Affective Temperaments: Unique Constructs or Dimensions of Normal Personality by Another Name?

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Abstract:

Background:

Current models theorize that affective temperaments underlie the development and expression of mood psychopathology. Recent studies support the construct validity of affective temperaments in clinical and non-clinical samples. However, one concern is that affective temperaments may be describing characteristics that are better captured by models of normal personality. We conducted two studies examining: (a) the association of affective temperaments with domains and facets of normal personality, and (b) whether affective temperaments accounted for variance in mood symptoms and disorders, impairment, and daily-life experiences over-and-above variance accounted for by normal personality.

Methods:

Study 1 included 522 young adults who completed the TEMPS-A and the NEO-PI-3. Study 2 included 145 participants who were administered the TEMPS-A, NEO-FFI, interviews assessing psychopathology and impairment, and an assessment of daily life experiences.

Results:

Study 1 revealed that personality domains and facets accounted for one-third to one-half of the variance in affective temperaments. However, study 2 demonstrated that affective temperaments accounted for unique variance in measures of psychopathology, impairment, and daily-life experiences after partialling variance associated with personality domains. Specifically, cyclothymic/irritable temperament predicted bipolar disorders, impairment, borderline

personality traits, urgency, and anger in daily life. Hyperthymic temperament predicted hypomanic episodes, grandiosity, sensation seeking, and increased activity in daily life.

Limitations:

The study was limited by the fact that only domain, not facet-level, measures of FFM were available in study 2.

Conclusions:

The findings support the validity of hyperthymic and cyclothymic/irritable temperaments as indicators of clinical psychopathology and indicate that they provide information beyond normal personality.

Keywords: Affective temperaments | Personality | Mood psychopathology | Bipolar spectrum disorders

Article:

1. Affective temperaments

Kraeplin (1899/1921) introduced four temperaments−depressive, manic, cyclothymic, and irritable−that he described as continuous states that occur not only during the course of mood episodes, but also during the intervals between episodes. Building on these foundations, Akiskal and Mallya (1987) operationalized four affective temperaments: dysthymic, cyclothymic, irritable, and hyperthymic temperaments. Affective temperaments are defined as relatively stable, trait-like expressions of affect that presumably convey risk for mood psychopathology (Akiskal et al., 2005a).

Dysthymic temperament is characterized by being pessimistic, highly self-critical, gloomy, and prone to excessive worrying. It also involves preoccupation with personal failure, lack of assertiveness, being self-denying, and striving to please others (Akiskal et al., 2005a). Cyclothymic temperament is operationalized by abrupt shifts between high and low moods, with each lasting a few days at a time. These biphasic alterations in mood are also associated with behavioral changes between sluggishness and increased energy, low self-confidence and over-confidence, and creative thinking and dull or confused thoughts (Akiskal et al., 2000). Irritable temperament, which is conceptually and empirically linked with cyclothymic temperament, is characterized by reactivity to aversive events with negative affect, moodiness, and a tendency to complain (Akiskal and Mallya, 1987).

In contrast to the other three temperaments, hyperthymic temperament consists of more adaptive tendencies that can prove to be beneficial to daily functioning. Hyperthymic temperament includes characteristics such as sociability, increased energy, and excessive cheerfulness. However, hyperthymic temperament also includes maladaptive aspects such as unwarranted

over-confidence, over-involvement in activities, uninhibited or reckless behavior, along with grandiose ideas that can lead to undesirable consequences (Akiskal et al., 2000). Consistent with the potential adaptive features of hypomanic episodes, hyperthymic temperament can have beneficial effects. However, markedly elevated hyperthymic traits, especially in conjunction with low constraint or with superimposed episodes of depression, can contribute to impairment and psychopathology (Akiskal et al., 2005b).

2. Assessment of affective temperaments

The Temperament Evaluation of Memphis, Pisa, Paris, and San Diego−Autoquestionnaire (TEMPS-A;Akiskal et al., 2005a) is a self-report measure assessing cyclothymic, irritable, hyperthymic, and dysthymic temperaments. The measure has been widely used and is reported to have good psychometric properties. Several studies have examined affective temperaments in patients with mood psychopathology. For example, Evans et al. (2005) reported that mood disorder patients had significantly higher scores for all temperaments except hyperthymic temperament compared to healthy controls. Similar results have been reported (Di Florio et al., 2010, Mendlowicz et al., 2005 and Nowakowska et al., 2005), although Kesebir et al. (2005) found similar scores for hyperthymic temperament across patients with bipolar disorder and healthy controls.

Recent studies have also examined the validity of the TEMPS-A in non-clinical samples. Lazary et al. (2009) reported that cyclothymic and dysthymic temperaments were associated with depressive symptoms and a family history of mood disorders. Walsh et al. (2012) examined affective temperaments in a sample of young adults at risk for mood psychopathology. They reported that combined cyclothymic/irritable temperament was associated with DSM-IV-TR bipolar disorders and broader bipolar spectrum disorders proposed by Akiskal (2004). In contrast, hyperthymic temperament was only associated with broader bipolar spectrum disorders and not DSM-IV-TR mood psychopathology. Dysthymic temperament was associated with depressive symptoms, but not mood disorders. These findings suggest that affective temperaments may convey risk for psychopathology and could serve as an important model for identifying those at risk for developing severe mood psychopathology.

3. Affective temperaments and normal personality

Affective temperaments share a number of features in common with normal dimensions of personality such as the Five-Factor Model (FFM). Affective temperaments and normal personality are expressed and measurable in both clinical and non-clinical populations, and their extreme variants are presumed to be associated with pathological expressions. An obvious concern is that affective temperaments may essentially be describing human characteristics that are more fully described by normal personality (and that measures of affective temperament may be capturing variance that is more fully explained by trait-based measures of personality). However, research examining the association of affective temperaments and normal dimensions

of personality is relatively limited. A validation study of the TEMPS-A in a German non-clinical sample (Blöink et al., 2005) examined the association of personality as measured by the NEO Five-Factor Inventory (NEO-FFI; Costa and McCrae, 1992) and affective temperaments assessed by the TEMPS-A. Results indicated that neuroticism was positively associated with cyclothymic, irritable, and dysthymic temperaments, but not hyperthymic temperament. In contrast, extraversion positively correlated with hyperthymic temperament and negatively with the remaining three temperaments. Conscientiousness was negatively correlated with cyclothymic temperament, whereas agreeableness was negatively correlated with both the cyclothymic and irritable temperaments. In addition, openness was found to have minimal associations to the four temperaments, but this may represent a more complex association of openness at the level of subfactors or facets. Similar results were reported by Rózsa et al. (2008) and Walsh et al. (2012). However, studies have not reported associations of FFM facets with affective temperaments, examined the total variance in the affective temperaments accounted for by normal personality, or examined whether affective temperaments account for variance in measures of psychopathology, functioning, or daily life experiences over-and-above variance accounted for by normal personality.

4. Goals and hypothesis

The goals of the present study were to examine the associations of affective temperaments with domains and facets of normal personality and to determine whether affective temperaments accounted for variance in measures of mood symptoms and disorders, impairment, and daily life experiences over-and-above variance accounted for by normal personality domains. We conducted two studies to: (a) examine the FFM structure of affective temperaments, and (b) examine whether affective temperaments accounted for variance over-and-above the effects of FFM domains in the prediction of interview-based ratings of psychopathology and functioning and ESM ratings of daily life experiences. Consistent with the model that normal personality provides the components for affective temperaments and with previous findings (e.g., Walsh et al., 2012), we hypothesized that hyperthymic temperament would be associated with high extraversion and low neuroticism, dysthymic temperament with low extraversion and high neuroticism, and cyclothymic/irritable temperament would be associated with high neuroticism and low agreeableness and conscientiousness. Study 1 is the first study to our knowledge that will examine the association of FFM facets with affective temperaments, and we expected that these associations will provide further information regarding the nature of these temperaments.

Study 2 represents the first attempt to examine whether affective temperaments account for variance in symptoms and functioning over-and-above the variance accounted for by the FFM. We specifically hypothesized that: (a) cyclothymic/irritable temperament will account for unique variance over-and-above normal personality domains in the prediction of mood psychopathology and impairment; (b) hyperthymic temperament will account for unique variance in terms of interview-based hyperthymic and grandiose symptoms; and (c) dysthymic temperament will account for unique variance in depressive symptoms and disorders.

4.1. Study 1

4.1.1. Overview

Study 1 examined the association of the four affective temperaments with FFM domains and facets in a large sample of young adults.

4.2. Methods

4.2.1. Participants

Participants were undergraduates enrolled in psychology courses at UNC-Greensboro who were recruited to participate in an online survey for course credit. A total of 580 participants started the study. Usable data were completed by 522 participants (58 participants failed to complete the survey or had elevated scores on an infrequency scale). The final sample consisted of 391 females and 131 males with a mean age of 19.7 (*SD*=3.3).

4.2.2. Materials and procedures

Participants completed the TEMPS-A, NEO-PI-3 (Costa and McCrae, 2010), a 13-item infrequency measure (Chapman and Chapman, 1983), and a brief demographic questionnaire. The 50-item research version of the TEMPS-A that assesses hyperthymic, dysthymic, cyclothymic, and irritable temperaments was administered. The 240-item NEO-PI-3 assesses five domains and 30 facets of normal personality. Following Chapman and Chapman, participants who endorsed more than two of the infrequency items were dropped from the analyses. The study was approved by the UNCG IRB and participants provided informed consent. Participants completed the questionnaires on-line using Qualtrics software. Previous studies by our laboratory indicated that participants who complete surveys on-line have comparable completion rates, infrequency scores, and scale scores to participants who complete paper versions of questionnaires in group testings.

5. Results

5.1. Descriptive statistics

Table 1 contains descriptive statistics and intercorrelations for the TEMPS-A subscales and the NEO-PI-3 domain scores. The values are consistent with previous findings in college student samples (e.g., Walsh et al., 2012). Given the large sample size and large number of correlations computed, alpha level in study 1 was set at .001 to minimize risk of Type 1 error and to avoid interpreting correlations that accounted for a trivial amount of variance as meaningful. Following Cohen (1992), medium and large effect sizes were noted in the tables. Note that the relatively poor internal consistency reliability for the dysthymic temperament subscales seems to reflect that it is the shortest of the four temperament subscales (only 9 items). Given their conceptual similarity and the high correlation of the TEMPS-A cyclothymic and irritable

subscales, our previous studies have combined them into a single scale. The reliability of the combined items was .86 in the present sample, which is higher than either of the individual subscales. The descriptive data and correlations for the NEO-PI-3 domains are consistent with Costa and McCrae (2010). Note that the coefficient alpha values for the NEO-PI-3 facets ranged from .48 (Openness-3) to .82 (Neuroticism-3).

Table 1.Descriptive statistics and intercorrelations of the TEMPS-A Subscales and of the NEO-PI-3 Factors (*n*=522).

	Mean	SD	Alpha	Dysthymic	Cyclothymic	Irritable	
Hyperthymic	8.52	2.97	.75	**−.42***	−.17*	−.27*	
Dysthymic	4.98	1.93	.54		.27*	.22*	
Cyclothymic	7.34	4.16	.82			***.57****	
Irritable	2.70	2.32	.73				
	Mean	SD	Alpha	Extraversion	Openness	Agreeableness	Conscientiousness
Neuroticism	98.4	22.7	.92	**−.31***	.07	−.17*	**−.48***
Extraversion	114.9	20.5	.90		**.36***	.09	.28*
Openness	114.3	18.7	.88			.14	−.03
Agreeableness	113.2	15.7	.83				.29*
Conscientiousness	113.5	19.6	.91				

Medium effects in bold, large effects in bold and italics. **p*<.001.

5.2. Association of affective temperaments with FFM domains and facets

Table 2 presents the correlations of the TEMPS-A scales with the NEO-PI-3 factor scores; Table 3 presents the correlations with the NEO-PI-3 facet scores. Hyperthymic temperament was distinguished from the other affective temperaments by its personality domain correlates. Consistent with previous findings, hyperthymic temperament had its strongest association with extraversion, and was inversely associated with neuroticism. Hyperthymic temperament also had a moderate-sized association with conscientiousness, although this may have been driven in part by the strong inverse association of neuroticism and conscientiousness in the present sample. Dysthymic temperament was characterized by high neuroticism and introversion (low extraversion), as well as by small associations with low conscientiousness and agreeableness (the latter consistent with the dependent and people-pleasing aspects of dysthymic temperament). Cyclothymic/irritable temperament was strongly associated with neuroticism and had moderate

inverse associations with agreeableness and conscientiousness, consistent with affective volatility and hostile orientation towards others.

Table 2. Correlations of the TEMPS-A Subscales and of the NEO-PI-3 Factors (*n*=522).

	Hyperthymic	Dysthymic	Cyclothymic	Irritable	Cyclothymic/Irritable
Neuroticism	**−.48***	**.49***	***.57*** *	***.56*** *	***.64*** *
Extraversion	***.60*** *	**−.34***	−.06	−.12	−.10
Openness to experience	.08	−.08	.15	.06	.12
Agreeableness	−.03	.21*	−.22*	**−.33***	**−.31***
Conscientiousness	**.32***	−.19*	**−.42***	−.27*	**−.39***

Medium effects in bold, large effects in bold and italics.*p<.001.

Table 3. Correlations of the TEMPS-A Subscales and of the NEO-PI-3 Facets (*n*=522).

	Hyperthymic	Dysthymic	Cyclothymic	Irritable	Cyclothymic/Irritable
N1 Anxiety	**−.38***	**.45***	**.41***	**.38***	**.45***
N2 Angry hostility	−.19*	.16	**.43***	***.59*** *	***.57*** *
N3 Depression	**−.47***	**.48***	***.54*** *	**.48***	***.58*** *
N4 Self-Consciousness	***−.54*** *	***.53*** *	**.36***	**.37***	**.41***
N5 Impulsiveness	−.18*	.17*	**.43***	**.38***	**.46***
N6 Vulnerability	**−.41***	**.40***	**.42***	**.37***	**.45***
E1 Warmth	**.43***	−.18*	−.11	−.25*	−.21*
E2 Gregariousness	**.44***	−.24*	−.06	−.08	−.08
E3 Assertiveness	***.51*** *	**−.48***	−.11	−.06	−.10
E4 Activity	***.51*** *	−.27*	.00	.03	.01
E5 Excitement seeking	**.32***	−.22*	.14	.08	.13
E6 Positive emotions	**.43***	−.12	−.12	−.23*	−.20*
O1 Fantasy	.00	−.04	.18*	.06	.13
O2 Aesthetics	.14	−.01	.15*	.05	.11
O3 Feelings	.00	.13	.24*	.23*	.27*
O4 Actions	.23*	**−.32***	−.09	−.16*	−.14
O5 Ideas	.15	−.14	.04	−.01	.02
O6 Values	−.16	−.01	.02	.03	.03
A1 Trust	.24*	−.02	−.25*	**−.36***	**−.34***
A2 Straightforwardness	−.09	.14	−.25*	−.23*	−.28*
A3 Altruism	.14	.07	−.13	−.20*	−.18*
A4 Compliance	−.03	.14	−.26*	**−.45***	**−.40***
A5 Modesty	**−.34***	.28*	.00	−.01	−.01
C1 Competence	**.42***	−.29*	**−.38***	−.28*	**−.37***
C2 Order	.14	−.11	−.26*	−.12	−.22*

C3 Dutifulness	.16*	−.01	−.28*	−.19*	−.27*
C4 Achievement striving	**.42***	−.24*	−.21*	−.13	−.19*
C5 Self-Discipline	**.35***	−.23*	**−.46***	**−.30***	***−.43****
C6 Deliberation	−.02	.04	−.28*	−.18*	−.26*

Medium effects in bold, large effects in bold and italics. *p<.001.

The individual personality facets provided additional information regarding the nature of the affective temperaments. Hyperthymic temperament was significantly associated with all of the extraversion facets and inversely with all the neuroticism facets, but had a mixed pattern of associations with the facets in the other domains. Consistent with its outgoing, appetitive characteristics, hyperthymic temperament was associated with the actions facet of openness, and the competence, achievement striving, and self-discipline facets of conscientiousness, but not the deliberation facet. Likewise, hyperthymic temperament was associated positively with the trust facet of agreeableness, but inversely with the modesty facet. Dysthymic temperament was associated with negative affect (all the facets of neuroticism), meekness (associated with modesty and self-consciousness, and inversely with assertiveness and action), and diminished competence. At the facet level, cyclothymic/irritable temperament was associated with all the facets of neuroticism. It was further distinguished from hyperthymic temperament by being low on warmth, positive emotions, trust, compliance, competence, and self-discipline.

Table 4 presents the total variance in the TEMPS-A affective temperaments accounted for by the NEO-PI-3 domains and facets. Not surprisingly, the personality facets accounted for a significant increment in variance over-and-above the variance accounted for by the domains in each of the affective temperaments (p <.001 for the change in R-square in each analysis).

Table 4. Total variance in the TEMPS-A affective temperaments accounted for by the NEO-PI-3 domains and facets (n=522).

	Variance accounted for by 5 NEO-PI-3 domains	Variance accounted for by 30 NEO-PI-3 facets
Hyperthymic	.49	.56
Dysthymic	.39	.46
Cyclothymic	.39	.47
Irritable	.38	.49
Cyclothymic/Irritable	.47	.56

5.3. Conclusions

Consistent with previous findings, FFM domains differentiated affective temperaments, and the personality facets provided even further characterization of the temperaments. However, normal personality domains and facets only accounted for up to one-half of the variance in the temperament measures, indicating that affective temperaments as measured by the TEMPS-A accounts for additional variance beyond normal personality. However, it is unclear whether the

variance in affective temperaments that is unaccounted for by normal personality is significantly associated with measures of psychopathology and impairment.

6.1. Study 2

6.1.1. Overview

Affective temperaments are proposed to underlie the development and expression of mood psychopathology. Therefore, ratings of affective temperaments should be associated with interview-based ratings of mood psychopathology, impairment, and experiences in daily life. Furthermore, if affective temperaments represent distinct constructs beyond normal personality domains, they should account for variance in measures of symptoms, impairment, and daily life experiences over-and-above variance accounted for by normal personality domains. We expected that the strongest findings for affective temperaments over-and-above normal personality should be in the prediction of clinical disorders and that the weakest effects should be found for the prediction of events in daily life.

6.2. Methods

6.2.1. Participants

Participants were drawn from an ongoing longitudinal study of risk for bipolar-spectrum psychopathology described in Walsh et al. (2012) and Walsh et al. (2013). Approximately 1200 students enrolled in General Psychology courses at UNC-Greensboro completed self-report questionnaires as part of a departmental mass screening for course credit. A total of 191 students were invited to participate in a study of risk for bipolar spectrum psychopathology. Specifically, all of the mass-screening participants who scored at least 1.5 SD above the mean on the Hypomanic Personality Scale (Eckblad and Chapman, 1986) and a comparable number of randomly selected participants who scored less than 1.5 *SD* above the mean were invited to participate. This recruitment strategy was employed to ensure the inclusion of a sufficient number of individuals who experience bipolar spectrum psychopathology, and presumably a broad range of affective temperaments. A total of 145 young adults completed a structured interview and questionnaire battery. The sample included 100 women and 45 men. Mean age was 19.5 years (*SD*=2.3 years). A subset of 138 of these participants completed a week-long experience sampling assessment. The study was approved by the UNCG IRB and participants provided informed consent.

6.3. Materials and procedures

6.3.1. Self-report questionnaires

Participants completed the TEMPS-A, the NEO-FFI, the HPS, the Beck Depression Inventory (BDI; Beck et al., 1961), and the UPPS Impulsivity Scale (Whiteside and Lynam, 2001 and Whiteside et al., 2005). Consistent with the studies by Walsh et al. (2012) and Walsh et

al. (2013), a unified cyclothymic/irritable temperament was computed by averaging the standardized scores on the two temperament ratings. The NEO-FFI is a widely used 60-item self-report measure assessing the FFM's domains of personality. The HPS consists of 48 true‑false items that assess mild, trait-like, manic functioning that identify risk for bipolar disorder. The BDI is a widely used screening measure of the severity of depressive symptoms. The UPPS is a 46-item scale used to assess four domains of impulsivity including urgency, lack of premeditation, lack of perseveration, and sensation seeking.

6.3.2. Structured interview

The interview assessed DSM-IV-TR mood disorders, Akiskal's bipolar spectrum disorders, borderline personality disorder, global functioning, and grandiose beliefs. All interviews were tape-recorded and lasted approximately 90 min. Interviews were conducted by two advanced clinical psychology graduate students under the supervision of a licensed psychologist. The Structured Clinical Interview for DSM-IV (SCID-I; First et al., 1995) was used to assess current and past mood disorders. Broader bipolar spectrum disorders were diagnosed using the criteria reported in Akiskal (2004). The SCID-I interview was appropriate for determining diagnoses of bipolar II ½ (history of depression superimposed on cyclothymic temperament) and III (history of depression and antidepressant-induced hypomania). Using Akiskal's (2004) criteria, participants were interviewed for hyperthymic temperament to determine diagnoses of bipolar IV. Participants' current functioning was examined using the global assessment of functioning (GAF; American Psychiatric Association, 2000). Borderline personality disorder was assessed using the International Personality Disorder Examination (IPDE; Loranger et al., 1994). Following Eckblad and Chapman (1986), the interview included a brief assessment of grandiosity. Specifically, participants were asked to rate the likelihood that they would become famous or be featured on the cover of a magazine, as well as their level of ambition, creativity, and the extent to which they felt that they were odd or different from their peers rated on Likert scales. Participants were also questioned about whether they considered themselves to be a leader or follower.

6.3.3. ESM assessment

The present study used 9 ESM items or indices from Walsh et al.'s (2013) study that assessed experiences relevant to affective temperaments (e.g., items assessing affect, energy, activity level, risky behavior, and confidence/grandiosity). Participants were issued a personal digital assistant (PDA) for seven days. The PDAs signaled participants, administered questionnaires, and time-stamped and recorded responses. Participants were signaled to complete ESM questionnaires eight times daily between noon and midnight, and had 3 min to initiate responses following the signal. After this time interval (or completion of the questionnaire), the PDA turned off and did not reactivate until the next signal, ensuring that participants did not skip questionnaires and complete them later.

6.3.4. Statistical method

Analyses of the interview, questionnaire, and experience sampling data examined whether affective temperaments accounted for variance over-and-above the normal personality domains assessed by the NEO-FFI. In every analysis, the five NEO-FFI domains were entered into regression equations at step 1, followed by the three affective temperaments (hyperthymic, dysthymic, and cyclothymic/irritable) at step 2. Thus, the effect of each affective temperament was examined with the five personality domains and the other two affective temperaments partialled from the equation. This resulted in an especially conservative strategy, but the goal was to determine whether the affective temperaments had unique explanatory power beyond the normal personality domains. Analyses assessing the interview and questionnaire measures were conducted with linear regression or binary logistic regression using SPSS 20; analyses assessing ESM criteria were computed using multilevel regressions with MPlus 6.1 (Muthén and Muthén, 2010). Multilevel linear modeling provides a more appropriate method than conventional unilevel analyses for nested data (Hox, 2002). Predictors were grand mean centered, and parameter estimates were calculated using robust standard errors in the multilevel analyses.

6.4. Results

6.4.1. Prediction of interview and questionnaire measures

Descriptive statistics for the interview and questionnaire measures can be found in Walsh et al. (2012). The bivariate correlations among the personality domains and the affective temperaments were comparable to those reported in study 1. Table 5 presents the prediction of mood disorders and episodes by the personality domains and affective temperaments. Cyclothymic/irritable temperament predicted DSM-IV bipolar disorders, any broad bipolar disorders, and hypomanic episodes or hyperthymia, over-and-above the effects of the five personality domains and the two other temperaments. However, this association was specific to bipolar psychopathology as cyclothymic/irritable temperament was not uniquely associated with the presence of “any DSM-IV mood disorders” (including both bipolar and unipolar depressive disorders). As expected, hyperthymic temperament was uniquely associated with hypomanic episodes or interview-based hyperthymia. Dysthymic temperament was not associated with any of the diagnoses. Note that none of the personality domains were associated with diagnoses.

Table 5. Prediction of interview measures of mood psychopathology by normal personality and affective temperaments.

Criterion	Step 1					Step 2		
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Hyperthymic	Dysthymic	Cyclothymic/Irritable
	OR 95%CI	OR 95%CI	OR 95%CI	OR 95%CI	OR 95%CI	OR 95%CI	OR 95%CI	OR 95%CI

Any DSM bipolar disorder	1.02	.96–1.09	1.05	.96–1.15	1.05	.97–1.15	.89*	.80–.99	.95	.87–1.04	1.04	.78–1.38	1.00	.70–1.42	3.04*	1.27–7.30
Any broad bipolar disorder[a]	1.04	.99–1.10	1.07	.98–1.16	1.05	.98–1.13	.95	.87–1.03	.96	.89–1.03	1.27	.97–1.65	.91	.65–1.27	4.17**	1.78–9.73
Any DSM mood disorder	1.07**	1.02–1.12	1.01	.95–1.07	1.07*	1.01–1.14	1.01	.95–1.08	.97	.91–1.03	1.00	.83–1.19	.98	.78–1.23	1.52	.87–2.68
Hypomania or Hyperthymia	1.05	.99–1.10	1.24***	1.13–1.35	1.01	.94–1.08	.98	.91–1.05	.98	.92–1.05	1.28*	1.01–1.63	.96	.73–1.27	2.97**	1.43–6.16

*p <.05. **p <.01. ***p <.001. [a] Includes bipolar I, II, II-1/2, III, and IV disorders.

Table 6 presents the linear regressions assessing interview and questionnaire criteria. Cyclothymic/irritable temperament had the strongest associations over-and-above the personality domains' effect with psychopathology ratings−being positively associated with ratings of depression, hypomanic personality, and borderline personality traits, as well as impaired overall functioning. As expected, hyperthymic temperament was uniquely associated with all of the ratings of grandiosity (e.g., likelihood of being famous or on a magazine cover), except ratings of being different and odd. In terms of impulsivity, cyclothymic/irritable temperament accounted for unique variance in urgency, and hyperthymic temperament was positively associated with sensation seeking and inversely associated with lack of perseverance. The associations of affective temperaments with the UPPS over-and-above the personality domains are especially striking given that the UPPS was initially derived from the FFM.

Table 6. Prediction of interview and questionnaire measures of symptoms and impairment.

Criterion	Step 1					Step 2		
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Hyperthymic	Dysthymic	Cyclothymic/Irritable
	β	*β*	*β*	*β*	*β*	*β*	*β*	*B*
Psychosocial Functioning GAF	−.337***	−.090	−.005	.108	.196*	.067	−.109	−.339***
Hypomanic personality Scale	.257***	.626***	.178**	−.335***	−.079	.438***	.039	.356***

Beck depression inventory	.479***	.011	.039	−.053	.018	−.106	.117	.524***
Borderline personality traits	.181*	.041	.139	−.243**	−.187*	−.020	.209*	.516***
Grandiosity								
Likely famous	−.246*	.142	.227*	−.305**	−.094	.490***	−.060	.187*
Ambitious	.064	.150	.163	−.145	.296**	.264*	−.098	−.146
Creative	−.186	.152	.396***	−.160	.036	.366**	−.080	.088
Leader	−.110	.255**	.017	−.502***	.247**	.421***	−.040	.138
On a magazine cover	.024	.258***	.226*	−.176	−.066	.369**	.025	.149
Odd or different	.156	.247**	.372***	−.061	−.150	.176	.103	.174
UPPS Impulsivity								
Lack of premeditation	.037	.438***	.003	−.039	−.389***	.070	−.067	−.045
Urgency	.336***	.160*	−.017	−.320***	−.218**	−.063	.063	.398***
Sensation seeking	−.102	.334***	.138	−.107	−.166	.334**	.055	.007
Lack of perseverance	.179*	−.030	−.069	.094	−.609***	−.223*	.086	.026

*p <.05. **p <.01. ***p <.001.

The personality domains were associated with the interview and questionnaire measures in a predictable fashion at the first step of the regression analysis. Neuroticism was associated with impaired functioning, ratings of psychopathology, and urgency. Extraversion was associated with hypomanic personality, impulsivity, and aspects of grandiosity. Similarly, openness was associated with hypomanic personality and aspects of grandiosity. Antagonism (low agreeableness) was associated with hypomanic and borderline personality traits and urgency, as well as ratings of being a leader or the likelihood of being famous. Conscientiousness was associated with healthy functioning and being ambitious and a leader, and inversely with aspects of impulsivity.

6.4.2. Prediction of daily life experiences

We examined the association of normal personality and affective temperaments with ratings of affect, hypomanic energy and activity, grandiosity, and risky behavior (see Table 7). Not surprisingly, after partialling out variance associated with normal personality, the affective temperaments were less robustly associated with experiences in normal daily life than they were with measures of psychopathology and impairment. Nevertheless, hyperthymic temperament was uniquely associated with feeling energetic and doing many and exciting activities. Cyclothymic/irritable temperament was associated with feeling angry in the moment and inversely with feeling energetic. Dysthymic temperament was not uniquely associated with any of the daily activities, including feeling sad in the moment.

Table 7. Prediction of ESM measures of daily life experiences by normal personality and affective temperaments.

Criterion	Step 1					Step 2		
	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Hyperthymic	Dysthymic	Cyclothymic/Irritable
Energetic	−.015 (.010)	.049 (.012)***	.000 (.014)	-.012 (.013)	.004 (.012)	.082 (.039)*	.060 (.043)	-.290 (.120)*
Happy	−.023 (.009)*	.033 (.012)**	−.010 (.013)	.001 (.012)	−.009 (.010)	.008 (.035)	.018 (.046)	-.137 (.100)
Sad	.041 (.009)***	.018 (.010)	.017 (.012)	-.014 (.012)	.007 (.011)	.047 (.032)	−.020 (.039)	.136 (.113)
Angry	.014 (.006)*	.008 (.008)	−.004 (.007)	-.029 (.010)**	−.002 (.008)	.028 (.029)	−.007 (.032)	.187 (.091)*
Doing something exciting	−.012 (.007)	.024 (.010)*	−.004 (.010)	-.007 (.010)	.010 (.010)	.084 (.035)*	.041 (.035)	-.009 (.097)
Doing many things	.006 (.009)	.035 (.012)**	−.008 (.013)	-.019 (.014)	.014 (.013)	.105 (.035)**	.051 (.041)	−.006 (.125)
Confident	−.026 (.010)*	.028 (.012)*	.004 (.013)	-.015 (.013)	.006 (.012)	.029 (.040)	−.020 (.048)	.054 (.120)
Doing something risky	.010 (.004)*	.015 (.007)*	−.002 (.006)	-.013 (.007)	−.012 (.006)*	.030 (.023)	−.008 (.027)	.056 (.070)
Better than others	−.027 (.013)*	.043 (.019)*	.031 (.016)*	−.061 (.017)***	.019 (.019)	.114 (.059)	.080 (.058)	.176 (.157)

Note: Values are raw multilevel regression coefficients (and standard error). *p <.05. *p <.01. ***p <.001.

The personality domains were associated with daily life experiences at step 1 in an expected fashion. Neuroticism was associated with measures of negative affect, whereas extraversion was associated with ratings of positive affect, energy, activity, and grandiosity. Openness was associated with feeling better than others. Agreeableness was inversely associated with anger and feeling better than others, and conscientiousness was inversely associated with risky behavior.

7. General discussion

Affective temperaments have their historical roots in descriptions of psychopathology dating back to antiquity and were represented in Kraeplin (1899/1921) diagnostic formulations at the turn of the 20th century. Work by Akiskal and colleagues (e.g., Akiskal and Mallya, 1987) during the past three decades has offered a theoretical framework that led to the operationalization of affective temperaments and development of a widely used self-report assessment. However, theoretical and empirical reports have not adequately disambiguated affective temperaments, which are explicitly linked to mood psychopathology, from normal dimensions of personality or examined the extent to which affective temperaments contribute incremental validity to the prediction of mood psychopathology over-and-above normal personality.

Differentiating affective temperaments from normal dimensions of personality also requires differentiating the terminology used to describe these constructs, including the use of temperament, normal personality, and personality pathology or disorders. Unfortunately, there are almost as many definitions of these constructs as there are researchers. Rothbart (e.g., Rothbart and Hwang, 2005) defined temperament as individual differences in infants and young children that are present prior to the development of higher cognitive and social aspects of personality that manifest in the domains of emotion, activity and attention. Akiskal and colleagues (e.g., Akiskal, 1981 and Akiskal et al., 2005a) followed Kraeplin (1899/1921) and Schneider (1958) suggesting that affective temperaments are dispositions to mood disorders. Akiskal et al. (2005) distinguished affective temperaments from the recent DSM model of personality disorders by focusing on a dispositional framework based upon emotional reactivity that could offer adaptive manifestations (primarily within hyperthymic temperament), rather than a maladaptive interpersonal configuration. Nevertheless, the pathological expressions of affective temperaments seem to share features in common with the DSM model of personality disorders. However, the closest analogues in DSM-IV-TR to pathological manifestations of affective temperaments are cyclothymic and dysthymic disorders, which are classified as Axis I syndromes, not Axis II personality disorders.

As noted, affective temperaments and normal personality dimensions share several features in common, including their trait-like expression in normal and pathological populations. In fact, in a study of the associations of affective temperaments with Cloninger's tridimensional personality model, Maremmani et al. (2005) argued for a general model of personality and affective temperaments. Thus, normal personality facets and traits may provide the building blocks or

primary components of affective temperaments. However, the present findings speak against affective temperaments being redundant with normal personality. Conceptually, the difference seems to lie in affective temperaments' specific associations with mood psychopathology. Thus, affective temperaments share many features with normal personality dimensions, but their uniqueness seems to be their ability to straddle and connect domains of normal affective variation with subclinical and clinical mood psychopathology. We believe that this is supported by the findings in study 1 of considerable, but not complete, overlap between affective temperaments and normal personality, and the findings of study 2 that affective temperaments are associated with mood psychopathology and impairment (even in a non-clinically ascertained sample) over-and-above the effects of normal personality. Thus, consistent with Haynes and Lench (2003), affective temperaments provide incremental validity beyond normal personality in the prediction of mood psychopathology.

Study 2 adopted a conservative analytic strategy to examine the correlates of affective temperaments. Specifically, the correlates of each affective temperament were assessed with the five normal personality domains and the other two affective temperaments partialled out of the regression equation. Nevertheless, affective temperaments accounted for variance in measures of mood psychopathology, impairment, grandiosity, impulsivity, and even daily life functioning. These unique associations of affective temperaments were stronger with measures of psychopathology and weaker with measures of normal daily activities. This was not surprising given that normal personality domains would be expected to account for more variance in normal, daily experiences than in diagnoses and ratings of psychopathology.

The results of study 2 indicated that that cyclothymic/irritable temperament was associated with psychopathology and impairment outcomes, consistent with Di Florio et al. (2010), Savitz et al. (2008),Evans et al. (2005), and Mendlowicz et al. (2005). It was also significantly associated with borderline personality disorder and urgency (impulsivity in response to negative affect), consistent with Angst's (2007)inclusion of borderline personality within the bipolar spectrum. These characteristics share many features with neuroticism and antagonism, but cyclothymic/irritable temperament accounted for variance beyond these personality dimensions. Hyperthymic temperament was associated with an activated, energetic, and grandiose profile. These characteristics are often associated with extraversion, but hyperthymic temperament accounted for unique variance beyond this personality domain.

In contrast to the other affective temperaments, dysthymic temperament had the poorest psychometric properties and the weakest pattern of associations. Consistent with the operationalization of the construct, the FFM facets indicated that it was characterized by negative affect, passivity, modesty, withdrawal, and a lack of perceived competence. However, dysthymic temperament generally did not account for variance over-and-above the FFM domains. Furthermore, Walsh et al. (2012) reported that dysthymic temperament did not have zero-order correlations with mood disorder diagnoses.

Previous studies examining the association of the FFM and affective temperaments have only reported on the personality domains, not at the facet level. As seen in study 1, the facets accounted for a significant increment in variance in affective temperaments (an average of about 8% more variance), beyond the variance accounted for by the FFM domains. The greatest variation at the facet level seemed to occur for openness and agreeableness. For example, hyperthymic temperament was not significantly associated with agreeableness at the domain level, but had a significant positive association with the agreeableness facet of trust, but a significant inverse association with the facet of modesty. Both of these correlations are consistent with the operationalization of hyperthymic temperament, but tend to "wash out" the association at the domain level. This is consistent with Paunonen and Ashton's (2001) recommendation to consider variation at the facet level when considering how psychological constructs map on to FFM space. Nevertheless, even analyzing the composition of the affective temperaments at the FFM facet level left approximately one-half of the variance in the temperaments unexplained.

Given the previous point, an obvious limitation of study 2 was that we only had a measure of FFM domains, not facets. Therefore, we offer the caveat that findings in which the affective temperaments accounted for significant variance in measures of psychopathology, functioning, and daily life over-and-above the personality domains, may not have been significant if we had been able to employ facet level measures of normal personality. Additional limitations included that predictor and criterion measures in study 2 were measured concurrently. Longitudinal data is needed to determine if affective temperaments predict the development of bipolar spectrum psychopathology over-and-above normal personality.

In conclusion, the present findings offer the first comprehensive assessment of the overlap and differentiation of affective temperaments with normal domains of personality. These findings provide both a description of the temperaments within a FFM framework and demonstrate that affective temperaments are not simply expressions of normal personality under another name. Affective temperaments offer a promising phenotype for understanding the etiology and development of mood disorders and specifically bipolar spectrum psychopathology.

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Conflict of interest

None of the authors had any conflicts of interest.

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