

Northumbria Research Link

Citation: Dempsey, Robert, Eardley, Katherine and Dodd, Alyson (2022) The role of tenacious versus flexible goal pursuit in the vulnerability to bipolar disorder. *Current Psychology*, 41 (4). pp. 2382-2389. ISSN 1046-1310

Published by: Springer

URL: <https://doi.org/10.1007/s12144-020-00748-7> <<https://doi.org/10.1007/s12144-020-00748-7>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/42839/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



The role of tenacious versus flexible goal pursuit in the vulnerability to bipolar disorder

Robert C. Dempsey^{1,2} · Katherine Eardley² · Alyson L. Dodd³

Published online: 28 April 2020

© The Author(s) 2020

Abstract

The vulnerability to bipolar disorder is characterized by dysregulated goal-related behavior, the setting of ambitious and extreme goals, and increases in goal approach behaviors. To date, no studies have investigated the nature of goal pursuit behaviors amongst individuals at a behavioral risk for bipolar disorder in terms of whether goal pursuit is characterized by a tenacious active striving for goals or a more flexible changeable focus on goals. A non-clinical sample of 168 participants completed online measures of mood, bipolar-vulnerability, reward sensitivity, goal-related perfectionist tendencies, tenacious goal pursuit and flexible goal adjustment behaviors. Our findings demonstrate that bipolar-vulnerability is characterized by the tenacious, not flexible, pursuit of goals, in combination with low regulation of goal behavior, and tendencies towards narcissistic and self-critical perfectionism indicative of setting high ambitious standards and making overly harsh self-judgments when such standards are not met. These findings are similar to those from clinical bipolar samples where there is evidence of prolonged symptom recoveries after the experience of goal frustrations and failures. Reducing the tenacious, active striving for goals amongst at-risk individuals may be a potential avenue for early intervention.

Keywords Bipolar disorder · Goal pursuit · Reward sensitivity · Hypomanic personality

The experience of bipolar disorder is characterized by the intense pursuit of goals (Johnson 2005), with increased goal-directed activity formally recognized as a diagnostic feature of hypo/manic episodes (American Psychiatric Association 2013). Individuals living with a bipolar diagnosis and those at a behavioral high risk for bipolar disorder are documented to experience goal-related mental imagery (Gregory et al. 2010; Ivins et al. 2014), dysfunctional beliefs about goal attainment (Lam et al. 2004), and increased reward sensitivities, ambitious goal-setting, goal-directed and impulsive behaviors

(Johnson et al. 2009; Johnson and Carver 2006; Jones and Day 2008; Muhtadie et al. 2013; Swann et al. 2009; Tharp et al. 2016), compared to those without a bipolar diagnosis and those at a low behavioral risk for bipolar disorder. Research also suggests that individuals with bipolar disorder spend more effort in pursuing goals of an ambitious or statistically unlikely nature (Johnson et al. 2017). Goal dysregulation appears to be a potentially unique risk factor for clinically significant bipolar experiences, and may differentiate bipolar-vulnerability from other mental health-related difficulties characterized by variable mood and behavior, such as borderline personality disorder and unipolar depression (Fulford et al. 2015; Lam et al. 2004). Understanding the mechanisms which underlie excessive and poorly regulated goal-related behavior is important for understanding the psychological pathways to hypo/mania and bipolar disorder and in the development of effective interventions.

In addition to heightened goal sensitivities, perfectionist beliefs regarding the need to accomplish goals, particularly those of an ambitious nature, appear to be unique to bipolar disorder (Lam et al. 2004). Heightened perfectionist beliefs and tendencies in general have been associated with the experience of bipolar spectrum conditions (Egan et al. 2011; Scott et al. 2000). Maladaptive forms of perfectionism, which can

✉ Robert C. Dempsey
r.dempsey@mmu.ac.uk

Alyson L. Dodd
alyson.dodd@northumbria.ac.uk

¹ Department of Psychology, Faculty of Health, Psychology & Social Care, Manchester Metropolitan University, Brooks Building, Birley Campus, Greater Manchester M15 6GX, UK

² Staffordshire Centre for Psychological Research, School of Life Sciences and Education, Science Centre, Staffordshire University, Leek Road, Stoke-on-Trent ST4 2DF, UK

³ Department of Psychology, Faculty of Health & Life Sciences, Northumbria University, Newcastle-upon-Tyne NE1 8SG, UK

include harsh self-criticism and expectations of negative evaluations by the self and by others when encountering failure, have also been associated with poorer emotion regulation amongst people living with bipolar disorder (Fletcher et al. 2019). Setting high standards for oneself, which may be reflected in the setting of highly ambitious and statistically unlikely goals, may be indicative of underlying needs for perfection amongst people with bipolar spectrum experiences. Few studies, however, have focused on the role of perfectionism and related goal striving behaviors and beliefs as a potential pathway underlying the vulnerability to bipolar disorder.

Whilst clinically significant bipolar spectrum experiences are associated with the increased pursuit of goals, including increased goal-directed activity and goal-related thinking, as well as tendencies to set perfectionist standards for goals, it is currently unclear whether the behavioral risk for bipolar disorder is associated with a tenacious persistent or a more flexible pursuit of goals. Tenacious goal pursuit has been characterized as the active striving for goals based on changing the environment to suit one's goals, which may be adaptive if the goals pursued are realistic (Brandtstädter and Renner 1990; Heyl et al. 2007). In contrast, flexible goal pursuit is defined as the adaptation and readjustment of goals based on available resources and the individual's situational constraints, such as knowing when to change goals to focus on more achievable targets (Brandtstädter and Renner 1990; Heyl et al. 2007). Considering the existing literature, people at risk for bipolar disorder should demonstrate tendencies towards more tenacious goal pursuit, possibly reflecting an inability to disengage from unachievable goals which may precipitate high mood symptoms characterized by increased goal-directed activity, rather than flexibly adjust targets when goals are no longer realistic or achievable. The present study aimed to investigate the associations between tenacious and flexible goal pursuit with the behavioral risk for bipolar disorder in a non-clinical sample. To investigate this aim, measures of goal regulation, reward sensitivity, perfectionism, hypomanic personality (a proxy measure of behavioral vulnerability for bipolar disorder), and current mood symptoms were taken.

Method

Sample

An online sample of 168 participants was recruited for this study (Mean_{age} = 27.41 years, SD = 10.61, one participant did not specify their age; 143 females, 25 males). Participants were recruited via social media adverts or via a University participation pool; for the latter, participants were offered course credits as an incentive. Otherwise, no incentives to participate were provided.

Materials

Hypomanic Personality Scale (HPS)

The 48-item version of the HPS (Eckblad and Chapman 1986) was used to assess the presence of hypomanic traits, a behavioral marker of the vulnerability to bipolar disorder. The HPS consists of a series of true-false statements assessing a range of personality traits indicative of mood variability and bipolar disorder (e.g., 'I often get so happy and energetic that I am almost giddy'). Higher scores on the HPS are indicative of an increased behavioral risk for bipolar disorder, with evidence of higher scores being associated with an increased prevalence of bipolar disorder over long-term follow-up (Kwapil et al. 2000). The HPS has demonstrated strong internal consistency (α s = .86–.87; Dempsey et al. 2017; Eckblad and Chapman 1986).

Center for Epidemiological Studies Depression Scale (CES-D)

The 20-item version of the CES-D was used to assess depressive symptoms (Radloff 1977). Each CES-D item assesses the experience of depressive symptoms over the past week (e.g., 'My sleep was restless', 'I was bothered by things that do not usually bother me') and is suitable for use in non-clinical and clinical samples (Calam et al. 2012; Dempsey et al. 2011). Participants rate each item on a four-point scale, from 0 ('Rarely or none of the time (less than a day)') to 3 ('Most or all of the time (5-7 days)'), with higher total CES-D scores indicating more severe depressive symptoms. The CES-D has demonstrated strong internal consistency (α = .91; Dempsey et al. 2011).

Altman Self-Rating Scale for Mania (ASRM)

The ASRM is a short 5-item measure of the experience of manic symptoms over the past week based on the DSM criteria for mania (Altman et al. 1997). Participants rate each symptom on a scale from 0 (e.g., 'I do not feel more self-confident than usual') to 4 ('I feel extremely self-confident all of the time'). The ASRM has been used to assess the severity of manic symptoms in a variety of clinical and non-clinical groups (e.g., Dodd et al. 2017; Fisk et al. 2015). Higher total scores indicate the experience of more severe manic symptoms. Acceptable levels of internal consistency have been reported for the 5-item ASRM (α = .79; Dodd et al. 2017).

Behavioral Inhibition & Behavioral Activation Scales (BIS/BAS)

The 28-item BIS/BAS scale was used to measure the sensitivity of the behavioral activation (BAS) and inhibition systems (BIS) associated with goal-related reward and punishment

sensitivities respectively (Carver and White 1994). This scale included the additional four-item Dysregulation of BAS subscale which assesses the weak regulation of the BAS (DYS: Holzwarth and Meyer 2006) which has been associated with increased bipolar-proneness cross-sectionally (Dodd et al. 2013) and prospectively (Dempsey et al. 2017). Behavioral inhibition is measured by a single BIS factor, with three separate subscales measuring BAS activity (Drive, Fun Seeking, Reward Responsiveness). Participants rate how applicable a series of statements are to themselves on a scale from 1 ('very false for me') to 4 ('very true for me'). The subscales of the BIS/BAS and DYS measures have demonstrated adequate internal consistencies ($\alpha = .63-.81$; Dempsey et al. 2017).

Tenacious Goal Pursuit and Flexible Goal Attainment Scales (TEN/FLEX)

This is a 30-item scale which captures two aspects of goal-related behavior, the tenacious pursuit of goals (TGP) and flexible goal adjustment (FGA) (Brandstädter and Renner 1990). Each item measures individual differences in goal behaviors on a -2 ('strongly disagree') to $+2$ ('strongly agree') scale, including maintaining (e.g., 'Even when a situation seems hopeless, I still try to master it'; TGP) or adjusting goal pursuit behaviors (e.g., 'After a serious drawback, I soon turn to new tasks'; FGA). Higher scores on the TGP and FGA subscales indicate more tenacious pursuit of goals and the flexible adjustment of goals respectively. Both the TGP and FGA subscales have demonstrated good internal consistencies ($\alpha = .83-.87$; Van Damme et al. 2016).

Big Three Perfectionism Scales (BTPS)

The BTPS is a 45-item measure of dispositional perfectionism which captures three higher-order global facets of perfectionism with ten underlying dimensions (Smith et al. 2016). For the present study, the three higher order scales were included in our analyses. The first subscale, *rigid perfectionism*, captures inflexible beliefs that one's own performances in tasks must be without error, flawless and perfect by nature. The second subscale, *self-critical perfectionism*, measures the tendency to make overly harsh self-evaluations and criticisms of one's performance when perfection is not achieved. The final subscale, *narcissistic perfectionism*, captures a sense of one's own perfect status over and above the achievements of others, which justifies setting high standards and unrealistic expectations for oneself (Smith et al. 2016). Each BTPS statement is rated on a 1 ('disagree strongly') to 5 ('agree strongly') scale, with higher scores indicating higher levels of dispositional perfectionism. High levels of internal consistency have been reported for the three higher order BTPS subscales ($\alpha = .92-.93$; Smith et al. 2016).

Procedure

Data collection was conducted online using Qualtrics with adverts for the study posted on social media and via University research participation systems. Advertisements directed the participants to an electronic information sheet and consent form, upon confirmation of participants consent they were shown a brief demographics questionnaire and the main study measures (HPS, BIS/BAS, CES-D, ASRM, TEN/FLEX, and the BTPS). Participants were shown a standardized debrief at the end of the study, including a brief summary of the study aims and information about appropriate support services if required. The study received institutional ethical approval from s.

Data Analysis Plan

Data were subject to series of correlation and regression analyses to investigate the associations between tenacious and flexible goal pursuit with bipolar-vulnerability. A linear regression analysis was conducted to investigate these associations whilst controlling for key demographic variables and other goal-related measures (e.g., perfectionism, BIS/BAS, mood symptoms). Exploratory analyses were conducted to investigate possible moderated relationships between tenacious and flexible goal pursuit and bipolar-vulnerability (HPS) scores by goal sensitivity (BIS/BAS, DYS) and perfectionism.

Results

Data Screenings

Two hundred and sixteen participants initially consented to taking part in the study. After removal of participants with no recorded questionnaire responses ($n = 19$), missing values analysis indicated that missing data in the dataset was missing completely at random (Little's test, $\chi^2 = 6247.20$, $p = .334$), therefore a small number of cases with missing values on some of the measures were subjected to listwise deletion ($n = 11$). A further eighteen participants failed the attention check items and were excluded from the data set, leaving the final sample of 168 participants for analysis. There was no indication of multivariate outliers in the final sample with no extreme z-scores across the study variables.

Descriptive Statistics

Table 1, below, displays the means, standard deviation, minimum and maximum scores for the main study variables (age, mood symptoms, bipolar vulnerability, perfectionism, goal sensitivity and pursuit). Whilst the descriptive data detailed

Table 1 Means and Standard Deviations for the key study measures

	Mean	S.D.	Minimum	Maximum	Cronbach's alpha
Age (years)	27.41	10.61	18	69	
HPS	15.24	7.82	1	40	.87
CES-D	21.26	12.46	0	54	.93
ASRM	4.29	3.47	0	16	.73
BIS	22.46	4.08	9	28	.82
BAS Drive	10.35	2.53	4	16	.78
BAS Fun Seeking	11.28	2.45	4	16	.69
BAS Reward	16.61	2.23	10	20	.66
DYS of BAS	12.21	2.21	7	16	.69
Tenacious Goal Pursuit	2.90	9.15	−28	22	.88
Flexible Goal Attainment	3.29	8.23	−17	20	.82
Rigid Perfectionism	26.03	8.90	9	45	.93
Self-Critical Perfectionism	57.58	14.34	19	89	.94
Narcissistic Perfectionism	32.77	9.03	16	58	.88

Key: ASRM = Altman Self-Rating Scale for Mania; BAS = Behavioral Activation Scale; BIS = Behavioral Inhibition Scale; CES-D = Center for Epidemiological Studies Depression Scale; DYS of BAS = Dysregulation of BAS subscale; HPS = Hypomanic Personality Scale

in Table 1 met assumptions of normality, it was notable that the mean CES-D score was above the revised recommended cut-off of 20 for identifying possible clinically significant depression (Vilagut et al. 2016). Approximately half of the sample ($n = 83$, 49.7%) scored above this CES-D cut-off. In terms of hypo/manic symptoms, 32.3% ($n = 54$) of the sample scored above the recommended cut-off of 6 on the ASRM which indicates a potential hypo/manic condition (Altman et al. 1997). Given that we were unable to verify whether the participants scoring above these cut-offs have a diagnosis of bipolar disorder, current mood symptoms were included as controlled variables in the regression analyses to account for potential mood-related effects. Internal reliabilities for the measures used in the study were generally good-to-excellent, however three of the BAS scales were just below the recommended Cronbach's alpha score of .7.

Correlation Analysis

Bivariate correlations were conducted to assess the relationship between the key study variables (see Table 2). The correlations were generally in the expected directions; Hypomanic Personality Scale scores were positively correlated with depression and manic symptoms, the BAS subscales including Dysregulation of BAS, as well as with tenacious goal pursuit, rigid and narcissistic perfectionism. HPS was significantly negatively correlated with BIS. In terms of the associations between tenacious (TGP) and flexible (FGA) goal behaviors, TGP was positively associated with scores on the HPS, ASRM, BAS subscales (but not DYS), and with rigid and narcissistic perfectionism. TGP was negatively

correlated with BIS and CES-D scores, with no relationship between TGP and FGA scores noted. FGA was positively correlated with age, ASRM and BAS Fun Seeking, with negative correlations between FGA and CES-D, BIS, rigid and self-critical perfectionism were noted.

Regression Analyses

A hierarchical regression analysis tested the associations between the goal pursuit measures (BIS/BAS/DYS, TEN/FLEX and Perfectionism) with scores on the Hypomanic Personality Scale (HPS) whilst controlling for participant age, sex, and current mood symptoms (CES-D and ASRM). One outlier was identified based on review of the residual statistics (Studentized Deleted Residual = 4.28) and was removed from the dataset. The analysis was re-run with the remaining 167 participants. The overall regression model was significant, $F(14, 151) = 10.149$, $p < .001$, and explained 43.7% of variance in HPS scores (only the final model statistics, after the inclusion of block 3 is reported here for brevity). There was no indication of multicollinearity (Tolerances $> .2$; VIFs < 4) and the model met the assumption of independent errors (Durbin-Watson statistic = 2.017). Table 3 details the associations between the study variables with HPS scores as the outcome.

As shown in Table 3, HPS scores were negatively associated with behavioral inhibition (BIS), but positively with Dysregulation of BAS (DYS), self-critical and narcissistic perfectionism (BTPS) scores after controlling for age, participant sex, and current bipolar mood symptoms (CES-D, ASRM). Tenacious Goal Pursuit (TGA), but not Flexible Goal Adjustment, was a significant positive predictor of

Table 2 Bivariate correlations between the key study variables

	HPS	CES-D	ASRM	BIS	BAS Drive	BAS Fun Seeking	BAS Reward	DYS	TGP	FGA	Rigid Perf	Self-Critical Perf	Narcissistic Perf
Age	-.12	-.07	-.12	-.14*	-.04	-.11	-.16*	-.12	.07	.15*	-.18**	-.19**	.06
HPS		.14*	.45**	-.18**	.30**	.41**	.24**	.33**	.25**	-.06	.26**	.09	.29**
CESD			-.21**	.32**	-.12	-.16*	-.15*	.16*	-.20**	-.54**	.26**	.48**	-.09
ASRM				-.32**	.24**	.36**	.08	.01	.23**	.16*	.08	-.13*	.29**
BIS					-.14*	-.34**	.07	.00	-.13*	-.47**	.28**	.68**	-.17*
BAS Drive						.44**	.50**	.16*	.35**	.09	.33**	-.05	.38**
BAS Fun Seeking							.40**	.34**	.23**	.15*	.16*	-.21**	.26**
BAS Reward								.39**	.17*	.11	.12	-.06	.07
DYS									.08	-.02	.08	.10	.01
Tenacious Goal Pursuit (TGP)										.07	.33**	-.06	.15*
Flexible Goal Attainment (FGA)											-.42**	-.60**	-.01
Rigid Perfectionism												.60**	.38**
Self-Critical Perfectionism													-.01

Key: ASRM = Altman Self-Rating Scale for Mania; BAS = Behavioral Activation Scale; BIS = Behavioral Inhibition Scale; CES-D = Center for Epidemiological Studies Depression Scale; DYS of BAS = Dysregulation of BAS subscale; HPS = Hypomanic Personality Scale

* $p < .05$, ** $p < .01$

HPS scores, indicating that an increased vulnerability to bipolar disorder is characterized by a more intense pursuit of goals

by maintaining goal-related behaviors, rather than the flexible adjustment of goal-related behaviors.

Table 3 Outcome of the regression analysis testing the role of tenacious and flexible goal pursuit in hypomanic personality

Step	Predictor	B	S. E.	β	t	C.I. (95%)
1	CES-D	.17	.04	.27	3.95**	.08–.25
	ASRM	1.14	.15	.52	7.60**	.84–1.43
	Age	-.04	.05	-.05	-.77	-.13–.06
	Sex	-1.42	1.45	-.07	-.98	-4.28 – 1.44
2	CES-D	.15	.05	.25	3.28**	.06–.25
	ASRM	.77	.15	.35	5.09**	.47–1.07
	Age	-.03	.05	-.04	-.635	-.12–.06
	Sex	-.85	1.38	-.04	-.611	-3.56 – 1.89
	BIS	-.42	.18	-.23	-2.37*	-.77 – -.07
	BAS Drive	.03	.25	.01	.112	-.46–.51
	BAS Fun Seeking	.41	.24	.13	1.674	-.07–.89
	BAS Reward	.37	.27	.11	1.352	-.17–.91
	DYS of BAS	.58	.24	.17	2.37*	.10–1.06
	Tenacious Goal Pursuit	.15	.06	.18	2.48*	.03–.26
	Flexible Goal Adjustment	-.05	.08	-.06	-.69	-.21–.10
	Rigid Perfectionism	-.12	.09	-.14	-1.38	-.29–.05
	Self-critical Perfectionism	.13	.06	.25	2.24*	.02–.25
Narcissistic Perfectionism	.14	.06	.17	2.29*	.02–.26	

Key: ASRM = Altman Self-Rating Scale for Mania; BAS = Behavioral Activation Scale; BIS = Behavioral Inhibition Scale; CES-D = Center for Epidemiological Studies Depression Scale; DYS of BAS = Dysregulation of BAS scale. * $p < .05$, ** $p < .01$

Moderation analyses were conducted using Model 1 of Hayes' (2013) PROCESS plugin for SPSS to explore potential moderation of the relationship between tenacious goal pursuit and hypomanic personality by potential moderators: flexible goal adjustment, reward sensitivity (BIS/BAS/DYS) and perfectionism. Current bipolar mood symptoms (CES-D and ASRM) were included as covariates in these analyses. There were no interactions between tenacious and flexible goal pursuit in predicting bipolar vulnerability, and neither reward sensitivity or perfectionism moderated the relationship between tenacious goal pursuit and bipolar vulnerability.

Discussion

This study investigated whether the vulnerability to bipolar disorder is associated with more tenacious goal pursuit (an active striving for goals based on changing one's environment) or with more flexible goal adjustment behaviors (readjustment of the goals themselves to suit resource-related constraints). The heightened vulnerability for bipolar disorder, as measured by the presence of hypomanic traits, was associated with more tenacious but not more flexible goal pursuit in our primary analysis. Heightened bipolar-vulnerability was also characterized by lower behavioral inhibition, greater dysregulation of goal-related behavior, as well as with more narcissistic and self-critical perfectionist tendencies. No evidence of moderated relationships between tenacious goal pursuit and bipolar vulnerability with the aforementioned measures were observed. This is the first study to demonstrate that the vulnerability to bipolar disorder is associated with the more active striving of fixed goals, rather than the flexible pursuit of goals.

The tenacious pursuit of goals amongst individuals with a vulnerability for bipolar disorder may have a significant role in developing clinically significant mood symptoms. Tenaciously pursuing goals may be beneficial in certain contexts by focusing efforts on achieving a desired goal, such as when goals are realistic and achievable in nature (Brandtstädter and Renner 1990; Heyl et al. 2007). However, the more tenacious pursuit of goals of an unlikely, unachievable or unrealistic nature may lead to more variable mood symptoms when such goals fail to be accomplished, potentially as such tenacious goal pursuit may require an activation of behavior similar to the activated nature of hypomanic symptoms. The association between hypomanic trait scores with low behavioral inhibition and higher behavioral dysregulation may also be indicative of poorly regulated behavior in response towards rewards.

The current findings indicate a role for two aspects of perfectionism in relation to goal-related behavior and the vulnerability towards bipolar disorder: narcissistic perfectionism (a perception of one's superiority over others which justifies setting high and unrealistic expectations for oneself) and self-

critical perfectionism (tendencies to make overly harsh judgements of the self when such perfectionist standards are not met). Indeed, previous studies with individuals with bipolar disorder have found that self-criticism is a predictor of prospective manic and hypomanic episodes (Alloy et al. 2009); whilst a combined self-criticism and performance evaluation factor, capturing extreme self-standards and expectations, interacted with the experience of positive life events to predict prospective increases in hypomania (Francis-Raniere et al. 2006). Making harsh self-judgements when overly ambitious goals and standards fail to be achieved, despite their tenacious pursuit, may exacerbate the negative effects of goal failure amongst those already vulnerable towards bipolar disorder. Indeed, there is evidence that people living with bipolar disorder take longer to recover from a goal failure and goal frustration, and that this duration of recovery may be dependent on the number of prior mood episodes experienced (Johnson et al. 2012; Wright et al. 2008). Exacerbated bipolar mood symptoms could be explained by tendencies to make overly harsh self-criticisms when ambitious goals fail to be achieved, although future research with non-clinical at-risk groups is needed to test this hypothesis.

It has been argued that the experience of self-critical perfectionism, autonomy, striving for ambitious goals and a heightened sensitivity to rewards amongst people with bipolar disorder is indicative of cognitive styles reflecting the nature of the Behavioral Activation System (BAS) (Alloy et al. 2009; Francis-Raniere et al. 2006). The BAS is implicated in approach behaviors towards goals and rewards (Gray 1987, 1990; Jones et al. 2007), and heightened activity of the BAS has been implicated in the experience of clinically significant bipolar mood symptoms (Alloy and Abramson 2010). The setting of high and ambitious goals, setting perfectionist standards for success in achieving goals, and tendencies to make harsh self-criticisms when such goals and standards are not met, may be explained by the underlying activity of the BAS.

There have been calls for clinical practice to focus on addressing these BAS-relevant cognitive styles when working with people with bipolar disorder (Nusslock et al. 2009). Our findings suggest that overly self-critical forms of perfectionism should also be targeted amongst at-risk individuals in addition to tenacious goal behaviors, ambitious goal setting, and striving, in order to reduce the risk of developing clinically significant symptoms. Encouraging the setting of more achievable intermediate goals in place of setting high or extreme goal outcomes, and moderating goal-pursuit behaviors and the personal expenditure of resources to achieve goals (i.e., reducing the time, effort and energies placed on goal achievement), may be appropriate targets for early intervention. At least one goal-focused mania prevention intervention targeting such high goal setting and goal-pursuit behaviors and beliefs (e.g., perfectionist tendencies associated with goal achievement) has been developed and tested with a clinical

bipolar sample, and has been associated with reductions in manic symptoms and in ambitious goal setting (Johnson and Fulford 2009). Whether such an approach is as effective for those at-risk for mania and bipolar disorder has yet to be tested; however, the results of the present study suggest that the targeting of tenacious goal striving behaviors and beliefs amongst those with a vulnerability for bipolar disorder may be a useful target for early intervention efforts.

There are some strengths and limitations to consider with this study. Whilst the study used validated psychometric assessments of bipolar-vulnerability, mood, goal pursuit and reward sensitivity, whether similar associations are found over time or when using more objective behavioral assessments of tenacious and flexible goal pursuit requires testing. Further clarification on the causal role of tenacious goal pursuit in preceding mania, or whether tenacious pursuit of goals is a result of mania-risk, is needed. It should be noted that there may have been some overlap in the goal-related content of the measures featured in the study. The HPS features a number of goal-related bipolar-relevant traits which may have overlapped with the other goal-related measures used, although there was no indication of strong correlations between the various predictors in this study. The current study did not assess the experience of recent goal-related life events which may activate the BAS, which may be important in understanding the development of hypo/manic symptoms as suggested by prior research conducted with clinical bipolar samples (e.g., Francis-Raniere et al. 2006). Whilst our study indicates a possible premorbid risk factor for bipolar disorder, our findings may not be directly applicable to clinical experiences of bipolar disorder so replications in a clinical group would be welcome. The study's sample was largely female and we were unable to collect detailed clinical histories of the participants in terms of prior mood symptoms or related experiences (e.g., substance use). Although the data was based on online self-report, we excluded participants who failed the attention check items dispersed through the study's measures as a data quality check.

In conclusion, this study is the first test of the role of tenacious versus flexible goal pursuit in the vulnerability to bipolar disorder as indexed by the Hypomanic Personality Scale. The findings of this study indicate that bipolar vulnerability is characterized by the tenacious, but not flexible, pursuit of goals. Tenacious goal pursuit, as well as tendencies towards endorsing high narcissistic perfectionist standards, and making overly harsh self-criticisms when such perfectionist standards are not met, may be one route to the development of clinically significant mood symptoms amongst those vulnerable to bipolar-related experiences.

Compliance with Ethical Standards

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Alloy, L. B., & Abramson, L. Y. (2010). The role of the behavioral approach system (BAS) in bipolar spectrum disorders. *Current Directions in Psychological Science*, 19(3), 189–194. <https://doi.org/10.1177/0963721410370292>.
- Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Gerstein, R. K., Keyser, J. D., Whitehouse, W. G., Urošević, S., Nusslock, R., Hogan, M. E., & Harmon-Jones, E. (2009). Behavioral approach system (BAS) - relevant cognitive styles and bipolar spectrum disorders: Concurrent and prospective associations. *Journal of Abnormal Psychology*, 118(3), 459–471.
- Altman, E. G., Hedeker, D., Peterson, J. L., & Davis, J. M. (1997). The Altman self-rating mania scale. *Biological Psychiatry*, 42(10), 948–955. [https://doi.org/10.1016/S0006-3223\(96\)00548-3](https://doi.org/10.1016/S0006-3223(96)00548-3).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.
- Brandtstädter, J., & Renner, G. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychology and Aging*, 5(1), 58–67.
- Calam, R., Jones, S., Sanders, M. R., Dempsey, R., & Sadhni, V. (2012). Parenting and the emotional and behavioural adjustment of young children in families with a parent with bipolar disorder. *Behavioural and Cognitive Psychotherapy*, 40(4), 425–437. <https://doi.org/10.1017/S1352465812000094>.
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology*, 67(2), 319–333.
- Dempsey, R. C., Gooding, P. A., & Jones, S. H. (2017). A prospective study of bipolar disorder vulnerability in relation to behavioural activation, behavioural inhibition and dysregulation of the behavioural activation system. *European Psychiatry*, 44, 24–29. <https://doi.org/10.1016/j.eurpsy.2017.03.005>.
- Dempsey, R. C., Gooding, P. A., & Jones, S. H. (2011). Positive and negative cognitive style correlates of the vulnerability to hypomania. *Journal of Clinical Psychology*, 67(7), 673–690. <https://doi.org/10.1002/jclp.20789>.
- Dodd, A. L., Mansell, W., Beck, R. A., & Tai, S. J. (2013). Self appraisals of internal states and risk of analogue bipolar symptoms in student samples: Evidence from standardised behavioural observations and a diary study. *Cognitive Therapy and Research*, 37(5), 981–995. <https://doi.org/10.1007/s10608-013-9541-4>.
- Dodd, A. L., Mezes, B., Lobban, F., & Jones, S. H. (2017). Psychological mechanisms and the ups and downs of personal recovery in bipolar disorder. *British Journal of Clinical Psychology*, 56(3), 310–328. <https://doi.org/10.1111/bjc.12140>.

- Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology, 95*(3), 214–222.
- Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review, 31*(2), 203–212. <https://doi.org/10.1016/j.cpr.2010.04.009>.
- Fisk, C., Dodd, A. L., & Collins, A. (2015). Response styles, bipolar risk, and mood in students: The Behaviours checklist. *Psychology and Psychotherapy: Theory, Research and Practice, 88*(4), 412–426. <https://doi.org/10.1111/papt.12052>.
- Fletcher, K., Yang, Y., Johnson, S. L., Berk, M., Perich, T., Cotton, S., Jones, S., Lapsley, S., Michalak, E., & Murray, G. (2019). Buffering against maladaptive perfectionism in bipolar disorder: The role of self-compassion. *Journal of Affective Disorders, 250*, 132–139. <https://doi.org/10.1016/j.jad.2019.03.003>.
- Francis-Raniere, E. L., Alloy, L. B., & Abramson, L. Y. (2006). Depressive personality styles and bipolar spectrum disorders: Prospective tests of the event congruency hypothesis. *Bipolar Disorders, 8*(4), 382–399. <https://doi.org/10.1111/j.1399-5618.2006.00337.x>.
- Fulford, D., Eisner, L. R., & Johnson, S. L. (2015). Differentiating risk for mania and borderline personality disorder: The nature of goal regulation and impulsivity. *Psychiatry Research, 227*(2–3), 347–352. <https://doi.org/10.1016/j.psychres.2015.02.001>.
- Gray, J. A. (1987). Perspectives on anxiety and impulsivity: A commentary. *Journal of Research in Personality, 21*(4), 493–509.
- Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition and Emotion, 4*(3), 269–288.
- Gregory, J. D., Brewin, C. R., Mansell, W., & Donaldson, C. (2010). Intrusive memories and images in bipolar disorder. *Behaviour Research and Therapy, 48*(7), 698–703.
- Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford Press.
- Heyl, V., Wahl, H.-W., & Mollenkopf, H. (2007). Affective well-being in old age: The role of tenacious goal pursuit and flexible goal adjustment. *European Psychologist, 12*(2), 119–129.
- Holzwarth, K., & Meyer, T. D. (2006). The dysregulation of the “behavioural activation system”: An independent dimension. *Personality and Individual Differences, 41*(2), 319–328. <https://doi.org/10.1016/j.paid.2005.12.020>.
- Ivins, A., Di Simplicio, M., Close, H., Goodwin, G. M., & Holmes, E. (2014). Mental imagery in bipolar affective disorder versus unipolar depression: Investigating cognitions at times of ‘positive’ mood. *Journal of Affective Disorders, 166*, 234–242. <https://doi.org/10.1016/j.jad.2014.05.007>.
- Johnson, S. L. (2005). Mania and dysregulation in goal pursuit: A review. *Clinical Psychology Review, 25*(2), 241–262. <https://doi.org/10.1016/j.cpr.2004.11.002>.
- Johnson, S. L., & Carver, C. S. (2006). Extreme goal setting and vulnerability to mania among undiagnosed young adults. *Cognitive Therapy and Research, 30*(3), 377–395. <https://doi.org/10.1007/s10608-006-9044-7>.
- Johnson, S. L., Eisner, L. R., & Carver, C. S. (2009). Elevated expectancies among persons diagnosed with bipolar disorder. *British Journal of Clinical Psychology, 48*(2), 217–222.
- Johnson, S. L., & Fulford, D. (2009). Preventing mania: A preliminary examination of the GOALS program. *Behavior Therapy, 40*(3), 103–113.
- Johnson, S. L., Fulford, D., & Carver, C. S. (2012). The double-edged sword of goal engagement: Consequences of goal pursuit in bipolar disorder. *Clinical Psychology & Psychotherapy, 19*(4), 352–362.
- Johnson, S. L., Swerdlow, B. A., Treadway, M., Tharp, J. A., & Carver, C. S. (2017). Willingness to expend effort toward reward and extreme ambitions in bipolar I disorder. *Clinical Psychological Science, 5*(6), 943–951. <https://doi.org/10.1177/2167702617718181>.
- Jones, S., & Day, C. (2008). Self appraisal and behavioural activation in the prediction of hypomanic personality and depressive symptoms. *Personality and Individual Differences, 45*(7), 643–648. <https://doi.org/10.1016/j.paid.2008.07.008>.
- Jones, S., Shams, M., & Liversidge, T. (2007). Approach goals, behavioural activation and risk of hypomania. *Personality and Individual Differences, 43*(6), 1366–1375. <https://doi.org/10.1016/j.paid.2007.04.005>.
- Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the hypomanic personality scale. *Journal of Abnormal Psychology, 109*(2), 222–226. <https://doi.org/10.1037/0021-843X.109.2.222>.
- Lam, D., Wright, K., & Smith, N. (2004). Dysfunctional assumptions in bipolar disorder. *Journal of Affective Disorders, 79*(1–3), 193–199. [https://doi.org/10.1016/S0165-0327\(02\)00462-7](https://doi.org/10.1016/S0165-0327(02)00462-7), 193.
- Muhtadie, L., Johnson, S. L., Carver, C. S., Gotlib, I. H., & Ketter, T. A. (2013). A profile approach to impulsivity in bipolar disorder: The key role of strong emotions. *Acta Psychiatrica Scandinavica, 129*(2), 100–108. <https://doi.org/10.1111/acps.12136>.
- Nusslock, R., Abramson, L. Y., Harmon-Jones, E., Alloy, L. B., & Coan, J. A. (2009). Psychosocial interventions for bipolar disorder: Perspective from the behavioural approach system (dysregulation) theory. *Clinical Psychology: Science and Practice, 16*(4), 449–469.
- Radloff, L. S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401.
- Scott, J., Stanton, B., Garland, A., & Ferrier, I. N. (2000). Cognitive vulnerability in patients with bipolar disorder. *Psychological Medicine, 30*(2), 467–472. <https://doi.org/10.1017/S0033291799008879>.
- Smith, M. M., Saklofske, D. H., Stoeber, J., & Sherry, S. B. (2016). The big three perfectionism scale: A new measure of perfectionism. *Journal of Psychoeducational Assessment, 34*, 670–687. <https://doi.org/10.1177/0734282916651539>.
- Swann, A. C., Lijffijt, M., Lane, S. D., Steinberg, J. L., & Gerard Moeller, F. G. (2009). Increased trait-like impulsivity and course of illness in bipolar disorder. *Bipolar Disorders, 11*(3), 280–288.
- Tharp, J. A., Johnson, S. L., Sinclair, S., & Kumar, S. (2016). Goals in bipolar I disorder: Big dreams predict more mania. *Motivation and Emotion, 40*(2), 290–299. <https://doi.org/10.1007/s11031-015-9519-5>.
- Van Damme, S., De Waegeneer, A., & Debruyne, J. (2016). Do flexible goal adjustment and acceptance help preserve quality of life in patients with multiple sclerosis? *International Journal of Behavioral Medicine, 23*(3), 333–339.
- Vilagut, G., Forero, C. G., Barbaglia, G., & Alonso, J. (2016). Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): A systematic review with meta-analysis. *PLoS One, 11*(5), e0155431. <https://doi.org/10.1371/journal.pone.0155431>.
- Wright, K. A., Lam, D., & Brown, R. G. (2008). Dysregulation of the behavioral activation system in remitted bipolar I disorder. *Journal of Abnormal Psychology, 117*(4), 838–848.