.2.3. *E/PE and social phobia*

Second, Mineka et al. (1998) argued that “symptom specificity must be viewed in relative rather than absolute terms” (p. 398). Among other things, they acknowledged that low positive affectivity was not unique to depression, but also characterized schizophrenia, social phobia, and other disorders (see also Brown et al., 1998; Watson et al., 1988). Thus, E/PE is not simply associated with the mood disorders, but also shows systematic links with at least one common anxiety disorder (i.e., social phobia).

4.2.4. *Illustration using the NCS data*

We can illustrate both of these points using data from the National Comorbidity Survey (NCS; Kessler et al., 1994, 1996). The NCS participants constitute a national probability sample of American adolescents and adults between the ages of 15 and 54 (overall $N=8098$). Current and lifetime *DSM-III-R* (APA, 1987) diagnoses were obtained from each participant using the World Health Organization Composite

International Diagnostic Interview (CIDI; see Kessler et al., 1994, 1996). These data were collected between September 1990 and February 1992.

The NCS data have been widely reported and discussed in the clinical literature. However, it is less widely known that a subsample of the NCS participants ($N = 5533$) also were assessed on a series of personality scales. For our purposes, it is particularly noteworthy that the assessment battery included measures of neuroticism, extraversion, and openness (i.e., three of the Big Five traits), using adjective markers developed by Goldberg (1992); for more information regarding the personality measures included in the NCS, see <http://www.hcp.med.harvard.edu/ncs/update.htm>.

Table 1 reports correlations between these Goldberg scales and three diagnostic indexes, which were created using lifetime CIDI diagnoses: the presence versus absence of (a) any mood disorder (i.e., major depression, dysthymia, and bipolar disorder); (b) any anxiety disorder (i.e., generalized anxiety disorder, panic disorder, agoraphobia, social phobia, simple phobia, or posttraumatic stress disorder); and (c) any substance use disorder (i.e., alcohol abuse, alcohol dependence, drug abuse, or drug dependence). These diagnostic indexes were scored dichotomously (0, absent; 1, present), so that higher scores reflect significant psychopathology.

Table 1 indicates that Openness essentially is unrelated to all three classes of disorder, with correlations ranging from only $-.04$ to $.04$. In contrast, Extraversion has significant, modest correlations with both the mood disorders ($r = -.10$) and the anxiety disorders ($r = -.18$). Consistent with the findings reviewed by Mineka et al. (1998), this latter coefficient basically reflects the significant association between Extraversion and social phobia ($r = -.18$); in fact, Extraversion's correlations with the five remaining anxiety disorders ranged from only $-.03$ to $-.06$. Finally, replicating previous research (see Mineka et al., 1998), Neuroticism clearly has the strongest and broadest correlations with psychopathology: it is significantly correlated with all three classes of disorders, and shows particularly strong links to the mood disorders ($r = .30$) and the anxiety disorders ($r = .29$). Moreover, all three diagnostic indexes had significantly stronger correlations with Neuroticism than with Extraversion (z s ranged from 6.10 to 23.01; all $ps < .01$, two-tailed) and Openness (z s ranged from 3.61 to 17.61; all $ps < .01$, two-tailed).

4.2.5. Quantifying the link between N/NE and psychopathology

The NCS data also illustrate a third key point offered by Mineka et al. (1998) in their articulation of the integrative hierarchical model: although N/NE is significantly related to virtually all DSM disorders, it is more strongly linked to some syndromes than to others. More specifically, in light of the temperamental/affective basis of this dimension,

Table 1
Correlations between Basic Personality Traits and Presence versus Absence of Lifetime Diagnoses in the National Comorbidity Survey (NCS) Data

Diagnostic class	Neuroticism	Extraversion	Openness
Any mood disorder	.30	-.10	.03
Any anxiety disorder	.29	-.18	-.04
Any substance disorder	.11	-.02	.04

Note. $N = 5533$. Correlations of $|.04|$ and greater are significant at $p < .01$, two-tailed.

it makes sense that it is more strongly related to disorders with a substantial component of subjective distress than with disorders that primarily are characterized by thought disorder, social/occupational dysfunction, behavioral avoidance, or other types of dysfunction. Subjective distress is a key element in most of the mood and anxiety disorders; indeed, Clark, Watson, and Mineka (1994) collectively referred to them as the *distress disorders*. Thus, it is not surprising that Neuroticism had significantly stronger correlations with the mood and anxiety disorders than with the substance use disorders ($z_s = 11.58$ and 10.81 , respectively; both $ps < .01$, two-tailed) in the NCS data.

Furthermore, Mineka et al. (1998) summarize evidence indicating that the size of this subjective distress/general negative affectivity component differs markedly across the individual syndromes comprising the mood and anxiety disorders. Specifically, major depression and generalized anxiety disorder (GAD) both are distress-based disorders that clearly contain an enormous amount of this general factor variance. In contrast, many of the anxiety disorders are associated with significant—but more limited—types of negative affectivity. Individuals with these disorders do experience marked subjective distress, but this distress tends to be concentrated in either: (a) specific classes of situations (e.g., social phobia) or (b) temporally discrete episodes (e.g., panic disorder). Finally, some disorders (e.g., subtypes of specific phobia) primarily are characterized by behavioral avoidance and have relatively modest components of nonspecific negative affectivity.

This analysis, in turn, suggests that N/NE should correlate more strongly with distress-based disorders such as major depression and GAD than with anxiety disorders containing a more modest distress component. Gamez, Watson, and Doebbeling (2004) provide evidence supporting this idea in a large ($N = 563$) sample of military veterans who served during the 1991 Gulf War. The participants in this follow-up study were selected from a larger initial sample (Doebbeling et al., 2002; Simms, Watson, & Doebbeling, 2002) to investigate three common problems among Gulf War veterans: cognitive dysfunction, chronic widespread pain, and depression. Thus, approximately 62% of this follow-up group met criteria for at least one of these three conditions. Current diagnoses were obtained from all participants using the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1997). N/NE scores were assessed using the Negative Temperament scale from the Schedule for Nonadaptive and Adaptive Personality (SNAP; Clark, 1993). As expected, N/NE had significantly stronger correlations with major depression ($r = .38$), GAD ($r = .31$) and PTSD ($r = .35$) than with social phobia, panic disorder, agoraphobia, and specific phobia (r_s ranged from $.12$ to $.20$) (for the correlational comparisons, z_s ranged from 2.10 to 4.86 ; all $ps < .05$, two-tailed).

5. General symptom analyses

5.1. SCID symptom analyses

We can further explicate the links between personality and psychopathology by taking a more refined and detailed approach that focuses on specific types of anxiety

and depression symptoms. We will begin by reporting symptom results from two data sets that further establish the basic points that N/NE: (a) correlates more strongly with some types of psychopathology than others and (b) is a particularly strong predictor of distress and dysphoria.

The first data set involves the sample of Gulf War veterans that was described earlier (see also Gamez et al., 2004; Simms, Watson, & Doebbeling, 2003). Table 2 reports correlations between three SNAP scales—Negative Temperament (a marker of N/NE), Positive Temperament (a measure of E/PE) and Disinhibition (which assesses the final Big Three dimension of undercontrolled versus overcontrolled behavior)—and a broad array of symptoms derived from the SCID. Nine of these symptoms were taken from the SCID Screening Module, which assesses key symptoms of selected disorders using a three-point scale (1, absent/no; 2, subthreshold; and 3, present/yes). Seven of these questions are symptoms that directly relate to specific anxiety disorders (i.e., symptoms of panic, agoraphobia, social anxiety, specific phobias, obsessions, compulsions, and generalized anxiety). In addition, Table 2 reports data from the first two questions of the SCID current depressive episode module; these items assess the presence of depressed mood and anhedonia.

Several aspects of these data are noteworthy. First, N/NE again clearly emerges as the strongest, broadest predictor of psychopathology. However, the magnitude of its correlations varied widely, ranging from .00 to .41. As expected, it showed its strongest links with the distress-based symptoms of depressed mood, anhedonia/loss of interest, and nervousness/anxiety (r s ranged from .39 to .41); in fact, N/NE had significantly stronger correlations with these three symptoms than with all of the others (z s ranged from 2.06 to 6.89; all p s < .05, two-tailed). Consistent with previous research (Brown et al., 1998; Mineka et al., 1998), E/PE correlated most strongly with indicators of depression ($r = -.30$ and $-.28$ with depressed mood and loss of interest, respectively) and social phobia ($r = -.27$); these correlations were significantly higher

Table 2
Correlations between the Big Three Temperament Dimensions and SCID-based Symptoms in a Gulf War Veteran Sample

Symptom	Negative Temperament	Positive Temperament	Disinhibition
Depressed mood	.41**	-.30**	.19**
Loss of interest or pleasure	.40**	-.28**	.19**
Nervousness/anxiety	.39**	-.23**	.08
Panic attacks	.31**	-.13**	.07
Social anxiety	.30**	-.27**	.09*
Obsessive intrusions	.27**	-.02	.06
Agoraphobic fears	.23**	-.10*	.08
Specific phobias	.14**	-.07	.01
Compulsions	.12**	-.08	.05
Drug use	.08	-.05	.19**
Excessive drinking	.00	.03	.13**

Note. $N = 526$.

* $p < .05$, two-tailed.

** $p < .01$, two-tailed.

than those with all other symptoms (z s ranged from 2.66 to 5.35), with the exception of nervousness/anxiety (z s ranged from 0.75 to 1.65). Finally, disinhibition had relatively weak links to psychopathology, although it did show modest correlations with indicators of depression and substance abuse.

5.2. Analyses of the provisional IDAS anxiety scales

Next, we consider data collected as part of an ongoing assessment project that is designed to create a multidimensional inventory of depression and anxiety symptoms (the Iowa Depression and Anxiety Scales, or IDAS). These symptom scales are being developed through concurrent analyses of three different populations: (a) college students, (b) community-dwelling adults, and (c) psychiatric patients. Because data collection in the latter two samples is not yet complete, we present results here on preliminary versions of the scales that are based solely on college student responses.

We administered an extensive pool of anxiety symptoms to two large groups of undergraduates. The first group consisted of 499 University of Iowa students. The second group included students from both Iowa ($N=369$) and the University at Buffalo ($N=304$). All respondents rated the extent to which they experienced each item “during the past two weeks, including today” on a 5-point scale ranging from *not at all* to *extremely*. Factor analyses of these symptoms yielded five replicable dimensions, which were used to create provisional anxiety scales: Anxious Affect (6 items; e.g., “I felt afraid,” “I found myself worrying all the time”), Social Anxiety (9 items; e.g., “I felt shy and timid around other people,” “I found it difficult to make eye contact with people”), Anxious Arousal items (11 items; e.g., “I felt faint,” “I felt like I was choking”), Traumatic Memories (6 items; e.g., “I had memories of something scary that happened,” “I had nightmares that reminded me of something bad that happened”) and Obsessions/Compulsions (8 items; e.g., “I found myself checking things over and over again,” “I washed my hands excessively”). Scale reliabilities in the second sample ranged from .76 (for Obsessions/Compulsions) to .91 (for Social Anxiety), with a median value of .85. Correlations among the scales ranged from .38 to .62, with a median value of .53.

Table 3 presents correlations between these symptom scales and markers of N/NE and E/PE in the second sample. These respondents were assessed using two measures of each dimension. Specifically, they completed the Neuroticism and Extraversion scales of the Big Five Inventory (BFI; John & Srivastava, 1999), as well as trait versions of the Negative Affect and Positive Affect scales from the PANAS. Consistent with previous evidence, the N/NE correlations varied widely, ranging from .20 (Obsessions/Compulsions with BFI Neuroticism) to .64 (Anxious Affect with PANAS Negative Affect). As expected, both trait markers had significantly stronger correlations with Anxious Affect ($r=.62$ and $.64$ for BFI Neuroticism and PANAS Negative Affect, respectively) than with any other symptom scale (z s ranged from 2.01 to 12.83; all $ps < .05$, two-tailed). Thus, we again see that N/NE is a particularly strong predictor of distress. In contrast, N/NE had substantial—but somewhat lower—correlations with Social Anxiety, Traumatic Memories, and Anxious Arousal (coefficients ranged from .38 to .59, median $r=.49$). Finally, N/NE had significantly

Table 3

Correlations between neuroticism/negative emotionality and extraversion/positive emotionality and the provisional IDAS anxiety symptom scales

Symptom Scale	BFI neuroticism	PANAS Negative Affect	BFI extraversion	PANAS Positive Affect
Anxious Affect	.62	.64	–.25	–.27
Social Anxiety	.46	.59	–.50	–.35
Traumatic Memories	.41	.52	–.17	–.18
Anxious Arousal	.38	.52	–.16	–.19
Obsessions/Compulsions	.20	.37	–.12	–.09

Note. $N = 672$. All correlations are significant at $p < .05$, two-tailed. IDAS, Iowa Depression and Anxiety Scales. BFI, Big Five Inventory. PANAS, Positive and Negative Affect Schedule.

weaker correlations with Obsessions/Compulsions than with any other scale (z s ranged from 4.10 to 12.83).

The results for E/PE also generally replicate previous findings. Most notably, both trait markers had significantly stronger correlations with Social Anxiety than with any other symptom scale (z s ranged from 2.53 to 10.93). It also is interesting to note that BFI Extraversion ($r = -.50$) correlated significantly more strongly with Social Anxiety than did PANAS Positive Affect ($r = -.35$; $z = 4.47$, $p < .01$, two-tailed). This result is not surprising, given that the former scale contains a number of interpersonally-oriented items (e.g., “is outgoing, sociable,” “is reserved”) not included in the latter. At the same time, however, this finding highlights the fact that scales assessing extraversion/sociability and positive affectivity are not completely interchangeable and show somewhat different associations with psychopathology.

6. Symptom-based analyses of heterogeneous disorders

6.1. Overview

Symptom heterogeneity is a prominent feature of many mood and anxiety disorders. Indeed, we subsequently review evidence indicating that several of these disorders can be decomposed into multiple distinct symptom groups. We can enhance our understanding of the links between personality and psychopathology by examining the specific symptom dimensions that comprise these disorders. We consider evidence related to four disorders: posttraumatic stress disorder (PTSD), obsessive compulsive disorder (OCD), specific phobia, and major depression.

6.2. PTSD

In addition to defining a significance threshold for the traumatic event (i.e., Criterion A), the *DSM-IV* criteria for PTSD include three distinct clusters of symptoms, each of which must be present for the disorder to be diagnosed: Criterion B (intru-

sions and persistent re-experiencing of the trauma), Criterion C (numbing and avoidance of stimuli associated with the trauma), and Criterion D (symptoms of increased arousal). This tripartite organization has generated an extensive factor analytic literature on the structure of PTSD symptoms (for a review, see Simms et al., 2002). Although the results have varied across studies, most analyses have failed to support the 3-factor structure articulated in *DSM-IV*. For instance, Simms et al. (2002) conducted confirmatory factor analyses in samples of deployed Gulf War veterans and nondeployed controls, using symptoms obtained from the Military Version of the PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The same 4-factor structure provided the best fit in both samples. This structure consisted of: (a) a 5-item Intrusions factor that corresponds to the current Criterion B; (b) a small Avoidance dimension comprised of two of the Criterion C symptoms; (c) an 8-item Dysphoria factor consisting of several Criterion C and Criterion D symptoms; and (d) a small two-item Hyperarousal dimension.

These replicated factors were used to create symptom scales that generally showed good psychometric properties. For our purposes, the Dysphoria scale is especially interesting. Simms et al. (2002) established that this scale (which combines classic numbing symptoms with manifestations of autonomic arousal) was a nonspecific measure of subjective distress. In the deployed veteran sample, for instance, it correlated .80 and .63 with scales assessing depression and generalized anxiety, respectively; moreover, it actually correlated much more strongly with depression than with the other three PTSD symptom scales (*r*s ranged from .51 to .61). These results clearly suggest that N/NE should correlate more strongly with Dysphoria than with other types of PTSD symptoms. To test this prediction, we correlated scores on these four symptom scales with the Big Three scales of the SNAP (see Table 4). It should be noted that the SNAP was included in the subsequent follow-up assessment of these Gulf War veterans, such that there was a time lag of roughly six years between the administration of these two sets of scales. Consistent with our expectation, the SNAP Negative Temperament scale had a significantly stronger correlation with Dysphoria ($r = .45$) than with the other three PTSD symptom scales (*r*s ranged from .28 to .32, *z*s ranged from 3.93 to 4.67).

Table 4

Correlations between the Big Three temperament dimensions and PTSD symptom scales in a Gulf War veteran sample

Symptom Scale	Negative Temperament	Positive Temperament	Disinhibition
PCL total score	.44**	-.12**	.19**
<i>Symptom Dimensions</i>			
Dysphoria	.45**	-.13**	.20**
Intrusions	.32**	-.07	.11**
Hyperarousal	.30**	-.05	.12**
Avoidance	.28**	-.08	.14**

Note. $N = 573$. PTSD, posttraumatic stress disorder. PCL, PTSD Checklist.

* $p < .05$, two-tailed.

** $p < .01$, two-tailed.

These results demonstrate the value of decomposing heterogeneous disorders such as PTSD into their homogeneous symptom elements. Consistent with our previous findings, the Table 4 data again establish that N/NE is a stronger predictor of subjective distress (i.e., Dysphoria) than of other types of psychopathology (i.e., Intrusions, Hyperarousal, and Avoidance). It is especially noteworthy that these differential relations were maintained across the six-year interval separating the administration of the trait and symptom scales.

6.3. OCD

OCD subsumes a broad range of symptoms, and researchers in this area increasingly have recognized that the disorder is phenotypically—perhaps even genotypically—heterogeneous (Baer, 1994; Calamari et al., 2004; Eapen, Robertson, Alsobrook, & Pauls, 1997; Leckman et al., 1997; Summerfeldt, Richter, Antony, & Swinson, 1999). Recent structural analyses have documented the existence of at least four replicable symptom dimensions within existing measures of OCD. Leckman et al. (1997) first identified these symptom dimensions in a series of exploratory factor analyses, which revealed four replicable factors: (1) obsessions and checking, (2) symmetry and ordering, (3) cleanliness and washing, and (4) hoarding. Summerfeldt et al. (1999) subsequently demonstrated that this four-factor model fit the data well in a series of confirmatory factor analyses. Finally, these same four symptom dimensions—checking, washing, ordering, and hoarding—consistently have been identified in item-level analyses of the Obsessive-Compulsive Inventory (OCI; Foa, Kozak, Salkovskis, Coles, & Amir, 1998), the revised OCI (OCI-R; Foa et al., 2002), and the Schedule of Compulsions, Obsessions, and Pathological Impulses (SCOPI; Watson & Wu, in press) (see Foa et al., 2002; Watson & Wu, in press; Wu & Watson, 2003).

We have collected data relating scores on these four symptom dimensions to the Big Five in several samples of students enrolled in various psychology classes at the University of Iowa; findings from some of these samples have been reported elsewhere (Watson & Wu, in press; Watson, Wu, & Cutshall, 2004; Wu & Watson, in press). We assessed personality using different versions of the BFI. To eliminate differences in metric across these various forms of the instrument, we standardized the scores on a within-sample basis and then combined them to permit a single overall analysis ($N=1,815$). OCD symptoms were assessed using two self-report instruments: the SCOPI and the OCI-R. Both instruments contain clear markers of Checking (SCOPI Obsessive Checking, OCI-R Checking), Cleaning (SCOPI Obsessive Cleanliness, OCI-R Washing), Ordering (SCOPI Compulsive Rituals, OCI-R Ordering), and Hoarding (SCOPI Hoarding and OCI-R Hoarding). In the current sample, these scale pairs had convergent correlations of .72 (Checking), .65 (Cleaning), .63 (Ordering), and .77 (Hoarding). We therefore created four composites from these scale pairs by first standardizing the scale scores and then averaging them. We also used a parallel procedure to create an OCD Symptom Total index based on overall SCOPI and OCI-R scores.

Table 5 reports correlations between these OCD symptoms and the Big Five. Corroborating previous results, N/NE clearly showed the strongest, broadest associations with OCD. Furthermore, although it was significantly correlated with every

Table 5
Correlations between the Big Five and OCD symptoms in a combined student sample

Symptom Score	N	E	O	A	C
OCD Symptom Total	.40	-.14	-.07	-.15	-.01
<i>Symptom Dimensions</i>					
Checking	.39	-.17	-.07	-.14	-.03
Cleaning	.22	-.06	-.07	-.07	.07
Ordering	.26	-.07	-.12	-.09	.16
Hoarding	.26	-.09	.04	-.06	-.18

Note. $N = 1815$. Correlations of $|\geq .07|$ and greater are significant at $p < .01$, two-tailed. OCD, obsessive compulsive disorder. N, Neuroticism. E, Extraversion. O, Openness. A, Agreeableness. C, Conscientiousness.

symptom score, it had a significantly stronger association with Checking ($r = .39$) than with Cleaning ($r = .22$, $z = 8.35$), Ordering ($r = .26$, $z = 6.46$) and Hoarding ($r = .26$, $z = 5.53$). These results are consistent with previous findings indicating that Checking is more non-specific and shows greater overlap with other types of psychopathology (including dissociation and depression) than these other symptom dimensions (see Watson et al., 2004; Wu & Watson, in press). In sharp contrast, all other Big Five traits were weakly related to OCD; in fact, no other trait had a correlation as high as $|\geq .20|$. Nevertheless, Conscientiousness showed a very interesting pattern. It was completely unrelated to the overall OCD score ($r = -.01$); at the specific symptom level, however, it was significantly positively related to Ordering (i.e., conscientious individuals prefer organization to disorder), but was negatively associated with Hoarding (i.e., conscientious people prefer neatness to clutter). These results demonstrate the utility of assessing these symptom dimensions separately.

6.4. Specific Phobia

DSM-IV formally recognizes four subtypes of specific phobia: animal, natural environment (e.g., storms, heights, and water), blood-injection-injury, and situational (e.g., tunnels, bridges, elevators, and enclosed spaces). It is noteworthy, however, that this quadripartite scheme was not specifically derived from—nor was it supported by—any explicit structural evidence.

What, in fact, do the structural data show? Investigators have conducted dozens of factor analyses of multi-item phobia measures such as the Fear Survey Schedule-III (FSS-III; Wolpe & Lang, 1964). Although the results have been somewhat inconsistent, the data broadly converge on a four-factor solution (Arrindell, Pickersgill, Merckelbach, Ardon, & Cornet, 1991; J. Beck, Carmin, & Henninger, 1998; Muris, Schmidt, & Merckelbach, 1999). Three of these dimensions represent potential subtypes of specific phobia (the fourth factor typically assesses social anxiety/social phobia): (a) animal fears, (b) blood-injection fears, and (c) some combination of situational and/or agoraphobic fears. Thus, the evidence broadly supports the existence of three of the *DSM-IV* subtypes; the one obvious discrepancy is the failure to identify a distinct dimension corresponding to natural environment fears.

These studies are limited, however, in that older instruments such as the FSS-III may not contain enough potential markers to define a distinct natural environment factor. To address this limitation, Cutshall and Watson (2004) created a new instrument, the Phobic Stimuli Response Scales (PSRS). The PSRS item pool included content relevant to all four *DSM-IV* specific phobia subtypes, and so provides the first direct test of its quadripartite classification scheme. Analyses of the PSRS items revealed five replicable symptom dimensions, which were used to create the final version of the instrument. One scale (Social) assesses the interpersonal/evaluative fears characteristic of social phobia. The Animal and Blood-Injection scales clearly represent the animal and blood-injection-injury subtypes, respectively, of *DSM-IV*, which further supports their validity. The Bodily Harm scale is defined by items reflecting environmental fears (e.g., “I get nervous during thunderstorms”), as well as health-related concerns (e.g., “I fear that I will suffer an early death”). This factor subsumes the current natural environment subtype, but ultimately reflects a broader construct. Finally, Physical Confinement assesses situational/agoraphobic concerns; it includes such items as “I dislike crowded places” and “I would be terrified if locked in a small, dark room.”

Table 6 presents correlations between the PSRS and markers of N/NE and E/PE in two samples of students enrolled in an introductory psychology course at the University of Iowa. Summary results from one of these samples is reported in Study 2 of Cutshall and Watson (2004); the other group represents the Iowa portion of the second sample that was used to create the provisional IDAS scales (see our previous discussion of the Table 3 analyses). Participants in both samples were assessed on the

Table 6
Correlations between neuroticism/negative emotionality and extraversion/positive emotionality and the Phobic Stimuli Response Scales

PSRS Scale	BFI Neuroticism	PANAS Negative Affect	BFI Extraversion	PANAS Positive Affect
<i>Sample 1</i>				
Social	.48**	—	-.50**	—
Physical confinement	.33**	—	-.14*	—
Bodily Harm	.27**	—	-.05	—
Blood-injection	.19**	—	-.01	—
Animal	.17**	—	.08	—
<i>Sample 2</i>				
Social	.47**	.48**	-.54**	-.29**
Physical Confinement	.33**	.30**	-.16**	-.18**
Bodily Harm	.28**	.30**	-.05	-.08
Blood-injection	.12*	.17**	.02	-.05
Animal	.07	.06	.06	.01

Note. $N = 317$ (Sample 1), 358 (Sample 2). PSRS, Phobic Stimuli Response Scales. BFI, Big Five Inventory. PANAS, Positive and Negative Affect Schedule.

* $p < .05$, two-tailed.

** $p < .01$, two-tailed.

BFI Neuroticism and Extraversion scales; the Sample 2 respondents also completed trait versions of the PANAS scales.

Several aspects of these data are noteworthy. First, consistent with the evidence reviewed by Mineka et al. (1998), N/NE clearly shows a stronger association with social phobia (r s ranged from .47 to .48) than with specific phobia (r s ranged from .06 to .33); indeed, both N/NE markers had significantly stronger correlations with PSRS Social than with all other scales (z s ranged from 2.84 to 7.10). Furthermore, we also see consistent evidence of differential relations within the specific phobia scales. Specifically, both N/NE measures had stronger links with Physical Confinement and Bodily Harm (r s ranged from .28 to .33) than with Animal and Blood-Injection fears (r s ranged from .06 to .19), although the differences between Bodily Harm and these other scales failed to reach significance in Sample 1 (all other z s ranged from 2.17 to 4.19).

Consistent with previous results (e.g., Brown et al., 1998; Mineka et al., 1998), E/PE showed a negative association with social/interpersonal fears, but was very weakly related to the various subtypes of specific phobia. Both E/PE markers had significantly stronger correlations with PSRS Social than with all other scales (z s ranged from 2.16 to 10.81); moreover, Physical Confinement was the only other scale to correlate significantly with E/PE in any analysis. Finally, replicating the finding reported in Table 3, we again see that BFI Extraversion ($r = -.54$) correlated significantly more strongly with social/evaluative fears than did PANAS Positive Affect ($r = -.29$; $z = 5.52$, $p < .01$, two-tailed) in Sample 2.

6.5. Depression

Researchers usually assess depressive symptoms as a single undifferentiated dimension. However, factor analytic investigations of commonly-used measures, such as the Beck Depression Inventory (BDI; A. Beck & Steer, 1993), the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), and the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960), typically have yielded evidence of additional content dimensions beyond the general depression factor; this consistent finding strongly suggests that meaningful subfactors can be identified within this domain (e.g., Pancheri, Picardi, Pasquini, Gaetano, & Biondi, 2002; Schotte, Maes, Cluydts, DeDoncker, & Cosyns, 1997; Steer, Clark, Beck, & Ranieri, 1999).

We noted previously that we currently are developing the IDAS, which is designed to produce a multidimensional measure of depression and anxiety symptoms. Earlier, we described the development of provisional anxiety scales. Parallel analyses of a large pool of depression items in the same two samples have identified six replicable symptom factors, which we used to create provisional depression scales. The 15-item Depressed Affect scale is relatively broad and includes numerous items reflecting the core emotional and cognitive disturbances in depression (e.g., “I felt sad,” “I felt inadequate,” “I had trouble making up my mind,” “I blamed myself for things”). Four other scales are specific in nature and essentially define core symptoms of depression. Thus, Suicidal Ideation (8 items; e.g., “I thought about killing myself,” “I thought that the world would be better off without me”) measures thoughts of death

Table 7

Correlations between neuroticism/negative emotionality and extraversion/positive emotionality and the provisional IDAS depression symptom scales

Symptom Scale	BFI Neuroticism	PANAS Negative Affect	BFI Extraversion	PANAS Positive Affect
Depressed Affect	.62	.69	–.31	–.37
Lassitude	.42	.44	–.19	–.33
Suicidal Ideation	.33	.50	–.18	–.26
Insomnia	.27	.38	–.16	–.18
Loss of Appetite	.27	.32	–.13	–.17
Positive Mood	–.47	–.37	.38	.60

Note. $N = 672$. All correlations are significant at $p < .01$, two-tailed. BFI, Big Five Inventory. PANAS, Positive and Negative Affect Schedule.

and self-harm; Lassitude (9 items; e.g., “I felt too tired to do anything,” “I slept more than usual”) assesses fatigue and loss of energy; Insomnia (8 items; e.g., “I woke up frequently during the night,” “I woke up much earlier than usual”) assesses various sleep difficulties; and Loss of Appetite (5 items; e.g., “My appetite was poor,” “I did not feel like eating”) measures eating-related problems. The final scale, Positive Mood (14 items; e.g., “I felt cheerful,” “I felt really good about myself”) directly assesses positive emotional experiences. Scale reliabilities in the second sample ranged from .87 to .94, with a median value of .88; correlations among the scales ranged from $|.20|$ to $|.61|$, with a median value of $|.36|$.

Table 7 reports correlations between these scales and markers of N/NE and E/PE in the second sample. The N/NE results replicate two familiar findings. First, both markers of this trait were significantly related to all of the symptom measures. Second, the magnitude of these coefficients varied widely, ranging from $|.27|$ to $|.69|$. In light of previous evidence, one would expect N/NE to correlate most strongly with Depressed Affect, and this, indeed, was the case: BFI Neuroticism ($r = .62$) and PANAS Negative Affect ($r = .69$) both had a significantly stronger association with Depressed Affect than with any other IDAS scale (r s ranged from $|.27|$ to $|.50|$, z s ranged from 4.98 to 11.95). Thus, we again see clear evidence that N/NE is a stronger predictor of subjective distress and dysphoria than of other types of dysfunction.

Both E/PE markers also were significantly related to every symptom scale. Not surprisingly, they (especially the PANAS Positive Affect scale) correlated most strongly with the IDAS Positive Mood scale. Among the remaining scales, they showed the strongest association with Depressed Affect ($r = -.31$ and $-.37$ for Extraversion and Positive Affect, respectively); only one other coefficient (between Positive Affect and Lassitude) exceeded $|.30|$.

7. Conclusion

We have reviewed extensive evidence establishing that E/PE and N/NE both have important links to psychopathology in general, and to the mood and anxiety disorders in particular. The former dimension shows relatively specific associations with

psychopathology. Most notably, markers of E/PE are most strongly and consistently correlated with indicators of: (a) anhedonia/depressed affect (which are prominent features of major depression) and (b) social/interpersonal anxiety (the core symptom of social phobia).

Among the general dimensions of personality, N/NE is the strongest, broadest predictor of psychopathology. Indeed, elevated levels of N/NE have been linked to virtually all *DSM* disorders. At the same time, however, the accumulating data—including the evidence we have presented here—clearly establish that this trait is more strongly associated with some types of psychopathology than with others. As we have seen, N/NE correlates more strongly and consistently with subjective distress and dysphoria than with other types of dysfunction. Thus, among the mood and anxiety disorders, it is most strongly related to disorders characterized by chronic, pervasive distress (e.g., depression and GAD), moderately related to syndromes characterized by more specific and limited forms of distress (e.g., panic disorder, social phobia), and weakly related to syndromes characterized primarily by behavioral avoidance (e.g., the animal and blood-injection subtypes of specific phobia). We clarified these relations further by conducting additional analyses at the specific symptom level. Our data demonstrate that N/NE is differentially related to the heterogeneous symptom dimensions comprising: (a) PTSD, (b) OCD, (c) specific phobia, and (d) depression. These results reveal the same basic pattern: Once again, N/NE is a significantly better predictor of subjective distress (e.g., Depressed Affect) than of other types of symptoms (e.g., lassitude, insomnia).

These findings raise the fundamental issue of etiology—that is, what factor or factors are causally responsible for these observed relations between temperament and psychopathology? As has been frequently noted in this literature, there are three basic possibilities, each of which can be decomposed into more specific variants (for extended discussions of this issue, see Clark et al., 1994; Watson & Clark, 1995; Widiger & Trull, 1992). First, one could argue that temperament exerts a causal influence on psychopathology, either by increasing the likelihood that a person initially develops a disorder (the vulnerability model), or by affecting the subsequent course or severity of the disorder (the pathoplasty model). Second, one might posit that psychopathology influences an individual's emotional/personality characteristics, either temporarily (the complication model) or permanently (the scar model). Third, temperament and psychopathology both might reflect the same underlying processes, so that neither can be viewed as clearly causing the other. For instance, the common cause model posits that a shared etiological factor (e.g., a common genetic diathesis) gives rise to both temperament and psychopathology. Similarly, the spectrum model argues that normal and abnormal processes fall on the same underlying continua, such that individual differences in temperament essentially represent subclinical manifestations of psychopathology (e.g., high N/NE scores and low E/PE scores may reflect low levels of depression).

All three possibilities already have received at least some support in the literature. For instance, the available evidence strongly suggests that N/NE is a significant vulnerability factor in the development of depression. Clayton, Ernst, and Angst (1994), for example, followed a large cohort of males across a 16-year period; they found

that high premorbid levels of N/NE predicted the subsequent development of depression. Similarly, Clark et al. (1994) summarized evidence indicating that extremely low N/NE scores were associated with a reduced risk of later depression. Conversely, other data indicate that the occurrence of a depressive episode leads to elevated scores on measures of N/NE, although it is not yet clear whether this change is temporary or permanent (see Clark et al., 1994; Watson & Clark, 1995). Thus, we already have clear evidence of reciprocal influences between temperament and psychopathology.

For our purposes, it is especially noteworthy that twin studies strongly suggest that temperament and psychopathology reflect, in part, a shared genetic diathesis (see Mineka et al., 1998; Watson & Clark, 1995). For instance, in an analysis of nearly 4000 pairs of Australian twins, Jardine, Martin, and Henderson (1984) found that a single genetic factor was responsible for most of the observed overlap between N/NE and symptoms of depression and anxiety (see also Carey & DiLalla, 1994). Kendler, Neale, Kessler, Heath, and Eaves (1993) replicated these findings at the diagnostic level, reporting that major depression, GAD, and N/NE all could be linked to a common genetic diathesis. On the basis of these data, Kendler et al. (1993) argued that this shared genetic factor represents a general tendency to cope poorly with stress and, therefore, to experience frequent and intense episodes of distress and negative affect.

We began this article by raising the crucial issue of continuity versus discontinuity. The data we have reviewed here: (a) establish strong and systematic links between personality and psychopathology and (b) demonstrate a basic continuity between them. In light of this evidence, we can reject the assertion of a complete discontinuity between normal and abnormal processes: To some extent at least, they reflect common underlying mechanisms. Thus, we conclude that these two domains are intrinsically interconnected, such that neither can be fully appreciated without the other. This conclusion underscores the importance of this area of investigation. We hope that our findings will further enhance the renaissance of interest in this topic and will encourage personality researchers to investigate it more vigorously.

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