Basic Dimensions Defining Mania Risk: A Structural Approach

Kasey Stanton
University of Notre Dame

June Gruber
University of Colorado Boulder

David Watson
University of Notre Dame

In Press, *Psychological Assessment*

Informed consent was obtained from all individual participants included in the study. The above authors declare that they have no conflict of interest (financial or non-financial), and APA ethical standards were followed in the conduct of this study. All of the reported research was approved by the Institutional Review Board at the University of Notre Dame.

Correspondence concerning this paper should be addressed to Kasey Stanton, Department of Psychology, 118 Haggar Hall, University of Notre Dame, Notre Dame, IN, 46556, USA. Email: kstanto1@nd.edu.

Abstract

Mania is the core criterion for bipolar disorder, a chronic and severe psychiatric illness centrally associated with positive affective disturbance. Many self-report measures have been created to assess symptoms of, and risk for, mania but there are notable disparities in their length, scope, and content. Thus, the goal of this study was to determine the structure and correlates of a number of widely used "bipolar-relevant" (BR) measures (e.g., Hypomanic Personality Scale, Altman Self-Rating Mania Scale, General Behavior Inventory, Mood Disorder Questionnaire). Data from a community sample (Study 1, *N* = 329) and a student sample assessed at two time points (Study 2; *N*s = 382 and 308, respectively) provided strong evidence that the BR measures were characterized by both (a) a well-defined common dimension when a single factor was extracted, and (b) a clear structure of Emotional Lability and Activated Positive Affect upon extracting two factors. The general factor showed a relatively non-specific pattern of associations with personality and psychopathology. In contrast, the Emotional Lability factor showed its strongest relations with neuroticism and depressive symptoms, displaying comparatively weaker relations with measures of extraversion and positive emotionality. Conversely, although Activated Positive Affect also associated positively with depressive symptoms and with neuroticism in some instances, its strongest relations were with measures of extraversion and high arousal positive emotionality. These findings suggest that measures defining Emotional Lability seem to assess mood volatility to a greater extent, whereas measures defining the Activated Positive Affect factor capture an intense, high arousal form of positive emotionality.

KEYWORDS**:** bipolar disorder, mania, positive affect, negative affect, five-factor model of personality

Basic Dimensions Defining Mania Risk: A Structural Approach

The study of mood and affective experiences is broadly defined using the dimensions of *positive affect* and *negative affect* (D. Watson, Wiese, Vaidya, & Tellegen, 1999). Positive affect is a term used to represent individual differences in positive feeling states such as joyfulness, attentiveness, and self-assurance, whereas negative affect is used to describe the tendency to experience negative feelings of sadness, anxiety, guilt, and anger (Shiota, Keltner, & John, 2006; D. Watson, 2000). There is growing interest in understanding affective disturbance across a range of psychological disorders (e.g., Dillon, Deveney, & Pizzagalli, 2011; Jazaieri, Urry, & Gross, 2013). Although the role of negative affective dysregulation in psychopathology is fairly well characterized, less is known about how the positive affective system—which is closely related to reward seeking and sensitivity (DeYoung, 2013; Quilty, DeYoung, Oakman, & Bagby, 2014)—may be a source of dysfunction (Gruber, Dutra, Hay, & Devlin, 2014; Gruber, Kogan, Quoidbach, & Mauss, 2013). Exploring positive affect's relations with psychopathology is of interest not only because these associations have been understudied, but also because evidence suggests that positive affect associates negatively with some forms of psychopathology (e.g., depression, schizotypy) but positively with others (e.g., bipolar disorder, substance use); in contrast, negative affect demonstrates ubiquitous positive relations with psychopathology (Gruber, 2011a; Gruber, Johnson, Oveis, & Keltner, 2008; D. Watson & Naragon-Gainey, 2010).

In particular, elevated levels of positive affect appear to be a particularly salient feature of bipolar disorder (BD) (Gruber, 2011a), as individuals with BD show greater positive emotional reactivity across a wide range of situations, suggesting that increased positive affect is a trait-like feature of BD that is invariant across contexts (du Pont, Welker, Gilbert & Gruber, in press; Gruber et al., 2014). Moreover, individuals with BD struggle to down-regulate positive emotion

intensity, and engage in emotion regulation strategies that prolong and intensify problematic positive mood states (Gruber, 2011a; 2011b; Gruber et al., 2013; 2014; D. Watson & Naragon-Gainey, 2010). Despite this compelling evidence that positive emotionality is strongly implicated in BD, important gaps in assessing positive affective disturbance in BD remain, as measures of BD traits and symptoms include content assessing positive emotional dysregulation to widely varying degrees (Gruber, 2011b; Gruber et al., 2008).

The Present Investigation: Assessment Issues in Bipolar Disorder Research

There are notable disparities in how BD and bipolar-relevant traits are assessed via self-report measures. We focus on self-report measures here given that (a) BD symptoms and affect are frequently assessed using this method, (b) BD measures vary widely in their length, format, and content, and (c) self-report provides a valid format of assessment for ratings of affect and of traits and symptoms related to BD (Miller, Johnson, & Eisner, 2009; Pendergast et al., 2015; D. Watson, 2000). As noted earlier, although affective dysfunction and BD are closely intertwined, widely used measures of BD and mania incorporate assessment of positive and negative affective dysregulation to varying degrees: Some include little measurement of mood, some focus solely on assessing either positive or negative affect, and others assess both types of affect.

For instance, the five items in the Altman Self-Rating Mania Scale (ASRM; Altman, Hedeker, Peterson, & Davis, 1997) primarily seem to assess high arousal positive affect (e.g., activity level, happiness). The Hypomania Checklist-32 (HCL-32; Angst et al., 2005) instructs respondents to describe how they felt during "a period when you were in a 'high' state," and a significant portion of its item content also assesses elevated positive affect (e.g., "feel more energetic"); however, unlike the ASRM, the HCL-32 also includes content assessing risk-taking and irritability. Similar to the HCL-32, the Mood Disorder Questionnaire (MDQ; 13 items;

Hirschfeld et al., 2000) appears to include content measuring euphoric mood, risk taking, and irritability.

The General Behavior Inventory (GBI; 28 mania/bipolar items; Depue, Krauss, Spoont, & Arbisi, 1989) also seems to assess content related to elevated positive mood, risk taking, and irritability, but includes content tapping affective lability (e.g., "mood shifts rapidly from high to low") much more so than the ARSM, HCL-32, or MDQ. Recent research examining the psychometric properties of the GBI indicate its items define an invariant two-factor structure of hypomania/biphasic (i.e., items indicative of both depression and mania simultaneously) symptoms and depressive symptoms across Black/African American and Caucasian samples (Pendergast et al., 2015); furthermore, GBI scores also have shown specificity in discriminating BD from other diagnoses in adulthood (Pendergast et al., 2014).

Next, the Hypomanic Personality Scale (HPS; 48 items; Eckblad & Chapman, 1986) was developed to assess an energetic and gregarious personality style thought to confer risk for hypomanic/manic episodes. Schalet, Durbin, and Revelle (2011) provide evidence for a three-factor structure of the HPS consisting of Social Vitality (e.g., "assertive, sociable"), Mood Volatility (e.g., "happy and irritable at same time"), and Excitement (e.g., "excited and happy for no reason"). These three subscales display divergent patterns of correlates that are not apparent when HPS total scores are used, which has been common practice in BD research (Schalet et al., 2011; Stanton et al., 2016; D. Watson & Naragon-Gainey, 2014). For instance, similar to the ASRM, the HPS Excitement scale seems to assess extreme levels of positive affect, and both it and the Social Vitality scale associate positively with extraversion (Stanton et al., 2016; D. Watson & Naragon-Gainey, 2014). In contrast, the HPS Mood Volatility scale correlates weakly with extraversion, but demonstrates strong relations with neuroticism.

The Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire (TEMPS-A; 50 items; Akiskal, Akiskal, Haykal, Manning, & Connor, 2005) is similar to the HPS in that it assesses characteristics conferring risk for BD. More specifically, the TEMPS-A—which includes content tapping emotional lability, elevated positive emotionality, and dysthymia—assesses temperamental styles associated with increased risk for disorders characterized by mood lability, including BD (Akiskal et al., 2005).

The Expanded Version of the Inventory of Depression and Anxiety Symptoms (IDAS-II; D. Watson et al., 2012) is a recently developed instrument that contains content related to BD. More specifically, the IDAS-II includes a Euphoria (five items; e.g., "felt elated for no reason") scale tapping elevated mood and a Mania scale (five items; e.g., "thoughts jumped rapidly") assessing racing thoughts characteristic of hypomanic and manic episodes. Although IDAS-II Euphoria and Mania tap distinct sets of content, they are substantially intercorrelated and both show strong convergence with interview ratings of mania (D. Watson et al., 2012).

In addition to these measures, several widely used omnibus personality instruments such as the Personality Assessment Inventory (PAI; Morey, 2007) and the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher et al., 2001) also include scales assessing bipolar-relevant traits and symptoms. The PAI includes a Mania scale assessing increased levels of energy and excitement, whereas the MMPI-2 includes a Hypomania scale tapping content related to elated mood, irritability, and racing thoughts. In addition, the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008) includes both a Hypomanic Activation scale—which assesses content related to grandiosity and aggression, and a more nuanced Activation scale—which assesses a form of externalizing related

to heightened excitement/energy (see Ben-Porath & Tellegen, 2008 and Tellegen & Ben-Porath, 2008 for more information regarding the MMPI-2 RF scales).

Research conducted by Sellbom, Bagby, Kushner, Quilty, and Ayearst (2012) indicates that scores on the MMPI-2-RF Activation scale are associated positively with BD and that such scores are useful in differentiating BD from depression and schizophrenia (all study participants met criteria for only one of these three disorders); relatedly, C. Watson, Quilty, and Bagby (2011) also found that Activation scale scores are useful in distinguishing BD from depression. Sellbom et al. (2012) found that higher scores on the MMPI-2-RF Hypomanic Activation scale also were useful in differentiating BD from depression, but not from schizophrenia.

Lastly, other omnibus inventories recently developed to assess dimensional models of personality disorder, such as the Personality Inventory for *DSM-5* (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012) and the Computerized Adaptive Test of Personality Disorder Static Form (CAT-PD-SF; Simms et al., 2011), also include scales assessing traits relevant to BD, as both include content assessing unpredictable mood swings. The PID-5 already has been widely cited, with research indicating that it generally converges well with other omnibus personality measures (e.g., the PAI; Al-Dajani, Gralnick & Bagby, 2016); however, Al-Dajani et al. (2016) noted that more data from clinical samples are needed to fully determine the strengths and limitations of the PID-5.

From here on, we refer to these self-report scales collectively as “bipolar-relevant” (BR) measures, as several of them (e.g., the HPS, GBI, and TEMPS-A) are intended to assess risk for mania and/or traits related to mania, rather than current manic symptoms per se; relatedly, other instruments are intended to be used as screening measures for BD and BD risk (e.g., the MDQ) rather than as diagnostic proxies (Hirschfeld et al., 2000; Zimmerman, 2012).

Given that the content and correlates of these BR measures differ substantially (e.g., some seem to tap primarily elation, whereas others assess affective lability), it is unsurprising that D. Watson and Naragon-Gainey (2014) found that they defined two distinct factors in a structural analysis including the HPS subscales, the GBI Biphasic and Mania scales, the IDAS-II Euphoria and Mania scales, and the HCL-32 in large sample (N = 698) consisting of both community adults and undergraduates. The first factor related strongly to neuroticism and was defined by scales tapping mood lability (e.g., HPS Mood Volatility and the GBI Biphasic and Hypomania scales). In contrast, the second factor associated weakly with neuroticism but showed strong positive relations with extraversion, and was marked by scales tapping elevated positive emotionality (e.g., HPS Social Vitality and Excitement). Thus, an interesting pattern emerged in these data, as the BR measures appeared to assess two markedly different constructs. D. Watson and Naragon-Gainey's (2014) findings indicate that it is important for researchers to consider the content tapped by BR scales carefully when selecting them for studies, as BR measures primarily tapping mood lability are likely to yield very different results from those assessing positive activation.

Although we focus here on self-report measures, it is noteworthy that dimensions similar to (a) mood lability and (b) elation/positive activation also have emerged in structural analyses of informant-rated BR symptom measures such as the Observer-Rated Scale for Mania (ORSM; i.e., factors labeled instable mania and euphoric mania, respectively; Krüger et al., 2010), as well as in analyses of the Young Mania Rating Scale (YMRS; includes factors defined by affective/behavioral volatility and elevated mood; Double, 1990; Young, Biggs, Ziegler, & Meyer, 1978), which is a widely used clinician-rated measure of manic symptoms. It also should be noted that these structural analyses of the ORSM and YMRS (i.e., Krüger et al., 2010 and

Double, 1990, respectively) indicated that both measures are defined by an additional factor assessing psychotic symptoms of BD; however, Youngstrom, Danielson, Findling, Gracious, and Calabrese (2002) found that the YMRS items best defined a single factor, and other research conducted by Youngstrom, Gracious, Danielson, Findling, and Calabrese (2003) also demonstrates the value in utilizing a total score derived from a single factor when using the YMRS. Therefore, although the YMRS assesses a range of content (e.g., elevated mood, irritability, decreased need for sleep), this content appears to define a coherent single factor.

Goals of the Present Investigation

Given the challenges that researchers and clinicians face when assessing BR traits and symptoms, our goal is to inform future assessment and research by determining which types of content (e.g., extreme positive affect, mood volatility) are assessed by existing BR measures. Thus, we aim to determine (a) if the same two factors reported by D. Watson and Naragon-Gainey (2014) emerge in structural analyses in other samples in which additional BR measures are included, and (b) how BR factors correlate with a wide range of measures assessing affect, personality, well-being, and other symptoms of psychopathology.

Addressing these aims has the potential to inform BD assessment by providing researchers with valuable information as to the extent to which various BR measures tap mood lability, elevated positive affect, or other emergent BR dimensions. Note that we focus on explicating the structure and correlates of measures purporting to measure BR traits and symptoms directly (i.e., measures explicitly developed to assess current manic symptoms and/or traits conferring a heightened risk for mania) rather than taking a broader focus by also incorporating measures intended to assess other constructs theoretically and empirically related to BD (e.g., reward seeking and sensitivity, achievement motivation; see Alloy et al., 2008; 2012; Johnson, Edge,

Holmes, & Carver, 2012). We adopted this approach given that our primary focus was to inform BD assessment by explicating the structure of commonly used BR scales, rather than to clarify the structure of a much larger network of constructs theoretically and empirically related to BD.

To address our goals, we assessed BR traits and symptoms and other theoretically and empirically related constructs in two phases. Study 1 involved an assessment of BR symptoms and traits in a sample of community participants. Participants in this sample also completed measures of affect, personality, well-being, and other psychopathology in order to explicate the nature of the factors that emerged in our structural analyses. Study 2 included a more expansive assessment of BR traits and symptoms in a student sample, as several additional measures were included to provide more comprehensive coverage. The students completed these measures at two separate time points, thereby providing us with three opportunities (i.e., one in the community sample and two in the student sample) to analyze the structure of BR measures. In selecting BR scales to administer in our studies, we sought to include a number of measures assessing both positive and negative affective dysfunction, as our review of the literature indicated that different BR measures tap these two types of dysfunction to varying degrees.

Although our results overlap with the findings of D. Watson and Naragon-Gainey (2014) in some regards (i.e., determining the structure of BR measures), the current studies advance this previous research in two key ways. First, the current studies offer an opportunity to determine whether the two-factor structure of elation and mood lability reported by D. Watson and Naragon-Gainey (2014) replicates when different sets of measures are used; related to this point, the Study 2 analyses examine the structure of BR measures in a more expansive set of measures, as our Study 2 battery included several scales (i.e., the MDQ, ASRM, and the PID-5 Emotional Lability scale) that were not used in the structural analyses reported by D. Watson and Naragon-

Gainey (2014). Second, whereas D. Watson and Naragon-Gainey (2014) focused solely on examining how their BR factors related to broad personality dimensions, our studies examine the associations for emergent BR factors with a wide range of measures of personality, affectivity, well-being, and other psychopathology; thus, our data more fully explicate the nomological networks of these BR factors.

Based on D. Watson and Naragon-Gainey's (2014) findings, we predicted that the BR measures would define a two-factor structure of affective lability and elevated positive affect. We expected the former factor to relate positively to neuroticism/negative affectivity, whereas the latter factor was predicted to display more robust associations with extraversion/positive emotionality. In regards to the elevated positive affect factor, we also predicted that it would associate positively with well-being in some cases, as measures predicted to define this factor (e.g., IDAS-II Euphoria) previously have shown positive associations with well-being (D. Watson et al., 2012). We examined the relations for these factors with other personality traits and other psychological symptoms on a more exploratory basis.

Study 1 Method

Participants and Procedures

Participants were 342 community adults who were recruited online via Amazon Mechanical Turk (Buhrmester, Kwang, & Gosling, 2011) and were paid $4 for participating. However, 13 participants subsequently were dropped for failing to respond appropriately to validity items that were sprinkled throughout the online protocol, yielding a final sample of 329 respondents (53.8% male; M_{age} = 32.16 years, *SD* = 10.47; 62.9% White, 27.7% Asian-American/Asian, 5.5% African American, 4.0% Hispanic/Latino, 0.6% American Indian, and 1.2 % other ethnicity). Participants were required to be 18 years or older and comfortable reading

and writing in English to be eligible for the study. Participants took 34 minutes on average to complete the study.

Bipolar-Relevant Scales

Altman Self-Rating Mania Scale. The ASRM (Altman et al., 1997) includes five groups of statements intended to assess the severity and presence of hypomanic symptoms over the past week (e.g., increased positive mood and self-confidence). Altman et al. (1997) found that scores on the ASRM were useful in distinguishing BD from depression and schizophrenia and were sensitive to change in BD symptoms over time. Total scores range from 0 to 20 ($\alpha = 0.86$; $M = 5.77$, $SD = 4.90$); 9.4% ($n = 31$) of the participants scored above the clinically significant ASRM threshold (≥ 14). Note that the coefficient alpha reported for this scale—and for all other scales used in this study—are those obtained in this sample.

Hypomanic Personality Scale. The HPS is a 48-item measure assessing a stable "hypomanic personality" thought to confer risk for manic episodes, that is, those who are "characterized as upbeat, gregarious, confident, and energetic people who sometimes display these attributes to a maladaptive extreme, becoming euphoric, hypersociable, grandiose, and overactive, with occasional episodic hypomanic symptoms" (Eckblad & Chapman, 1986, p. 216). Indeed, scores on the HPS have demonstrated considerable validity in predicting hypomanic and manic episodes longitudinally (Kwapil et al., 2000). As discussed earlier, Schalet et al. (2011) present data indicating a three-factor structure of the HPS, consisting of Social Vitality (19 items; e.g., "persuade and inspire others"; $\alpha = .85$, $M = 5.84$, $SD = 4.43$), Mood Volatility (13 items; e.g., "mood goes up and down easily"; $\alpha = .81$, $M = 5.11$, $SD = 3.37$), and Excitement (seven items; e.g., "get so happy and energetic that I am giddy"; $\alpha = .74$, $M =$

1.52, *SD* = 1.79). We report results using these three factor-based subscales. Participants answered the items using a dichotomous true-false response format.[1]

Expanded Version of the Inventory of Depression and Anxiety Symptoms. The IDAS-II (D. Watson et al., 2012) assesses specific symptoms of depressive, anxiety, and bipolar disorders. D. Watson and colleagues (2012) present data from a range of samples indicating that scores on the IDAS-II scales demonstrate strong convergent, discriminant, and criterion validity in their relations with other self-report and interview-based measures of depression, anxiety, and BD. Participants completed the IDAS-II Euphoria (five items; e.g. "felt I could do things others couldn't"; α=0.89, *M* = 10.02, *SD* = 5.01) and Mania (five items; "kept racing from one activity to the next"; α=0.89, *M* = 9.73, *SD* = 4.80) scales to assess BD symptoms. The IDAS-II Dysphoria (10 items; e.g., "felt depressed"; α=0.92, *M* = 20.58, *SD* = 8.70) and Well-being (eight items; "felt proud of myself"; α=0.94, *M* = 23.20, *SD* = 7.75) scales also were administered. Participants indicated the extent to which they had experienced each symptom in the past two weeks using a 5-point scale ranging from *not at all* to *extremely*.

Mood Disorder Questionnaire. The MDQ (Hirschfeld et al., 2000) is a 13-item screening measure that asks participants if they have ever experienced a range of symptoms in their lifetimes, including content assessing hyperactivity, irritability, risk-taking, and grandiosity (α=0.84, *M* = 5.93, *SD* = 3.63). Scores on the MDQ have demonstrated utility in distinguishing BD symptoms from depression (Miller et al., 2009). Participants responded to the items using a dichotomous yes/no response format. The MDQ can be scored dimensionally to assess for lifetime presence of BD symptoms, and this scoring method was used in all study analyses.

Measures of Personality and Affect, Other Psychopathology, and Well-being

[1] It should be noted that participants completed only the items that are scored to create the Social Vitality, Mood Volatility, and Excitement subscales. This precluded us from computing how many of our participants scored above the clinically significant HPS risk threshold score, which is often reported in BD research (e.g., Gruber et al., 2008).

Affect Valuation Index. The Affect Valuation Index (AVI; Tsai, Knutson, & Fung, 2006) assesses both actual affect and ideal affect (i.e., "how much you would ideally like to feel"). Participants rated only their actual levels of affect in this study; specifically, they were asked to indicate how often they actually experienced a particular emotion or mood over the course of a typical week. They rated themselves on three high arousal positive affect adjectives (e.g., *elated*; α=0.89, *M* = 8.52, *SD* = 2.82) and four low arousal adjectives (e.g., *peaceful*; α=0.92, *M* = 13.56, *SD* = 3.58), which are scored separately. These measures of high and low arousal positive affect have demonstrated specificity in their personality relations, as high arousal positive affect shows comparatively stronger relations with extraversion than does low arousal positive affect (Tsai et al., 2006). Participants rated their experiences using a 5-point rating scale ranging from *not at all* to *an extreme amount*.

Big Five Inventory. The Big Five Inventory (BFI; John & Srivastava, 1999) was constructed to provide efficient assessment of the five-factor model personality dimensions of neuroticism, extraversion, openness, agreeableness and conscientiousness. Scores from the BFI scales converge strongly with other measures of five-factor model personality (John & Srivastava, 1999). Only the extraversion (eight items; α=0.89, *M* = 23.03, *SD* = 7.70) and neuroticism (eight items; α=0.90, *M* = 20.97, *SD* = 7.78) scales were administered. Participants responded to these items on a 5-point scale ranging from *disagree strongly* to *agree strongly*.

Flourishing Scale. The Flourishing Scale (FS; Diener et al., 2010) is a measure of positive functioning and well-being in a variety of domains, including relationship satisfaction, optimism, and finding meaning. Diener et al. (2010) present evidence indicating that Flourishing Scale scores converge strongly with those from other widely used measures of well-being (Diener et al., 2010). The Flourishing Scale's eight items are intended to provide an overall assessment of

positive functioning (α=0.93, *M* = 43.02, *SD* = 9.11); they are answered on a 7-point scale ranging from s*trongly disagree* to s*trongly agree*.

Modified Differential Emotions Scale. The Modified Differential Emotions scale (mDES; Cohn, Fredrickson, Brown, Mikels, & Conway, 2009) assesses trait-like experiences of discrete emotions. It consists of 23 individual positive (e.g., amusement, awe, interest) and negative (e.g., anger, disgust, fear, guilt) emotion terms rated on a scale ranging from *not at all* to *extremely*[2]. From this set of items, we created overall Positive (11 items; α=0.91, *M* = 35.57, *SD* = 9.25) and Negative Emotions (nine items; α=0.91, *M* = 14.99, *SD* = 6.47) scales. Cohn et al. (2009) found that scores on these two scales display robust associations with well-being both cross-sectionally and longitudinally, with Positive Emotions scores showing positive associations with well-being and Negative Emotions scores demonstrating negative relations.

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS; D. Watson, Clark, & Tellegen, 1988) is 20-item measure, with 10 adjectives assessing Positive Affect (e.g., excited, proud; α=0.92, *M* = 31.18, *SD* = 9.08) and 10 adjectives assessing Negative Affect (e.g., distressed, nervous; α=0.90, *M* = 15.08, *SD* = 6.40). D. Watson et al. (1988) presented data indicating that the PANAS scales show strong convergence with other measures of affect and also display specificity in their psychopathology relations (e.g., Positive Affect displays moderate negative associations with depression, whereas Negative Affect associates strongly positively with depression). Although a variety of time frames can be used with this measure, participants were asked to indicate "to what extent you generally feel this

[2] The mDES emotion terms were administered to participants as short statements rather than as adjectives in Study 2 (e.g., "I feel amused" rather than "amused"). Participants also rated themselves on several additional adjectives in Study 1 that were not used in Study 2. Thus, although the version of the mDES completed by participants in Study 2 was similar to that in Study 1, there were slight differences between them.

way, that is, how you feel on average." Participants rated themselves using a 5-point scale ranging from *very slightly or not at all* to e*xtremely*.

Positive Urgency Measure. The Positive Urgency Measure (PUM; Cyders et al., 2007) is a 14-item scale of self-rated positive urgency, that is, the tendency to respond recklessly and maladaptively when strong positive mood states are experienced (e.g., "can't stop from going overboard when overjoyed"; α=0.96, *M* = 25.88, *SD* = 9.30); such a tendency is characteristic of manic episodes. Participants indicated how well the statements describe them on a 4-point scale ranging from *very much like me* to *not at all like me*.

Responses to Positive Affect. The Responses to Positive Affect measure (RPA; Feldman, Joormann, & Johnson, 2008) is a 17-item self-report scale assessing trait-like responses to the experience of positive affect. It consists of three factor-analytically derived subscales: Dampening (eight items; e.g., "think luck will end soon"; α = .88, *M* = 14.91, *SD* = 5.60), Self-focused Positive Rumination (four items; e.g. "think you are proud of yourself"; α = .83, *M* = 9.31, *SD* = 3.00), and Emotion-focused Positive Rumination (five items; e.g. "feel full of energy"; α = .80, *M* = 12.57, *SD* = 3.23). Items were rated on a 4-point scale ranging from *almost never* to *almost always*. Previous research indicates that RPA subscale scores are elevated for individuals scoring highly on the HPS (Feldman et al., 2008) and for individuals with BD diagnoses (Gruber, Eidelman, Johnson, Smith, & Harvey, 2011).

Satisfaction with Life Scale. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) is a 5-item measure assessing general life satisfaction (α = 0.93, *M* = 22.53, *SD* = 7.89) that has been widely used in research on well-being. Scores on the SWLS show strong convergence with other measures of well-being and are sensitive to changes in well-

being longitudinally (Pavot & Diener, 1993). Participants responded to the items using a 7-point scale ranging from *strongly disagree* to *strongly agree*.

Subjective Happiness Scale. The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) is a widely used, 4-item measure of well-being (α =0.90, M = 18.55, SD = 5.91). Lyubormirsky and Lepper (1999) present data establishing the convergent and discriminant validity of SHS scores. Participants responded to the items using a 7-point scale; response options varied for each item.

Temperament and Affectivity Inventory. The Temperament and Affectivity Inventory (TAI; D. Watson, Stasik, Chmielewski, & Naragon-Gainey, 2015) is 93-item measure assessing specific types of trait affectivity (e.g., anger, shyness, vigor). D. Watson et al. (2015) present data indicating that TAI scale scores show strong convergent, discriminant, and incremental validity in relation to measures of personality and psychopathology. The TAI includes both positively and negatively-valenced affect scales, but only the positive-valenced scales were included in this study. Thus, participants completed the 10-item Geniality scale (e.g. "generally a good-natured person"; α = 0.86, M = 39.82, SD = 5.80), the 9-item Experience Seeking scale (e.g., "enjoy things others might find scary"; α = 0.86, M = 26.66, SD = 7.19), the 6-item Attentiveness scale (e.g., "easy for me to stay alert"; α = 0.85, M = 20.96, SD = 5.07), and the 5-item Vigor scale (e.g., "lead an active life"; α = 0.89, M = 15.62, SD = 4.72). Participants answered the items using a 5-point scale ranging from *strongly disagree* to *strongly agree*.

Study 1 Results

Overview

We conducted an exploratory factor analysis on the BR scales to address the first goal of our study, which was to determine the structure of these measures. These results are presented

first, followed by correlation analyses (using standard Pearson product-moment correlations) with measures of personality, affect, well-being, and other psychopathology, which were conducted to address our second goal of explicating the nature of these factors vis-à-vis their relations with these other domains. All analyses were conducted using SAS Version 9.4.

Prior to conducting all study analyses (including computing descriptive statistics and coefficient alphas), we handled missing data using a multiple-imputation program (PROC MI) from SAS Version 9.4. Due to an administrative error in the online protocol, there was a significant amount of missing data in the PANAS (3.2% of total item responses) and the mDES (1.9% of total responses); in marked contrast, no other measure had any missing responses. We performed imputations at the item level when scales were missing 20% or fewer of their items; overall, we conducted a total of 21 item-level imputations across the PANAS and mDES. In cases with more extensive missing data, we used scale-level imputation. Overall, we conducted scale-level imputations in 18 cases for PANAS Negative Affect; 12 cases for PANAS Positive Affect; 11 cases for mDES Negative Emotions; and 6 cases for mDES Positive Emotions.

Factor Analysis of Bipolar-Relevant Scales

Determining the number of factors. To determine the number of factors to extract in our data, we conducted a principal components analysis on the seven BR scales (ASRM, HPS Social Vitality, HPS Mood Volatility, HPS Excitement, IDAS-II Euphoria, IDAS-II Mania, MDQ). We examined this issue using both parallel analysis (O'Connor, 2000) and Velicer's (1976) minimum average partial (MAP) test. Although we report results from principal factor analyses subsequently, we used principal components analysis here given that principal factor analysis tends to overestimate the number of factors to be extracted when using these procedures, particularly for parallel analysis (see Timmerman & Lorenzo-Seva, 2011).

First, we conducted a parallel analysis (*Ncases* = 329, *Nvars* = 7, *Ndatasets* = 1,000, *percent* = 95) using O'Connor's (2000) SAS program, a procedure in which the observed eigenvalues from a principal components analysis are compared to the eigenvalues from random datasets with the same sample size and number of variables. This analysis suggested that only one factor be extracted, as the value for the first principal component was larger than its random counterpart (4.15 vs. 1.21) but the value for the second was not (0.96 vs. 1.12).

Second, we used the MAP test to provide further information about the optimal number of factors to extract. In Velicer's MAP test, average squared partial correlations are calculated for a range of factor solutions consisting of an increasing number of factors, with the optimal solution producing the lowest mean value. The MAP test indicated that the mean squared partial correlation was lowest in the one-factor solution (.071), increased slightly in the two-factor solution (.083), and continued to increase for subsequent solutions. Thus, both a parallel analysis and the MAP test indicated that a single general factor should be extracted. Given the goals of our study, however (i.e., determining the correlates of BR factors with affect, personality, and other symptoms), we decided to examine both the one-factor and two-factor solutions in subsequent analyses. More specifically, we examined a one-factor solution given that both parallel analysis and the MAP test suggested that it may be optimal, but we also examined a two-factor solution to determine if the BR scales defined the same two psychologically meaningful factors identified in previous research (i.e., D. Watson & Naragon-Gainey, 2014).

Description of the factors. Next, we conducted principal factor analyses to determine the structure of the BR measures, examining both the one- and two-factor solutions; in the latter, the factors were rotated to oblique simple structure using promax (power = 3).[3] Note that although

[3] The structural analyses presented here and in Study 2 were based on matrices of Pearson correlations. We also examined the structure of the BR scales by deriving factors from polychoric correlation matrices. We do not report

we used principal components analyses to determine the optimal number of factors to extract, we use principal factor analyses given that we aimed to model the latent structure of BR measures.

The one-factor solution indicated that the BR scales defined a general dimension, as all seven scales loaded ≥ .50 on this single factor (see Table 1). In the two-factor solution (also depicted in Table 1), the first promax factor was defined by scales assessing content related to extreme, high arousal positive affect and extraversion, as IDAS-II Euphoria (e.g., "elated for no reason"), the ASRM (e.g., "constantly active"), and HPS Social Vitality (e.g., "ability to persuade others") all were clear markers of this dimension. We labeled this factor *Activated Positive Affect.* In contrast, the second factor was marked by such scales as HPS Mood Volatility (e.g., "often felt happy and irritable"), the MDQ (e.g., "so irritable that you started fights"), and IDAS-II Mania (e.g., "thoughts jumped rapidly from one idea to the next"), which tap content related to emotional lability of both positive and negative affect, irritability, and cognitive aspects of mania (e.g., racing thoughts). We labeled this factor *Emotional Lability.*[4] We computed regression-based factor scores to model all three factors in subsequent correlational analyses; note that the scores from the two-factor solution correlated .65.

Based on MacCallum, Widaman, Zhang, and Hong's (1999) guidelines for using communality estimates (i.e., the degree to which the extracted factors can account for variance in the observed variables) and the degree of factor definition (i.e., factors being clearly marked by multiple indicators) for determining adequate sample sizes, the samples used here for extracting Activated Positive Affect and Emotional Lability are adequate for the accurate recovery of

---

these results here, as these analyses produced highly similar two-factor structures of Activated Positive Affect and Emotional Lability to those from structural analyses based on matrices of Pearson correlations across studies.

[4] Although we focus on factors derived from principal factor analyses here, we also examined the structure of the BR scales using principal components analyses, which yielded similar structural results across studies (i.e., the same basic factor structure of Activated Positive Affect and Emotional Lability emerged across samples).

population factors. In the two-factor solution, the average communality level was .60, and both of the factors were defined by several BR measures.

Bipolar-Relevant Factors: Relations with Other Study Variables

Personality and affect. As seen in Table 2, the Activated Positive Affect and Emotional Lability factors demonstrated noticeably different relations with measures of personality and affect, other psychopathology, and well-being. In fact, all Table 2 correlations for Activated Positive Affect differed significantly from those for Emotional Lability. Activated Positive Affect demonstrated especially strong positive correlations with BFI Extraversion (r = .56) and with high arousal positive affect (i.e., AVI High Arousal Positive Affect, TAI Vigor and Experience Seeking; rs ranged from .60 to .68, mean r = .64). It also correlated positively with scales assessing low arousal positive affect (i.e., AVI Low Arousal Positive Affect, TAI Geniality), but the strength of these relations was much weaker (mean r = .31). Indeed, Activated Positive Affect's associations with AVI High Arousal Positive Affect and TAI Vigor and Experience Seeking all were significantly stronger than its relations with both AVI Low Arousal Positive Affect and TAI Geniality (zs ranged from 5.44 to 9.29).

In contrast to Activated Positive Affect, Emotional Lability displayed only very weak to moderate relations to positive affect measures. Unlike Activated Positive Affect, which related negatively to BFI Neuroticism (r = -.22) and very weakly to negative affect measures, Emotion Lability demonstrated positive relations with these measures (i.e., BFI Neuroticism, PANAS Negative Affect, and mDES Negative Emotions; rs ranged from .22 to .31, mean r = .27). Furthermore, Emotional Lability showed a notable positive correlation with RPA Dampening (r = .48); in contrast, Activated Positive Affect related less strongly to this measure (r = .35) but more strongly to the RPA Self- (r = .58) and Emotion-Focused (r = .52) scales.

As noted earlier, in addition to reporting associations with the scores from the two-factor structure, we also report correlations (again, see Table 2) for the factor scores derived from the single-factor solution. This factor generally demonstrated positive relations with both positively and negatively-valenced affect measures, but showed comparatively stronger relations with the former than the latter. Its relations with measures of personality and affect largely were similar to those for Activated Positive Affect, although they generally were weaker in magnitude.

Other psychopathology. Our battery also included measures of depressive symptoms (IDAS-II Dysphoria) and positive urgency (PUM). Whereas Emotional Lability had a strong positive correlation (r = .51) with IDAS-II Dysphoria, Activated Positive Affect related weakly to this measure (r = .18); similarly, Emotional Lability correlated more strongly with the PUM (r = .62) than did Activated Positive Affect (r = .46). Similar to Emotional Lability, the general factor showed robust positive associations with both the PUM and IDAS-II Dysphoria.

Well-being. Interestingly, the Activated Positive Affect factor showed noteworthy positive associations with measures of well-being, as its correlations with IDAS-II Well-being (r = .65), the SWLS (r = .40), the SHS (r = .34), and the Flourishing Scale (r = .33) all were moderate to strong in magnitude. In contrast, Emotional Lability showed weak relations with these measures (rs ranged from -.06 to .25; mean r = .06). Similar to Activated Positive Affect, the general factor related positively to well-being, although these relations were weaker in magnitude.[5]

Study 2

Overview and Procedure

[5] As stated, the associations between Activated Positive Affect and Emotional Lability and other study variables were examined using Pearson correlations. However, some of our scales may yield ordinal data, given that their items were answered using only a few response options (e.g., the PUM uses a 4-point scale ranging from *very much like me* to *not at all like me*). Accordingly, we also examined the associations for these factors using Spearman correlations, which yielded very similar patterns of results across studies. Therefore, we do not report these Spearman correlation results here or in Study 2.

As stated earlier, participants completed an expanded battery of BR measures to determine the generalizability of the Study 1 results. Specifically, the participants in Study 2 also were administered the GBI (Depue et al., 1989) and the Emotional Lability scale from the PID-5 (Krueger, Derringer, Markon, Watson, & Skodol, 2012), which provided additional markers for the structural analyses of BR traits and symptoms. Descriptions of these additional measures follow a description of the Study 2 sample.

Participants

The sample consisted of University of Notre Dame undergraduates (*N* = 382; although the sample sizes varied slightly for some analyses due to missing data). The majority of the students identified as Caucasian (69.1% White, 11.3% Asian-American/Asian, 9.7% Hispanic, 5.5% African American, 0.3% Native Hawaiian or Pacific Islander, 0.3% American Indian/Alaska Native, and 3.9% Other); the majority were female (66.8%). The participants reported an average age of 19.21 years (*SD* = 1.16) and took 57 minutes on average to complete the study. A subset of this sample (*N* = 308, which represents 80.6% of the original sample) completed the same battery of measures approximately two weeks after the first administration, which provided an additional opportunity to examine the replicability of the study results. The participants took 61 minutes on average to complete this Time 2 assessment. Once again, participants were required to be 18 years or older and comfortable reading and writing in English to be eligible for the study.

It should be noted that our original sample consisted of 418 students and 328 students at Times 1 and 2, respectively; however, 36 participants at Time 1 and 20 participants at Time 2 failed to respond to nearly all of the study items. Thus, data from these participants were eliminated, reducing our final sample sizes to 382 and 308 at Times 1 and 2, respectively; all

reported sample information and ensuing Study 2 results reflect data from these final reduced samples (handling of missing data for Study 2 is discussed later).

Additional Study 2 Measures

General Behavior Inventory. The GBI assesses "symptomatic behaviors associated with depression and hypomania/mania" (Depue et al., 1989, p. 118). It includes items assessing depression, mania, and biphasic symptoms, which are indicative of both depression and mania concurrently. Participants completed only the 28 biphasic (seven items) and hypomanic/manic (21 items) items, responding to the items using a 4-point scale ranging from *never or hardly ever* to *very often or almost constantly*. As stated earlier, GBI scores have shown specificity in discriminating BD from other diagnoses (Pendergast et al., 2014). Note that scale means, standard deviations, and coefficient alphas (all of which were computed for each scale separately at each time point) for the GBI, PID-5, and all other Study 2 measures are provided in Table 3.

Personality Inventory for *DSM-5*. The PID-5 (Krueger et al., 2012) is a comprehensive measure of personality pathology as described in *DSM-5* Section III (Emerging Models and Measures). As discussed, research indicates that the PID-5 generally shows good convergence with other omnibus personality measures (e.g., the PAI; Al-Dajani, Gralnick & Bagby, 2016). Participants completed only the PID-5 Emotional Lability scale (seven items; e.g., "my emotions change for no reason") for this study, responding to the items using a 4-point scale ranging from *very false or often false* to *very true or often true.*

Study 2 Results

As in Study 1, we conducted exploratory factor analyses of the BR scales and conducted a series of correlational analyses using standard Pearson product-moment correlations to examine the relations between the emergent BR factors and other study variables. All analyses were

conducted using SAS Version 9.4. Once again, prior to conducting all study analyses (including computing descriptive statistics and coefficient alphas), we handled missing data for participants across studies using a multiple-imputation program (PROC MI) from SAS Version 9.4. As in Study 1, imputations were conducted at the item level in cases in which participants were missing 20% or fewer of an instrument's items (e.g., if a participant was missing four of the Hypomanic Personality Scale's 48 items, the rest of the instrument's items were entered into the imputation to compute a value for the missing responses). In Study 2, we conducted item-level imputations for 14 cases at Time 1, and again for 14 cases at Time 2.

Determining the number of factors. Following the same procedure described in Study 1, we began by conducting parallel analyses and MAP tests in both assessments to determine the optimal number of factors to extract. The parallel analysis of the Time 1 data (*Ncases* = 381, *Nvars* = 10, *Ndatasets* = 1,000, *percent* = 95) suggested that a maximum of two factors should be extracted: The first and second eigenvalues exceeded their random counterparts (4.73 vs 1.26, 1.46 vs. 1.18, respectively), but the third eigenvalue was smaller than its random counterpart (.79 vs. 1.12). Similarly, the parallel analysis of the Time 2 data (*Ncases* = 305, *Nvars* = 10, *Ndatasets* = 1,000, *percent* = 95) again indicated that the first and second eigenvalues were greater than their random counterparts (5.10 vs. 1.29, 1.27 vs. 1.20, respectively), but that the third (.89 vs. 1.13) was not.

MAP tests provided further evidence that two factors should be extracted in the Time 1 data. In the Time 1 data, the mean squared partial correlation was lowest in the two-factor solution (.0521). However, at Time 2, the mean squared partial value was smallest in the one-factor solution (.0553), suggesting a one-factor solution was optimal. Overall, these analyses

provided support for both a one-factor and a two-factor solution. Consequently, following the logic outlined in Study 1, we examine both one- and two-factor solutions in subsequent analyses.

Description of Factors

We conducted principal factor analyses in each set of ratings, examining both the one- and two-factor solutions; in the latter, the factors were rotated to oblique simple structure using promax (power = 3). Once again, although we used principal components analyses to determine the optimal number of factors to extract, we use principal factor analyses to examine the factor structure of the BR scales. As depicted in Tables 4 and 5, all scales loaded ≥ .40 on a single factor in both assessments, providing strong evidence for a general BR dimension. The GBI Biphasic, GBI Mania, and HPS Mood Volatility scales were the three strongest markers of this general factor, as all three had loadings ≥ .75 in both sets of ratings. This suggests that this general factor is characterized most strongly by emotional lability, as all three measures include considerable content tapping affective dysregulation.

The two-factor structure in both sets of data appeared to be similar (a) to each other and (b) to the two-factor solution presented in Study 1 (again, see Tables 4 and 5). The first factor was strongly marked by GBI Biphasic (e.g., "rapid mood shifts"), PID-5 Emotional Lability (e.g., "emotions change for no good reason"), HPS Mood Volatility (e.g., "feel emotions with extreme intensity), and GBI Mania (e.g., "energetic and restless"); these four scales all loaded ≥ .60 on this dimension across both solutions. Whereas IDAS-II Mania showed substantial loadings on both factors in Study 1 (i.e. its loadings were .39 and .54 on Activated Positive Affect and Emotional Lability, respectively), it was a was a clear marker of the first factor in both Study 2 assessments: It had loadings of .57 and .60 on this first factor in the Time 1 and Time 2 solutions, respectively, and loadings of only .19 and .21 on the second factor at Times 1 and 2,

respectively. Thus, this first factor was marked by scales most strongly representing the general dimension in the one-factor solutions, and it seems to tap affective lability and cognitive symptoms of mania, thereby closely resembling the Emotional Lability factor in Study 1.

In Study 2, the second factor represented high arousal positive affect and extraversion, similar to the Activated Positive Affect factor in Study 1. The ASRM (e.g., "happier than usual"), IDAS-II Euphoria (e.g., "much more energy than usual"), HPS Social Vitality (e.g., "life of the party"), and HPS Excitement (e.g., "excited for no reason) scales all marked this second factor, with loadings ≥ .50 across both sets of ratings. It should be noted that although the HPS Excitement scale split evenly across the two factors in Study 1 (.39 and .44 on Factors I and II, respectively), it was a clearer marker of the second factor in the Study 2 data, loading ≥ .50 across both time points and showing much weaker (< .25) loadings on Factor I.

It is likely that HPS Excitement (Factor II) and IDAS-II Mania (Factor I) were clearer markers of a single factor in Study 2 because these structural analyses consisted of a larger number of indicators that yielded better defined factors (e.g., there were a greater number of scales defining the Emotional Lability factor in Study 2 than Study 1); thus, the Study 2 assessments yielded more distinctive and interpretable dimensions. In fact, the MDQ was the only measure to perform inconsistently across the two Study 2 assessments, perhaps because it contains a fairly heterogeneous range of content—including symptoms of irritability, energy, self-confidence, racing thoughts, and risk taking—related to both Factors I and II. It loaded more strongly on Factor I in the Time 1 data (.42 vs. .29), but had a larger loading on Factor 2 in the Time 2 solution (.26 vs. .38).

As in Study 1, we computed regression-based factor scores to represent both (a) these factors and (b) the general factor from the one-factor solution in subsequent analyses.

Following the terminology used in Study 1, we again refer to the factors from the two-factor solution as *Emotional Lability* and *Activated Positive Affect*, respectively. These factors correlated .53 at Time 1 and .61 at Time 2.

Based on the MacCallum et al. (1999) guidelines, the sample sizes used for extracting the Activated Positive Affect and Emotional Lability dimensions exceeded what is recommended for accurate recovery of population factors at both time points. Note that for the two-factor solution the average level of communality was .52 at Time1 and .54 at Time 2; furthermore, the Activated Positive Affect and Emotional Lability factors each were defined by several BR measures at both time points.

Factor Similarity Across Samples

To determine the level of similarity between the factor solutions across the two Study 2 time points (i.e., examining how similar the factors at Time 1 were to those that emerged at Time 2), we computed comparability coefficients (Finn, 1986). Comparability coefficients are derived by (a) generating regression-based scoring weights for each factor in each solution, and (b) applying these weights to participants' actual scores in each dataset (Everett & Entrekin, 1980; Finn, 1986; Gorsuch, 1983; Harman, 1976). Using this method, we therefore can compute correlations between four regression-based factor scores (two representing the Time 1 factors and two representing the Time 2 factors) in each set of ratings for the two-factor solution, and two regression-based factor scores (one for the general factor at Time 1 and Time 2) for the one-factor solution. Note that weights obtained from highly similar factor solutions will produce very strongly correlated scores, with coefficients ≥ .90 providing strong evidence that the same factor emerged across different solutions (see Everett, 1983). The one-factor solution was highly comparable across samples, as both comparability coefficients were .99. Similarly, we obtained

strong evidence for the replicability of our two-factor solution across the Study 2 assessments, as all four comparability coefficients (i.e., one for Activated Positive Affect and another for Emotional Lability at each assessment) were .99.

Comparability coefficients provide a stringent method of testing factor similarity (Everett & Entrekin, 1980), but we could not use them to determine the similarity between the Study 1 and Study 2 factor solutions because they were based on different sets of measures (i.e., participants in Study 1 completed only seven BR scales, whereas participants in Study 2 completed an expanded set of 10 BR scales). Instead, we computed congruence coefficients (Gorsuch, 1983) to assess the similarity of the factor loadings from the Study 1 factors with the corresponding loadings from both of the Study 2 solutions (e.g., comparing the loadings for Activated Positive Affect in the community sample with the loadings for Activated Positive Affect in each student solution, using the seven BR scales that were administered in both studies). Loadings were highly congruent across samples for the one-factor solution (coefficients = .98 and .99 for the Time 1 and Time 2 solutions, respectively), suggesting that the same general factor emerged in all three solutions. When we consider two factors, the loadings for the Activated Positive Affect factor from Study 1 were highly congruent with the corresponding loadings for this factor in both Study 2 solutions (coefficients = .94 and .92 with the Time 1 and Time 2 solutions, respectively). Similarly, the loadings on the Emotional Lability factor from Study 1 also were highly congruent with those from both Study 2 solutions (coefficients = .96 and .93 with the Time 1 and Time 2 solutions, respectively). These very high coefficients provide evidence that the same Activated Positive Affect and Emotional Lability factors emerged in all three solutions across Studies 1 and 2.

Bipolar-Relevant Factors: Relations with Other Study Variables

Personality and affect. Results for both Study 2 assessments are discussed together because a similar pattern of correlations was observed for the Activated Positive Affect and Emotional Lability factors across the two sets of ratings. The factor-scale correlations are depicted in Tables 6 (Time 1 data) and 7 (Time 2 data). Similar to Study 1, Activated Positive Affect had many of its strongest associations with measures of high arousal positive affect and extraversion (i.e., AVI High Arousal Positive Affect, TAI Experience Seeking, BFI Extraversion; *r*s ranged from .34 to .44, mean $r = .40$) across time points, although these relations were slightly weaker in magnitude than those for Study 1. Furthermore, unlike Study 1, Activated Positive Affect was only modestly linked to TAI Vigor ($r = .23$ and .13 at Time 1 and Time 2, respectively) and also related positively with some negative affect measures (i.e., *r*s with PANAS Negative Affect were .33 and .43 at Time 1 and Time 2, respectively). Even though Activated Positive Affect showed weaker associations with TAI Vigor than in Study 1, it still generally related more strongly to high versus low arousal positive affect scales (e.g., AVI Low Arousal Positive Affect, TAI Geniality and Attentiveness; *r*s ranged from -.17 to .04, mean $r = -.05$); for example, it displayed significantly stronger correlations with AVI High Arousal Positive Affect than with AVI Low Arousal Positive Affect in both Study 2 assessments (*z*s = 7.70 and 7.32, respectively).

Emotional Lability showed even more robust positive relations with negative affect/neuroticism across the Study 2 time points (i.e., PANAS Negative Affect, mDES Negative Emotions, BFI Neuroticism; *r*s ranged from .49 to .65, mean $r = .56$) than it did in Study 1. It also generally showed weak relations with high and low arousal positive affect scales in Study 2. As in Study 1, Activated Positive Affect and Emotional Lability demonstrated differential relations with the RPA subscales: the former displayed weak to moderate positive associations

with all three subscales at both time points (*r*s ranged from .27 to .37, mean *r* = .32) whereas the latter showed specificity to RPA Dampening (*r*s = .45 and .48 for Times 1 and 2, respectively).

As in Study 1, we again report associations between the general factor in the one-factor solution and other study variables (see Tables 6 and 7). The general factor demonstrated moderate to strong positive relations with negative affect measures, weak positive relations with high arousal positive affect measures, and weak negative relations with low arousal positive affect. Thus, this single factor displayed a different pattern of relations than in Study 1, wherein it showed positive relations with both positively and negatively valenced affect measures, and generally displayed its strongest relations with indicators of high arousal positive affect.

Other psychopathology. The strong association between Emotional Lability and Dysphoria replicated in both Study 2 samples, as this correlation was the highest for that factor at both Time 1 and Time 2 (both *r*s = .66). However, in contrast to Study 1—wherein positive urgency showed a significantly stronger relation to Emotional Lability than to Activated Positive Affect—the two factors correlated similarly with the PUM in the Study 2 assessments (for Emotional Lability, *r*s = .54, .58, respectively, at Times 1 and 2; for Activated Positive Affect, *r*s = .46 and .56, respectively, at Times 1 and 2). Indeed, these associations with the PUM represented the only cases in which correlations did not differ significantly between the two factors in all three sets of analyses reported in Studies 1 and 2. Results for the single factor replicated those from Study 1, as it related positively to both Dysphoria and the PUM at both time points.

Well-being. As in Study 1, Activated Positive Affect again showed positive relations to some measures of well-being, although the magnitude of these relations was weaker and actually was negative in some cases. In contrast to Activated Positive Affect, Emotional Lability showed

negative associations with all measures of well-being (i.e., the SWLS, SHS, Flourishing Scale, IDAS-II Well-being) at both Study 2 time points. Although the single factor correlated positively with most well-being measures in Study 1, it demonstrated primarily negative relations with these measures in Study 2.

Discussion

The goals of this study were to inform the assessment and future study of BD by (a) determining if BR measures define two distinct factors as in previous research, and (b) examining the correlates of emergent BR factors with a wide range of measures assessing personality and affect, other symptoms of psychopathology, and well-being. These goals were driven by previous evidence suggesting that self-report BR measures define two distinct factors (D. Watson & Naragon-Gainey, 2014), as well as findings demonstrating the value in explicating the relations between BD and both positive and negative affective dysfunction (Gruber, 2011a; Gruber et al., 2008; Gruber et al., 2014; D. Watson & Naragon-Gainey, 2010).

Although we aimed to determine if two distinct, psychologically meaningful factors could be extracted from our structural analyses of BR measures, some evidence across studies—and in Study 1 especially—suggested that a one-factor solution may be optimal. Therefore, in addition to explicating the nature of the two-factor solution, we also examined the structure and correlates of a one-factor solution across studies. These results indicated that the BR measures converged to define the same general factor across samples and assessments.

Although some findings favored extracting a single general factor, the preponderance of evidence from Study 2—which consisted of a more expansive set of BR measures, including the GBI Mania, GBI Biphasic, and PID-5 Emotional Lability scales—supported extracting two factors. Furthermore, when two factors were extracted, a structure defined by Emotional Lability

(marked by such scales as HPS Mood Volatility and PID-5 Emotional Lability) and Activated Positive Affect (marked by such scales as IDAS-II Euphoria and HPS Social Vitality) emerged that was both (a) psychologically meaningful and (b) highly replicable across Studies 1 (community sample) and 2 (student sample assessed at two time points). This two-factor structure of Emotional Lability and Activated Positive Affect was especially well-defined in Study 2. Notably, these structural results also appear highly similar to those presented by D. Watson and Naragon-Gainey (2014), even though we used different (in both studies) and more expansive (in Study 2) sets of measures than in previous research.

Thus, although the Emotional Lability and Activated Positive Affect factors both were (a) defined by scales purporting to measure BR traits and symptoms and (b) strongly correlated at all three assessments (*r*s ranged from .53 to .65), they appear to tap distinct dimensions within this broader domain, given that they show differential patterns of correlates in many regards. Next, we provide more detailed descriptions of both of these factors and of their respective relations with other variables, following a brief description of the general factor and its correlates.

Nature of the Bipolar-Relevant Factors

General factor. Our results consistently indicated that the BR measures cohered to define a strong general factor in the one-factor solution. In Study 1, general factor scores displayed robust positive relations with high arousal positive affect and with other psychopathology (i.e., IDAS-II Dysphoria and positive urgency). In Study 2, this general factor again associated positively with positive urgency and depressive symptoms, but showed much stronger relations with negative affect/neuroticism than it did with measures of high arousal positive affect. It is interesting that this factor—which was highly replicable across studies—showed notable positive correlates with positive affect measures in Study 1, but also displayed robust positive

associations with other symptoms across studies and actually correlated more strongly with negative affect/neuroticism than with positive affect in Study 2.

These complex results likely are due, in part, to this general factor being defined both by scales tapping extreme positive affect content (i.e., the Activated Positive Affect factor)—which builds in overlap with positive affect measures—and scales primarily assessing mood volatility content (i.e., the Emotional Lability factor), which builds in overlap with measures of negative affect/neuroticism and other psychopathology. Furthermore, even though the one-factor solution was highly replicable across studies, scales tapping elevated positive affect generally loaded more strongly on this general factor in Study 1 than in Study 2; conversely, this factor was marked most strongly by scales assessing cognitive and mood volatility symptoms in Study 2. Viewed in this context, these complex results make a good deal of sense.

Emotional Lability. As noted earlier, the Emotional Lability and Activated Positive Affect factors from the two-factor solution displayed distinctive patterns of correlates. The Emotional Lability factor appears to tap negative affect/neuroticism to a significant degree, demonstrating noteworthy positive associations with such measures. Given the strength of these associations—which were particularly strong in the Study 2 assessments—it is unsurprising that this factor also related positively to other psychopathology measures (viz., depressive symptoms and positive urgency). In contrast to its moderate to strong positive relations with negative affect/neuroticism and psychopathology, Emotional Lability generally showed comparatively weaker relations with positive affect/extraversion. Taken together, this pattern of relations across Studies 1 and 2 suggests that high scores on the Emotional Lability factor are pathological in nature.

Activated Positive Affect. In contrast, Activated Positive Affect displayed a particular affinity with measures of extraversion and high arousal positive affect (e.g., feeling excited) across studies. It correlated positively with measures of low-arousal positive affect (e.g., feeling peaceful) in many cases, but these relations were much weaker than those for high arousal positive affect, indicating that this factor is characterized more strongly by the latter than the former. Although Activated Positive Affect related positively to negative affect/neuroticism in some instances, these relations generally were much weaker in magnitude than those for Emotional Lability. Based on these results, further research is needed to examine the extent to which the content tapped by markers of this factor is adaptive versus maladaptive; most notably, it was somewhat surprising that this factor associated as strongly with well-being as it did in some instances (e.g., $r = .65$ with IDAS-II Well-being in Study 1), suggesting that high scores on this factor may be adaptive in some ways.

Broader Implications of Results

Our findings indicated strongly that the BR measures included in these studies defined a common dimension, suggesting that these scales all assess the same broad construct to a considerable degree. However, the emergence of two replicable and psychologically meaningful factors of Emotional Lability and Activated Positive Affect also bears important assessment-related and clinical implications that are obscured when focusing solely on a one-factor solution.

Notably, these two-factor findings add to a body of research that has sought to clarify which BD features (a) are specific to BD versus (b) shared with a range of other disorders. As discussed, affective lability is a common feature across a number of disorders, and the emergence of our Emotional Lability factor indicates that many BR measures tap such content to a considerable degree. Our results indicated that Emotional Lability correlated strongly with

depressive symptoms, lending support to the idea that the content defining this factor also relates strongly and non-specifically to other forms of psychopathology.

In contrast, the emergence of the Activated Positive Affect factor is in accord with findings suggesting that elevated levels of high-arousal positive affect are a more specific feature of BD (Gruber, 2011b; D. Watson & Naragon-Gainey, 2010). The identification of this factor bears significant implications for future work in this area, as it underscores the importance of research aimed at understanding the role of positive affective disturbance in BD. Relatedly, the emergence of this factor is consistent with previous evidence suggesting that elevated reward seeking—which is closely tied to the positive affective system (DeYoung, 2013; D. Watson, 2000)—is a key feature of BD (Alloy et al., 2008; 2012; Johnson, Edge, et al., 2012). Although grandiose narcissism, antisocial personality disorder, and substance use also have shown positive relations with extraversion/positive affect (see Johnson, Leedom, & Muhtadie, 2012 for a discussion of how positive emotions are linked to these disorders), our data and findings from other studies (e.g., Gruber, 2011a; Gruber et al., 2014; D. Watson & Naragon-Gainey, 2010) indicate that elevated levels of positive affect are an especially prominent feature of BD that can be used to distinguish it from internalizing disorders—and depressive disorders especially, which are characterized by elevated negative affect but substantial deficits in positive affect (Mineka, Watson, & Clark, 1998; Rector, Bagby, Huta, & Ayearst, 2012).

Thus, our findings bear important assessment-related implications. More specifically, they suggest that although BR scales cohere to define a common dimension, these measures also define two psychologically meaningful factors that show different patterns of correlates. More fundamentally, the emergence of this robust two-factor structure informs conceptualizations of BD and structural models of psychopathology by showing that BD is strongly related to

dysfunction of the both positive valence (Activated Positive Affect) and negative valence (Emotional Lability) systems of the Research Domain Criteria (Insel et al., 2010).

Other recent research indicates that positive and negative emotional dysfunction in BD can be explained at more nuanced levels. For instance, in regard to the negative valence system, Quilty, Pelletier, DeYoung, and Bagby (2013) found that the personality aspect of Volatility (e.g., rapid mood swings) within the broader neuroticism domain showed specificity in its relations with BD; in contrast, the specific neuroticism aspect of Withdrawal (e.g. feeling vulnerable/self-conscious) showed specificity to depression (see DeYoung, Quilty, & Peterson, 2007 regarding the placement of aspects of personality within hierarchical personality models). Our Emotional Lability factor appears more closely related to Volatility than to Withdrawal, although it will be important to determine the relations between these dimensions empirically.

With regard to positive emotional dysfunction, Quilty, Mackew, and Bagby (2014) found that BD appears to be associated especially strongly with the fun seeking (e.g., craving excitement and new sensations) component of the behavioral activation system, which itself is a component of the broader positive valence system (Insel et al., 2010). Although our battery did not contain direct measures of behavioral activation per se, it did include extraversion/positive affect scales tapping content similar to fun seeking (e.g., TAI Experience Seeking; "like to stir things up," "enjoy trying new things"), and such scales associated positively with the Activated Positive Affect factor. Relatedly, recent research indicates both that extraversion/positive affect and behavioral activation measures indeed are closely interrelated (Quilty, DeYoung et al., 2014) and that experience seeking displays robust positive associations with mania (D. Watson, Stasik, Ellickson-Larew, & Stanton, 2015). Thus, when our findings are embedded into this previous body of research, it seems that some aspects of positive and negative affective dysfunction are

more closely related to BR traits and symptoms than are others; therefore, it will be important to explicate the nature of such relations further to improve our understanding of the sources of dysfunction that are specific versus non-specific to BD.

Limitations, Future Directions, and Conclusions

Our data have important implications for the assessment of BD and BR traits and symptoms in future research. However, this study has several limitations that need to be acknowledged. First, we relied solely on self-report across studies. It will be important for future research to incorporate interview (e.g., the YMRS; Young et al., 1978) and informant measures (e.g., the ORSM; Krüger et al., 2010) of BD and other constructs to determine the robustness of these results across methods. Additionally, although we examined the structure and correlates of a wider range of BR measures than has been done previously, our battery was far from comprehensive, as it did not include other BR measures that have been widely used in the literature (e.g., the TEMPS-A, HCL-32, BR scales from the MMPI-2-RF and PAI). Related to this point, although our battery included extraversion and positive emotionality scales closely related to reward seeking and sensitivity (e.g., extraversion, experience seeking, and high arousal positive affect), it did not include direct measures of these constructs per se; thus, it will be important for future research in this area to incorporate measures of reward seeking and sensitivity, as well as other constructs related to the positive affective system (i.e., achievement motivation) that are implicated in BD (Alloy et al., 2008; 2012; Gruber 2011a; Johnson, Leedom, et al., 2012; Quilty, De Young, et al., 2014). In particular, further research is needed to clarify the nature of the relations between BR scales defined by positive affective content (i.e., those defining Activated Positive Affect) and reward seeking, given that emotional states overlapping

with reward seeking (e.g., feeling self-assured, bold, and daring) are a facet of the broader positive affective domain (Stanton & Watson, 2014; 2015; D. Watson, 2000).

Next, although we presented data from both community and student samples, it will be important for future research to examine the structure and correlates of BR traits and symptoms in more clinically-oriented samples in which higher levels of bipolar symptoms are likely to be reported. Furthermore, it will be useful for future research to determine the degree to which individuals diagnosed with BD differ on the Emotional Lability and Activated Positive Affect dimensions from individuals diagnosed with other disorders characterized by affective lability (e.g., borderline personality disorder) and heightened reward seeking (e.g., pathological gambling, substance use; see Gruber et al., 2013). Lastly, although we report a number of interesting associations for the Emotional Lability and Activated Positive Affect factors across samples, causality cannot be inferred from these relations. Thus, future research incorporating experimental designs is needed to more directly test the underlying causal mechanisms.

Despite these limitations, our data provide evidence both that self-report BR measures (a) cohere to form a general factor and (b) also define a replicable two-factor structure of Emotional Lability and Activated Positive Affect. These two factors showed distinct patterns of relations with other variables, which demonstrates that results based on analyses using markers of Emotional Lability are likely to differ substantially from those based on indicators of Activated Positive Affect. Moreover, the emergence of a distinct Activated Positive Affect factor illustrates the value of research explicating the role of positive affective dysfunction in BD. We hope that future research will build from our work to further explicate the structure and correlates of BR measures.

References

Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005). TEMPS-A: Progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire. *Journal of Affective Disorders, 85*, 3-16.

Al-Dajani, N., Gralnick, T. M., & Bagby, R. M. (2016). A psychometric review of the Personality Inventory for *DSM–5* (PID–5): Current status and future directions. *Journal of Personality Assessment, 98*, 62-81.

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Cogswell, A., Grandin, L. D., Hughes, M. E., . . . Hogan, M. E. (2008). Behavioral approach system and behavioral inhibition system sensitivities and bipolar spectrum disorders: Prospective prediction of bipolar mood episodes. *Bipolar Disorders, 10*, 310–322.

Alloy, L. B., Bender, R. E., Whitehouse, W. G., Wagner, C. A., Liu, R. T., Grant, D. A., . . . Abramson, L. Y. (2012). High behavioral approach system (BAS) sensitivity, reward responsiveness, and goal-striving predict first onset of bipolar spectrum disorders: A prospective behavioral high-risk design. *Journal of Abnormal Psychology, 121*, 339-351.

Altman, E. G., Hedeker, D., Peterson, J. L., & Davis, J. M. (1997). The Altman Self-Rating Mania Scale. *Biological Psychiatry, 42*, 948-955.

Angst, J., Adolfsson, R., Benazzi, F., Gamma, A., Hantouche, E., Meyer, T. D., . . . Scott, J. (2005). The HCL-32: Towards a self-assessment tool for hypomanic symptoms in outpatients. *Journal of Affective Disorders, 88*, 217-233.

Ben-Porath, Y. S., & Tellegen, A. (2008). *Minnesota Multiphasic Personality Inventory-2 Restructured Form*. Minneapolis, MN: University of Minnesota Press.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*, 3-5.

Butcher, J. N., Dahlstrom, W., Graham, J. R., Tellegen, A., Kaemmer, B., & McGargee, E. I. (2001). *Minnesota Multiphasic Personality Inventory-2: Manual for Administration and Scoring (2nd ed.).* Minneapolis, MN: University of Minnesota Press.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion, 9,* 361–368.

Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S., Annus, A. M., & Peterson, C. (2007). Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment, 19,* 107-118.

Depue, R. A., Krauss, S., Spoont, M. R., & Arbisi, P. (1989). General Behavior Inventory identification of unipolar and bipolar affective conditions in a nonclinical university population. *Journal of Abnormal Psychology, 98*, 117–126.

DeYoung, C. G. (2013). The neuromodulator of exploration: A unifying theory of the role of dopamine in personality. *Frontiers in Human Neuroscience, 7*, article 762.

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*, 880-896.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49*, 71-75.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*, 143-156.

Dillon, D. G., Deveney, C. M., & Pizzagalli, D. A. (2011). From basic processes to real-world problems: How research on emotion and emotion regulation can inform understanding of psychopathology, and vice versa. *Emotion Review, 3*, 74-82.

Double, D. B. (1990). The factor structure of manic rating scales. *Journal of Affective Disorders, 18*, 113-119.

du Pont, A., Welker, K. Gilbert, K. E., & Gruber, J. (in press). The emerging field of positive emotion dysregulation. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory and applications*. New York, NY: Guilford Press.

Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology, 95*, 214–222.

Everett, J. E. (1983). Factor comparability as a means of determining the number of factors and their rotation. *Multivariate Behavioral Research, 18,* 197–218.

Everett, J. E., & Entrekin, L. V. (1980). Factor comparability and the advantages of multiple group factor analysis. *Multivariate Behavioral Research, 2,* 165–180.

Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to Positive Affect: A Self-Report Measure of Rumination and Dampening. *Cognitive Therapy and Research, 32*, 507–525.

Finn, S. E. (1986). Structural stability of the MMPI in adult males. *Journal of Consulting and Clinical Psychology, 54,* 703–707.

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.

Gruber, J. (2011a). A review and synthesis of positive emotion and reward disturbance in bipolar disorder. *Clinical Psychology & Psychotherapy, 18*, 356-365.

Gruber, J. (2011b). When feeling good can be bad: Positive emotion persistence (PEP) in bipolar disorder. *Current Directions in Psychological Science, 20*, 217-221.

Gruber, J., Dutra, S. J., Hay, A. C., & Devlin, H. C. (2014). Positive emotion disturbance across clinical disorders. In M. M. Tugade, M. N. Shiota, & L. D. Kirby (Eds.), *Handbook of positive emotions* (pp. 432-447). New York, NY: Guilford Press.

Gruber, J., Eidelman, P., Johnson, S. L., Smith, B., & Harvey, A. G. (2011). Hooked on a feeling: Rumination about positive and negative emotion in inter-episode bipolar disorder. *Journal of Abnormal Psychology, 120,* 956-961.

Gruber, J., Johnson, S. L., Oveis, C, & Keltner, D. (2008). Risk for mania and positive emotional responding: Too much of a good thing? *Emotion, 8,* 23-33.

Gruber, J., Kogan, A., Quoidbach, J., & Mauss, I. B. (2013). Happiness is best kept stable: Positive emotion variability is associated with poorer psychological health. *Emotion, 13*, 1-6.

Harman, H. H. (1976). *Modern factor analysis* (3rd ed.). Chicago: University of Chicago Press.

Hirschfeld, R. M. A., Williams, J. B. W., Spitzer, R. L., Calabrese, J. R., Flynn, L., Keck, P. E., ... Zajecka, J. (2000). Development and validation of a screening instrument for bipolar spectrum disorder: The Mood Disorder Questionnaire. *The American Journal of Psychiatry, 157*, 1873-1875.

Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., . . . Wang, P. (2010). Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders. *The American Journal of Psychiatry, 167*, 748-751.

Jazaieri, H., Urry, H. L., & Gross, J. J. (2013). Affective disturbance and psychopathology: An emotion regulation perspective. *Journal of Experimental Psychopathology, 4*, 584-599.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality* (2nd ed., pp. 102–138). New York: Guilford.

Johnson, S. L., Edge, M. D., Holmes, M. K., & Carver, C. S. (2012). The behavioral activation system and mania. *Annual Review of Clinical Psychology, 8*, 243-267.

Johnson, S. L., Leedom, L. J., & Muhtadie, L. (2012). The dominance behavioral system and psychopathology: Evidence from self-report, observational, and biological studies. *Psychological Bulletin, 138*, 692-743.

Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for *DSM-5*. *Psychological Medicine, 42,* 1879-1890.

Krüger, S., Quilty, L. C., Bagby, R. M., Lippold, T., Bermpohl, F., & Bräunig, P. (2010). The Observer-Rated Scale for Mania (ORSM): Development, psychometric properties and utility. *Journal of Affective Disorders, 122*, 179-183.

Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the Hypomanic Personality Scale. *Journal of Abnormal Psychology, 109*, 222–226.

Lyubomirsky, S., & Lepper, H. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46,* 137-155.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4*, 84-99.

Miller, C. J., Johnson, S. L., & Eisner, L. (2009). Assessment tools for adult bipolar disorder. *Clinical Psychology: Science and Practice, 16*, 188-201.

Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology, 49*, 377-412.

Morey, L. C. (2007). *Personality Assessment Inventory professional manual, second edition*. Odessa, FL: Psychological Assessment Resources.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers, 32,* 396-402.

Pavot, W., & Diener, E. (1993). Review of the Satisfaction With Life Scale. *Psychological Assessment, 5*, 164-172.

Pendergast, L. L., Youngstrom, E. A., Brown, C., Jensen, D., Abramson, L. Y., & Alloy, L. B. (2015). Structural invariance of General Behavior Inventory (GBI) scores in Black and White young adults. *Psychological Assessment, 27*, 21-30.

Pendergast, L. L., Youngstrom, E. A., Merkitch, K. G., Moore, K. A., Black, C. L., Abramson, L. Y., & Alloy, L. B. (2014). Differentiating bipolar disorder from unipolar depression and ADHD: The utility of the General Behavior Inventory. *Psychological Assessment, 26,* 195-206.

Quilty, L. C., DeYoung, C. G., Oakman, J. M., & Bagby, R. M. (2014). Extraversion and behavioral activation: Integrating the components of approach. *Journal of Personality Assessment, 96,* 87-94.

Quilty, L. C., Mackew, L., & Bagby, R. M. (2014). Distinct profiles of behavioral inhibition and activation system sensitivity in unipolar vs. bipolar mood disorders. *Psychiatry Research, 219,* 228-231.

Quilty, L. C., Pelletier, M., DeYoung, C. G., & Michael Bagby, R. (2013). Hierarchical personality traits and the distinction between unipolar and bipolar disorders. *Journal of Affective Disorders, 147*, 247-254.

Rector, N. A., Bagby, R. M., Huta, V., & Ayearst, L. E. (2012). Examination of the trait facets of the five-factor model in discriminating specific mood and anxiety disorders. *Psychiatry Research, 199*, 131-139.

Schalet, B. D., Durbin, C. E., & Revelle, W. (2011). Multidimensional structure of the Hypomanic Personality Scale. *Psychological Assessment, 23*, 504–522.

Sellbom, M., Bagby, R. M., Kushner, S., Quilty, L. C., & Ayearst, L. E. (2012). Diagnostic construct validity of MMPI-2 Restructured Form (MMPI-2-RF) scale scores. *Assessment, 19,* 176-186.

Shiota, M. N., Keltner, D., & John, O. P. (2006). Positive emotions dispositions differentially associated with Big Five personality and attachment style. *Journal of Positive Psychology, 1*, 61-71.

Simms, L. J., Goldberg, L. R., Roberts, J. E., Watson, D., Welte, J., & Rotterman, J. H. (2011). Computerized adaptive assessment of personality disorder: Introducing the CAT–PD Project. *Journal of Personality Assessment, 93*, 380-389.

Stanton, K., Daly, E., Stasik-O'Brien, S. M., Ellickson-Larew, S., Clark, L. A., & Watson, D. (2016). An integrative analysis of the Narcissistic Personality Inventory and the Hypomanic Personality Scale: Implications for construct validity. *Assessment*. Advance online publication.

Stanton, K., & Watson, D. (2014). Positive and Negative Affective Dysfunction in Psychopathology. *Social and Personality Psychology Compass, 8*, 555-567.

Stanton, K., & Watson, D. (2015). Replicable facets of positive emotionality and their relations to psychopathology. *Assessment, 22*, 665-680.

Tellegen, A., & Ben-Porath, Y. S. (2008). *MMPI-2-RF: Technical manual*. Minneapolis, MN: University of Minnesota Press.

Timmerman, M. E., & Lorenzo-Seva, U. (2011). Dimensionality assessment of ordered polytomous items with parallel analysis. *Psychological Methods, 16,* 209-220.

Tsai, J. L., Knutson, B. K., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology, 90*, 288–307.

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika, 41*, 321-327.

Watson, C., Quilty, L. C., & Bagby, R. M. (2011). Differentiating bipolar disorder from major depressive disorder using the MMPI-2-RF: A receiver operating characteristics (ROC) analysis. *Journal of Psychopathology and Behavioral Assessment, 33*, 368-374.

Watson, D. (2000). *Mood and temperament*. New York: Guilford Press.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063-1070.

Watson, D., O'Hara, M. W., Naragon-Gainey, K., Koffel, E., Chmielewski, M., Kotov, R., . . . Ruggero, C. J. (2012). Development and Validation of New Anxiety and Bipolar Symptom Scales for an Expanded Version of the IDAS (the IDAS-II). *Assessment*, *19*, 399–420.

Watson, D., & 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., & Naragon-Gainey, K. (2014). Personality, emotions, and the emotional disorders. *Clinical Psychological Science, 2*, 422–442.

Watson, D., Stasik, S. M., Chmielewski, M., & Naragon-Gainey, K. (2015). Development and validation of the Temperament and Affectivity Inventory (TAI). *Assessment, 22*, 540-560.

Watson, D., Stasik, S. M., Ellickson-Larew, S. A., & Stanton, K. (2015). Extraversion and psychopathology: A facet-level analysis. *Journal of Abnormal Psychology, 124*, 432-446.

Watson, D., Wiese, D., Vaidya, J., & 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.

Young, R. C., Biggs, J. T., Ziegler, V. E., & Meyer, D. A. (1978). A rating scale for mania: Reliability, validity and sensitivity. *The British Journal of Psychiatry, 133*, 429-435.

Youngstrom, E. A., Danielson, C. K., Findling, R. L., Gracious, B. L., & Calabrese, J. R. (2002). Factor structure of the Young Mania Rating Scale for use with youths ages 5 to 17 years. *Journal of Clinical Child and Adolescent Psychology, 31*, 567-572.

Youngstrom, E. A., Gracious, B. L., Danielson, C. K., Findling, R. L., & Calabrese, J. (2003). Toward an integration of parent and clinician report on the Young Mania Rating Scale. *Journal of Affective Disorders, 77*, 179-190.

Zimmerman, M. (2012). Misuse of the Mood Disorders Questionnaire as a case-finding measure and a critique of the concept of using a screening scale for bipolar disorder in psychiatric practice. *Bipolar Disorders, 14*, 127-134.

Table 1

Promax Factor Loadings of the Bipolar-Relevant Scales from the Two-Factor Solution and Scale Loadings on a Single Factor in the Community Sample

Bipolar-Relevant Scale	I	II	Single-Factor
IDAS-II Euphoria	**.88**	.05	**.86**
Altman Self-Rating Mania Scale	**.82**	-.05	**.72**
HPS Social Vitality	**.60**	.08	**.63**
HPS Mood Volatility	-.04	**.83**	**.70**
Mood Disorder Questionnaire	.00	**.63**	**.56**
IDAS-II Mania	.39	**.54**	**.84**
HPS Excitement	.39	.44	**.76**

Note. $N = 329$. Loadings $\geq |.50|$ are highlighted. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms. HPS = Hypomanic Personality Scale.

Table 2

Correlations between the Bipolar-Relevant Factors and Personality, Affectivity, Other Psychopathology, and Well-being Scales in the Community Sample

Scale	Factor I	Factor II	Single Factor
AVI High Arousal Positive Affect	**.68**	**.35**	**.58**
IDAS-II Well-being	**.65**	.25	**.51**
TAI Experience Seeking	**.64**	**.44**	**.59**
TAI Vigor	**.60**	.29	**.50**
PANAS Positive Affect	**.58**	.25	**.47**
RPA Self-Focus	**.58**	**.40**	**.53**
BFI Extraversion	**.56**	.25	**.45**
mDES Positive Emotions	**.52**	.21	**.41**
RPA Emotion-Focus	**.52**	**.40**	**.50**
Satisfaction with Life Scale	**.40**	.04	.26
Subjective Happiness Scale	**.34**	-.06	.18
Flourishing Scale	**.33**	-.00	.20
AVI Low Arousal Positive Affect	**.33**	.06	.23
TAI Geniality	.28	.09	.21
Positive Urgency	**.46**	**.62**	**.56**
IDAS-II Dysphoria	.18	**.51**	**.34**
RPA Dampening	**.35**	**.48**	**.43**
PANAS Negative Affect	.03	**.31**	.16
mDES Negative Emotions	.00	.28	.13
TAI Attentiveness	.09	-.25	-.06
BFI Neuroticism	-.22	.22	-.03

Note. $N = 329$. Correlations $\geq |.30|$ are highlighted, and all correlations for Factor I are significantly different from those for Factor II. IDAS-II = Expanded version of the Inventory of Depression and Anxiety Symptoms. AVI = Affect Valuation Index. TAI = Temperament and Affectivity Inventory. PANAS = Positive and Negative Affect Schedule. BFI = Big Five Inventory. mDES = Modified Differential Emotions Scale. RPA = Responses to Positive Affect.

Table 3

Scale Descriptive Statistics and Coefficient Alphas in the Student Samples

	Time 1			Time 2		
Scale	Mean	S.D.	Alpha	Mean	S.D.	Alpha
ASRM (5)	4.10	3.08	.72	3.90	3.18	.76
GBI Biphasic (7)	11.94	3.65	.80	11.31	3.68	.83
GBI Mania (21)	33.52	9.37	.91	31.72	9.89	.94
HPS Excitement (7)	1.70	1.90	.76	1.69	1.83	.74
HPS Mood Volatility (13)	4.46	3.08	.77	4.13	3.10	.78
HPS Social Vitality (19)	6.44	4.00	.79	6.57	4.04	.79
IDAS-II Euphoria (5)	8.69	3.37	.80	8.77	3.52	.81
IDAS-II Mania (5)	8.79	3.97	.83	8.48	4.06	.87
PID-5 Emotional Lability (7)	13.62	5.43	.93	12.76	5.27	.93
MDQ (13)	6.31	3.69	.85	5.16	3.69	.86
Positive Urgency (14)	24.19	8.98	.96	22.86	8.91	.96
IDAS-II Dysphoria (10)	21.71	7.76	.89	20.13	7.29	.89
RPA Dampening (8)	15.64	4.69	.83	15.33	4.75	.85
RAP Emotion-focus (5)	12.67	2.85	.75	11.94	3.04	.80
RPA Self-focus (4)	9.35	2.36	.72	9.21	2.60	.81
Flourishing Scale (8)	44.83	6.87	.91	44.92	7.62	.94
IDAS-II Well-being (8)	22.58	5.98	.87	22.67	6.31	.89
SWLS (5)	25.16	6.55	.89	25.72	6.36	.91
SHS (4)	19.13	5.06	.89	19.23	4.76	.87

Table 3, cont.

	Time 1			Time 2		
	Mean	S.D.	Alpha	Mean	S.D.	Alpha
BFI Extraversion (8)	24.58	6.57	.88	24.93	6.50	.88
BFI Neuroticism (8)	23.07	6.03	.83	22.59	5.97	.83
mDES Negative Emotions (8)	15.81	5.87	.90	15.25	5.40	.89
mDES Positive Emotions (11)	37.08	7.15	.89	36.30	7.63	.91
PANAS Negative Affect (10)	20.45	6.95	.89	19.21	6.83	.90
PANAS Positive Affect (10)	32.88	6.48	.88	31.32	7.20	.90
AVI High Arousal PA (3)	8.55	2.29	.86	8.48	2.45	.88
AVI Low Arousal PA (4)	12.18	3.25	.90	12.32	3.37	.93
TAI Attentiveness (6)	30.35	4.58	.85	30.58	4.49	.85
TAI Experience Seeking (9)	27.51	5.87	.82	27.15	5.71	.80
TAI Geniality (10)	40.82	4.83	.84	40.47	5.43	.89
TAI Vigor (5)	17.98	3.68	.83	18.12	3.58	.84

Note. *N*= 381-382 for Sample 1 and *N*= 305-308 for Sample2. The number of items for each scale are in parentheses following the scale name. ASRM= Altman Self-Rating Mania Scale. AVI= Affect Valuation Index. BFI= Big Five Inventory. GBI= General Behavior Inventory. IDAS-II= Expanded Version of the Inventory of Depression and Anxiety Symptoms. HPS= Hypomanic Personality Scale. mDES = Modified Differential Emotions Scale. MDQ= Mood Disorder Questionnaire. PANAS= Positive and Negative Affect Schedule. PID-5= Personality Inventory for *DSM-5*. RPA= Responses to Positive Affect. SWLS= Satisfaction with Life Scale. SHS= Subjective Happiness Scale. TAI= Temperament and Affectivity Inventory.

Table 4

Promax Factor Loadings of the Bipolar-Relevant Scales from the Two-Factor Solution and Scale Loadings on a Single Factor in the Student Sample (Time 1)

Bipolar-Relevant Scale	I	II	Single Factor
GBI Biphasic	**.91**	-.11	**.77**
PID-5 Emotional Lability	**.81**	-.19	**.62**
HPS Mood Volatility	**.75**	.11	**.79**
GBI Mania	**.71**	.23	**.86**
IDAS-II Mania	**.57**	.19	**.69**
Mood Disorder Questionnaire	.42	.29	**.63**
Altman Self-Rating Mania Scale	-.13	**.68**	.40
IDAS-II Euphoria	.10	**.67**	**.61**
HPS Social Vitality	.00	**.59**	.46
HPS Excitement	.16	**.54**	**.58**

Note. $N = 381$. Loadings ≥ |.50| are highlighted. GBI= General Behavior Inventory. PID-5= Personality Inventory for *DSM-5*. HPS= Hypomanic Personality Scale. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms.

Table 5

Promax Factor Loadings of the Bipolar-Relevant Scales from the Two-Factor Solution and Scale Loadings on a Single Factor in the Student Sample (Time 2)

Bipolar-Relevant Scale	I	II	Single Factor
PID-5 Emotional Lability	**.88**	-.25	**.61**
GBI Biphasic	**.88**	.01	**.82**
HPS Mood Volatility	**.69**	.18	**.79**
GBI Mania	**.62**	.37	**.89**
IDAS-II Mania	**.60**	.21	**.74**
IDAS-II Euphoria	.08	**.71**	**.67**
HPS Social Vitality	-.10	**.67**	.48
Altman Self-Rating Mania Scale	-.07	**.62**	.46
HPS Excitement	.24	**.56**	**.70**
Mood Disorder Questionnaire	.26	.38	**.56**

Note. $N = 305$. Loadings $\geq |.50|$ are highlighted. PID-5= Personality Inventory for *DSM-5*. GBI= General Behavior Inventory. HPS= Hypomanic Personality Scale. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms.

Table 6

Correlations between the Bipolar-Relevant Factors and Personality, Affectivity, Other Psychopathology, and Well-being Scales in the Student Sample (Time 1)

Scale	Factor I	Factor II	Single Factor
IDAS-II Dysphoria	**.66**	.25	**.58**
PANAS Negative Affect	**.62**	**.33**	**.57**
mDES Negative Emotions	**.56**	.26	**.51**
Positive Urgency	**.54***	**.46***	**.56**
BFI Neuroticism	**.49**	-.06	**.33**
RPA Dampening	**.45**	.27	**.43**
Subjective Happiness Scale	**-.37**	.14	-.22
Satisfaction with Life Scale	**-.33**	.00	-.24
Flourishing Scale	**-.33**	.03	-.23
TAI Attentiveness	**-.32**	-.17	-.29
AVI Low Arousal Positive Affect	**-.31**	.03	-.21
TAI Geniality	-.21	.04	-.14
AVI High Arousal Positive Affect	.00	**.44**	.16
BFI Extraversion	.02	**.40**	.16
TAI Experience Seeking	.24	**.38**	**.31**
IDAS-II Well-Being	-.06	**.38**	.09
PANAS Positive Affect	-.02	**.35**	.11
RPA Self-Focus	.14	**.34**	.22
RPA Emotion-Focus	.13	**.30**	.20
mDES Positive Emotions	-.07	.28	.05
TAI Vigor	-.02	.23	.07

Note. $N = 381$. Correlations ≥ |.30| are highlighted, and all correlations except for those with an asterisk (*) are significantly different for Factor I than those for Factor II. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms. PANAS = Positive and Negative Affect Schedule. BFI = Big Five Inventory. mDES = Modified Differential Emotions Scale. RPA= Responses to Positive Affect. AVI = Affect Valuation Index. TAI = Temperament and Affectivity Inventory.

Table 7

Correlations between the Bipolar-Relevant Factors and Personality, Affectivity, Other Psychopathology, and Well-being Scales in the Student Sample (Time 2)

Scale	Factor I	Factor II	Single Factor
IDAS-II Dysphoria	**.66**	**.38**	**.59**
PANAS Negative Affect	**.65**	**.43**	**.60**
Positive Urgency	**.58***	**.56***	**.61**
mDES Negative Emotions	**.55**	.25	**.46**
BFI Neuroticism	**.51**	.04	**.35**
RPA Dampening	**.48**	**.31**	**.44**
Flourishing Scale	**-.38**	-.06	-.27
Satisfaction with Life Scale	**-.37**	-.08	-.28
TAI Attentiveness	**-.33**	-.16	-.28
Subjective Happiness Scale	**-.31**	.12	-.15
AVI Low Arousal Positive Affect	-.29	.00	-.19
TAI Geniality	-.22	-.01	-.14
AVI High Arousal Positive Affect	.05	**.42**	.22
BFI Extraversion	.02	**.40**	.18
PANAS Positive Affect	-.02	**.37**	.15
RPA Emotion-Focus	.23	**.37**	**.31**
TAI Experience Seeking	.20	**.34**	.27
RPA Self-Focus	.15	**.32**	.24
IDAS-II Well-being	-.05	**.30**	.10
mDES Positive Emotions	-.10	.23	.04
TAI Vigor	-.11	.13	-.01

Note. $N = 304$. Correlations ≥ |.30| are highlighted, and all correlations except for those with an asterisk (*) are significantly different for Factor I than those for Factor II. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms. PANAS = Positive and Negative Affect Schedule. BFI = Big Five Inventory. mDES = Modified Differential Emotions Scale. RPA= Responses to Positive Affect. AVI = Affect Valuation Index. TAI = Temperament and Affectivity Inventory.