

## The association of affective temperaments with impairment and psychopathology in a young adult sample.

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### **Abstract:**

#### Background

Previous research has examined the association of affective temperaments, as measured by the TEMPS-A, with DSM bipolar disorders. However, the relation of the TEMPS-A with risk for bipolar disorder remains unclear. The present study examined the association of affective temperaments with psychopathology, personality, and functioning in a nonclinically ascertained sample of young adults at risk for bipolar disorder.

#### Methods

One hundred forty-five participants completed the TEMPS-A, as well as interview and questionnaire measures of psychopathology, personality, and functioning.

#### Results

Cyclothymic/irritable temperament was associated with a range of deleterious outcomes, including mood disorders and impaired functioning. It was negatively associated with agreeableness and conscientiousness, and positively associated with current depressive symptoms, neuroticism, borderline symptoms, impulsivity, and grandiosity. Dysthymic temperament was positively associated with current depressive symptoms, neuroticism and agreeableness, but was unrelated to mood psychopathology. Hyperthymic temperament was associated with bipolar spectrum disorders, hypomania or interview-rated hyperthymia, extraversion, openness, impulsivity, and grandiosity.

#### Limitations

The present study was cross-sectional. Longitudinal studies utilizing the TEMPS-A are needed to better understand the predictive validity of the TEMPS-A for the development of bipolar disorder.

#### Conclusions

Early identification of individuals who fall on the bipolar spectrum may hasten appropriate

intervention or monitoring, and prevent misdiagnosis. The TEMPS-A appears to be a useful tool for assessing affective temperaments and bipolar spectrum psychopathology. The results support previous research documenting the association of cyclothymic/irritable temperament with bipolar psychopathology and other negative outcomes.

**Keywords:** affective temperament | TEMPS-A | bipolar spectrum | bipolar disorder | cyclothymia | irritability | psychology |

## Article:

### 1. Introduction

#### 1.1. Affective temperaments

Aretaeus of Cappadocia (1785/2010), a second-century Greek physician, first documented the connection between the emotional highs (mania) and lows (melancholia) that are central to mood psychopathology. Centuries later, Kraepelin (1899/1921) systematically observed and conceptualized this association as manic-depressive insanity, now known as bipolar disorder. Kraepelin identified four affective temperaments that he suggested underlie mood episodes, but may also be present among individuals without the full-blown illness. Building on Kraepelin's foundation, as well as extensive clinical experience, Akiskal and Mallya (1987) modified and operationalized Kraepelin's conceptualization of affective temperaments. Initially developed from observations made in a mood disorders clinic (Akiskal et al., 1977), they identified cyclothymic, dysthymic, and hyperthymic temperaments that were hypothesized to represent the most proximal behavioral phenotypes in the premorbid course of affective disorders (Akiskal, 1994).

Cyclothymic temperament (Akiskal and Mallya, 1987 and Akiskal et al., 2005b) is characterized by erratic instability in mood. Patients from Akiskal et al.'s (1977) mood clinic often exhibited alternating symptoms of depression and hypomania. The cyclical patterns also included a decreased need for sleep that alternated with hypersomnolence. 'Creative spurts' alternated with 'dry spells,' overconfidence with low self-esteem, and people-seeking with social withdrawal. The hallmark of the temperament is the chronic, biphasic dysregulation that is marked with shifts from an 'up' phase to a 'low' phase lasting at least two days.

Among people exhibiting cyclothymic temperament, there is an irritable subtype (Akiskal et al., 1979) characterized by the tendency to overreact to aversive stimuli with negative affect. This subtype is considered akin to borderline personality (Akiskal et al., 1979), as both involve rapid shifts in mood and erratic behaviors (Akiskal, 1994). The irritable temperament (Akiskal, 1992 and Akiskal and Mallya, 1987) is characterized by petulance, impulsivity, brooding, and mean-spirited humor. Not surprisingly given their common origin in Akiskal's model, the cyclothymic and irritable temperaments tend to co-occur.

In contrast, many features of hyperthymic temperament are adaptive and found in people in prominent leadership roles, whereas the less desirable manifestations, such as being meddlesome, are tolerated (Akiskal and Akiskal, 2005 and Weise et al., 1996). Adaptive aspects of this temperament include elevations in cheerfulness, gregariousness, and energy, along with decreased shyness and need for sleep. Maladaptive characteristics include reckless behavior,

overconfidence, poor insight, and over-involvement (Akiskal and Mallya, 1987). Maladaptive hyperthymia results in impaired judgment in social, financial, and sexual affairs and can jeopardize health and relationships (Akiskal and Akiskal, 2005).

Dysthymic temperament is characterized by habitual gloominess, brooding, guilt, self-denigration, anhedonia, and lethargy (Akiskal, 1996 and Akiskal and Mallya, 1987). Additional characteristics include being shy, non-assertive, sensitive to criticism, self-denying, conscientious, pessimistic, and humorless (Akiskal, 1983 and Akiskal, 1989). Cloninger et al. (1998) found an association with this temperament and increased rates of suicidality.

These affective temperaments best capture the classic European considerations of mood pathology that extend beyond the current diagnostic classifications (Akiskal, 1996 and Akiskal, 2004). In line with Kraepelin's work, Akiskal characterized affective temperaments as dispositions, rather than mood states, and considered them to be subaffective or subthreshold symptoms that are trait affective expressions of mood disorders (Akiskal, 1981 and Sass et al., 1993) that precede and follow mood episodes. Recently, Perugi et al. (2012) suggested that affective temperaments may also influence the clinical features and course of bipolar psychopathology.

## 1.2. Measurement and validation of affective temperaments

The Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-Autoquestionnaire (TEMPS-A; Akiskal et al., 2005a and Akiskal et al., 2005b) is a self-report measure that assesses affective temperaments that are presumed to underlie mood disorders. The TEMPS-A is designed to assess emotional, cognitive, and circadian traits that characterize hyperthymic, dysthymic, cyclothymic, and irritable temperaments. Akiskal et al. (2005b) examined the psychometric properties of the TEMPS-A in a patient population and reported Cronbach alpha coefficients ranging from .76 to .88 and 6 to 12 month test-retest reliability ranging from .58 to .70 for the four temperament subscales. Additionally, Kawamura et al. (2010) reported good long-term stability for the TEMPS-A over a 6-year timeframe.

Research has examined associations of the TEMPS-A in patients with clinical disorders. Numerous validation studies found elevated rates of cyclothymic and irritable temperaments (Di Florio et al., 2010, Evans et al., 2005, Kesebir et al., 2005, Mendlowicz et al., 2005, Nowakowska et al., 2005 and Savitz et al., 2008), as well as dysthymic temperament (Evans et al., 2005, Matsumoto et al., 2005, Mendlowicz et al., 2005 and Nowakowska et al., 2005) in patients with bipolar disorder in comparison to healthy control participants. Similarly, Goto et al. (2011) reported higher rates of cyclothymic, irritable, and dysthymic temperaments in patients with bipolar spectrum disorders, in comparison to depressed patients. In general, research has not supported higher rates of hyperthymic temperament in bipolar samples in comparison to healthy participants (Evans et al., 2005, Mendlowicz et al., 2005, Nowakowska et al., 2005 and Savitz et al., 2008), although one study (Kesebir et al., 2005) reported this trend. Two studies reported higher rates of hyperthymic temperament in bipolar patients in comparison to depressed patients (Gassab et al., 2008 and Mazzarini et al., 2009). Karam et al. (2010) found elevated rates of dysthymic, cyclothymic, and irritable temperaments among participants with a history of a 12-month mood or anxiety disorder, and lower rates of hyperthymic temperament.

Several studies have examined the validity of affective temperaments in nonclinical samples. Signoretta et al. (2005) examined the relation of the TEMPS-Interview Version (TEMPS-I; Akiskal et al., 1998) with measures of psychopathology in a nonclinical sample of students ages 14–26. Specifically, the authors found that dysthymic temperament was associated with ratings of social inhibition and a lack of antisocial and hyperactive behavior. Cyclothymic temperament was associated with the most emotional and behavioral problems in comparison to the other temperaments, including increased anxiety-sleep problems, sensitivity to separation, eating problems in females, and antisocial-aggressive behavior in males. This study was limited by its exclusion of any students experiencing emotional disorders requiring clinical attention. Recently, Morvan et al. (2011) examined the relation of the TEMPS-A with questionnaire measures of anxiety and depressive symptoms in a large sample of undergraduate students. Dysthymic, cyclothymic, and irritable temperaments were associated with depressive and anxiety symptoms, whereas hyperthymic temperament was inversely associated with depressive symptoms. However, studies examining the construct validity of the TEMPS-A in nonclinical samples generally have not employed comprehensive interview measures of psychopathology.

Construct validation of the TEMPS-A also requires examining the extent to which the temperaments are meaningfully associated with normal personality traits. Two studies have examined the relation of the TEMPS-A with the five-factor model of personality using nonclinical samples. Rózsa et al. (2008) examined the relation of the TEMPS-A in a nonclinical community/student sample using the NEO-PI-R (Costa and McCrae, 1992) and Blöink et al. (2005) examined the relation of the TEMPS-A with the NEO-FFI in a student sample (Borkenau and Ostendorf, 1994 and Costa and McCrae, 1989). Both studies found that neuroticism was positively associated with the cyclothymic, irritable, and dysthymic temperaments, and was negatively associated with hyperthymic temperament. Additionally, across studies cyclothymic temperament was negatively associated with conscientiousness, irritability was negatively associated with agreeableness, and dysthymic temperament was negatively associated with extraversion. Both studies also reported that hyperthymic temperament was positively associated with extraversion and conscientiousness, consistent with the notion that hyperthymia without concomitant depression or mania can be adaptive (Maremmani et al., 2011).

Although a number of studies have examined the relation of affective temperaments with clinical bipolar disorders, there is a paucity of research examining risk for bipolar disorders in nonclinical samples using the TEMPS-A. Özgürda et al. (2009) found higher rates of TEMPS-A cyclothymic and irritable temperaments in a sample of patients with bipolar I disorder who reported experiencing mood swings prior to the onset of their first affective episode. However, the TEMPS-A was administered after participants had already developed bipolar disorders. Several studies support the relation of cyclothymia with the development of bipolar disorders; however, these studies did not utilize the TEMPS-A. For example, Akiskal et al. (1977) prospectively examined patients with cyclothymia and found that nearly a third of the sample progressed into a full-blown bipolar disorder over a 2–3 year period. More recently, Alloy et al. (2010) examined the course of bipolar spectrum disorders over a 3-year period in college undergraduates and found that 74% of participants initially identified with cyclothymia or bipolar NOS transitioned to bipolar II disorder, and 15% of participants with bipolar NOS, cyclothymic, or bipolar II disorders subsequently developed bipolar I disorder. Akiskal et al. (1995) prospectively examined temperament variables associated with switching from unipolar

depression to bipolar II disorder over an 11-year period, and identified mood lability as a major predictor of a switch. In a cross-sectional study, Hantouche et al. (1998) reported that 88% of their sample of patients with unipolar depression who scored highly on a self-report measure of cyclothymia were re-assigned a diagnosis of bipolar II disorder after further examination.

Overall, the TEMPS-A appears to be a useful tool for examining affective temperaments in both healthy and clinical populations. However, the role of the TEMPS-A as a measure of bipolar spectrum psychopathology and risk for bipolar disorder remains unclear. In addition, there is support for the association of cyclothymic temperament and bipolar psychopathology, but limited research utilizing the TEMPS-A to examine this relationship. The present study aims to address these gaps in the literature by examining the expression of the TEMPS-A in a nonclinically ascertained sample of young adults at risk for the development of bipolar disorder.

### 1.3. Goals and hypotheses

The goal of the present study was to examine the construct validity of affective temperaments in a large sample of nonclinically ascertained young adults that includes participants psychometrically identified as at-risk for bipolar spectrum psychopathology. Specifically, the study examined the association of affective temperaments with interview and questionnaire measures of psychopathology, personality, and functioning. The study improved upon previous work with nonclinical samples by employing a high-risk sample and using structured diagnostic interviews. We assessed the associations of affective temperaments with: 1) DSM-IV-TR mood disorders, 2) Akiskal's (2004) broad bipolar spectrum disorders, 3) borderline personality disorder symptoms, 4) substance use, 5) psychosocial functioning, and 6) personality.

Cyclothymic and irritable temperament were expected to be associated with DSM bipolar and bipolar spectrum disorders, history of hypomania, current depressive symptoms, and borderline personality symptoms. They were also expected to be positively associated with a range of maladaptive characteristics, including psychosocial impairment, urgency, lack of premeditation, sensation seeking, neuroticism, and impairment associated with alcohol and drug use, and were expected to be negatively associated with extraversion, conscientiousness, and agreeableness. Hyperthymic temperament was hypothesized to be positively associated with DSM bipolar disorders and bipolar spectrum disorders, history of hypomania, as well as psychosocial functioning, extraversion, openness, lack of premeditation, and sensation seeking, and was expected to be negatively associated with neuroticism. Dysthymic temperament was expected to be positively associated with DSM bipolar disorders, major depression, current depressive symptoms, psychosocial impairment, neuroticism, and negatively associated with extraversion.

## 2. Methods

### 2.1. Participants

Approximately 1200 students enrolled in General Psychology courses at the University of North Carolina at Greensboro (UNCG) 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 (Walsh et al., 2012). Specifically, all of the mass-screening participants who scored at least 1.5 SD above the mean on the Hypomanic Personality Scale (HPS; 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 147 participants took part in the study. Two participants were dropped due to invalid questionnaire measures. The final sample included 100 women and 45 men. Mean age was 19.5 years ( $SD = 2.3$  years). The sample was 65% Caucasian, 16% African American, 4% Hispanic, 4% Asian/Pacific Islander, 4% other, and 7% unspecified. Note that all participants provided informed consent. The study was approved by the UNCG Institutional Review Board and conformed to the Helsinki Declaration as revised 1989.

## 2.2. Materials and procedures

### 2.2.1. Mass-screening questionnaires

Mass-screening participants completed a brief demographic questionnaire, the HPS, the NEO Five Factor Inventory (NEO-FFI; Costa and McCrae, 1992), and additional questionnaires not used in the present study. The HPS consists of 48 true-false items that assess mild, trait-like, manic functioning that identify risk for bipolar disorder. The HPS items were intermixed with a 13-item infrequency scale (Chapman and Chapman, 1983). Participants who endorsed more than two infrequency items were dropped from further study. The NEO-FFI is a widely used 60-item self-report measure assessing the Five Factor Model's domains of personality including neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience.

### 2.2.2. Structured interview

The interview assessed DSM-IV-TR mood disorders, Akiskal's bipolar spectrum disorders, borderline personality disorder, and alcohol and drug use/abuse. All interviews were tape-recorded and lasted approximately 90 minutes. Interviews were conducted by two advanced clinical psychology graduate students under the supervision of a licensed psychologist. One-fifth of the interviews were double-rated to establish interrater reliability.

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  $\frac{1}{2}$  (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. The interview assessed substance use disorders using the SCID-I and the scoring system reported in Kwapil (1996) produced quantitative ratings of substance use and impairment. 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 six-point Likert scales. Participants were also questioned about whether they considered themselves to be a leader or follower.

### 2.2.3. Self-report questionnaires

Following the structured interview, participants completed several self-report questionnaires,

including the TEMPS-A (Akiskal et al., 2005a and Akiskal et al., 2005b). The current study used the research version of the TEMPS-A, which consists of 50 true-false items. Participants completed the Beck Depression Inventory (BDI; Beck et al., 1961), a widely used screening measure of the severity of depressive symptoms. The HPS (Eckblad and Chapman, 1986) was re-administered to assess test-retest reliability. Participants completed the UPPS Impulsive Behavior Scale (Whiteside and Lynam, 2001 and Whiteside et al., 2005), a 46-item scale used to assess four domains of impulsivity including urgency, lack of premeditation, lack of perseverance, and sensation seeking.

### 3. Results

#### 3.1. TEMPS-A data

Table 1 presents descriptive data and intercorrelations of the TEMPS-A subscales. Given the considerable overlap of cyclothymic and irritable temperaments, a combined cyclothymic/irritable variable was created for each participant by computing the mean of the standardized scores for these measures. This combined variable was used in place of the individual cyclothymic and irritable variables for all regression analyses to avoid multicollinearity effects.

Table 1. TEMPS-A descriptive statistics and intercorrelations.

	Mean	SD	Coefficient alpha	Pearson correlations <sup>a</sup>		
				Hyperthymic	Dysthymic	Cyclothymic
Hyperthymic	8.62	2.82	.73	~		
Dysthymic	4.61	2.08	.62	<b>-.43***</b>	~	
Cyclothymic	4.62	3.94	.84	-.11	<b>.36***</b>	~
Irritable	1.57	1.92	.73	-.15*	<b>.23***</b>	<b>.65***</b>

\*  $p < .05$  \*\*\*  $p < .001$ .

a Medium effect sizes in bold, large effect sizes in bold and italics (consistent with Cohen, 1992).

#### 3.2. Relation of the TEMPS-A with interview and questionnaire measures

Thirty interviews (21%) were independently rated by both interviewers to assess interrater reliability. Intraclass correlations using two-way mixed models for absolute agreement for single ratings were computed for continuous measures including: global functioning .82, borderline symptoms .84, alcohol use .97, and drug use .99. Kappa was computed for dichotomous measures including: DSM-IV-TR bipolar diagnoses 1.00, bipolar spectrum diagnoses 1.00, interview-rated hyperthymia .83, and major depressive episodes .92.

Table 2 presents the associations of TEMPS-A scores with dichotomous indicators of mood psychopathology, and frequencies of mood psychopathology in the sample. Table 3 presents descriptive data for quantitative measures of psychopathology, personality, and functioning, as

well as correlations with the TEMPS-A. Note that the correlations are presented mainly for illustrative purposes, given that logistic and linear regressions were the primary analyses.

Table 2. Interview assessed mood episodes and disorders—descriptive statistics and correlations with TEMPS-A.

	% of sample	Point-biserial correlations <sup>a</sup>				
		Hyperthymic	Dysthymic	Cyclothymic	Irritable	Cyclo/irr
Any DSM bipolar disorder	10.2%	.04	.08	<b>.32***</b>	<b>.35***</b>	<b>.37***</b>
Any broad bipolar disorder <sup>b</sup>	15.0%	.13	.06	<b>.38***</b>	<b>.33***</b>	<b>.39***</b>
Any DSM mood disorder	39.3%	-.09	.15	.28**	.23**	.29**
Hypomania or hyperthymia	25.2%	<b>.31***</b>	.01	.26**	.17*	.24**
DSM major depressive episode	29.9%	-.15	.15	.27**	.24**	.28**

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

a Medium effect sizes in bold.

b Includes bipolar I, II, II-1/2, III, and IV disorders.

Table 3. Interview and questionnaire measures of psychopathology and personality—descriptive statistics and correlations with TEMPS-A.

Criterion	Mean	SD	Coefficient alpha <sup>a</sup>	Pearson correlations <sup>b</sup>				
				Hyperthymic	Dysthymic	Cyclothymic	Irritable	Cyclo/irr
BDI—depressive symptoms	4.34	5.70	.89	-.26**	<b>.39***</b>	<b>.59***</b>	<b>.53***</b>	<b>.62***</b>
GAF—psychosocial functioning	76.12	12.76	~	.16*	-.29***	<b>-.51***</b>	<b>-.41**</b>	<b>-.51***</b>
Hypomanic Personality Scale	20.08	10.11	.93	<b>.54***</b>	-.04	<b>.52***</b>	<b>.31***</b>	<b>.45***</b>
NEO-FFI								
Neuroticism	23.08	9.61	.88	<b>-.35***</b>	<b>.42***</b>	<b>.59***</b>	<b>.42***</b>	<b>.56***</b>
Extraversion	32.10	6.41	.77	<b>.59***</b>	-.19*	-.09	-.19*	-.16
Openness	28.24	6.95	.76	.16*	-.03	.15	.08	.13

Criterion	Mean	SD	Coefficient alpha <sup>a</sup>	Pearson correlations <sup>b</sup>				
				Hyperthymic	Dysthymic	Cyclothymic	Irritable	Cyclo/irr
Agreeableness	30.05	6.26	.73	-.08	.14	<b>-.41***</b>	<b>-.50***</b>	<b>-.50***</b>
Conscientiousness	30.48	7.14	.82	.18*	-.13	<b>-.31***</b>	<b>-.25**</b>	<b>-.31***</b>
IPDE borderline symptoms	1.50	2.29	~	-.11	<b>.30***</b>	<b>.57***</b>	<b>.56***</b>	<b>.62***</b>
UPPS impulsivity								
Lack of premeditation	2.02	.56	.89	.23**	-.09	.07	.02	.05
Urgency	2.20	.58	.87	-.11	.22**	<b>.59***</b>	<b>.55***</b>	<b>.63***</b>
Sensation seeking	2.82	.63	.87	<b>.41***</b>	-.12	.06	-.05	.01
Lack of perseverance	1.93	.51	.86	<b>-.35***</b>	.28**	<b>.35***</b>	.16	.28**
Grandiosity questions								
Famous	2.14	1.45	~	<b>.47***</b>	<b>-.32***</b>	.12	-.00	.06
Ambition	2.74	.92	~	<b>.35***</b>	-.21*	-.10	-.13	.06
Creative	2.61	1.32	~	<b>.45***</b>	-.29**	.01	-.07	-.04
Leadership	.70	.46	~	<b>.52***</b>	<b>-.33***</b>	.08	.07	.08
Magazine	1.67	1.40	~	<b>.36***</b>	-.13	.22*	.04	.14
Odd/different	2.31	1.25	~	.18*	.05	<b>.34***</b>	.12	.25**
Heaviest alcohol impairment	.88	.86	~	.02	-.05	.09	.18*	.15
Heaviest drug impairment	.59	.98	~	-.13	-.02	.12	.04	.12

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

a Coefficient alpha reported for questionnaire measures.

b Medium effect sizes in bold, large effect sizes in bold and italics.

Table 4 presents the associations of TEMPS-A scores with dichotomous indicators of psychopathology. Binary logistic regression was used to examine the relation of the TEMPS-A with mood psychopathology. Cyclothymic/irritable temperament was positively associated with clinical bipolar disorders, broad bipolar spectrum disorders, mood disorders, hypomania or interview-rated hyperthymia, and history of major depression. Hyperthymic temperament was modestly associated with broad bipolar spectrum disorder diagnoses and was positively associated with hypomania or interview-rated hyperthymia. Relations of dysthymic temperament with mood psychopathology were not significant.

Table 4. Simultaneous binary logistic regressions examining the relation of the TEMPS with mood disorders.

Criterion	Hyperthymic		Dythymic		Cyclo/irr	
	OR	95%CI	OR	95%CI	OR	95%CI
Any DSM bipolar disorder	1.41	.73–2.70	.97	.50–1.88	2.77***	1.60–4.80
Any broad bipolar disorder <sup>a</sup>	2.10*	1.12–3.94	1.06	.58–1.91	3.06***	1.79–5.23
Any DSM mood disorder	.95	.65–1.40	1.12	.75–1.67	1.78**	1.20–2.62
Hypomania or hyperthymia	3.18***	1.79–5.62	1.27	.78–2.08	2.02**	1.28–3.20
DSM major depressive episode	.80	.54–1.20	1.08	.71–1.64	1.71**	1.16–2.52

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

a Includes bipolar I, II, II-1/2, III, and IV disorders.

Table 5 presents simultaneous linear regressions of the TEMPS-A with quantitative measures of psychopathology and personality. Hyperthymic temperament was positively associated with extraversion, openness, lack of premeditation, sensation seeking, becoming famous, ambition, creativity, leadership, being on a magazine cover, and being odd or different. Hyperthymia was negatively associated with neuroticism and lack of perseverance. Dythymic temperament was positively associated with current depressive symptoms, neuroticism and agreeableness. Cyclothymic/irritable temperament was positively associated with current depressive symptoms, neuroticism, borderline symptoms, urgency, leadership, being on a magazine cover, being odd or different, and was modestly associated with lack of perseverance, becoming famous, and heaviest alcohol impairment. Cyclothymic/irritable temperament was negatively associated with psychosocial functioning, agreeableness, and conscientiousness.

Table 5. Simultaneous linear regressions examining the relation of TEMPS-A scores with continuous measures of psychopathology and personality.

Criterion	Hyperthymic $\beta$	Dythymic $\beta$	Cyclo/irr $\beta$	Total $R^2$
BDI	– .100	.170*	.546***	.428***
GAF	.043	– .122	– .459***	.274***
HPS	.652***	.069	.529***	.581***
NEO-FFI				
Neuroticism	– .198**	.182*	.471***	.408***
Extraversion	.616***	.100	– .094	.358***
Openness	.187*	– .001	.154	.050

Criterion	Hyperthymic $\beta$	Dysthymic $\beta$	Cyclo/irr $\beta$	Total R <sup>2</sup>
Agreeableness	-.039	.320***	-.604***	.348***
Conscientiousness	.144	.023	-.292**	.112**
IPDE borderline	.040	.133	.586***	.401***
UPPS impulsivity				
Lack of premeditation	.238**	-.019	.092	.061*
Urgency	-.002	.025	.619***	.394***
Sensation seeking	.440***	.047	.060	.176***
Lack of perseverance	-.276**	.097	.207*	.181***
Grandiosity				
Famous	.446***	-.164	.214*	.278***
Ambition	.320**	-.044	-.032	.125**
Creative	.421***	-.112	.095	.220***
Leadership	.494***	-.149	.231**	.327***
Magazine	.426***	.012	.237**	.186***
Odd/different	.310**	.118	.294**	.136**
Heaviest alcohol impairment	.004	-.104	.182*	.032
Heaviest drug impairment	-.078	-.176	.167	.038

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

#### 4. Discussion

Previous validation studies have examined the association between affective temperaments and DSM bipolar psychopathology. However, few studies have examined the relation of affective temperaments with risk for bipolar disorder in a nonclinical sample. The present study aimed to address this gap in the literature by examining the relation of affective temperaments with bipolar spectrum psychopathology in an at-risk sample of young adults. To our knowledge, this is the first study to employ a comprehensive battery of diagnostic interviews and self-report measures to examine risk for bipolar disorder in a nonclinically ascertained sample using the TEMPS-A.

The present study indicated that cyclothymic/irritable temperament was associated with pathological outcomes. Consistent with previous research (Di Florio et al., 2010, Evans et al., 2005, Mendlowicz et al., 2005 and Savitz et al., 2008), cyclothymic/irritable temperament was associated with DSM bipolar disorders, as well as subclinical bipolar psychopathology, including broader bipolar spectrum disorders. Cyclothymic/irritable temperament was also positively associated with major depressive episodes, hypomania or hyperthymia, and mood disorders. These results offer support for the Kraepelinian notion that affective temperaments may underlie mood psychopathology.

The results also indicated that there was considerable overlap across the cyclothymic and irritable temperaments, with nearly half the variance shared between them. Thus, conceptually it may make more sense to think of cyclothymia and irritability as operating hand-in-hand rather than as clear-cut distinct constructs—and the results are reflective of their natural overlap. Future research should continue to examine the relation of these two temperaments. Specifically, improving our understanding of the processes that underlie cyclothymic and irritable temperament should clarify whether they are independent, overlapping, or subordinate

constructs.

In addition to bipolar psychopathology, cyclothymic/irritable temperament was associated with a range of other problematic outcomes, including poor psychosocial functioning and borderline symptoms. The relation of cyclothymic/irritable temperament with borderline psychopathology likely reflects overlap across the domains of affective dysregulation, anger, and impulsivity. Cyclothymic/irritable temperament was positively associated with measures of impulsivity, specifically urgency and lack of perseverance. Note that urgency captures variance in both bipolar (Walsh et al., 2012) and borderline psychopathology (Tragesser and Robinson, 2009) and reflects the tendency to engage in risky behavior in the face of negative affect. Lack of perseverance reflects difficulty staying with a task through completion. The positive association of cyclothymic/irritable temperament with lack of perseverance may reflect low tolerance for negative affect associated with task completion (e.g., boredom, frustration). Cyclothymic/irritable temperament was also associated with maladaptive personality traits. Specifically, it was positively associated with neuroticism, and was negatively associated with agreeableness and conscientiousness, suggesting the construct is tapping negative affect, disorganization, and antagonism. It was also associated with several measures of grandiosity specific to future success (e.g., fame, being on a magazine cover), and perceiving oneself as odd. It was not associated with ambition or self-perceived high creativity, however. This suggests that individuals with cyclothymic/irritable temperament may harbor grandiose ideas regarding their future, but not necessarily current, qualities and endeavors.

In comparison to cyclothymic/irritable temperament, dysthymic temperament was associated with fewer adverse outcomes. Specifically, dysthymic temperament was unrelated to history of DSM mood disorders, mood episodes, borderline symptoms, or measures of impulsivity. Additionally, dysthymic temperament was only modestly associated with depressive symptoms and neuroticism, and was positively associated with agreeableness. These findings suggest that dysthymic temperament taps negative affect as well as a cooperative attitude and desire to please. Taken together, dysthymic temperament may reflect low self-esteem, as well as passivity (Akiskal, 1983 and Akiskal, 1989).

Consistent with previous research (Evans et al., 2005, Mendlowicz et al., 2005, Nowakowska et al., 2005 and Savitz et al., 2008), hyperthymic temperament was not associated with DSM bipolar disorders. However, it was associated with subclinical bipolar psychopathology, including broader bipolar spectrum disorders as well as history of hypomania or interview-rated hyperthymia. Taken together, these findings underscore the notion that hyperthymic traits tap bipolar spectrum psychopathology, although many of the adaptive components of the temperament (e.g., exuberance, optimism, confidence, energy) likely occupy space within normal dimensions of personality. As expected, hyperthymic temperament was positively associated with adaptive personality traits, including extraversion and openness, and was negatively associated with neuroticism. Thus, hyperthymic temperament taps warmth, energy, openness, as well as stability. It also differed from cyclothymic/irritable temperament on measures of impulsivity. Hyperthymic temperament was negatively associated with lack of perseverance, unrelated to urgency, and was positively associated with lack of premeditation and sensation seeking. This suggests that individuals with hyperthymic temperament engage in risky behavior for the sake of thrill-seeking, rather than to alleviate negative affect (as in

cyclothymic/irritable temperament), and fail to reflect on the potential consequences of their actions. Hyperthymic temperament was associated with perseverance, suggesting that the energy and enthusiasm at the core of the temperament may aid in task completion, and perhaps tolerance for boredom and negative affect. Hyperthymic temperament was also associated with all measures of grandiosity, consistent with the overconfidence, exuberance, and optimism that comprise the hyperthymic temperament (Akiskal, 2004).

The present study was limited by its cross-sectional design. We found that cyclothymic/irritable temperament was associated with bipolar spectrum psychopathology, as well as a range of other negative outcomes. Furthermore, hyperthymic temperament was associated with bipolar spectrum disorders, but not clinical bipolar disorders. Longitudinal studies are needed to better understand the predictive validity of the TEMPS-A as a measure of risk for the development of full-blown bipolar disorders.

Overall, the present research supports the TEMPS-A as a useful measure for assessing affective temperaments as well as bipolar spectrum psychopathology. Identifying individuals at risk for the development of bipolar disorders should ultimately enhance our understanding of risk and protective factors, as well as promote early intervention. The average length of time between symptom onset and diagnosis of bipolar disorder is often a decade or longer (Ghaemi et al., 1999 and Hirschfeld et al., 2003), in large part due to misdiagnosis (Akiskal, 2004 and Hirschfeld et al., 2003). Accurate measurement tools may help us identify individuals who fall on the bipolar spectrum, thus hastening appropriate intervention or monitoring, and prevent misclassification. The TEMPS-A is short and easy to administer, and offers valid data concerning affective temperaments and relation to the bipolar spectrum. Specifically, the present research supports the relation of cyclothymic/irritable temperament with bipolar spectrum psychopathology, consistent with numerous other studies (Di Florio et al., 2010, Evans et al., 2005, Kesebir et al., 2005, Mendlowicz et al., 2005, Nowakowska et al., 2005 and Savitz et al., 2008). Although the measure has only been studied at the group level, information obtained at the individual level could be used in conjunction with diagnostic interviews to guide treatment decisions.

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#### Conflict of interest

None of the authors had any conflicts of interest.

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