



## Emotions and the emotional disorders: A quantitative hierarchical perspective

David Watson<sup>1</sup>, Lee Anna Clark, and Sara M. Stasik  
(*University of Notre Dame, USA*)

**ABSTRACT.** Previous evidence has established that general negative affect represents a non-specific factor common to both anxiety and depression, whereas low positive affect is more specifically related to the latter. Little is known, however, about how specific, lower order affects relate to these constructs. We investigated how six emotional disorders—major depression, generalized anxiety disorder (GAD), posttraumatic stress disorder (PTSD), panic disorder, social phobia, and obsessive compulsive disorder—are linked to both general and specific types of affect in two samples ( $N_s = 331$  and  $253$ ), using the Expanded Form of the Positive and Negative Affect Schedule (PANAS-X). Replicating previous results, the *General Negative Affect* scale was nonspecifically related to the emotional disorders, whereas *General Positive Affect* had a specific (inverse) association with major depression. *Fear* emerged as the broadest predictor at the lower order level, showing strong and consistent associations with major depression, GAD, PTSD, and panic disorder. In contrast, three lower order scales—*Sadness*, *Guilt*, and *Joviality*—displayed clear specificity and were significant predictors of major depression. These results demonstrate the usefulness of examining affect-psychopathology relations at the specific, lower order level.

**KEYWORDS.** Major depression. Anxiety disorders. Negative affect. Positive affect. *Ex post facto* study.

**RESUMEN.** La evidencia anterior ha establecido que el afecto negativo representa un factor general que es común a la ansiedad y a la depresión, mientras que el afecto

<sup>1</sup> Correspondence: Department of Psychology, 118 Haggard Hall, University of Notre Dame, Notre Dame, IN, 46556 (USA). Email: db.watson@nd.edu

positivo bajo es más específicamente relacionado a la última. Sin embargo, poco es sabido sobre como los afectos específicos del nivel más bajo se relacionan con la depresión y estos constructos. Investigamos como seis trastornos emocionales –trastorno de depresión mayor, trastorno de ansiedad generalizada (TAG), trastorno por estrés postraumático (TEPT), trastorno de angustia, fobia social y trastorno obsesivo-compulsivo– están vinculados a los tipos generales y específicos del afecto en dos muestras ( $Ns = 331$  and  $253$ ), usando la forma ampliada de la escala de Afecto Positivo y Afecto Negativo (PANAS-X). Replicando resultados anteriores, la escala de *Afecto Negativo General* se relacionó con los trastornos emocionales de manera no específica, mientras que *Afecto Positivo General* tuvo una asociación específica (inversa) con la depresión mayor. El *miedo* fue el predictor más general al orden más bajo, mostrando asociaciones fuertes y consistentes con depresión mayor, TAG, TEPT, y trastorno de angustia. En cambio, tres escalas del orden más bajo –*Tristeza*, *Culpa* y *Jovialidad*– mostraron especificidad clara y fueron predictores significativos de la depresión mayor. Estos resultados muestran la utilidad de examinar las relaciones entre el afecto y la psicopatología al orden específico y más bajo.

**PALABRAS CLAVE.** Depresión mayor. Trastornos de ansiedad. Afecto negativo. Afecto positivo. Estudio *ex post facto*.

Our goal in this paper is to explicate the affective correlates of the unipolar mood and anxiety disorders. Interest in this topic burgeoned in the 1980s because of two key developments. First, starting in the 1970s, researchers reported strong associations between indicators of depression and anxiety across diverse samples; moreover, this finding was robust and generalizable across different methods, including self-reports and teachers', parents' and clinicians' ratings (Clark and Watson, 1991; Watson, O'Hara, and Stuart, 2008). Subsequent work in the 1980s established similarly strong comorbidity between Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnoses of the unipolar mood and anxiety disorders (Mineka, Watson, and Clark, 1998; Watson, 2009).

Second, research in the 1980s established the basic hierarchical structure of affective experience. Extensive evidence demonstrated the existence of two dominant higher order dimensions: *Negative Affect* and *Positive Affect* (Watson, Wiese, Vaidya, and Tellegen, 1999). *Negative Affect* is a general dimension of subjective distress and dissatisfaction that subsumes a broad range of negative mood states, including fear, sadness, anger and guilt. Its emergence in structural analyses reflects the fact that these various negative emotions significantly co-occur both within and across individuals. Similarly, the general *Positive Affect* dimension reflects important co-occurrences among various positive mood states; for example, someone who is happy also will report feeling energetic, confident, and alert. These higher order factors have been identified in both intra- and interindividual analyses, and they emerge consistently across diverse sets of descriptors, time frames, response formats, and languages (Watson and Clark, 1997, 1999; Watson *et al.*, 1999).

It must be emphasized, however, that emotional experience cannot be reduced to these two general dimensions. In fact, structural studies consistently have identified

specific content factors that correspond to discrete emotions such as sadness, fear, anger and joy (Tellegen, Watson, and Clark, 1999; Watson and Clark, 1992, 1999). This has led to the articulation of a hierarchical model of affect in which these higher order factors are each composed of several correlated —yet ultimately distinguishable— emotional states (Tellegen *et al.*, 1999; Watson and Clark, 1992). For instance, the higher order negative affect dimension can be decomposed into specific emotions such as sadness/depression, fear/anxiety, and anger/hostility. In this hierarchical model, the lower level reflects the specific content (and distinctive qualities) of individual affects, whereas the upper level reflects their valence (*i.e.*, whether they represent positive or negative states).

#### *The two-factor affective model of anxiety and depression*

This hierarchical model provides a valuable framework for understanding the comorbidity data discussed earlier. Watson, Clark, and Carey (1988) argued that this general *Negative Affect* dimension was largely responsible for the substantial overlap/comorbidity between depression and anxiety. Phrased differently, because specific emotions share a common component of general negative affect, this higher order factor produces strong correlations among different types of negative emotion, including sad/depressed affect (a core feature of major depression) and fearful/anxious affect (a key element of the anxiety disorders).

How, then, can depression and anxiety be distinguished? Extensive data establish that the higher order *Positive Affect* factor has stronger (negative) associations with depression than with anxiety (Watson, 2009; Watson and Naragon-Gainey, 2010). Watson *et al.* (1988) therefore proposed that low levels of positive affectivity are a specific feature of depression that distinguishes it from anxiety. Thus, in this two-factor model, *Negative Affect* represents a non-specific dimension that is common to depression and anxiety, whereas low *Positive Affect* is a specific factor that is related primarily to depression.

#### *Supportive evidence at the higher order level*

This two-factor model has received extensive support. Numerous studies have shown that negative affect measures are related broadly and nonspecifically to indicators of both depression and anxiety (*e.g.*, Mineka *et al.*, 1998; Watson *et al.*, 1988). Kotov, Gamez, Schmidt, and Watson (2010) reported particularly striking meta-analytic evidence for neuroticism, a personality trait that essentially reflects individual differences in negative affectivity (Watson *et al.*, 1999). Kotov *et al.* compared the mean neuroticism scores of individuals with and without various emotional disorders. Neuroticism displayed large effect sizes (expressed as Cohen's *d*; Cohen, 1988) with every analyzed disorder; for example, *ds* (corrected for unreliability) ranged from 1.33 to 2.25 for major depression, social phobia, panic disorder, generalized anxiety disorder (GAD), obsessive-compulsive disorder (OCD), and posttraumatic stress disorder (PTSD).

Moreover, positive affect measures consistently correlate negatively with depressed mood and symptomatology and are related more weakly to indicators of anxiety (Mineka *et al.*, 1998; Watson and Naragon-Gainey, 2010). One partial exception, however, is that

low positive affect shows consistent negative associations with social anxiety/social phobia (Kashdan, 2007; Naragon-Gainey, Watson, and Markon, 2009). Low positive affectivity also is consistently linked to negative symptoms of schizophrenia/schizotypy (Watson and Naragon-Gainey, 2010). Thus, Watson and Naragon-Gainey recently concluded that «the reviewed data establish that low levels of positive affect are a distinguishing feature of depression, social anxiety and schizophrenia/schizotypy» (pp. 846-847). They further added that «a more limited range of evidence suggests that indicators of positive affect are more strongly and systematically linked to depression than to these other syndromes» (p. 847).

#### *Limited evidence at the lower order level*

Unfortunately, the available data are limited almost entirely to the higher order dimensions. Indeed, Watson and Naragon-Gainey (2010) concluded their review by calling for «a more intensive assessment strategy» (p. 847) that explicates the psychopathological correlates of specific types of positive affect.

Regarding specific negative affects, there is limited evidence based on the Revised NEO Personality Inventory (Costa and McCrae, 1992), which includes facet scales assessing anxiety, depression and angry hostility. For example, Bienvenu *et al.* (2004) reported that lifetime diagnoses of major depression, GAD, OCD, panic disorder and social phobia were associated with significantly higher levels of both depression and anxiety. In contrast, angry hostility scores were elevated in major depression, panic disorder, and social phobia, but not in GAD or OCD. Rector, Hood, Richter, and Bagby (2002) found that patients with OCD scored significantly higher on anxiety, whereas depressed individuals had significantly higher scores on depression; no differences were observed on angry hostility. Thus, these data provide some limited evidence of specificity.

#### *The current study*

Given this limited evidence, the primary goal of this *ex post facto* study (Montero and León, 2007; Ramos-Álvarez, Moreno-Fernández, Valdés-Conroy, and Catena, 2008) is to examine how specific lower order affects are related to the unipolar mood and anxiety disorders. Because of our focus on affective experience, we will not consider other important, more physiologically based dimensions that are related to these disorders, such as the hyperarousal component of the tripartite model (Clark and Watson, 1991; Mineka *et al.*, 1998).

We will examine relations with six DSM-IV disorders (American Psychiatric Association, 2000)—major depression, GAD, PTSD, panic disorder, social phobia, and OCD—using the Expanded Form of the Positive and Negative Affect Schedule (PANAS-X; Watson and Clark, 1999) to assess affect. The PANAS-X contains scales assessing the higher order dimensions of *Positive and Negative Affect*. In addition, it measures four specific negative emotions (fear, sadness, guilt, hostility) and three types of positive affect (joviality, self-assurance, attentiveness). The PANAS-X also assesses four mixed affective states (shyness, fatigue, serenity, surprise) that we do not consider here.

We examined these relations in two groups of outpatients who completed the PANAS-X using different time instructions. Specifically, patients in the first sample rated their trait affectivity, whereas those in the second sample described their emotional experiences over the previous week. Consequently, our design allows us to focus on robust, replicable associations that emerged in both samples.

In light of the limited available evidence, we made no formal predictions. However, given that sad, depressed mood (Criterion 1) and guilt (Criterion 7) both are part of the symptom criteria for major depression in DSM-IV (American Psychiatric Association, 2000), one would expect sadness and guilt to show particularly strong associations with this disorder. Conversely, considering the central importance of fearful/anxious affect in the anxiety disorders (*e.g.*, Watson *et al.*, 2008), one would expect these syndromes to be particularly strongly related to the PANAS-X *Fear* scale.

## Method

### *Participants and procedure*

Watson, O'Hara, Chmielewski, *et al.* (2008) report results on a sample of 605 patients. Here, we analyze the data from these participants as two separate subgroups, depending on whether they completed the PANAS-X using general, trait instructions (Sample 1;  $N = 331$ ) or «past week» instructions (Sample 2;  $N = 253$ ). We chose to analyze these subgroups separately here because state and trait measures might show somewhat different associations with disorders (specifically, one might expect state affect scales to display somewhat stronger associations with current diagnoses). Sample 1 consisted of 225 women and 106 men, whose average age was 42.21 years ( $SD = 13.39$ , range = 18-83). Sample 2 included 154 women and 99 men; their average age was 41.18 years ( $SD = 13.12$ , range = 18-76). Participants in both groups were predominantly White (90% across the two samples). The participants were recruited from the Community Mental Health Center of Mideastern Iowa, the Adult Psychiatry Clinic at the University of Iowa Hospital and Clinics, and the Seashore Psychology Clinic in the Department of Psychology at the University of Iowa. Patients at these sites were individually approached and recruited. They were assessed in small group sessions and were paid for their participation. For details regarding their recruitment, see Watson, O'Hara, Chmielewski, *et al.* (2008).

### *Measures*

- The PANAS-X (Watson and Clark, 1999) is a factor analytically derived measure of emotional experience. As noted, Sample 1 participants were administered the trait version of the instrument, which asked them to indicate on a 5-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*) «to what extent you generally feel this way, that is, how you feel on the average»; participants in Sample 2 were asked to indicate «to what extent you felt this way during the past week.» The PANAS-X includes two 10-item scales that measure the higher order dimensions of *General Negative Affect* (*e.g.*, afraid, irritable, upset) and *General Positive Affect* (*e.g.*, active, alert, interested). It also contains four scales measuring

specific negative emotions that are strong markers of the higher order *Negative Affect* dimension (Watson and Clark, 1997, 1999): *Fear* (6 items; e.g., scared, nervous), *Sadness* (5 items; e.g., blue, lonely), *Guilt* (6 items; e.g., ashamed, angry at self), and *Hostility* (6 items; e.g., angry, scornful). In addition, three scales assess positive emotions that are strongly linked to the general *Positive Affect* factor: *Joviality* (8 items; e.g., happy, enthusiastic), *Self-Assurance* (6 items; e.g., proud, confident), and *Attentiveness* (4 items; e.g., alert, concentrating). The PANAS-X scales all are internally consistent (Watson and Clark, 1999). Across the two samples, coefficient alphas for the *General Positive Affect* and *Negative Affect* scales ranged from .90 to .91. Coefficient alphas for the specific affect scales ranged from .75 (*Attentiveness*) to .93 (*Joviality*) in Sample 1, and from .77 (*Attentiveness*) to .94 (*Joviality*) in Sample 2.

- SCID-IV. Current DSM-IV diagnoses were assessed using the Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, and Williams, 1997). The interviewers were staff members who had masters' level training in clinical/counseling psychology or public health (see Watson, O'Hara, Chmielewski, *et al.*, 2008, for further details). Table 1 presents prevalence data for the six analyzed disorders in each sample.

**TABLE 1.** Prevalence of mood and anxiety disorder diagnoses in the two samples.

Diagnosis	Sample 1		Sample 2	
	Cases	% of Sample	Cases	% of Sample
Major depression	141	42.60	105	41.50
GAD	78	23.56	49	19.37
PTSD	45	13.60	34	13.44
Panic disorder	33	9.97	34	13.44
Social phobia	34	10.27	45	17.79
OCD	27	8.16	28	11.07

*Note.* GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder.

To assess interrater reliability, the interviews were audiotaped; 76 tapes were scored independently by a second interviewer. All diagnoses showed good to excellent interrater reliability (Watson, O'Hara, Chmielewski, *et al.*, 2008). Specifically, the kappas were .95 (major depression), .93 (OCD), .87 (social phobia), .86 (PTSD), .84 (panic disorder), and .70 (GAD).

## Results

### *Higher order relations with psychopathology*

*Bivariate analyses.* We first examine relations at the higher order level. In examining scale-diagnosis relations, a problem with standard Pearson product-moment correlations is that they are substantially influenced by the differential base rates of various disorders;

specifically, they will be inflated for more common diagnoses and will be attenuated for less prevalent syndromes, regardless of the true strength of the relations (Kotov *et al.*, 2010; Watson, O'Hara, Chmielewski *et al.*, 2008). Accordingly, Table 2 presents polychoric correlations between the general dimension scales and DSM-IV diagnoses in each sample. Polychoric correlations estimate the associations between normally distributed latent continuous variables (Flora and Curran, 2004; Schmukle and Egloff, 2009). They retain the rank order information provided by Pearson correlations (*i.e.*, the same affect scales will be relatively strong—or weak—predictors of particular diagnoses), but are unaffected by differences in prevalence rates, thereby facilitating cross-diagnosis comparisons. Diagnoses were scored as 0 (*absent*) and 1 (*present*), so that positive correlations indicate that higher scores on a scale are associated with an increased likelihood of receiving the diagnosis.

**TABLE 2.** Polychoric correlations between the PANAS-X general dimension scales and SCID diagnoses.

<i>Scale</i>	<i>MDD</i>	<i>GAD</i>	<i>PTSD</i>	<i>Panic disorder</i>	<i>Social Phobia</i>	<i>OCD</i>
Sample 1						
General NA	<b>.61*</b>	<b>.54*</b>	<b>.42*</b>	<b>.54*</b>	.27*	.29*
General PA	<b>-.44*</b>	-.13	-.10	-.21*	-.16	-.10
Sample 2						
General NA	<b>.60*</b>	<b>.50*</b>	<b>.50*</b>	<b>.47*</b>	<b>.40*</b>	<b>.42*</b>
General PA	<b>-.52*</b>	<b>-.40*</b>	-.18	-.23*	-.14	-.24*

*Note.*  $N = 331$  (Sample 1),  $253$  (Sample 2). Correlations of  $|\text{.40}|$  and greater are in bold. MDD = major depression, GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder.

\* $p < .05$

Consistent with previous research, the *General Negative Affect* scale shows relatively broad and nonspecific associations with the emotional disorders in these samples. It has polychoric correlations of .40 or greater in 10 of 12 cases, displaying consistently strong associations with major depression, GAD, PTSD, and panic disorder (polychoric  $r$ s ranged from .42 to .61). As expected, *General Positive Affect* exhibits much greater specificity: It has a moderate to strong negative association with major depression ( $r = -.44$  and  $-.52$  in Samples 1 and 2, respectively), but is much more weakly related to the anxiety disorders ( $r$ s range from  $-.10$  to  $-.40$ , mean coefficient =  $-.19$ ). Indeed, only 1 of its 10 anxiety disorder correlations exceeds  $-.25$  (*viz.*, GAD in Sample 2). Thus, our data provide further support for the two-factor model proposed by Watson *et al.* (1988): the *Negative Affect* dimension is nonspecifically related to both anxiety and depression, whereas low *Positive Affect* is relatively specific to the latter.

*Multivariate analyses.* Next, we conducted a series of logistic regression analyses to identify the unique, incremental predictive power of the individual affect scales for each disorder. To facilitate interpretation, the affect scales were standardized to put them on the same metric.



**TABLE 3.** Odds ratios from logistic regression analyses of the general dimension scales.

<i>Scale</i>	<i>MDD</i>	<i>GAD</i>	<i>PTSD</i>	<i>Panic disorder</i>	<i>Social phobia</i>	<i>OCD</i>
Sample 1						
Negative affect	<b>3.08</b>	<b>2.79</b>	<b>2.19</b>	<b>3.11</b>	<b>1.50</b>	<b>1.72</b>
Positive affect	<b>.52</b>	1	1.02	.87	.82	.94
Sample 2						
Negative affect	<b>3.38</b>	<b>2.51</b>	<b>2.79</b>	<b>2.55</b>	<b>2.16</b>	<b>2.16</b>
Positive affect	<b>.39</b>	<b>.53</b>	.86	.81	.92	.70

*Note.*  $N = 331$  (Sample 1), 253 (Sample 2). Significant effects ( $p < .05$ ) are in bold. MDD = major depression. GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder.

Table 3 presents the odds ratios (ORs) from these logistic regressions. These results yield the same basic conclusions as the bivariate analyses. *General Negative Affect* clearly emerges as a strong and nonspecific predictor of the emotional disorders, and is associated with significantly higher ORs in all 12 analyses. In marked contrast, the *General Positive Affect* scale again shows far greater specificity: It contributes significantly to major depression in both samples, but is unrelated to the anxiety disorders in 9 of 10 analyses; the sole exception to this pattern again involves GAD in Sample 2. These findings offer further support for the two-factor model proposed by Watson *et al.* (1988).

#### *Lower order relations with psychopathology*

*Bivariate analyses.* We now consider relations at the lower order level. Table 4 presents polychoric correlations between the DSM-IV diagnoses and the PANAS-X specific affect scales. Looking first at the negative affects, Table 4 establishes that Fear has broad, nonspecific associations with the emotional disorders that closely resemble the pattern observed for *General Negative Affect*. It has polychoric correlations of .40 or greater in 10 of 12 instances; it displays consistently strong associations with major depression, GAD, PTSD, and panic disorder ( $r$ s range from .45 to .59). It is noteworthy, moreover, that it is the strongest single predictor of the anxiety disorders in 9 of 10 analyses (the one exception involves social phobia in Sample 1). Having said that, however, it is surprising that its strongest associations actually are with major depression in both samples ( $r = .59$  and  $.58$  in Samples 1 and 2, respectively), rather than with an anxiety disorder.



**TABLE 4.** Polychoric correlations between the PANAS-X specific affect scales and SCID diagnoses.

<i>Scale</i>	<i>MDD</i>	<i>GAD</i>	<i>PTSD</i>	<i>Panic disorder</i>	<i>Social phobia</i>	<i>OCD</i>
Sample 1						
Fear	<b>.59*</b>	<b>.54*</b>	<b>.45*</b>	<b>.56*</b>	.21*	.26*
Sadness	<b>.62*</b>	.37*	.35*	<b>.47*</b>	.29*	.25*
Guilt	<b>.60*</b>	.39*	.37*	<b>.50*</b>	.23*	.20*
Hostility	.38*	.32*	.33*	.32*	.21*	.13
Joviality	<b>-.41*</b>	-.17*	-.10	-.20*	-.15	-.23*
Self-Assurance	-.26*	-.07	-.01	-.11	-.09	-.09
Attentiveness	<b>-.41*</b>	-.13	-.11	-.14	-.17	-.02
Sample 2						
Fear	<b>.58*</b>	<b>.46*</b>	<b>.53*</b>	<b>.50*</b>	<b>.44*</b>	<b>.46*</b>
Sadness	<b>.66*</b>	.37*	.36*	.32*	.25*	.29*
Guilt	<b>.64*</b>	<b>.41*</b>	<b>.40*</b>	<b>.44*</b>	.39*	<b>.40*</b>
Hostility	<b>.40*</b>	<b>.40*</b>	.29*	.31*	.26*	<b>.40*</b>
Joviality	<b>-.61*</b>	<b>-.41*</b>	-.26*	-.30*	-.16	-.26*
Self-Assurance	<b>-.44*</b>	-.31*	-.19	-.19*	-.23*	-.08
Attentiveness	<b>-.44*</b>	-.27*	-.03	-.10	-.03	-.19

*Note.*  $N = 331$  (Sample 1),  $253$  (Sample 2). Correlations of  $|\geq .40|$  and greater are in bold. MDD = major depression, GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder.

\* $p < .05$ .

*Sadness* and *Guilt* show much greater specificity and, as expected, clearly are most strongly linked to major depression. Their polychoric correlations with depression all are .60 or greater, with a mean value of .63; in contrast, their associations with the anxiety disorders range from .20 to .50, with an average coefficient of only .35. Finally, *Hostility* correlates more weakly with the emotional disorders: Its coefficients range from .13 to .40, with a mean value of only .31.

Replicating results observed at the higher order level, the specific positive affects tend to correlate more strongly and consistently with major depression ( $r$ s range from  $-.26$  to  $-.61$ , mean  $r = -.43$ ) than with the anxiety disorders ( $r$ s range from  $-.02$  to  $-.41$ , mean  $r = -.16$ ). *Joviality* has the strongest overall link to depression (mean  $r = -.51$ ), followed by *Attentiveness* (mean  $r = -.42$ ) and *Self-Assurance* (mean  $r = -.35$ ).

*Multivariate analyses.* Next, we conducted a series of logistic regression analyses to identify the unique, incremental predictive power of the individual affect scales. As before, the scales were standardized to put them on the same metric.

**TABLE 5.** Odds ratios from logistic regression analyses of the specific affect scales.

<i>Scale</i>	<i>MDD</i>	<i>GAD</i>	<i>PTSD</i>	<i>Panic disorder</i>	<i>Social phobia</i>	<i>OCD</i>
Sample 1						
Fear	<b>2.53</b>	<b>2.53</b>	<b>2.03</b>	<b>2.66</b>	.98	1.40
Sadness	<b>1.66</b>	1.27	1.25	1.67	1.81	1.18
Guilt	<b>1.67</b>	.96	1.38	1.63	.96	1.11
Hostility	<b>.64</b>	.95	.82	.63	1.15	.86
Joviality	<b>.62</b>	.82	.92	.78	1.12	.51
Self-Assurance	<b>1.78</b>	1.37	1.54	1.59	1.07	1.18
Attentiveness	<b>.55</b>	.89	.84	.93	.80	1.45
Sample 2						
Fear	<b>1.83</b>	<b>1.93</b>	<b>2.89</b>	<b>2.41</b>	<b>2.26</b>	<b>2.18</b>
Sadness	<b>1.74</b>	.74	.74	.67	.65	.71
Guilt	<b>1.75</b>	1.15	1.24	1.51	1.42	1.10
Hostility	.87	<b>1.56</b>	1.17	1.15	1.20	1.45
Joviality	<b>.40</b>	.56	.69	.62	1.28	.48
Self-Assurance	1.32	.78	.60	.84	<b>.37</b>	1.68
Attentiveness	.64	1.05	<b>1.93</b>	1.41	<b>1.81</b>	.77

Note.  $N = 331$  (Sample 1), 253 (Sample 2). Significant effects ( $p < .05$ ) are in bold. MDD = major depression, GAD = generalized anxiety disorder, PTSD = posttraumatic stress disorder, OCD = obsessive-compulsive disorder.

Table 5 presents the ORs from these logistic regressions. Several replicable effects emerged in these analyses. First, *Fear* is the strongest and broadest predictor of the emotional disorders: It contributes significantly in 10 of 12 regressions, and is related consistently to major depression, GAD, PTSD, and panic disorder. Second, consistent with results observed at the bivariate level, *Sadness* and *Guilt* display strong specificity and are related significantly only to depression. It is noteworthy, in fact, that both scales contribute to the prediction of depression in both samples, but that neither of them had a significant effect in any of the 10 analyses involving the anxiety disorders. *Joviality* also displays impressive specificity and is related significantly only to major depression in both samples. The three remaining scales (*Hostility*, *Self-Assurance* and *Attentiveness*) have relatively weak and inconsistent associations with these disorders.

## Discussion

### *Analyses of the negative affects*

*Fear*. Previous work has established that the higher order *Negative Affect* dimension is strongly and nonspecifically related to anxiety and depression (Watson *et al.*, 1988). We replicated this same basic pattern in our data. Note, for example, that the PANAS-X General Negative Affect scale was significantly related to mood and anxiety disorder diagnoses in all 12 logistic regression analyses. Moreover, we extended these findings by establishing that the lower order *Fear* scale yields very similar results. Given the central importance of fearful/apprehensive affect in the anxiety disorders (Watson *et al.*, 2008), we expected this scale to show particularly strong associations with anxiety

disorders. This expectation clearly was confirmed. *Fear* had polychoric correlations ranging from .21 to .54 (mean  $r = .44$ ) with anxiety diagnoses, and was the strongest single predictor of these disorders in 9 of 10 cases; in contrast, the other specific negative affect scales had mean coefficients of only .33 (*Sadness*), .37 (*Guilt*), and .30 (*Hostility*) with anxiety diagnoses. Moreover, *Fear* emerged as a significant predictor of the anxiety disorders in 8 of 10 logistic regressions; the other scales produced only one significant effect (*Hostility* vs. GAD in Sample 2) in 30 analyses. These results amply demonstrate the crucial role of fearful, anxious affect in these disorders.

Unexpectedly, however, *Fear* also was related strongly to major depression ( $r = .59$  and .58 in Samples 1 and 2, respectively); furthermore, it was associated with an increased risk for major depression in both logistic regressions. Overall, therefore, our results suggest that the specific content that is tapped by this scale (*i.e.*, feeling nervous, shaky, afraid, frightened) lies at the very core of the emotional disorders and plays a key role in the overlap/comorbidity between these diagnoses. It will be important to replicate and extend these findings in future research.

*Sadness and Guilt.* In contrast, certain types of negative affect did show clear evidence of specificity. Consistent with our expectation, *Sadness* and *Guilt* both were strongly related to major depression but displayed much weaker links to anxiety disorders. For instance, they had polychoric correlations with major depression that ranged from .60 to .66, with a mean coefficient of .63; in marked contrast, they had an average correlation of only .35 with the anxiety disorders (see Table 4). Furthermore, they were significant predictors of major depression in both logistic regression analyses, but did not contribute to any anxiety disorder diagnosis in either sample. Thus, despite the fact that these scales are strong markers of the higher order *Negative Affect* dimension, they still exhibit considerable specificity. These results indicate that the content subsumed by these scales (*i.e.*, feeling sad, lonely, guilty and dissatisfied with oneself) can play a useful role in differential diagnosis and assessment. Moreover, they are consistent with Watson's (2009) quadripartite model, which posits that even symptoms containing a strong component of general distress can show specificity in distinguishing depression from anxiety.

*Anger and Hostility.* In contrast to the other negative affect scales, *Hostility* displayed relatively weak and nonspecific associations with the emotional disorders; as shown in Table 4, its polychoric correlations ranged from .13 to .40, with a mean value of only .31. These data are particularly interesting in light of recent analyses that have highlighted the importance of anger and hostility in the anxiety disorders (*e.g.*, Hawkins and Cougle, 2011; Olatunji, Ciesielski, and Tolin, 2010).

Furthermore, it is interesting to note that anger and irritability are included in the symptom criteria for major depression (irritable mood can be an alternative expression of depressed mood in children and adolescents), GAD (criterion C4: irritability), and PTSD (criterion D2: irritability or outbursts of anger) (American Psychiatric Association, 2000). Nevertheless, *Hostility* displayed very little incremental predictive power in our data: It contributed significantly in only 2 of 12 logistic regressions, and one of these actually represented a suppressor effect (*Hostility* was associated with reduced odds

of major depression in Sample 1). Thus, our data strongly suggest that observed associations between anger and the emotional disorders largely reflect the influence of the higher order *Negative Affect* dimension (*i.e.*, the variance that anger shares with other negative emotions), rather than the specific component of anger. These results demonstrate how misleading it can be to examine single types of affect in isolation; one gets a much clearer sense of the true nature of these associations by investigating multiple variables at different levels within affective structure.

#### *Analyses of the positive affects*

Previous studies have established that indicators of positive affect are relatively specific to depression. Our data replicated this basic pattern at both the higher order and lower order levels. At the higher order level, the *General Positive Affect* scale contributed significantly to the prediction of major depression in both samples, but was related to the anxiety disorders in only 1 of 10 analyses. Similarly, at the lower order level, the specific positive affect scales of the PANAS-X correlated more strongly and consistently with major depression (mean  $r = -.43$ ) than with the anxiety disorders (mean  $r = -.16$ ). With regard to the latter, it is noteworthy that these scales contributed significantly to the prediction of anxiety disorders in only 3 of 30 logistic regression analyses; moreover, two of these relations actually represented suppressor effects (*Attentiveness* was associated with increased odds of both PTSD and social phobia in Sample 2) and none of them replicated across samples. Thus, our results again support the argument that focusing on symptoms of anhedonia/low positive emotionality can enhance the differential diagnosis and assessment of depression.

In addition, our data extend earlier results by highlighting the predictive power of the specific content subsumed within the PANAS-X *Joviality* scale (*i.e.*, feeling happy, cheerful, lively and enthusiastic). *Joviality* was related more strongly to depression (mean  $r = -.51$ ) than were *Attentiveness* (mean  $r = -.42$ ) and *Self-Assurance* (mean  $r = -.35$ ). Moreover, *Joviality* was the only lower order positive affect scale to contribute significantly to the prediction of major depression in the logistic regressions. These findings suggest that it will be useful in future depression research to focus more specifically on this type of affective content.

#### *Strengths and limitations*

This is the first study to examine both general and specific affect scales in relation to a broad range of emotional disorders. Strengths of the study include the use of a well-validated, factor analytically derived affect instrument (the PANAS-X), the reliable assessment of multiple DSM-IV mood and anxiety disorders via the SCID-IV, and our ability to establish the robustness of observed effects across two reasonably sized samples of patients who rated their emotional experience using different time frames.

Nevertheless, our study has two important limitations that need to be acknowledged. First, our results are restricted to a single self-report affect inventory. Although the PANAS-X is a well-validated and widely used instrument, its modeling of the specific lower order affects differs somewhat from that of other prominent multidimensional measures (Humrichouse, Chmielewski, McDade-Montez, and Watson, 2007; Watson and Clark, 1997). It therefore will be important to replicate and extend these findings using

other measures and methods. Second, we used a cross-sectional design in which the affect scales and diagnoses were assessed at the same time. Prospective longitudinal studies are needed to clarify the nature of the relations between basic individual differences in affectivity and the emotional disorders. Future studies of this type can help to establish whether specific temperamental/affective dimensions represent significant vulnerability factors for particular mood and anxiety disorders.

### Conclusion

Despite these limitations, our study contributes to the literature by establishing the importance of examining affect-psychopathology relations at the specific lower order level. We found that one scale (*Fear*) had strong and nonspecific associations with the emotional disorders, whereas three others (*Sadness*, *Guilt*, and *Joviality*) showed clear specificity to depression; the remaining scales (*Hostility*, *Self-Assurance*, and *Attentiveness*) had weaker links to these disorders and displayed little incremental power in predicting them. We hope that others will build on these results by examining the psychopathological correlates of lower order affects across a wider range of measures, methods and disorders.

### References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed., text revision). Washington, DC: Author.
- Bienvenu, O.J., Samuels, J.F., Costa, P.T. Jr., Reti, I.M., Eaton, W.W., and Nestadt, G. (2004). Anxiety and depressive disorders and the five-factor model of personality: A higher- and lower-order personality trait investigation in a community sample. *Depression and Anxiety*, 20, 92-97.
- Clark, L.A. and Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, 100, 316-336.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup>. ed.). New York: Academic Press.
- Costa, P.T., Jr. and McCrae, R.R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- First, M.B., Spitzer, R.L., Gibbon, M., and Williams, J.B.W. (1997). *Structured Clinical Interview for DSM-IV Axis I Disorders- Patient Edition (SCID- I/P)*. New York: Biometrics Research, New York State Psychiatric Institute.
- Flora, D.B. and Curran, P.J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, 9, 466-491.
- Hawkins, K.A. and Cogle, J.R. (2011). Anger problems across the anxiety disorders: Findings from a population-based study. *Depression and Anxiety*, 28, 145-152.
- Humrichouse, J., Chmielewski, M., McDade-Montez, E.A., and Watson, D. (2007). Affect assessment through self-report methods. In J. Rottenberg and S.L. Johnson (Eds.), *Emotion and psychopathology: Bridging affective and clinical science* (pp. 13-34). Washington, DC: American Psychological Association.
- Kashdan, T.B. (2007). Social anxiety spectrum and diminished positive experiences: Theoretical synthesis and meta-analysis. *Clinical Psychology Review*, 27, 348-365.

- Kotov, R., Gamez, W., Schmidt, F., and Watson, D. (2010). Linking «big» personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, 2010, 136, 768-821.
- Mineka, S., Watson, D., and Clark, L.A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, 49, 377-412.
- Montero, I. and León, O. G. (2007). A guide for naming research studies in Psychology. *International Journal of Clinical and Health Psychology*, 7, 847-862.
- Naragon-Gainey, K., Watson, D., and Markon, K. (2009). Differential relations of depression and social anxiety symptoms to the facets of extraversion/positive emotionality. *Journal of Abnormal Psychology*, 118, 299-310.
- Olatunji, B.O., Ciesielski, B.G., and Tolin, D.F. (2010). Fear and loathing: A meta-analytic review of the specificity of anger in PTSD. *Behavior Therapy*, 41, 93-105.
- Ramos-Álvarez, M. M., Moreno-Fernández, M. M., Valdés-Conroy, B., and Catena, A. (2008). Criteria of the peer review process for publication of experimental and quasi-experimental research in psychology: A guide for creating research papers. *International Journal of Clinical and Health Psychology*, 8, 751-764.
- Rector, N.A., Hood, K., Richter, M.A., and Bagby, R.M. (2002). Obsessive-compulsive disorder and the five-factor model of personality: Distinction and overlap with major depressive disorder. *Behaviour Research and Therapy*, 40, 1205-1219.
- Schmukle, S.C. and Egloff, B. (2009). Exploring bipolarity of affect ratings by using polychoric correlations. *Cognition and Emotion*, 23, 272-295.
- Tellegen, A., Watson, D., and Clark, L.A. (1999). On the dimensional and hierarchical structure of affect. *Psychological Science*, 10, 297-303.
- Watson, D. (2009). Differentiating the mood and anxiety disorders: A quadripartite model. *Annual Review of Clinical Psychology*, 5, 221-247.
- Watson, D. and Clark, L.A. (1992). Affects separable and inseparable: On the hierarchical arrangement of the negative affects. *Journal of Personality and Social Psychology*, 62, 489-505.
- Watson, D. and Clark, L.A. (1997). Measurement and mismeasurement of mood: Recurrent and emergent issues. *Journal of Personality Assessment*, 68, 267-296.
- Watson, D. and Clark, L.A. (1999). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. Retrieved March 23, 2011 from Iowa Research Online: [http://ir.uiowa.edu/psychology\\_pubs/11/](http://ir.uiowa.edu/psychology_pubs/11/)
- Watson, D., Clark, L.A., and Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology*, 97, 346-353.
- Watson, D. and Naragon-Gainey, K. (2010). On the specificity of positive emotional dysfunction in psychopathology: Evidence from the mood and anxiety disorders and schizophrenia/schizotypy. *Clinical Psychology Review*, 30, 839-848.
- Watson, D., O'Hara, M.W., Chmielewski, M., McDade-Montez, E.A., Koffel, E., Naragon, K., and Stuart, S. (2008). Further validation of the IDAS: Evidence of convergent, discriminant, criterion, and incremental validity. *Psychological Assessment*, 20, 248-259.
- Watson, D., O'Hara, M.W., and Stuart, S. (2008). Hierarchical structures of affect and psychopathology and their implications for the classification of emotional disorders. *Depression and Anxiety*, 25, 282-288.
- Watson, D., Wiese, D., Vaidya, J., and Tellegen, A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology*, 76, 820-838.

Received April 17, 2011

Accepted May 16, 2011