

## Measuring the validity and psychometric properties of a short form of the Hypomanic Personality Scale

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Sperry, S.H., Walsh, M.A., Kwapil, T.R. (2015). Measuring the validity and psychometric properties of a short form of the Hypomanic Personality Scale. *Personality and Individual Differences*, 82, 52-57. doi: 10.1016/j.paid.2015.03.004

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### **Abstract:**

The Hypomanic Personality Scale (HPS) is used to investigate hypomanic traits and risk for bipolar spectrum disorders; however, the length of the HPS (48 items) may be prohibitive for clinical research and screening purposes. Meads and Bentall (2008) developed a promising 20-item version of the HPS; however, the psychometric properties and validity of the short form have not been thoroughly examined. The present study investigated the construct validity and psychometric properties of the short HPS. A sample of 2713 non-clinically ascertained young adults was used to assess psychometric properties of the short form relative to the original scale. Two non-overlapping subsamples ( $n = 522$ ;  $n = 145$ ) were used to investigate the validity of the short HPS using personality and temperament questionnaires and clinical interviews of bipolar psychopathology and diagnoses. The short and original HPS generally had comparable correlations with measures of temperament, personality, impulsivity, borderline personality, grandiosity, psychosocial functioning, and alcohol use, and comparably predicted DSM bipolar and bipolar spectrum diagnoses. Overall, the short HPS was found to be both reliable and valid. However, the short HPS tended to be more strongly correlated with pathological components of hypomanic personality and less strongly correlated with exuberant and potentially adaptive aspects of the construct.

**Keywords:** Bipolar spectrum | Psychometrics | Hypomanic Personality Scale | Hypomania

### **Article:**

## 1. Introduction

Current research suggests that there is a broad spectrum of bipolar psychopathology that extends beyond traditional diagnostic classifications such as the DSM-5 (American Psychiatric Association, 2013). Akiskal (2004) expanded bipolar diagnoses by proposing additional classifications such as bipolar II½, III, and IV diagnoses. More recently, research suggests that the spectrum is a continuum of pathological and non-pathological experiences rather than discrete diagnoses (Akiskal et al., 2000, Angst et al., 2003 and Walsh et al., in press). This spectrum includes subclinical symptoms of dysregulated mood, cognition, behavior, and sense of self (Angst et al., 2003 and Walsh et al., 2012). For example, Kwapil et al. (2011) assessed the expression of subclinical bipolar spectrum traits in daily life and found associations with elevated energy-enthusiasm, irritability, dysphoria, flight of ideas, mild grandiose beliefs, risky behavior, and variability in affect. Those who experience subclinical symptoms may suffer impairment and distress (Angst et al., 2003) and are at heightened risk for the development of clinical bipolar disorders (Kwapil et al., 2000). The study of bipolar spectrum psychopathology would be enhanced by the availability of brief, non-invasive assessment tools.

The Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986) is widely used to investigate bipolar spectrum psychopathology. The measure includes 48 self-report items designed to assess hypomanic personality traits and risk for bipolar disorder. Eckblad and Chapman's initial validation study found that 77% of high HPS scorers experienced a hypomanic episode and a 13-year follow-up of the sample found that the HPS predicted the onset of bipolar disorders (Kwapil et al., 2000). HPS scores are associated with impulsivity (Johnson, Carver, Mulé, & Joorman, 2013), increased positive affect and irritability (Gruber, Oveis, Keltner, & Johnson, 2008), sensitivity to positive stimuli (Trevisani, Johnson, & Carver, 2008), and greater cognitive flexibility when in a positive mood (Fulford, Feldman, Tabak, McGillicuddy, & Johnson, 2013). Walsh, Royal, Brown et al. (2012) found an association between high HPS scores and bipolar diagnoses, Akiskal's spectrum disorders, and a range of subclinical and associated traits (hypomania, hyperthymic temperament, borderline traits, irritability, and depressive symptoms), providing further evidence of its validity as a measure of the broader bipolar spectrum.

Although the HPS has been widely used, its length may be prohibitive, especially in clinical research and studies needing a brief screening measure. In addition, certain items of the original 48-item scale may be inefficient or redundant. Meads and Bentall (2008) derived a 20-item short form of the HPS using one-parameter item response theory or Rasch analysis in a sample of approximately 300 undergraduate students. Items were removed if they exhibited significant misfit, excessive residual values, or significant differential item functioning by gender. The coefficient alpha of the shortened form was .80. This was less than the reported reliability of the original measure (.87), although the reliability was greater than the predicted reliability using the Spearman-Brown Prophecy formula (.74) suggesting that the authors removed relatively

inefficient items. However, their reliability value should be interpreted cautiously because it was computed from the same data that was used to derive the short form (which could overestimate the reliability), rather than from an independent sample. The short HPS and original HPS correlated  $r = .94$ . Of the 35 people scoring in the top decile of the original HPS, 30 remained in the top decile as measured by the short HPS. The authors also provided a limited assessment of the validity of the short HPS. Specifically, they reported that the original and short HPS had comparable correlations with the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and the Response Style Questionnaire (Nolen-Hoeksema, 1991). However, neither of these measures tap core aspects of bipolar spectrum psychopathology.

We identified four studies that either derived or administered the short HPS to examine bipolar spectrum psychopathology. Participants identified by elevated scores on the short measure made significantly more impulsive decisions on the Two-Choice Impulsivity Paradigm (Mason, O'Sullivan, Blackburn, Bentall, & El-Deredy, 2012) and had increased sensitivity to the value of goal-related events (O'Sullivan, Szczepanowski, El-Deredy, Mason, & Bentall, 2011). Hawke, Provencher, and Arntz (2011) reported that the short HPS was associated with entitlement and grandiosity, insufficient self-control, unrelenting standards, and hyper-criticalness. In addition, high HPS scorers were more likely to meet criteria for past psychiatric diagnoses, specifically anxiety and personality disorders, have a current disorder, and score higher than controls on most measures of early maladaptive schemas. McCarthy-Jones, Knowles, and Rowse (2012) reported that positive affect, intrusive visual imagery, and anxiety predicted short HPS scores. Coefficient alpha of the short HPS in this study was .68.

The development of a shortened version of the HPS is promising; however, there are several limitations to Meads and Bentall's (2008) study and the validation of the measure. Specifically, their study was based upon a relatively small sample size and used the same sample for measure derivation and validation. Most concerning, the validation measures did not provide good tests of the construct validity of hypomanic personality. Additional studies have used the short HPS; however, there have not been comprehensive examinations of the construct validity of the short HPS. Furthermore, studies have varied in terms of the cut-off scores used to identify high and low scorers on the short HPS.

### 1.1. Goals and hypotheses of the present study

The goals of the present study were to examine the psychometric properties and the construct validity of Meads and Bentall's (2008) short HPS in several large non-clinical samples of young adults. Specifically, the present study examined descriptive characteristics of the short measure relative to the original measure. We expected to replicate Meads and Bentall's findings of good reliability for the short measure and a high correlation between the two versions. We also examined the validity of the short measure relative to the original measure in terms of associations with questionnaire and interview measures of psychopathology, personality, and impairment. Note that we treated HPS scores as continuous variables and did not use a high-risk

group approach, consistent with the view that bipolar spectrum psychopathology falls on a continuum. We hypothesized that the short HPS would replicate the associations with interview and questionnaire measures seen in the original measure. The present study offers the advantages of a large unselected sample to compare descriptive properties of the original and short HPS, a large subset of the original sample who completed questionnaire measures of personality and affective temperament, and an independent subset oversampled for high HPS scores that underwent structured diagnostic interviews assessing bipolar spectrum and related psychopathology. Thus, the study should provide the first comprehensive assessment of the validity of the short HPS as a predictor of bipolar spectrum psychopathology.

## **2. Method**

### **2.1. Participants**

The original HPS was completed in departmental mass screening sessions by 2713 undergraduates (76% female) enrolled at UNC-Greensboro. Short HPS scores were computed from the original measure. The mean age of the sample was 19.6 ( $SD = 3.1$ ). This sample was used to examine descriptive statistics of the original and short measure. Two non-overlapping subsets of participants were used to examine the validity of the short measure in comparison to the original measure. A subset of 522 participants (described in Kwapil et al., 2013) was used to examine the associations of the original and short HPS with measures of personality and affective temperaments. A subset of 145 participants (described in Walsh et al., 2012 and Walsh et al., 2012) was used to examine associations with interview measures. The original and subsamples were comparable in terms of sex and age. Data collection was approved by the UNCG Institutional Review Board and all participants provided informed consent.

### **2.2. Materials**

#### **2.2.1. Self-report questionnaires**

The HPS is a 48-item self-report measure assessing hypomanic personality traits. Questions are dichotomous and scores range from 0 to 48. The HPS has good internal consistency (Cronbach's Alpha = 0.87) and test-retest reliability ( $r = 0.81$ ) (Eckblad & Chapman, 1986). The HPS was intermixed with a 13-item infrequency measure to screen for invalid responders. Participants who endorsed more than 2 infrequency items were dropped from further study. The Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire (TEMPS-A; Akiskal, Akiskal, Haykal, Manning, & Connor, 2005) was used to assess affective temperaments. The TEMPS is a 50-item self-report measure. Internal consistency (Cronbach's Alpha) for each subscale was as follows: .91 (cyclothymic), .81 (dysthymic), .77 (irritable), .76 (hyperthymic) (Akiskal, Mendlowicz et al., 2005). The NEO-PI-3 (Costa & McCrae, 2010) was used to assess the Five-Factor Model of personality. It is comprised of 240 items that measure Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Internal consistency among the different subscales of the NEO range from .56 to .81 (Costa &

McCrae, 2010). The UPPS Impulsivity Scale ( Whiteside, Lynam, Miller, & Reynolds, 2005) is a 45-item scale designed to measure the four personality dimensions underlying impulsivity: urgency, lack of premeditation, lack of perseverance, and sensation seeking. UPPS scores were calculated based on the total sum of the respective scales. Coefficient alphas for the UPPS were 0.89, 0.83, 0.87, and 0.87 for urgency, lack of premeditation, lack of perseverance, and sensation seeking ( Whiteside et al., 2005). The Beck Depression Inventory (BDI; Beck et al., 1961) is a 21-item self-report measure assessing current depressive symptoms. Items are scored from 0 to 3 (total score range 0-63). Coefficient alpha for the scale is reported to be .80 ( Beck & Steer, 1984).

### 2.2.2. Interview measures

The Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (SCID-IV; First, Spitzer, Gibbon, & Williams, 2002) was used to assess current and past mood disorders. Broader bipolar spectrum disorders were diagnosed using the criteria reported by Akiskal (2004). Briefly, these criteria were used to determine diagnoses based on information obtained from the SCID interview. Specifically, participants were assessed for hyperthymic temperament and hypomania. Quantitative ratings of heaviest reported alcohol use and other drug use (including cannabis, amphetamines, sedatives, inhalants, cocaine, phencyclidine, hallucinogens, and opioids) were made using the scoring system reported in Kwapil (1996). The ratings were based upon heaviest reported frequency and quantity of use and ranged from 0 to 20 for alcohol and 0 to 42 for other drugs. Participants' current functioning was assessed by the global assessment of functioning, an interview rated measure ranging from 1 to 100 based upon DSM-IV-TR Axis V (GAF; American Psychiatric Association, 2000). Borderline personality disorder was assessed using the International Personality Disorder Examination (Loranger et al., 1994). Scores on the IPDE were calculated based on the sum of the dimensional ratings for each borderline criterion. The overall inter-rater reliability kappas for the borderline personality disorder section of the IPDE were 0.89 and 0.93 for the dimensional score. Following Eckblad and Chapman (1986), participants were asked six items assessing grandiosity. Participants rated the likelihood from 0 to 5 that they would become famous or be featured on the cover of a magazine, as well as their level of ambition, creativity, the extent to which they felt that they were odd or different from their peers, and whether they considered themselves to be leaders or followers.

### 2.3. Procedure

Mass-screening participants ( $n = 2713$ ) completed a demographic questionnaire and the original HPS. The first subset of participants ( $n = 522$ ) completed the HPS, TEMPS-A, and NEO-PI-3. Participants in the second subset ( $n = 145$ ) completed the original HPS on two occasions (at mass screening and at the interview session). Participants completed the HPS between 2 and 12 weeks apart ( $M = 5.5$  weeks). HPS scores from first and second administration correlated .81. Walsh, Royal, Brown et al. (2012) used the mean HPS score for all analyses; therefore, the

present study computed the mean of the two short HPS scores for comparison with the mean of the original measure in this subset of participants. These participants completed structured diagnostic interviews assessing mood disorders (SCID-IV-TR), broader bipolar spectrum disorders, substance use/abuse, psychosocial functioning (GAF), and borderline personality (IPDE). Interviews lasted approximately 90 min and were conducted by two advanced clinical psychology graduate students under the supervision of a licensed psychologist. In addition to the diagnostic interview, the second subset completed the BDI self-report measure and the UPPS Impulsivity Scale. Note that for all samples, total scores for the short form of the HPS were derived from the original form.

Cronbach’s alpha was calculated for both the original and short form of the HPS. Cronbach’s alpha is the most commonly reported measure of internal consistency, which serves as a reliability estimate. However, Cronbach’s alpha may underestimate internal consistency for binary items (Hancock and Mueller, 2001 and Liu et al., 2010) therefore, binary alpha was calculated in addition to Cronbach’s alpha. Spearman-Brown Estimated Alpha was calculated to provide an estimate of the predicted reliability of the scale based on the number of items removed. Pearson correlations were used to examine the association between original and short forms of the HPS and questionnaire and quantitative interview variables. Pearson correlations were used in place of Spearman’s rho as it is a robust measure given the large sample size and relatively low amount of skew among measures employed. Fisher *R* to *Z* transformations were calculated for each measure and the original and short forms of the HPS.

Fisher *R* to *Z* transformations allow for the examination of the difference between two independent correlation coefficients enabling us to examine the magnitude of difference between correlations of short and original forms of the HPS with questionnaires (Preacher, 2002). Binary logistic regressions were used to examine the associations of the short and original HPS with mood diagnoses.

### 3. Results

Descriptive statistics and reliability for the original and short form of the HPS were calculated using the original sample of 2713 undergraduates (Table 1). The short and original versions were highly correlated,  $r(2711) = .92, p < .001$ . As expected, the reliability estimates were slightly lower in the short form relative to the original version. However, the short form reliabilities were not as low as predicted by the Spearman Brown formula, suggesting that the short form removed relatively inefficient items. Despite removing roughly 60% of the original items, the short forms retained good internal consistency.

**Table 1.** Descriptive statistics for the Hypomanic Personality Scale (HPS) original and short forms in a sample of 2713.

	Item count	<i>M</i>	SD	Range	Skew	Skew S.E.	Kurtosis	Kurtosis S.E.	Alpha	Binary alpha	SBEA
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Original HPS	48	19.24	8.48	0-47	.28	.05	-.62	.09	.87	.92	-
Short HPS	20	8.94	4.17	0-20	.16	.05	-.40	.09	.78	.85	.74

SBEA = Spearman-Brown estimated alpha.

Correlations of the short and original form of the HPS with measures of temperament and personality in the first subset ( $n = 522$ ) are displayed in Table 2. Both the short and original forms were comparably correlated with measures of affective temperament and personality in terms of statistical significance and effect sizes. However, note that the short form was not correlated with TEMPS-Dysthymic temperament whereas the original scale was.

Fisher  $R$  to  $Z$  transformations indicated that correlations with hyperthymic temperament, dysthymic temperament, extraversion, openness, and conscientiousness were significantly greater for the original HPS, whereas correlations with neuroticism, as well as cyclothymic, irritable, cyclothymic/irritable temperaments were significantly greater for the short HPS.

**Table 2.** Correlations for the original and short HPS and questionnaires in subset of 522.

	Original HPS	Short HPS	Fisher $R$ to $Z$
	$r$	$r$	$Z$
<i>TEMPS-A temperaments</i>			
Hyperthymic	<b>.44***</b>	<b>.34***</b>	7.46***
Dysthymic	-.17***	-.07	-6.84***
Cyclothymic	<b>.52***</b>	<b>.59***</b>	-5.31***
Irritable	.29***	<b>.33***</b>	-2.91**
Cylothymic/irritable	<b>.46***</b>	<b>.52 ***</b>	-4.65***
<i>NEO-PI-3</i>			
Neuroticism	.11*	.20***	-6.48***
Extraversion	<b>.46***</b>	<b>.37***</b>	6.50***
Openness to experience	<b>.31***</b>	.28***	2.69**
Agreeableness	-.24***	-.23***	-1.08
Conscientiousness	-.11**	-.17***	3.39***

Medium effect sizes in bold, large effect sizes in bold and italics. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Correlations between the short and original form of the HPS and measures of impulsivity, depression, psychosocial functioning, grandiosity, alcohol and substance use, and borderline personality traits in the second subset ( $n = 145$ ) are presented in Table 3. Both the short and original forms correlated significantly with psychosocial functioning, depression, impulsivity, grandiosity, borderline traits, and heaviest alcohol use. Fisher's  $R$  to  $Z$  transformations indicated that correlations with sensation seeking and most grandiosity measures were significantly stronger for the original HPS, whereas correlations with lack of perseverance were significantly greater for the short HPS. Note that consistent with the findings for the original scale

from Walsh, Royal, Brown et al. (2012), the results were generally unchanged if the average short HPS score was used or the short HPS scores from the individual assessments were used.

**Table 3.** Correlations for the original and short forms of the HPS and measures of psychopathology.

	Original HPS	Short HPS	Fisher <i>R</i> to <i>Z</i>
	<i>r</i>	<i>r</i>	<i>Z</i>
<i>UPPS impulsivity</i>			
Lack of premeditation	<b>.30***</b>	.25**	1.79
Urgency	<b>.41***</b>	<b>.45***</b>	-1.53
Sensation seeking	<b>.34***</b>	.25**	3.26***
Lack of perseverance	.01	.07	-2.07**
<i>Grandiosity measures</i>			
Famous	<b>.44***</b>	<b>.33***</b>	4.16***
Ambition	.29**	.21*	2.85**
Creative	<b>.39***</b>	.27**	4.43***
Leader	<b>.42***</b>	<b>.36***</b>	2.26*
Magazine	<b>.48***</b>	<b>.39***</b>	3.48***
Odd	<b>.53***</b>	<b>.49***</b>	1.61
Borderline traits	<b>.36***</b>	<b>.37***</b>	-0.37
Heaviest alcohol use	.17*	.17*	0.00
Heaviest drug use	.16	.13	1.04
Global functioning	<b>-.30***</b>	<b>-.33***</b>	1.09
BDI	.17*	.19*	-0.70

Medium effect sizes in bold, large effect sizes in bold and italics. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Binary logistic regressions are displayed in Table 4. Both the short and original HPS significantly predicted DSM-IV bipolar diagnoses, bipolar spectrum diagnoses, and hypomania or hyperthymic temperament. Neither forms predicted DSM-IV major depressive disorder or DSM-IV major depressive episodes, which is in line with previous research indicating that the original HPS taps core aspects of bipolar spectrum psychopathology rather than unipolar mood disorder (e.g., Walsh, Royal, Brown et al., 2012). Note that in every analysis the odds ratios for the short form fell within the confidence intervals around the odds ratios for the original form, indicating that the original and short forms did not differ in their prediction of mood disorders.

**Table 4.** Binary logistic regressions of the original and short HPS predicting mood disorders.

	% of sample	Original HPS		Short HPS	
		OR	95% CI	OR	95% CI
DSM-IV bipolar disorder	11%	2.87**	1.46-5.65	3.00**	1.48-6.06

Bipolar spectrum disorder	26%	4.03***	2.07-7.82	3.92***	2.01-7.67
Hypomania or hyperthymia	44%	5.82***	3.09-10.95	5.04***	2.74-9.13
DSM-IV major depressive episode	22%	1.19	.83-1.70	1.14	.80-1.63
DSM-IV major depressive disorder	34%	.70	.46-1.07	.70	.46-1.06

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

#### 4. Discussion

The present study examined the reliability and construct validity of the short form of the HPS derived by Meads and Bentall (2008). Although previous studies have employed the short HPS, this is the first study to comprehensively examine the validity and reliability of the short form relative to the original measure. Furthermore, the study used one large sample and two sub-samples to examine psychometric properties and associations with measures of personality and psychopathology in both the original and short forms of the HPS. The short HPS showed only minimally attenuated reliability relative to the original form of the HPS and correlated with both questionnaire and quantitative interview measures tapping core aspects of bipolar spectrum psychopathology. Overall, the short form exhibited comparable validity to the original measure in terms of statistical significance and effect sizes with the exception of TEMPS-Dysthymic. In addition, the short HPS predicted DSM bipolar diagnoses, bipolar spectrum disorders, and interview ratings of hyperthymia and hypomania. These findings provide support for the use of the short form as a screening measure of bipolar spectrum psychopathology.

Although the short and original forms of the HPS appear to be similarly correlated with questionnaire and quantitative interview measures, slight systematic differences were observed in the magnitude of correlations. Results suggested that although the short and original forms of the HPS performed similarly, the two measures may be tapping slightly different aspects of hypomania. For example, the short measure seems to be more highly correlated with the more maladaptive or negative aspects of hypomanic personality (neuroticism, cyclothymic and irritable temperament), whereas the original measure seems to be more correlated with the exuberant and potentially adaptive aspects of the construct (extraversion, hyperthymic temperament, openness, and conscientiousness). In addition, the short HPS no longer correlates with dysthymic temperament, which may suggest that items were removed that tap this key construct. However, the two forms were comparable in their prediction of mood disorders.

The explanation for why the two forms appear to be tapping subtly different aspects of hypomanic personality may lie in the choice of the measurement model used to derive the short measures. Meads and Bentall (2008) are commended for using IRT to evaluate the original HPS; however, their one-parameter Rasch analysis assumes a unidimensional measure. This is potentially problematic because evidence suggests that the HPS has a multidimensional structure. Shalet, Durbin, and Revelle (2011) reported that the HPS was comprised of three factors including mood volatility (negative and unpredictable mood), excitement (energetic and cheerful mood), and social vitality (social potency and vivaciousness). Rawlings, Barrantes-

Vidal, Claridge, McCreery, and Galanos (2000) found a four-factor structure of the HPS including an affective component (negative aspects of mood lability), cognitive component (creativity, productivity, and grandiosity), hypersociability and activity component, and viewing oneself as normal or ordinary component. The use of a unidimensional IRT model would likely lead to item selection that is biased towards the strongest underlying factor - in this case negative or volatile mood. Thus, it is not surprising that the short form tended to correlate more strongly than the original form with neuroticism and cyclothymia, and less strongly with extraversion and hyperthymia. The present results indicate that although the overall pattern of correlations and effect sizes are relatively comparable for the short and original HPS, the short form seems to be tapping slightly more pathological characteristics of hypomanic personality than the original measure (an issue that potential users of the short scale should take into consideration).

Meads and Bentall's (2008) derivation of the short form is limited by the use of a one-parameter IRT model that assumes equal discrimination across all items. A two-parameter IRT model offers advantages for examining measures of personality and psychopathology in that such models consider both item difficulty and discrimination. In the present study, short HPS scores were calculated from the administration of the original HPS, rather than administering the short form to participants. This offered the advantage of being able to directly compare the validity of both forms (because both forms were available for all participants). However, it is unclear if performance on the short measure would have differed if it had been administered without the additional HPS items. Thus, future studies should administer the short form to investigate whether administration differences between the short and original measures have an effect on reliability or validity.

Current models view bipolar psychopathology as a spectrum of subclinical to clinical manifestations of dysregulated mood, cognition and behavior. As a result, there is a need for psychometric inventories that provide not only an assessment of bipolar psychopathology on a continuum but also a method of identifying people at risk for bipolar spectrum disorders. In addition, brief psychometrically sound measures are needed in clinical screening and bipolar research. The HPS is increasingly recognized as a valid measure of bipolar spectrum psychopathology and a predictor of bipolar spectrum diagnoses. In general, Meads and Bentall's (2008) short form of the HPS provides a useful measure of hypomanic traits and has the ability to predict bipolar mood disorders. However, the short HPS may tap more deviant aspects of bipolar spectrum psychopathology and may fail to tap more energetic and potentially adaptive characteristics relative to the original HPS, which may limit the utility of the measure.

### **Acknowledgements**

The authors thank Daniella DeGeorge for her assistance with data collection and Georgina Gross and Charlotte Chun for their comments on the manuscript. None of the authors had conflicts of interest regarding this work. Support for this work was provided by a P3 Award from the UNCG

College of Arts & Sciences. The funding source had no involvement in the study design or in the preparation of this manuscript.

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