

## The expression of bipolar spectrum psychopathology in daily life

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### Abstract:

#### Background

Bipolar psychopathology has traditionally been defined by categorical diagnoses. However, these disorders may simply reflect the extremes of a broader spectrum of clinical and subclinical bipolar psychopathology.

#### Method

The present study examined the validity of the Hypomanic Personality Scale (HPS) as a measure of bipolar spectrum psychopathology in 305 young adults using experience sampling methodology. The participants completed the HPS and were signaled randomly eight times daily for seven days to complete brief questionnaires on their current experiences.

#### Results

High HPS scores were associated with elevated energetic-enthusiasm, irritability, dysphoria, flight of ideas, mild grandiose beliefs, and risky behavior, as well as increased variability in affect in daily life. High HPS scores were also associated with greater reactivity in negative affect and behavior in response to viewing themselves as unsuccessful in their activities.

#### Limitations

It is not clear to what extent the participants had diagnosable bipolar disorders.

#### Conclusions

The findings support a broader spectrum of bipolar psychopathology and the validity of the HPS as a measure of this construct.

**Keywords:** bipolar | hypomania | experience sampling methodology | ecological momentary assessment | psychology

## 1. Introduction

### 1.1. A spectrum of bipolar psychopathology

Bipolar disorders have a lifetime prevalence of approximately 3% (Merikangas et al., 2007) and typically involve recurring episodes that result in impairment, hospitalization, and premature mortality ([Osby et al., 2001] and [Calabrese et al., 2003]). However, empirical and clinical evidence supports the existence of a wider spectrum of bipolar characteristics and psychopathology (e.g., [Akiskal, 2004], [Angst et al., 2003] and [Judd and Akiskal, 2003]) that extends beyond the boundaries of current diagnostic systems. People with subclinical symptoms who fall on this spectrum often experience impairment and are at heightened risk for developing bipolar disorders (Angst and Cassano, 2005). Therefore, identification of a broader spectrum of bipolar psychopathology should enhance our understanding of the etiology and development of such disorders. The present study examined the validity of the Hypomanic Personality Scale (HPS; Eckblad and Chapman, 1986) as a measure of bipolar spectrum psychopathology using experience sampling methodology (ESM).

Whether defined narrowly or broadly, bipolar spectrum psychopathology involves dysregulation in mood, cognition, and behavior. It is characterized by periods of euphoria, dysphoria, and irritability, as well as labile affect. Disruptions in cognition involve form of thought (e.g., racing thoughts) and content of thought (e.g., grandiosity and unrealistic plans). Behavioral and somatic changes include increased energy, sociability, and impulsivity, as well as decreased need for sleep.

Eckblad and Chapman (1986) developed the self-report HPS to assess trait-like hypomanic functioning. They reported that 77% of college students identified by high scores on the HPS met criteria for a hypomanic episode. A thirteen-year follow-up of their sample found that 28% of the HPS group met criteria for a hypomanic episode within the past 2 years, compared to 3% of controls (Kwapil et al., 2000). Therefore, the HPS appears to be a promising measure of bipolar spectrum psychopathology in nonclinical populations.

### 1.2. Bipolar spectrum psychopathology in daily life

Researchers are increasingly using ESM to examine clinical and subclinical psychopathology in daily life (e.g., [Brown et al., 2007] and [Myin-Germeys et al., 2009]). ESM is a widely used, within-day self-assessment technique that prompts participants at random intervals to complete brief questionnaires. ESM offers several advantages over traditional laboratory assessments (e.g., [Csikszentmihalyi and Larson, 1987] and [Reis and Gable, 2000]). Specifically, ESM: (1) repeatedly assesses participants in their daily environment, thereby enhancing ecological

validity; (2) assesses experiences at the signal, thereby minimizing retrospective bias; and (3) examines the context of participants' experiences. A few studies have used ESM with patients with bipolar disorder (e.g., [Havermans et al., 2007] and [Myin-Germeys et al., 2003]). However, ESM has not been used to examine the expression of the broader bipolar spectrum in daily life.

### 1.3. Goals and hypotheses

This study examined the validity of the HPS as a measure of bipolar spectrum psychopathology in daily life using ESM in a large non-clinically ascertained sample of college students. Based upon Eckblad and Chapman's (1986) findings, students appear to be an appropriate group for assessing subclinical bipolar characteristics. It is hypothesized that the HPS will be positively associated with energetic-enthusiasm, irritability, flight of ideas, confidence/grandiosity, sociability, and risky/excitement-seeking behavior, as well as greater variability in mood. It is expected that high HPS scorers will be more reactive to cues of success/failure in daily life (i.e., HPS will moderate the relation of perceived success/failure with affect, cognition, and behavior). Finally, the study examined whether HPS scores moderate the change in affect and cognition across the day.

## 2. Method

### 2.1. Participants

Approximately 1400 undergraduates completed the HPS as part of screening sessions and 321 of these participants completed the ESM assessment. Sixteen participants were dropped from the analyses due to completing fewer than 20 ESM questionnaires. The final sample consisted of 240 women and 65 men (mean age = 19.6 years,  $SD = 2.8$ ).

### 2.2. Materials and procedures

Participants completed a demographic questionnaire, the HPS, and an infrequency scale (Chapman and Chapman, 1983) during the screening sessions. Participants with scores  $> 2$  on the infrequency scale were not eligible for the ESM assessment. Participants volunteered to take part in the ESM study. In addition, participants who scored more than 1.5 SD above the mean on the HPS were recruited to ensure that there were an adequate number of high scorers. Coefficient alpha was .87 for the HPS in the ESM sample and standardized scores ranged from  $-1.91$  to  $3.01$  (based on norms from 2217 UNCG students) with a unimodal distribution.

ESM data were collected on PDAs using iESP software (Intel, 2004). Table 1 presents the ESM items and indices. The PDAs signaled participants, administered questionnaires, and time-stamped and recorded responses. Participants were signaled to complete eight questionnaires daily between noon and midnight for seven days.

Table 1. Experience sampling protocol items and indices.

<i>Affect in the moment</i>
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Energetic-Enthusiasm index (alpha = .95)
Item 10 I feel enthusiastic right now
Item 14 I feel excited right now
Item 17 I feel energetic right now
Irritability index (alpha = .93)
Item 07 I feel irritable right now
Item 12 I feel frustrated right now
Item 15 I feel angry right now
Dysphoria index (alpha = .93)
Item 08 I feel sad right now
Item 11 I feel gloomy right now
Item 06 I feel happy right now
Item 13 I feel anxious right now
<i>Thought disruption in the moment</i>
Flight of Ideas index (alpha = .94)
Item 03 My thoughts are racing right now
Item 05 I am thinking about a lot of things right now
Item 04 I have trouble concentrating right now
<i>Sense of self in the moment</i>
Item 01 I feel confident right now
Item 18 I feel like I am better than most people right now
Item 23 I am the center of attention right now
<i>Social functioning in the moment</i>
Item 19 Are you alone at this time?
Social Closeness index (alpha = .95)
Item 20 I like this person (these people)
Item 21 I am important to this person (these people)
Item 22 I feel close to this person (these people)
<i>Current activity</i>
Item 24 I like what I am doing right now
Item 28 I am successful in my current activity
<i>Other</i>
Item 02 I feel tired right now
Item 29 My behavior right now could get me in trouble

Note: All items rated from 1 (not at all) to 7 (very much) except item 19 (yes/no). Coefficient alpha for indices are based upon aggregate scores on subjects.

ESM data have a hierarchical structure in which ratings in daily life (level 1 data) are nested within participants (level 2 data). Hierarchical linear modeling is the appropriate method for analyzing nested data (Schwartz and Stone, 1998). Initial analyses assessed the effects of the level 2 predictor (HPS score) on level 1 dependent measures (ESM daily life ratings). Cross-level interactions (Kreft and de Leeuw, 1998) examined whether level 1 associations (e.g., association between success and irritability in daily life) varied as a function of HPS scores. Analyses were conducted using HLM 6 (Raudenbush et al., 2004). Following Luke (2004), level 1 predictors were group mean centered and the level 2 predictor was grand mean centered. Parameter estimates were calculated using robust standard errors (Hox, 2002).

### 3. Results

Participants completed an average of 41 ESM questionnaires ( $SD = 10$ ). HPS scores were unassociated with the number of completed ESM questionnaires. Table 2 displays the associations of HPS scores with experiences in daily life.<sup>1</sup> HPS scores were positively associated with positive and negative affect in daily life. High HPS scorers also exhibited greater variability in affect in daily life than low HPS scorers. HPS scores correlated significantly with the variance of participants' daily ratings of energetic-enthusiasm ( $r = .33, p < .001$ ), happiness ( $r = .16, p < .01$ ), irritability ( $r = .27, p < .001$ ), dysphoria ( $r = .29, p < .001$ ), and anxiety ( $r = .36, p < .001$ ).

Table 2. Relation of scores on the Hypomanic Personality Scale with experiences in daily life.

Level 1 (ESM daily life) criterion	Level 2 predictor
	Hypomanic Personality Scale score $\gamma_{01}(df = 303)$
Affect in the moment	
Energetic-enthusiasm index	0.041 ( $SE = 0.006$ ) <sup>□</sup>
Happiness	0.017 ( $SE = 0.005$ ) <sup>⊥</sup>
Irritability index	0.033 ( $SE = 0.005$ ) <sup>⊥</sup>
Dysphoria index	0.022 ( $SE = 0.005$ ) <sup>□</sup>
Anxiety	0.048 ( $SE = 0.007$ ) <sup>□</sup>
Thought disruption	
Flight of ideas index	0.044 ( $SE = 0.006$ ) <sup>⊥</sup>
Difficulty concentrating	0.046 ( $SE = 0.006$ ) <sup>⊥</sup>
Sense of Self	
Confident	0.023 ( $SE = 0.005$ ) <sup>□</sup>
Better than most people	0.034 ( $SE = 0.009$ ) <sup>□</sup>
Center of attention	0.033 ( $SE = 0.005$ ) <sup>□</sup>
Social functioning	

Level 1 (ESM daily life) criterion	Level 2 predictor
With others at signal	0.001 ( <i>SE</i> = 0.001)
Social closeness index	0.003 ( <i>SE</i> = 0.005)
Current activities	
Like activity	0.008 ( <i>SE</i> = 0.005)
Successful at activity	0.001 ( <i>SE</i> = 0.004)
Tired	0.004 ( <i>SE</i> = 0.006)
Behavior gets me into trouble	0.016 ( <i>SE</i> = 0.004) <sup>□</sup>

Raw multilevel regression coefficients indicating the relation of the level 2 predictor (HPS) with the level 1 (daily life experience) criteria.

$p < .001$ .

As hypothesized, HPS scores were positively associated with feeling confident, superior to others, like the center of attention, and that their behavior could get them into trouble. HPS scores were positively associated with flight of ideas and difficulty concentrating, but unassociated with time spent with others, feeling close with others and liking or feeling successful in current activities.

Cross-level analyses examined whether participants high in HPS were more reactive to success/failure in daily life. HPS scores moderated the relation of success with irritability and the likelihood of getting into trouble, indicating that the impact of success/failure was greater on high HPS scorers. However, HPS did not moderate the relation of success with flight of ideas, although as noted above, there was a main effect of the HPS on flight of ideas. Participants reported experiencing more energetic-enthusiasm when successful, although the HPS did not moderate this relation.

Finally, cross-level interactions examined whether changes in affect and cognition across the day differed across levels of HPS scores. Overall, reports of energetic-enthusiasm diminished across the day; however, a significant cross-level interaction indicated that this decline was not reported by high-scoring HPS participants, as their ratings of energetic-enthusiasm remained constant across the day. None of the other cross-level interactions of time and affect were moderated by HPS. Overall, ratings of irritability and dysphoria demonstrated linear increases across the day, although ratings of happiness did not vary significantly. Note that there were no significant cross-level interactions with nonlinear (quadratic and cubic) representations of time.

Difficulty concentrating increased across the day for the entire sample; that is there was a main effect of higher concentration problems in the high HPS participants relative to the low HPS participants, but their increases across the day in concentration difficulties were comparable. However, flight of ideas, which presumably is more specific to bipolar psychopathology than concentration problems, demonstrated a different pattern. As noted above, there was a main effect of greater flight of ideas in high HPS scorers. However, flight of ideas remained constant

across the day for both high and low HPS scorers. In other words, participants with low HPS scores reported minimal flight of ideas that did not increase during the day (as concentration difficulties did). High HPS scorers reported heightened levels of flight of ideas that remained constant across the day. Thus, concentration difficulties increased as the day progressed, but elevated flight of ideas were specifically associated with the bipolar spectrum and remained constant throughout the day.

#### 4. Discussion

The present findings supported the validity of the HPS as a measure of bipolar spectrum psychopathology in a nonclinical sample of young adults. Unlike traditional validation strategies, the use of ESM allowed the examination of HPS correlates at multiple points during daily life. This allowed us to examine, for example, not only affective tone and intensity, but affective reactivity and variability in daily life.

High HPS scores were associated with elevated intensity of positive and negative affect. Consistent with the notion that mood dysregulation is a core feature of the bipolar spectrum, high HPS scorers exhibited greater variability in affect in daily life. HPS scores were positively associated with confidence, feeling superior, and being the center of attention — capturing the grandiose aspect of the bipolar spectrum. As expected, the HPS was associated with increased difficulty concentrating and flight of ideas. Engagement in risky behavior was associated with high HPS scores, but hypersociability was not. It may be that the social environment of college students limited detection of wide variability in social contact.

HPS scores moderated reactivity to success/failure in daily life. Given that hypomania and mania are characterized by exaggerated self-assessment, it was hypothesized that subjective appraisals of success/failure in real life would constitute a potent cue for eliciting affective and cognitive characteristics associated with the bipolar spectrum. Indeed, as Henry et al. (2008) proposed, the assessment of affective reactivity is an important and overlooked component in the study of mood disorders and dysregulation that is as relevant as the tone and intensity of affect. As expected, high HPS scorers experienced more irritability and risky behaviors when unsuccessful. However, they did not experience more racing thoughts or energetic-enthusiasm than others when feeling successful. It may be that high HPS scorers do not show cognitive and motivational reactivity to success because the appraisal of success is congruent with their internal representation of the self. However, consistent with current cognitive theories of the bipolar spectrum ([Colom et al., 2001] and [Newman et al., 2002]), when confronted with failure, the lack of congruence with their internal self might activate irritability and acting-out behaviors. On the other hand, the two “non-reactive” features, high energy and flight of ideas, were elevated in high HPS scorers, but relatively stable across the day. High energy and a cognitive style defined by disrupted and divergent thinking are closer to trait-like features of the bipolar spectrum, which would not be so highly variable or reactive to environmental cues. In contrast, negative affect and acting-out behavior would be more susceptible to reactivity.

The results of this study must be interpreted in light of two limitations. First, ESM data collection occurred as much as 12 weeks after the administration of the HPS. However, the HPS

was designed to measure stable characteristics and has good test–retest reliability across this time frame (Eckblad and Chapman, 1986). Secondly, participants were not assessed for bipolar disorders (although the focus was not specifically on disorders). Nevertheless, the findings are consistent with a broader spectrum of bipolar characteristics that is identifiable in nonclinical samples and provide further support for the HPS as a measure of this construct. Note that we are currently examining the expression of Akiskal's (e.g., Akiskal and Akiskal, 2005) affective temperaments, as these appear central to understanding the bipolar spectrum. Examining a broader spectrum of bipolar psychopathology should enhance our understanding of the etiology and development of bipolar disorders, facilitate identification of vulnerable individuals, and promote early interventions ([Angst and Cassano, 2005] and [Barrantes-Vidal et al., 2002]). Greater attention to subclinical bipolar symptoms in clinical practice should increase the likelihood that patients receive appropriate diagnoses and treatment.

#### Role of funding source

Neus Barrantes-Vidal and Thomas R. Kwapil are supported by the Generalitat de Catalunya (2009SGR672). The Generalitat de Catalunya had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

#### Conflict of interest

None of the authors had any conflicts of interest.

#### Acknowledgements

The authors thank Jason Mesner and Amethyst Royal for their assistance with data collection.

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1 Note that all of the effects were recomputed with sex and the HPS  $\times$  sex interaction entered as additional level 2 variables. The statistical significance of the main effects for HPS did not change for any of the analyses after the entry of sex into the regressions, and none of the interaction terms were significant (indicating that HPS was not differentially expressed in daily life for men and women).

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