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## Research report

## Creativity is linked to ambition across the bipolar spectrum

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## ABSTRACT

**Objective:** Beyond evidence for an association, little is known about the mechanism linking creativity bipolar spectrum conditions. Theory suggests that ambition, which is heightened in bipolar disorder (BD) and associated with creativity in the general population, might be an important variable. The overarching aim of this project was to evaluate whether ambition is related to creativity among those with bipolar spectrum conditions.

**Method:** Across two studies, we examined correlations between a validated self-report measure of ambition, the WASSUP, and creativity. In Study One, 22 individuals diagnosed with BD who self-identified as highly creative completed the WASSUP and a measure of lifetime creative accomplishment. In Study Two, 221 undergraduates completed the WASSUP, a measure of mania risk (the Hypomanic Personality Scale, HPS) and a measure designed to assess creativity in business projects and tasks.

**Results:** In Study One, WASSUP scores were significantly elevated compared to normative levels in BD, and WASSUP scores were correlated with lifetime creative accomplishment within the artistic sample. In Study Two, mania risk was related to greater ambition and creativity, and ambition was also directly related to greater creativity.

**Limitations:** Both studies were limited by the reliance on self-reported ambition.

**Conclusion:** Ambition could be one important component of creative success across the bipolar spectrum.

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## 1. Introduction

Biographical studies suggest that bipolar disorder (BD) is over-represented among artistic populations (Andreasen, 1987; Jamison, 1993), and quantitative (Richards et al., 1988) and epidemiological studies (Kyaga et al., 2011, 2013; Tremblay et al., 2010) support the idea that those with BD and their family members are over-represented among artistic populations. We have argued that evidence linking BD with creativity has potential to decrease the stigma that is currently so destructive for those living with the condition (Johnson et al., 2012c).

Researchers have not yet identified mechanisms driving creativity in BD (Johnson et al., 2012c; Srivastava and Ketter, 2010). There is little evidence for elevated divergent thinking among those diagnosed with BD (Johnson et al., in press). Indeed, cognitive

variables tied to creative accomplishment, such as attentional set-shifting, fluidity, and reactive flexibility, appear compromised in BD (Clark et al., 2005; Robinson et al., 2006). A proposed mechanism of elevated positive affectivity has generated both positive (Fulford et al., 2013) and null findings (Johnson et al., in press).

In a previous review, *ambition* was identified as related to creative accomplishment and also consistently elevated among those diagnosed with BD (Johnson et al., 2012c). Specifically, self-report measures of heightened lifetime ambitions (Johnson et al., 2012b) and overly valued goal pursuit (Wright et al., 2005) are elevated among people diagnosed with bipolar disorder. Persons with BD have also been found to be more willing to work towards difficult to obtain rewards during laboratory tasks (Harmon-Jones et al., 2008). High ambitions also predict increases in manic symptoms (Johnson et al., 2012a) and the onset of bipolar spectrum disorder (Alloy et al., 2006). In the general population, ambition and drive appear central for creative accomplishment (Murray and Johnson, 2010), with dedication and “perspiration” often noted in biographical and qualitative studies (Sternberg, 2006). In a meta-analysis, drive and ambition were identified as key traits related to creative accomplishment (Feist, 1998).

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Consistent with theory, recent work suggests that motivation is related to lifetime creative accomplishments among students at high risk for BD (Ruiter and Johnson, 2015), although not among persons diagnosed with BD (Johnson et al., in press). Neither available study of this topic, though, assessed a highly creative sample. The overarching aim of this project was to investigate the hypothesized involvement of ambition in creativity across the bipolar spectrum. In Study One, highly creative individuals who self-identified with BD completed measures of ambition and lifetime creativity. We assessed whether ambition was elevated compared to norms for BD, and whether creativity and ambition were correlated within this group. Study Two extended research on ambition and creativity by testing the same association to the sub-clinical end of the bipolar spectrum. Study Two also extends the findings on creativity to a measure of creativity developed to assess propensities toward creativity within business domains.

## 2. Study One methods

All procedures were reviewed in advance by the university ethics board. Participants completed written informed consent procedures.

### 2.1. Participants

Following community-based participatory research (Israel et al., 1998), we recruited participants through a “community engagement” day that included presentations and discussions on creativity and BD. Recruitment strategies targeted a broad range of adults with BD who self-identified as creative, through bipolar newsletters, networking, posters in art galleries and other art venues, websites, and social media.

Participants ( $n=22$ ) self-reported as (a) having been diagnosed with BD and (b) highly creative (22.7% male; Age  $M=42.05$ ;  $SD=12.73$ ). Four participants reporting being disabled or unemployed, 10 were employed, and five declined to answer. Sixteen participants had completed college or higher education, six had completed some college and three were students. Eight participants were living alone, two with parents, eight with a partner, and four with relatives or roommates. Seven participants reported annual income less than \$11,000 Canadian dollars, four reported \$11,000–\$25,000, six reported \$26,000–\$50,000, and one above \$50,000 (four declined to answer). Nineteen described Caucasian European-Canadian backgrounds, two described aboriginal Canadian, and one Filipino-Chinese ethnic background. Eleven reported a diagnosis of BD I, four reported BD II, one reported an unspecified milder form, one reported rapid cycling, and one reported receiving diagnoses of type I and type II BD (four declined to answer). Participants reported that they had been diagnosed an average of 11.45 years previously ( $SD=10.0$ , median=9), but that they had been living with the disorder for an average of 26.57 years ( $SD=15.60$ , median=10).

### 2.2. Measures

*Creative Achievement Questionnaire* (CAQ; Carson et al., 2005). The CAQ is a self-report measure of lifetime creative accomplishment across visual arts, music, creative writing, dance, drama, architecture, humor, scientific discovery, invention, and culinary domains. Response options range from “no training or recognized talent in this area” (0) through exceptional acclaim or recognition (e.g., “My choreography has been critiqued by a national publication” [7 points]). Total scores reflect the sum of accomplishments in each domain (range 0–70). CAQ scores correlate with laboratory indices of creativity (Carson et al., 2005).

*Willingly Approached Set of Statistically Unlikely Pursuits* (WASSUP; Johnson and Carver, 2006). Participants indicate how likely they are to

set highly ambitious life goals (e.g., “you will have 20 million dollars or more”) on a Likert scale ranging from one (“No chance I will set this goal for myself”) to five (“Definitely WILL set this goal for myself”). WASSUP scores are elevated among those at risk for and diagnosed with BD (see Johnson et al., 2012b for review) and relate to a laboratory measure of willingness to expend effort to obtain a difficult to reward (Johnson et al., in preparation). We administered two subscales that have consistently differentiated BD from healthy controls and those at high risk from those at low risk for BD: Popular Fame and Financial Success (cf. Carver and Johnson, 2009; Johnson and Carver, 2006; Johnson and Jones, 2009). Internal consistency for Popular Fame was adequate,  $\alpha=.84$ . Because internal consistency for Financial Success was not adequate,  $\alpha=.46$ , analyses of this scale are not reported further (as one would expect given the poor reliability, Financial Success did not relate to key outcomes).

*Seven-up Seven-down* (Youngstrom et al., 2013). The Seven-up Seven-down scale was developed as a screening instrument for lifetime manic and depressive symptoms. Items were drawn from the 73-item General Behavior Inventory (GBI), a well-validated scale that predicts the onset of bipolar diagnoses (Danielson et al., 2003; Depue et al., 1989). Seven items reflecting manic symptoms and seven reflecting depression were identified with factor analysis and confirmed in a second sample. Construct validity was supported by robust correlations with scales that have been shown to correlate with BD. Internal consistency was high in the present sample (Seven-up  $\alpha=.93$ , Seven-down  $\alpha=.96$ ).

*Brief Quality of Life in Bipolar Disorder* (Brief QoLBD; Michalak and Murray, 2010). The 12-item Brief QoLBD items are drawn from the QoLBD, a scale with strong factor analytic support, appropriate one-week test-retest reliability (.69), and robust associations with established quality of life (QoL) measures. In this sample, internal reliability was good ( $\alpha=.86$ ).

## 3. Study one results

Analyses were completed using SPSS version 21, with alpha set to .05 (two-tailed tests).

As expected, the Study One sample reported more severe lifetime manic symptoms (Seven-up) ( $M=10.64$ ) and depressive symptoms (Seven-down) ( $M=13.86$ ) than did the original validation sample of healthy adults (Seven-up  $M=3.98$ ,  $t(21)=5.83$ ,  $p<.001$ , Seven-down  $M=5.77$ ,  $t(21)=6.59$ ,  $p<.001$ ). QoL in the present sample (Brief QoLBD  $M=40.82$ ) was comparable to normative levels within the Brief QoLBD validation sample of 224 people diagnosed with BD ( $M=40.25$ ,  $t(21)=.32$ ,  $p=.75$ ).

Confirming that we recruited a sample with high creative accomplishment, the current sample endorsed higher creative accomplishment ( $M=27.45$ ) than a bipolar normative sample ( $M=14.10$ ,  $t(21)=3.25$ ,  $p=.004$ ) or a normative community sample with no mood disorder ( $M=9.06$ ,  $t(21)=4.471$ ,  $p<.0005$ ) (norms drawn from Johnson et al., in press).

Consistent with expectations, the current sample endorsed higher ambitions (WASSUP Fame  $M=18.77$ ) than a normative bipolar sample ( $M=11.15$ ,  $t(21)=2.46$ ,  $p=.02$ ), or a normative general population sample ( $M=10.53$ ,  $t(21)=2.93$ ,  $p<.01$ ) (norms drawn from Johnson et al., in press). Consistent with the main hypothesis, ambition (WASSUP Fame) was significantly associated with CAQ scores:  $r=.44$ ,  $p=.04$ .

## 4. Study one discussion

Although research suggests that BD is linked to creativity, it has been difficult to identify mechanisms underpinning the link. Study One examined whether heightened ambition might help fuel

creative accomplishments among people diagnosed with BD. Although previous theory and research implicated ambition and motivation (Johnson et al., in press; Ruiters and Johnson, 2015), the current study is distinguished by a sample with significant creative accomplishment. As expected, highly creative individuals with BD endorsed elevated ambition for fame compared to normative samples of people with BD and with no mood disorder. Moreover, ambitions for fame within the creative bipolar sample were associated with higher self-reported creative accomplishment.

Current findings are limited by the small sample size and the reliance on a single measure of creativity within the creative sample. Study One was also limited by a lack of control over mood state, which might bias individuals to endorse both creativity and ambition. Finally, most findings to date have focused on how motivation influences lifetime creative accomplishments in the arts (Johnson et al., in press; Ruiters and Johnson, 2015), with only one study that used a different measure—of creativity on a problem-solving task (Ruiters and Johnson, 2015); hence there is a need to examine whether the ambition-creativity link generalizes to other forms of creativity.

## 5. Study two introduction

To address the limitations of Study One, Study Two used a larger, nonclinical sample to investigate the link between ambition and creativity across the bipolar spectrum. Study Two also employed a different measure of creativity—the creativity scale of the Proclivity for Improvisation scale (Hmieleski and Corbett, 2006). This scale was developed to assess creativity within business projects and tasks, a construct that has been validated as a predictor of intent to become an entrepreneur as well as success within entrepreneurship (Rauch and Frese, 2007). Some previous empirical research has suggested that subsyndromal manic traits (Akiskal et al., 2005a, 2005b) and family history of BD (Coryell et al., 1989) might be over-represented among those who achieve heights of success within the business world. Hence we chose the Proclivity for Improvisation Creativity scale as a form of creativity quite different than success in the artistic domains covered on the CAQ, thus extending the Study One investigation. In Study Two, the bipolar spectrum was measured quantitatively, on a validated measure of mania-proneness, the Hypomanic Personality Scale. Previous research has suggested that creative accomplishments might be particularly elevated among those with milder manic tendencies as compared to those with bipolar I disorder diagnoses (Johnson et al., 2012c; Vellante et al., 2011).

## 6. Study two methods

Study procedures were approved by the university ethics board. Participants completed an online written consent and confirmed that they were at least 18 years old.

### 6.1. Participants

All participants were recruited from research participation pools of a large public university as part of a broader study on entrepreneurship (see Johnson et al., 2015 for details). Study enrollment occurred through an online portal listing available studies, with this study described as research on entrepreneurship and personality. The full survey, which contained several measures not listed here, was completed in approximately one hour, and responses were confidential. Participants were drawn from two pools: students and staff of an MBA program and undergraduate students of the

psychology department. The MBA participants were paid \$15 for study completion, while the undergraduate psychology students were offered course credit. After excluding 6 MBA and 8 psychology students for failing catch items randomly distributed throughout the measures (e.g. “Select answer 2 as your response”), 76 MBA pool participants and 149 psychology students participants remained.

### 6.2. Measures

As with Study One, participants completed the WASSUP Fame,  $M=2.02$ ,  $SD=1.01$ , and Financial Success,  $M=2.84$ ,  $SD=1.21$ , subscales. In Study Two, internal consistency was high for both Financial Success,  $\alpha=.85$ , and Fame,  $\alpha=.94$ .

The Hypomanic Personality Scale (HPS; Eckblad and Chapman, 1986) is a self-report index of risk for BD. Subsyndromal symptoms of mania (“Sometimes ideas and insights come to me so fast that I cannot express them all”), as well as related traits such as positive affectivity are assessed in the 48-item scale. The measure reached sufficient internal consistency in the original sample,  $\alpha=.87$ , and 15-week test retest reliability of .81 and differentiated individuals on a bipolar spectrum (78% of those with high scores as compared to 0% of those with low scores). Validity has been supported through 10-year follow-up findings that scores predict the onset of bipolar diagnoses (Kwapil et al., 2000), and also correlate with genetic polymorphisms implicated in BD (Johnson et al., 2014). In the present study, the HPS demonstrated good internal consistency,  $\alpha=.92$  ( $M=22.44$ ,  $SD=6.17$ ). Participants were also asked if they had ever received a diagnosis of BD. Four participants endorsed this item. Findings were entirely parallel when these four participants were excluded; present results include these participants.

The Proclivity for Improvisation Creativity Scale (Hmieleski and Corbett, 2006) is a 9-item measure developed to assess trait-like tendencies to be able to generate creative solutions in work and projects, particularly under circumstances of constrained resources (e.g. “I am creative when asked to work with limited resources”). The scale was designed to assess creativity within workplace endeavors and particularly entrepreneurship. Respondents rated how often they could be described in a particular way on a scale of 0 “Never” to 100 “Always”, the scale has obtained factor analytic support and shows expected correlations with entrepreneurial intent and with cognitive and personality variables that have been related to creativity (Hmieleski and Corbett, 2006). Internal consistency in the present sample was high,  $\alpha=.95$  ( $M=58.34$ ,  $SD=20.44$ ).

Affect Rating. To capture the extent of high arousal positive effect, participants were asked to complete a single item “Please indicate the extent to which you feel excited right now” on a scale from 1 “not at all” to 5 “extremely”, as one would expect, mean scores were modest,  $M=2.04$ ,  $SD=1.16$ .

## 7. Results

Analyses were completed using SPSS version 22, with alpha set to .05 (two-tailed tests). Estimates of skew and kurtosis were within normal range for all scales. Four participants were excluded as multivariate outliers; analyses are based on 221 participants.

As shown in Table 1, higher mania risk (HPS) correlated with significantly higher ambition (WASSUP Fame and Financial Success) and creativity (Proclivity for Improvisation scale). Ambition scores were also related to significantly higher levels of creativity. These effects were not appreciably changed by controlling for affect (see Table 1). After controlling for positive affect and ambition scores (WASSUP Fame and Financial Success), mania risk remained uniquely and independently related to creativity (Proclivity for Improvisation scale),  $\text{partial } r(215)=-.44$ ,  $p<.0005$ .

**Table 1**  
Correlations of mania risk (HPS), ambition (WASSUP Popular Fame and Financial Success), and Proclivity for Improvisation Creativity Scale (Study 2,  $N=221$ ).

	Creativity		HPS	
	$r$ ( $p$ )	partial $r^*$ ( $p$ )	$r$ ( $p$ )	partial $r^*$ ( $p$ )
Creativity			.51 (.000)	.49 (.000)
WASSUP Fame	.25 (.000)	.23 (.001)	.41 (.000)	.38 (.000)
WASSUP Financial Success	.18 (.007)	.15 (.03)	.27 (.000)	.23 (.001)

Note: HPS=Hypomanic Personality Scale; Creativity=Proclivity for Improvisation Creativity Scale; WASSUP=Willingly Approached Set of Statistically Unlikely Pursuits.

\* Partial  $r$  controlling for mood rating.

## 8. Discussion study two

Findings of the present study extend previous research on manic tendencies and ambition to a measure designed to assess creativity within business environments, the Proclivity for Improvisation Creativity scale. The HPS and WASSUP scales were related to this form of creativity, suggesting that manic tendencies and ambition might foster tendencies to generate novel and unique solutions in business environments. These effects did not appear to be an artifact of mood state, in that these effects remained significant after controlling for ratings of current positive mood state. When we examined whether ambition scores statistically explained the links between manic tendencies and creativity, findings suggested that manic tendencies remained significantly related to creativity after accounting for ambition scores. That is manic tendencies might facilitate creative tendencies, as measured on the Proclivity for Improvisation scale, through pathways beyond the ambition to achieve high levels of extrinsic recognition.

## 9. Overall discussion

Findings across two studies strongly suggest that across the bipolar spectrum, ambition and creativity are linked. People with BD and those at risk for mania are highly goal-driven and reward-focused (see Johnson et al., 2012b for review), and as noted above, this is reflected in willingness to pursue difficult goals. Creative expression may be one of the most difficult goals to pursue, given the long hours of practice and lack of normal career structures (see Murray and Johnson, 2010). The present findings extend previous work by suggesting that ambition may be important to understanding two different aspects of creativity across the bipolar spectrum: success in establishing a career and accomplishing critical milestones as an artist (Study One), tendencies to generate creative solutions on tasks and projects (Study Two). The present two-study project highlights that both forms of creativity may be enhanced by the high levels of ambition observed in the bipolar spectrum. Findings of Study two suggest that heightened ambition may be important in general for the tendency to generate creative solutions on tasks and projects, rather than being only relevant within bipolar spectrum disorder.

In placing these findings in context, it is important to consider several issues. First, we were restricted to a single self-report measure of ambition in this project. Previous research has suggested that ambition for extrinsic recognition is only one of the forms of motivation that may foster creativity in the context of mania risk. Specific ambition to succeed within creative endeavors can also be distinguished from broader tendencies to be highly ambitious, and may be important to consider as well (Ruiter and Johnson, 2015). Moreover, findings of Study Two indicate that the relationship between mania risk and creativity is not entirely about ambition.

Future studies would do well to gather a range of measures of motivation, as well as a fuller set of measures that could help explain creativity in relation to mania risk, including measures of cognitive style, perseverance, and affective traits (Johnson et al., 2012c; Srivastava et al., 2010).

It is also important to consider the severity of manic symptoms. In Study One, participants varied in the severity of their bipolar histories, but our sample was too small to examine the influence of these severity levels on relative creative accomplishment. In Study Two, we were constrained to studying risk for BD as defined by subsyndromal symptoms. The positive findings for mania risk in Study Two, though, join with a host of previous research suggesting that milder symptoms, and even family history, might be particularly advantageous for creativity (Akiskal and Akiskal, 2007; Akiskal et al., 2005a, 2005b). Indeed, links of ambition with creativity may be particularly important in milder bipolar spectrum conditions, as one recent study did not find that ambition predicted creative accomplishment within a bipolar I sample (Johnson et al., in press), even though ambition remains heightened among individuals who have experienced multiple hospitalizations for bipolar I disorder (Johnson et al., 2012a). A key question, then, is how and when ambition can continue to be funneled toward strong creative accomplishment in those with more severe symptom histories.

More broadly, current findings suggest the need to consider both benefits and disadvantages of manic traits. The heightened ambitions observed in bipolar spectrum have been empirically linked to the more difficult outcomes of illness onset and a more severe course of mania. These same traits, though, may be tied to the greater accomplishments sometimes observed in this population. As such, clinicians would do well to help their clients weigh the difficulties and the benefits of high ambition in BD, and researchers would do well to consider the biological and environmental factors that may be driving ambition within the bipolar spectrum.

## Contributors

For Study One, Sheri Johnson, Gregory Murray and Erin Michalak designed the study and wrote the protocol. Erin Michalak spearheaded organizing the conference and recruiting participants. Sharon Hou assisted in the data collection and Sheri Johnson conducted the analyses. For Study Two, Michael Freeman, Paige Staudenmaier and Sheri Johnson collaborated on study design, managed the data collection, and Sheri Johnson conducted the analyses and drafted the paper with feedback from all authors. All authors contributed to the writing process and have approved the final manuscript.

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## Conflict of interest

None.

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