



Dominance Motivation, Goal Pursuit, and Mania in Bipolar Disorder

Submitted by Hannah Moakes, to the University of Exeter
as a thesis for the degree of Doctor of Clinical Psychology, April 2016

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Signature: 

Author's Declaration

The literature review was completed independently by the author. In terms of the empirical work, data from participants recruited between September 2015 and January 2016 were collected jointly by the author and another DClinPsy trainee, Helena Blowers. Her project utilised additional measures for the project titled "Physical Activity and Mood in Bipolar Disorder". The author screened over one third of potential recruits to the study. Monitoring of participant diary completion and data entry were shared equally between the author and the other trainee. All other aspects of the study were completed by the author including data analysis, and write up.

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SCHOOL OF PSYCHOLOGY
DOCTORATE IN CLINICAL PSYCHOLOGY

LITERATURE REVIEW

The characteristics of goal pursuit in individuals diagnosed with Bipolar Disorder and individuals with a vulnerability to Bipolar Disorder

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Abstract

Background: It is proposed that individuals diagnosed with or vulnerable to Bipolar Spectrum Disorders (BSDs) have a hypersensitive Behavioural Activation System (BAS). This system is thought to facilitate a wide range of cognitive and motivational processes that support positive, goal-directed behaviour, and regulate responses to attaining a reward. The model suggests improvements in prevention and treatment of BD in relation to goal-directed behaviour. There have been no recent reviews of evidence relating to personal goal pursuit in BSDs.

Objectives: To identify the characteristics of personal goal pursuit in individuals with a diagnosis of and vulnerable to BSDs.

Method: A search of four databases was conducted: PsychINFO, Web of Science®, PubMed, and Scopus. **The Quality Assessment Tool for Quantitative Studies (Effective public health practice project [EPHPP], 2010) was used to assess study quality on items relevant to the study design.**

Results: Thirteen studies were identified in the review. Due to the range of areas of goal pursuit that were studied (goal type, goal valence, goal appraisal, goal effort), it was difficult to compare all the studies. The reliance upon student populations in a number of the studies limits generalisability of the findings.

Conclusions: There is preliminary evidence to suggest that individuals vulnerable to and diagnosed with BD are more likely to set highly ambitious goals around popular fame and wealth. However, this evidence arises largely from non-clinical populations and cross-sectional designs, so further research in a BD population is required. It is not possible to draw conclusions about other aspects of goal pursuit, due to the limited available data from predominantly correlational research. There is limited evidence as to whether goal processes are causal to BD or are a vulnerability factor,

and therefore more research is required in other areas of goal pursuit, such as goal effort, goal attainment, and mania.

Keywords: Bipolar Disorder, Behavioural Activation System, Goal Pursuit

Introduction

For individuals to receive a diagnosis of Bipolar disorder I (BD) they must have experienced at least one lifetime manic episode (American Psychiatric Association [APA], 2013). Mania is defined by a distinct period of elevated or irritable mood, accompanied by symptoms such as decreased need for sleep, increased psychomotor activation, extreme self-confidence, pressured speech, racing thoughts, and pursuit of pleasurable activities without attention to potential dangers (APA, 2013). These symptoms must be severe enough to interfere with functioning and must either last one week or require hospitalisation. BDII is characterised by hypomania and the presence of a depressive episode. Hypomania involves the same symptoms as mania, but the symptoms only need to last for four days and do not need to interfere with functioning. Additionally, BDII requires that the person experience at least one lifetime episode of major depression. Cyclothymic disorder is defined by rapid and chronic fluctuations between manic and depressive symptoms, but the high or low mood does not become intense enough to be diagnosed as a manic or depressive episode (APA, 2013). These diagnoses have been referred to as Bipolar Spectrum Disorders (BSDs).

BD is a complex mental disorder associated with elevated rates for numerous negative outcomes including hospitalisation, mortality, and suicide (Baldessarini, Pompili, & Tondo, 2006). BD has a probable multifactorial genesis (Johnson, Fulford, & Carver, 2012c), and one of the most influential models is the Behavioural Activation System (BAS) dysregulation theory of BD (BAS; Gray, 1982, 1991, 1994). Neurobiological models of the BAS such as this propose that a principal function of the system is to mobilise effort. The system is thought to facilitate a range of cognitive and motivational processes that support positive, goal-directed behaviour,

and regulate responses to attaining a reward. It is believed to be related to the regulation of cognition, affect, and behaviour, whilst pursuing goals and following the attainment of goals (Johnson et al., 2012c). Depue and Iacono (1989) proposed that mania is the result of an excessively high BAS activity or sensitivity, based on observations that increased activity and goal-directed behaviour are well recognised features of mania. It is argued that when a goal is frustrated, this can also result in BAS activation and a surge of energy and motivation to assist the individual to regain lost ground and eradicate any goal blockages (Carver, 2004). This can present emotionally as anger (Carver & Harmon-Jones, 2009), a symptom that has been linked to mania (Cassidy, Forest, Murry, & Carroll, 1998).

In contrast, when an obstacle is considered too large to overcome, responses are depressed affect and disengagement of effort (Johnson, Edge, Holmes & Carver, 2012b). It is postulated that in response to events involving failures, losses, or nonattainment of goals, BAS deactivation occurs. This can lead to depressive symptoms, decreased goal-directed activity, loss of energy, anhedonia, hopelessness, and feelings of sadness (Urosevic, Abramson, Harmon-Jones, & Alloy, 2008). The BAS theory is considered a vulnerability–stress model, so hypersensitive BAS is the vulnerability that combines with the experience of life events that involve BAS-activation or BAS-deactivation, resulting in excessive activation or deactivation of approach motivation (Alloy & Abramson, 2010). The model proposes that individuals with BD have a single vulnerability (a dysregulated BAS), but polar-specific triggers for depressive and hypomanic/manic experiences. (e.g., Alloy et al., 2009a; Urosevic et al., 2008).

However, it is also important to consider potential limitations of the BAS theory as it does not take into consideration the interactions between cognitive,

developmental and interpersonal factors in the development of BD. Schwannauer, Noble and Fraser (2011) found direct effects of dysfunctional regulation of emotion and lack of social support in predicting bipolar risk, and argue that current negative interpersonal experiences (e.g., difficulties in attachment relationships) are more significant in the development of the disorder compared with past experiences. It is argued that models need to include these complex multilevel and dynamic processes (Schwannauer, 2011). Although the BAS theory considers life events involving goal achievement, it is not best placed to explain dynamic fluctuations in manic symptoms.

Evidence suggests that possessing and moving towards meaningful life goals is a requirement for subjective well-being (Emmons, 1986). Goals have been defined as “internal representations of desired states, where states are broadly construed as outcomes, events, or processes” (Austin & Vancouver, 1996 p. 338). It is suggested that these internally represented desired states can vary from biological internal processes (e.g., body temperature), to complicated cognitive representations of sought after rewards (e.g., career success), ranging from neurological to interpersonal, and can span different durations (Gardner, 1987; Izard, 1993). Psychological research relating to goals and related constructs is abundant. Austin and Vancouver (1996) devised some common concepts differentiating between goals research in terms of their focus upon structure (e.g. properties, organisation), process (e.g. effort, revision), and content (e.g. approach or avoidance). Within goals research, idiographic methodologies, are noted to have a number of strengths (Sheldon, 2002). They typically ask individuals to select salient personal goals (Brunstein, 1993), personal strivings (Emmons, 1996), life tasks (Cantor & Blanton, 1996), personal projects (Little, 1993), and current concerns (Klinger, 1997), that

they pursue. Thus, they are typically goals in which people are personally invested and lend well to longitudinal research as they occupy attention over time (Sheldon, 2002), as opposed to research where goals are generated by the experimenter, where the goals would not typically have such characteristics.

Distinctions have been made between specific processes and mechanisms involved in goal regulation within models of the reward system (Johnson, et al., 2012b). Within the literature different aspects of goal pursuit have been investigated, such as goal importance (Alloy et al., 2009; Fulford, Johnson, & Tuchman, 2009), goal effort and perfectionism (Morrison, Peyton, & Nothard, 2003), and goal content (Johnson, Carver & Gotlib, 2012a).

The BAS model suggests improvements in prevention and treatment of BD including pharmacological and psychological interventions. It is proposed that interventions could support individuals with goal-directed behaviour, such as identifying and modifying ambitious goals, and decreasing goal striving behaviours, which could reduce the likelihood and severity of manic and depressive episodes (Alloy & Abramson, 2010). There have been no recent reviews in the area of personal goal pursuit and mania, so the aim of this review is to explore the characteristics of goal pursuit in individuals diagnosed with and vulnerability to BD, by focussing on the following question:

'What are the characteristics of goal pursuit in individuals with a diagnosis of or a vulnerability to Bipolar Disorder?'

Method

This systematic review was conducted using the PRISMA reporting protocol (Moher, Liberati, Tetzlaff, & Altman, 2009).

Eligibility Criteria

Inclusion criteria. Inclusion criteria for the study were: a) participants were over 18 years of age b) individuals with a diagnosis of BSD, an analogue sample identified using a scoring criterion on a measure of hypomania (e.g., hypomanic personality scale [HPS], Eckblad & Chapman, 1986), or a non-clinical sample that was administered a measure of hypomania/mania, c) quantitative or qualitative methods using experimental, correlational, or longitudinal designs, d) studies that allowed participants to select goals that they were pursuing in everyday life, e) studies that investigated any aspects of personal goal related psychological processes relating to Austin and Vancouver's (1996) aspects of goal content, structure and function. This might include emotional reactivity to successes and rewards, heightened emphasis on goals, increased confidence after goal successes, and excessive goal engagement after success (Johnson & Fulford, 2009). For example, studies might investigate group differences in how individuals respond to positive feedback during goal pursuit, or look at whether individuals continue to strive excessively towards goals despite making progress.

Exclusion criteria. Studies were excluded if the goals were provided for the participant by the experimenter in the context of a laboratory task (e.g., goals to win points in a game). Review papers were also excluded, although they were used to scan for further empirical articles.

Information Sources

The following databases were searched; PsychINFO, Web of Science®, PubMed, and Scopus. Search characters were set to meet each database's use of Boolean operators and each search concept was separated by the word "AND". These searches were entered into the "title" and "abstract" fields so that the key

concepts of the research question were identified. Articles published from the oldest possible record within each database up to January 2016 were included. Reference lists of retrieved articles were also examined for relevant articles.

Search

Titles and abstracts were searched using goal* AND (striving* OR project* OR life task*OR current concern*OR motiv* OR approach* OR avoid*) AND (bipolar disorder OR bipolar OR mani* OR hypomani* OR cyclothymi*OR hyperthymi*). Reference lists of selected articles were also checked for relevant studies.

Study Selection

Titles and abstracts of all articles identified were initially screened to see if they met the eligibility criteria. Dissertation abstracts were not included in the review due to resource limitations as that they were difficult to source and read in full, so only peer-reviewed primary publications were included. As the search terms were inclusive, a number of irrelevant articles that did not meet all criteria were generated from the search. Abstracts were initially screened to ensure that the criteria for inclusion were met. If any of the inclusion criteria were not met or any of the exclusion criteria were met, studies were excluded. For instance, a study that investigated delay-dependence of an approach bias in an alcohol approach-avoidance task was generated by the search, but was excluded based on the information from the abstract, because it clearly did not concern the participant's everyday goals. Relevant articles were then read in full and again assessed against the eligibility criteria. All relevant articles were written in English.

Data Extraction The following data was extracted from all studies: (a) the number of participants (b) the sample characteristics (c) the design of the study (d) the main goal measure (e) the results, (f) the effect size.

Study Quality

The selected studies were assessed in terms of their quality at the individual study level. Studies were assessed against the **Quality Assessment Tool for Quantitative Studies (EPHPP,2010)**. This assessment tool rates studies as strong, moderate or weak on each of eight criteria. In this review, studies were rated on criteria relevant to the particular study design (e.g., correlational studies were not rated on the dimension of 'intervention integrity'). Also, whilst it is possible that studies that did not report aspects of their results did have good quality, for the purpose of this review it will be considered a risk. No study was excluded on the basis of quality, but the quality tool was used to inform the synthesis of evidence.

Results

Study Selection

An overview of the screening and selection procedures of studies is presented in Figure 1. Forty-six full text articles were assessed for eligibility. Three studies were excluded because the sample included individuals under the age of 18 years, 21 studies did not specifically measure self-selected goals, one study did not include individuals with a BSD diagnosis or measure hypomania, and eight studies were identified as review papers. This left 13 studies in the review.

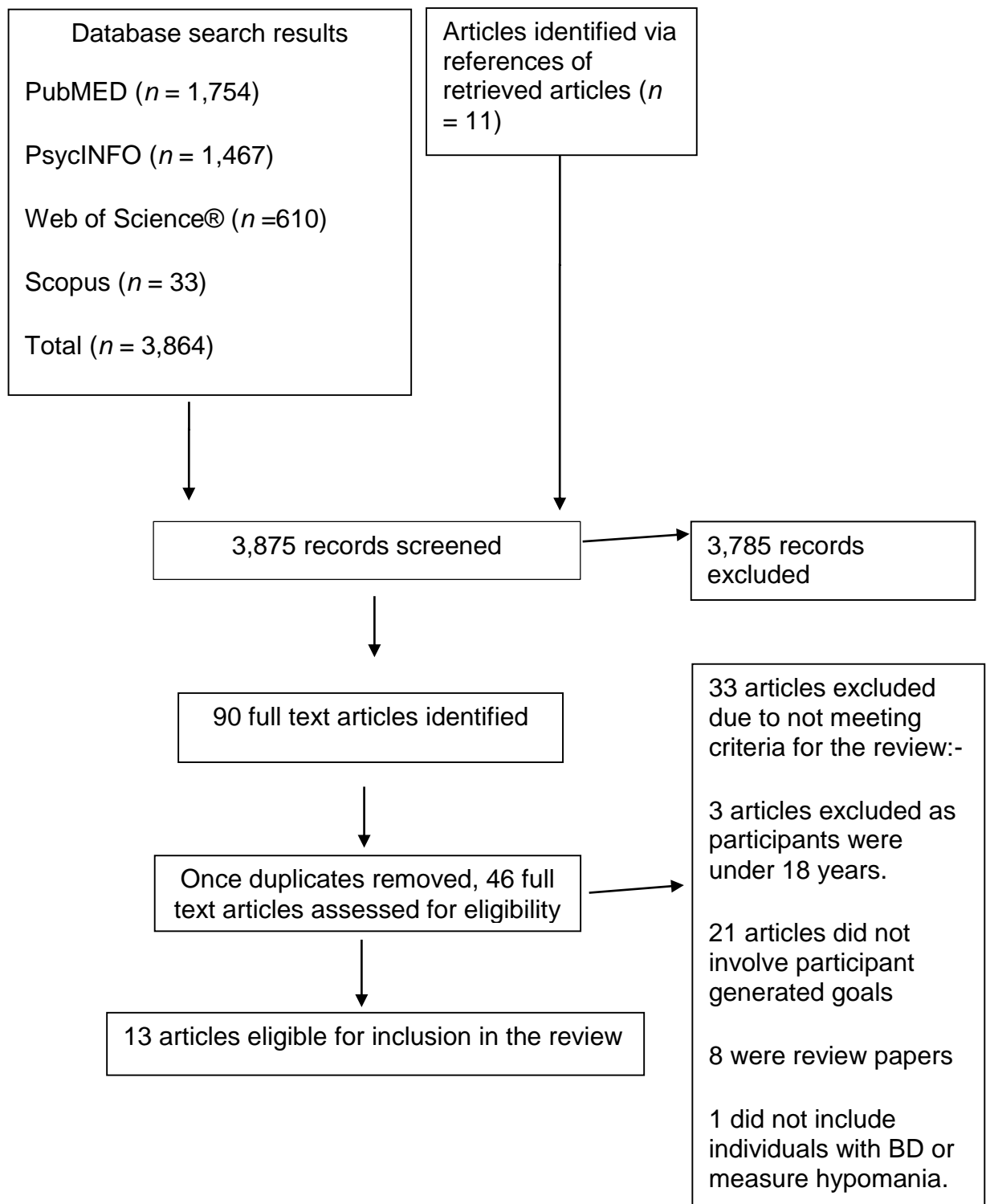


Figure 1

Identification process of articles.

Study Characteristics

Characteristics of the studies reviewed are presented within Table 1. Five studies included participants that had received a diagnosis of a BSD. The remaining eight studies recruited from a student population: one study recruited an analogue sample identified through screening measures (e.g. HPS), and the seven remaining studies recruited unselected participants. The included studies involved 4,666 participants, and sample sizes ranged from 10 to 888 participants. Eight studies had a cross-sectional correlational design, three studies were longitudinal designs, one was a case-control diary design, and one was an uncontrolled pre-post design. These papers investigated different aspects of goal pursuit and some examined more than one aspect of goal pursuit. The studies investigated either goal content or process (as defined by Austin & Vancouver, 1996). Nine of the studies investigated goal content and the types of goals individuals pursue (eight of those investigating ambitious goal setting, and one study examining approach/avoidance goals). Three studies looked at goal process; one study examined at goal management expectancy and goal valence, one study explored goal appraisals (stress/difficulty, social meaning / importance and efficacy/control) and one study investigated goal effort.

Table 1

Study characteristics, outcomes and limitations

| Reference | Sample | N | Mean age | Design | Mania Measure | Goal Measure | Outcome (significant results indicated by asterisks) | Limitations | Quality rating |
|---------------------------------------|---|-----|--------------------------|-------------------------------------|---------------|--------------|--|--|---|
| Cross sectional correlational studies | | | | | | | | | |
| Fulford, Eisner & Johnson (2015) | Undergraduate students over 18 years (unselected) | 214 | 18 years (range 17 - 33) | Cross sectional correlational study | HPS | WASSUP | The HPS was significantly positively related with goal regulation traits WASSUP – Popular Fame $r = .39^{**}$ (medium) WASSUP - Financial $r = .14^*$ (small). | Student population (a low percentage of the sample exceeded the cut-off for being at high risk for mania) Relies on self-report Participants chose from a predetermined goal list. | Weak: Selection bias Confounding variables not matched |
| Fulford Johnson, Carver (2008) | Undergraduate students over 18 years. Unselected | 233 | Not reported | Cross sectional correlational study | HPS | WASSUP | Hypomania was related to elevations on measures of affective and goal dysregulation. On the WASSUP scale, the HPS related positively to the popular fame $r = .39^{***}$ (medium), and financial success $r = .23^{**}$ (small) The HPS did not relate to elevated scores on the WASSUP world well-being subscale $r = .10$ (small), or | Student population High probability of Type I error, given the large number of correlations tested. No evidence that alpha level was corrected. Relies on self-report | Weak: Selection bias Confounding variables not matched |

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| | | | | | | | WASSUP family subscale $r = .08$ (small) | Participants chose from a predetermined goal list. | |
| Gruber & Johnson (2009) | Students (unselected) | 302 University of California, Berkeley ($n = 95$) University of Miami ($n = 207$). | 19.97 $SD=2.0$ 20.6 $SD =1.3$ | Cross sectional correlational study | HPS ASRM | WASSUP. | Current symptoms of mania were correlated significantly with increased fame, friends, family, and wealth goals on the WASSUP. Effect sizes ranged from $r = .14^*$ to $r = .26^{**}$ (small) The HPS was significantly and positively associated with extrinsic goals relating to fame $r = .34^*$ (medium) and politics $r = .25^*$ (small) regardless of whether current symptoms were controlled for. | Undergraduate sample Relies on self-report Participants chose from a predetermined goal list. | Weak: Selection bias Confounding variables not matched |
| Johnson & Carver (2012) | Study 1 - students over 18 years (unselected) Study 2 - students over | 454 780 | Not reported Not reported | Cross sectional correlational study Cross sectional correlational | HPS HPS | WASSUP WASSUP | Study 1: HPS correlated with substantially with ambitions for popular fame $r = .29^{**}$ (medium) and financial success $r = .42^{**}$ (medium). Although, the HPS related to ambitions for popular fame among both genders, the association was significantly stronger among females, $r = .57^{***}$ (large), than among males, $r = .35^{***}$ (medium). Study 2: | Student population Relies upon self-report measures Participants chose from a predetermined goal list. | Weak: Selection bias Confounding variables not matched |

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| | 18 years (unselected) | | | study | | | The HPS correlated substantially with the ambitions for popular fame. The HPS correlated moderately with ambitions for financial success. WASSUP popular fame $r = .37^*$ (medium); WASSUP financial success $r = .29^*$ (medium). | | |
| Johnson & Carver (2006) | Study 1 - Students unselected Study 2 - Students unselected | 888 888 | Not reported | Cross sectional correlational study | HPS SMRI | WASSUP. | Study 1: A measure of lifetime vulnerability to mania was related to traits bearing on incentive endorsement of high ambitions for popular fame $r = .45^{***}$ (large); Political influence $r = .22^{**}$ (small); Financial success $r = .20^{**}$ (small) Relations were weaker to ambitions for other kinds of extreme goals. The effects were independent of current symptoms of mania and depression and lifetime depression. Study 2: HPS was strongly related to ambitions for popular fame, with more modest associations for political influence and financial success. Correlations with the goals of having a positive impact on world | Student sample Relies on self-report Participants chose from a predetermined goal list. | Weak: Selection bias Confounding variables not matched |

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| | | | | | | | <p>well-being, having many friends, and having an ideal connection to partner and family were lower but they were statistically significant.</p> <p>HPS (lifetime mania) - effect sizes ranged from $r = .14^{***}$ (small) to $r = .44^{***}$ (large)</p> <p>SMRI (current mania) effect sizes ranged from $r = .05$ to $r = .21^{**}$ (small).</p> | | |
| Johnson, Freeman, Staudenmaier (2015) | Students & university staff (unselected) | 224 | Not reported | Cross sectional correlational study | HPS | WASSUP | <p>Mania risk (HPS) was related to higher ambition (WASSUP) scores.</p> <p>Fame $r = .42^{**}$ (medium) Money $r = .27^{**}$ (small)</p> <p>After controlling for excitement ratings, the HPS remained significantly correlated with WASSUP Fame, partial $r = .38^{***}$ (medium), and Financial Success, partial $r = .22^{***}$ (small).</p> | <p>Predominantly student population</p> <p>Relies on self-report.</p> <p>Participants chose from a predetermined goal list.</p> | <p>Weak:</p> <p>Selection bias</p> <p>Confounding variables not matched</p> |
| Jones, Shams, Liversidge (2007) | Study 1 – students unselected | <p>Study 1 – 172</p> <p>Study 2 – 230</p> | <p>Study 1 - 25.63 (s.d. 8.3).</p> <p>Study 2 - 22.36</p> | <p>Study 1 - Cross sectional correlational</p> <p>Study 2 - Cross</p> | HPS | <p>Approach & avoidance goals</p> <p>Achievement goals questionnaire (Elliot &</p> | <p>Tendency towards approach responses to achievement goals specifically associated with tendency towards hypomania. Avoidance $r = .09$ (very small effect size); Approach $r = .28^{**}$ (medium effect size).</p> | <p>Student population</p> <p>Relies on self-report</p> <p>Participants chose from a</p> | <p>Weak:</p> <p>Selection bias</p> <p>Confounding variables not matched</p> |

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| | Study 2 – students unselected | | (s.d. 5.0). | sectional correlational | | Sheldon, 1997) | The bivariate relationship between approach goals and HPS was replicated. Avoidance $r = -.11$ (small); Approach $r = .17^{**}$ (small). | predetermined goal list. | |
| Meyer, Beevers & Johnson (2004) | Students – (participants were not screened) | 464 | Not reported | Cross sectional correlational study | ASRM GBI | Goal appraisals (importance, difficulty, efficacy) The personal projects task (Little, 1983, 1989) | Measures of lifetime history of manic symptoms (GBI-Hyp) correlated positively with goal stress/ difficulty ($r = .16^{**}$ small effect). Current mania correlated negatively with goal stress/difficulty (ASRM = $r = .15^{**}$, small effect). Goal social meaning / importance correlated positively with current mania (ASRM $r = .16^{**}$ small) and negatively with lifetime mania history (GBI-Hyp $r = -.05$, small effect). Goal efficacy/ control correlated positively with current mania (ASRM $r = .25^{**}$ small effect) and negatively with lifetime history of mania (GBI-Hyp $r = -.13^{**}$ small effect). However, the efficacy/ control scale was the only unique significant predictor of current hypomania ($\beta = .19^{**}$), and mediation analyses indicated that the | Non-clinical convenience sample of students (81% female) Relies on self-report Uses a pre-determined goal list | Weak: Selection bias Confounding variables not matched |

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| | | | | | | | relationships between lifetime mania and goal stress/difficulty and lifetime mania and goal efficacy/control could be accounted for by current depression. | | |
| Cross sectional case controlled | | | | | | | | | |
| Gilbert & Gruber (2009) | 31 persons diagnosed with BD type I (currently remitted), 31 persons diagnosed with MDD (currently remitted) 31 healthy non-psychiatric controls (CTL) with no current or past psychiatric disorders. | 93 | 30.94 (9.82) 31.20 (10.97) 32.06 (9.02) | Case- control cross-sectional study | YMRS | Goal management beliefs Goal Ambition Goal Valence Measured using 7 point Likert scale | For personal goal characteristics, groups did not significantly differ in the importance of, ability to accomplish, or the realistic nature of the visualized goal. The BD group reported lower beliefs that they could manage their goal compared to the MDD ($d = 1.53$, very large) and CTL ($d = 0.33$, medium) groups. Groups did not significantly differ on coding of negative valence, ambition of the goal, or any of the nine goal content codes. However, the BD group's goal was coded as less positively valenced than the CTL group $d = -.85$ (large) No significant group differences in goal variable were found after a rumination manipulation. | Relatively small sample size to detect effects, no power calculation reported. Potential for demand characteristics in the rumination manipulation aspect of study, as participants completed mindfulness and rumination conditions. | Moderate: Selection bias |

| Longitudinal studies | | | | | | | | | |
|--|---|---|--|---------------------------|------|---|--|---|---|
| Fulford, Johnson, Llabre & Carver (2010) | Adults 18-70 years BD & non mood disorder (MD) control | 12 BD (4 males and 8 females) 12 no history of MD (5 males and 7 females). | Not reported | Case control diary design | BRMS | Goal Effort Assessed using a 4 point Likert scale Goal Progress | BD and control participants responded to failure to meet expected goal progress by increasing subsequent effort toward that goal, and they responded to unexpectedly high goal progress by relaxing effort and coasting. Persons with BD decreased effort toward goals significantly less than did control subjects after better than expected goal progress. The effect size could not be calculated from the limited presentation of the results and only the regression coefficient was reported. | Only 24 participants and no evidence of a power calculation. Therefore, less confidence in the size of the effects found. Unclear if the control group were matched. Minimal results presented. | Weak: Selection bias Confounding variables not matched |
| Johnson, Carver & Gotlib (2012a) | Participants with BD I and control participants with no history of mood disorders. 18 to 65 years of age. | 92 BD 81 control | 37.8 (11.6) years 35 (12.1) years | Longitudinal | BRMS | WASSUP | Participants with BD endorsed higher ambitions for popular fame than did controls (<i>eta squared</i> = .23, small). Heightened ambitions for popular fame (<i>partial rs</i> = .48, large) and financial success (<i>partial rs</i> = .49, large) predicted increases in manic symptoms in those with bipolar disorder over the next three months. | Error in copying one side of WASSUP form meant items were missing for 24 participants. Dealt with as missing at random. BD group had higher levels of anxiety and substance issues than controls. | Moderate: Selection bias |

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| | | | | | | | | Small sample size in follow up study with few reporting severe mania symptoms | |
| Johnson, Eisner & Carver (2009) | <p>Students.</p> <p>Respondents with scores of 35 or higher on HPS invited to participate. 27 participants had BD diagnoses (BD I (N =15), BD II (N= 5), and BD not otherwise specified</p> <p>Students who endorsed five or more depressive symptoms for at least 2 weeks on IDD-L were invited to participate (N = 7). 35 participants had a history of unipolar MDE and no history of mania</p> | 103 | Not reported | Longitudinal | HPS SRMI | WASSUP. | <p>On WASSUP subscales only world wellbeing correlated significantly with current symptoms of mania ($r = .21^*$, small effect)</p> <p>SCID diagnoses of lifetime mania and depression (and their interaction) were then tested as predictors of WASSUP subscales.</p> <p>Two main effects for mania history emerged, predicting higher expectations of popular fame $F(1, 99) = 5.70^*$ (partial eta squared = .05, small effect) and financial success $F(1, 99) = 8.02^{**}$ (partial eta squared = .08, medium effect).</p> | <p>Student population</p> <p>Small effect sizes and limited power for detecting small main effects.</p> <p>Relies on self-report</p> <p>Uses a predetermined goal list</p> | <p>Weak:</p> <p>Selection bias</p> <p>Confounding variables not matched</p> |

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| | 41 had no history of mood disorders. | | | | | | | | |
| Pre-post uncontrolled study | | | | | | | | | |
| Johnson & Fulford (2009) | BD 18+ years receiving pharmacological treatment. No current mania or depression | 10 participants (8 female; 6 Caucasian, 4 Hispanic) | 46.7 Years *SD not reported | Pre-post uncontrolled study | BRMS ASRM | WASSUP. | Participation in the GOALS program, a program to help people develop skills for regulating goals, was related to significant decreases in manic symptoms ($d = .88$, large effect) and reduction in ambitious goal-setting $d = 0.48$ (large effect) | Small sample size No control group and alternative explanations possible for decreases observed (testing, history, regression to the mean) and not specific to the program. Repeated measures design could create demand characteristics following group completion A correlation between improvement in manic symptoms and reduction in WASSUP scores was not conducted. | Weak: Selection bias Withdrawals not described |

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| | | | | | | | | | Uses a predetermined goal list | |
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Notes ** p <0.05. ** p<0.01 ***p<0.001. ASRM = Altman self-rating mania scale, BRMS =Bech-Rafaelsen mania scale, General behaviour inventory = GBI, HPS = Hypomanic personality scale, SRMI = Self-rating mania inventory, YMRS = Young mania rating scale, WASSUP = Willingly approached set of statistically unlikely pursuits.

Critical Evaluation

Cross-sectional correlational studies

The majority (eight) of the studies were cross-sectional correlational studies, and six of them investigated ambitious goal setting. The pattern of the results suggests there is a relationship between ambitious goal setting and current symptoms of mania / vulnerability to mania (measured using HPS), particularly around ambitions for fame and financial success. Different effect sizes were found ranging from small, medium, to large, but they were generally all in the same direction. The studies were conducted with student populations using measures to assess at-risk individuals. It would be important to test whether this phenomenon is present in a BD population, comparing them to non-clinical populations. It is also not possible to determine whether ambitious goal setting is causally related or whether it predicts worsening of BD symptoms over time. Ambitious goals were assessed using the self-report measure, WASSUP, and therefore is vulnerable to biases in response style and has not been independently validated. Participants could be motivated to minimise symptoms of mania or ambitious goals as they perceive this to be socially desirable, increasing the correlation between these constructs. Also, although the WASSUP captures goals that are pursued in life it is not an idiographic measure of participant-generated goals, so may not capture personal goals that are most meaningful. Additionally, little is known about whether ambitious goal setting is unique to BD/mania or whether this is present in other disorders.

One study (Jones et al., 2007) found a positive relationship between hypomania and number of approach goals endorsed by participants, with small to medium effect sizes. Current hypomania was also associated with more positive goal expectancies with small effect sizes (Meyer et al., 2004), and therefore could lend

support to BAS theory that increased goal expectancies relates to increased mania and goal activity. However, these findings were within a student population and the representativeness of the sample can be questioned. It is unclear whether differences would be found between a BD and non-clinical population on these variables, and whether approach goals are causally related or predictive of BD. Again, the studies rely upon self-report questioning the reliability and validity of the findings. Shared method variance could artificially increase the association between variables. A criticism of correlational methodologies is that third variables could explain the relationship. For example, another variable could explain the relationship between ambitious goal setting and vulnerability to mania, such that this association is not very meaningful. Whilst some of the studies attempted to control for third variables (e.g., controlling for current mania and depression when assessing at-risk populations), other potentially important variables were not controlled for (e.g., levels of excitement).

Cross-sectional case-controlled studies

One cross-sectional case-control study was reported. Gilbert & Gruber (2009) found that individuals with BD reported lower beliefs they could manage their goals than individuals in the depressed group, and this effect was very large. The goals of individuals with BD were less likely to be positively valenced (assessed by a blind rater) in comparison to the depressed and control group, and this effect was found to be large. It is unclear what criteria raters used to determine goal valence. No differences in goal ambition were found in individuals with BD compared to individuals with depression or healthy controls (Gilbert & Gruber, 2009). Goal ambition was blind rated by researchers, as opposed to the WASSUP, which could

indicate that specific characteristics of the WASSUP drive the findings that have utilised this measure.

A criticism of the study relates to the small sample and limited power to detect effects. Also, whilst efforts were made to match controls, it is likely that some of the differences found relate to other group differences. Overall, there is preliminary evidence suggesting that individuals with BD have less confidence in their ability to manage their goals than depressed individuals or those with no psychopathology. Little is known about how goal characteristics might differ according to phase of illness in which participants were tested, and warrants further exploration.

Longitudinal studies

Three longitudinal studies were included in the review. One study used experience-sampling methodology to test the association between goal progress and subsequent effort toward that goal among persons with BD and control subjects (Fulford et al., 2010). Persons with BD decreased effort toward goals significantly less than control subjects after better than expected goal progress. This finding supports the BAS sensitivity model, that goal effort is dysregulated in individuals with BD. As there was only a small sample there is less confidence in the size of the effects found, and perhaps doubt about the replicability of these findings. An important strength was that dynamic aspects of goal striving were investigated. This provides an analogue of the ascent to mania process that could lead to BD as opposed to most other studies that investigated goals in a snapshot assessment, increasing understanding of mechanism. This was the only study to investigate goal effort, capturing the active component of goal striving that is governed by BAS. Given the study limitations, the identified relationship between goal effort and progress in BD must be considered preliminary. It is unclear whether individuals with

other psychopathologies respond similarly to better than expected goal progress, and whether this pattern is a predictor of mania.

Two studies investigated ambitious goal setting. Johnson et al. (2012a) found that individuals with BDI endorsed more ambitions around popular fame than healthy controls, and these effects were found to be small. Heightened ambitions for popular fame and financial success predicted an increase in manic symptoms in those with BD, and these effect sizes were large (Johnson et al., 2012a). This is suggestive of a directional relationship between heightened extrinsic ambitions and manic symptoms. Limitations relate to the small sample size and the differences between groups identified at baseline, with the BD group having higher levels of anxiety and substance misuse. However, this was the only study to investigate ambitious goal setting over a period of time. It remains unknown whether ambitious goal setting predicts mania in individuals with BDII, those vulnerable to mania, or individuals diagnosed with other psychopathologies.

Lifetime history of BD was related to elevated expectations for money and popular fame compared to lifetime depression, and these effects were very small to small (Johnson et al., 2009). This suggests that ambitious goals are not just present when individuals are currently manic, so it may be a vulnerability factor for BD, or could alternatively be a 'scar' of the disorder. However, this finding was within a student population. Both of these studies relied upon the WASSUP and therefore goals were obtained from a predetermined goal list, as opposed to the assessment of idiographic/personal goals. Overall, there is preliminary evidence that individuals with BD have higher ambitions for extrinsic goals, particularly fame, than depressed individuals or healthy controls.

Pre-post uncontrolled study

One pre-post uncontrolled study (Johnson & Fulford, 2009), examined the effectiveness of an intervention for BD supporting individuals to develop skills to regulate goals. They found that the intervention related to significant decreases in manic symptoms (large effect) and reduction in ambitious goal-setting (large effect). Study limitations were the small sample size, absence of a control group, reliance on self-report measures, and potential for demand characteristics. It is unclear whether these results extend to individuals with BDII, and whether the reduction of mania symptoms was causally related to the reduction of ambitious goals.

Discussion

Numerous aspects of goal pursuit have been investigated in individuals vulnerable to and with a diagnosis of BD. This review was interested in the characteristics of goal pursuit in relation to self-selected goals as opposed to experimenter identified goals, based on the assumption that these would be more personally meaningful and ecologically valid.

The main finding relates to goal content, and comes from a small but growing body of evidence suggesting that individuals with a diagnosis of and vulnerability to mania set highly ambitious goals, predominantly around popular fame (effect sizes range from very small to large) and wealth (effect sizes range from very small to medium). Those vulnerable to mania also endorse higher ambitions for fame and wealth (Fulford et al., 2008; Fulford et al., 2015; Johnson & Carver, 2006; Johnson & Carver, 2012; Johnson et al., 2015), as well as those currently experiencing mania (Gruber & Johnson, 2009). Therefore, it is suggested that ambitious goal setting is not simply a secondary phenomenon of BD. This finding supports the BAS model of BD. No studies have examined whether ambitious goal setting increases the chance

of subsequent manic episodes in people without a history of BD, which would be a strong indication that ambitious goal setting is a vulnerability factor for BD. One longitudinal study (Johnson et al., 2012a) found that heightened ambitions for fame and wealth predicted increases in manic symptoms (large effect size) suggesting a directional relationship, but causality cannot be inferred. An intervention focusing on goal pursuit in BD was effective in reducing mania and ambitious goal setting, and these effects were large. However, the authors did not assess whether reductions in mania correlated with reductions in ambitious goal setting (Johnson & Fulford, 2009).

It is important to recognise these studies' limitations. The majority were conducted with a student population who may not be a representative sample. Given that a student population is typically younger than a sample from a general population, the goals they set may differ to individuals who are at other life stages, and also goals that are more similar to one another (Erikson, 1959). Additionally, some behaviours endorsed on the HPS may be developmentally appropriate, and not necessarily reflect mania risk (e.g., the item "at social gatherings, I am usually the 'life of the party'"). Many of the studies were cross-sectional and this does not allow for the measure of the dynamic aspects of goal pursuit. All of the studies used self-report measures, which can create demand characteristics and compromise reliability and validity. Also, with the exception of one study ambitious goal setting was measured using the WASSUP from the same group of researchers. The WASSUP uses a predetermined set of highly ambitious extrinsic goals as opposed to asking participants to select personally meaningful goals, which reduces ecological validity and increases the chance of participants providing socially desirable responses. Also, it is important to note that the studies using the WASSUP were conducted by the same research group and this measure has never been

independently validated. Moreover, the lack of methodological diversity could mean that these findings may not generalise beyond this measure.

What is not clear is whether in day to day life individuals with BD actually strive towards these ambitious goals, and how this relates dynamically to symptomology. Furthermore, the extent to which ambitious goal setting is specific to BD or whether this is present in other psychopathologies is unknown. Further research within clinical populations, examining longitudinal dynamic aspects of idiosyncratic goal pursuit is warranted, given that current research comes from snapshot assessments relying upon a self-report measure. Future research to establish whether there is a causal relationship between ambitious goal setting and mania is necessary, as this research would lend support treatments aiming to modulate ambitious goal setting (Johnson & Fulford, 2009).

Fewer conclusions can be drawn about goal processes, due to the small number of studies examining different aspects of goal pursuit in BD. There is preliminary evidence that goal effort and response following goal attainment/non-attainment is dysregulated in individuals with BDI, but this requires further testing in a larger clinical sample, and with individuals with other BD conditions. Developing the evidence base in relation to goal effort will be important for evolving therapies to support individuals to modulate goal-directed behaviour. There is also evidence that individuals with BD have lower beliefs they can manage their goals compared to individuals with depression and healthy controls. However, what is unclear is the relationship between goal management beliefs and BD symptoms. It would be important for future studies to investigate this relationship longitudinally. It is also noteworthy that individuals with BD set very ambitious goals, but have poor self-efficacy beliefs about these goals. This is not observed in healthy controls and could

increase the likelihood of distress and vulnerability to depression about the goals not being achieved.

Other goal processes warranting further investigation relates to goal appraisals. There was some preliminary evidence to suggest that individuals with BD rate their goals as more stressful/difficult than those in positive mood, this could have been accounted for by current depression. Current mood might be relevant at time of testing, even if it does not reach clinical levels of mania/depression, but this has not been paid sufficient attention across the studies. It would be interesting to understand the dynamic relationship between goal stress/difficulty and BD symptoms in a clinical population. Additionally, it would be of interest to examine goal importance further, comparing clinical and control groups in terms of how important their goals are, and how goal importance ratings might fluctuate with BD symptoms in a longitudinal design. Given the limited research regarding goal processes this seems to be a priority for future research in order to inform treatments for BD. There is evidence that there is an association between ambitious goal setting and BD, but the importance of this association is unclear. Further research is required before treatments aiming to modulate the content of goals, and other aspects of goal-directed activity, can be supported. Further goal related research with regards to the transition between mania and depression would also be useful in terms of testing the BAS dysregulation theory.

However, it is important to take into account the distinction in the functionality of day-to-day pursuit of goals and overarching goals. Some goals may be characterized as abstract 'magnificent obsessions', others as more concrete 'trivial pursuits'. There is evidence to suggest that the level of goal identification (i.e., abstract vs. concrete) could contribute to disturbed affect in mood, and that cycles of

mania and depression may reflect dysregulated levels of goal identification (Watkins, 2011). Therefore, it has been argued that it is vital to assess level of goal identification across different mood states. It is suggested that depressed mood is related to more abstract goals in response to negative outcomes (Johnson, McKenzie & McMurrich, 2008), whereas mania might be related to more concrete goal identification in response to rewards (Zimbardo, Keough, & Boyd, 1997). Future research should more extensively investigate levels of goal identification in relation to manic symptoms.

Additionally, it is important to consider the limitations of the BAS theory. The theory does not take into account other predictors of mood fluctuations such as difficult interpersonal experiences, or lack of social support, which have been identified as predicting risk of BD (Schwannauer, Noble, & Fraser, 2011). For example, Schwannauer, Noble and Fraser (2011) found direct effects of dysfunctional regulation of emotion and lack of social support in predicting bipolar risk, and argue that current negative interpersonal experiences (e.g., difficulties in attachment relationships) are more significant in the development of the disorder compared with past experiences. DBS theory does not take into consideration such factors, which may be more relevant to manic symptoms in a clinical population. In comparison to a healthy student population or analogue sample, the social support individuals with BD receive and interpersonal experiences they encounter are also likely to be very different and life experiences of students are likely to differ from those who suffer with a severe mental health problems.

Therefore, it has been argued that models of BD need to include these complex multilevel and dynamic processes (Schwannauer, 2011). For example, the ambitious extrinsic goals that individuals may set may not be conducive to

harmonious relationships and could cause interpersonal difficulties and reduced social support, therefore compounding difficulties in the regulation of mood.

Additionally, difficult life events (e.g., lack of employment, isolation) may limit resources available for adaptive goal striving, as well as potentially contributing to interpersonal stresses and difficulties that have implications for mood regulation.

Consequently, it is important to consider the integration of BAS theory with other models of mood that take into account interpersonal factors in understanding BD.

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Appendix A: Guide for Authors from Clinical Psychology Review

Description

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SCHOOL OF PSYCHOLOGY
DOCTORATE IN CLINICAL PSYCHOLOGY

EMPIRICAL PAPER

Dominance Motivation, Goal Pursuit, and Mania in Bipolar Disorder.

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**Submitted in partial fulfillment of requirements for the Doctorate Degree in
Clinical Psychology, University of Exeter**

Abstract

The study aimed to test how progress on achievement and power goals, and perceptions of power, fluctuate with mania symptoms in Bipolar Disorder (BD), testing the Dominance Behavioural System (DBS) model. The DBS includes biological, psychological, and behavioural components that serve the goal of control over social and material resources needed for survival and reproduction (Johnson, Leedom, & Muhtadie, 2012c). Daily diary methodology was employed, with 29 individuals meeting the Diagnostic and Statistical Manual-Fourth Edition (DSM-IV) criteria for BD I or II as verified by the Structured Clinical Interview [SCID-I-RV] (First, Spitzer, Gibbon & Williams, 2002). Baseline measures of dominance motivation and ambitious goal setting were taken. Over fourteen days, participants reported daily on their goal progress, symptoms of mania, power, and anger. It was hypothesised there would be a positive relationship between symptoms of mania and dominance motivation. It was also hypothesised that for power but not achievement goals, i) goal progress would be associated with perceptions of power, ii) symptoms of mania, and iii) that goal frustration would be associated with anger. Pearson's correlations and multilevel modelling analyses found largely null results with the exception of a positive relationship between progress towards power goals and perceptions of power. Thus, the results did not provide support for the DBS model predictions for relationships between power goals and manic symptoms. Future studies could utilise further measures of dominance motivation and power, and study goal pursuit over a more protracted duration, including comparisons between BD, depressed groups, and healthy controls.

Keywords Bipolar Disorder, Dominance Behavioural System, Goals, Power

Introduction

The diagnostic category BD contains a number of related diagnoses, subsequently referred to as Bipolar Spectrum Disorders (BSDs). BDI is considered the most severe, and can be diagnosed when someone experiences at least one episode of mania (DSM-V; American Psychiatric Association [APA], 2013). Mania is a distinct period of elevated or irritable mood, accompanied by symptoms including reduced need for sleep, racing thoughts, increased psychomotor activation, pressured speech, extreme self-confidence, and pursuit of pleasurable activities without consideration to potential dangers (APA, 2013). These symptoms must be severe enough to affect functioning, and must last one week or necessitate hospitalisation (APA, 2013).

BSDs can be associated with significant personal, social, and economic costs. BSDs are often associated with divorce, substance abuse, suicide, impairment in work and academic functioning (Angst, Stassen, Clayton, & Angst, 2002; Conway, Compton, Stinson, & Grant, 2006; Judd et al., 2008; Nusslock, Alloy, Abramson, Harmon-Jones, & Hogan, 2008), and with elevated rates of physical fighting compared to individuals with no diagnosed mental disorder (Corrigan & Watson, 2005).

Behavioural Activation System

There is growing evidence supporting the Behavioural Activation System (BAS) sensitivity model of BD, which suggests that BAS sensitivity is elevated among people prone to mania, and is related to the course of mania (Alloy et al., 2012a,b). BAS is a biologically based system postulated to guide approach toward reward-relevant stimuli, in which the goal is to move toward something desirable. BAS can be considered an over-arching concept covering numerous, more specific

processes that may have separate neurobiological underpinnings (Johnson, Edge, Holmes, & Carver, 2012b).

BAS functions include a range of affective and cognitive processes that support goal-directed behaviour (Johnson et al., 2012b). Johnson et al. (2012b) proposed that when goals are frustrated, this can result in BAS activation and a surge of energy and motivation. This can assist the individual in overcoming obstacles or regaining lost ground (Carver, 2004), and can manifest emotionally as anger. Anger is unique in this respect, as other emotions considered negative (e.g., anxiety) are associated with the avoidance motivational system (Carver & Harmon-Jones, 2009).

Mania has been positively associated with anger (Cassidy, Forest, Murry, & Carroll, 1998), and individuals with hypomania show greater left anterior cortical activation than controls when striving towards a challenging reward (Harmon-Jones et al., 2008), and when angered (Harmon-Jones et al., 2002). Greater left than right frontal cortical activity has been associated with approach motivation, positive affect and anger (Harmon-Jones, Gable, & Peterson, 2010). It is further argued that as medication used to treat mania reduces aggression (Malone, Delaney, Luebbert, Cater, & Campbell, 2000); this indicates that anger and aggression arise from the same underlying motivational system, namely the BAS.

The reciprocal relationship between goal motivation and affect has long been acknowledged (Emmons, 1986). Pervin (1983) proposed that affect is key to motivation and goal-directed behaviour, and plays a fundamental role in the motivational properties of goals. Goals have been defined as “internal representations of desired states, where states are broadly construed as outcomes, events, or processes” (Austin & Vancouver, 1996, p. 338). Within psychological

literature, goals have been differentiated in terms of their structure (e.g., properties, organisation), process (e.g., effort, revision), and content (e.g., approach, avoidance; Austin & Vancouver, 1996).

Models of the reward system distinguish between specific processes and mechanisms involved in goal regulation (Johnson et al., 2012b). People with BD value goal pursuit more than controls (Alloy et al., 2009; Fulford, Johnson, & Tuchman, 2009; Wright, Lam, & Newsom-Davis, 2005). They report viewing goal attainment as central to their sense of worth (Lam, Wright, & Sham, 2005) and pursue goals with greater effort and perfectionism than controls (Morrison, Peyton & Nothard, 2003). Laboratory studies found that individuals with BD apply greater effort to attain reward in a card sorting task than controls (Hayden et al., 2008). Also, people diagnosed with BD set highly ambitious goals, specifically extrinsic goals (e.g., fame, wealth), as opposed to intrinsic pursuits (e.g., self-development; Johnson, Carver, & Gotlib, 2012a). These manifestations of BAS hypersensitivity do not appear to be a secondary phenomenon of illness, as they are often found amongst at-risk populations (Johnson & Carver, 2006), and several of these properties appear to be related to the course of manic symptoms (Johnson et al., 2012a).

Dominance Behavioural System

Related to the view that mania reflects a dysfunctional approach system, it is hypothesised that mania relates to dysfunctions in the social dominance system (Johnson & Carver, 2012). This hypothesis focuses more specifically on the aspect of approach concerned with social dominance, namely power. Power is defined as the capacity to influence others, originating mostly from control over important resources and the ability to control rewards and punishments (French & Raven,

1959; Keltner, Grunefield, & Anderson, 2003). Power is considered a relational variable, as opposed to power over inanimate objects, as it is only in relation to another person or a group that power can be understood (Emerson, 1962; Thibaut & Kelley, 1959). It is proposed that dominance motivation describes an individual's ambition and energy to pursue power (Johnson et al., 2012c).

The DBS is associated with motivation to pursue power and self-perceptions of having gained power (Johnson & Carver, 2012). The DBS motivates behaviour, directs sensory processing, and ensures quick and efficient learning of behaviours that enhance the chances of achieving identified power goals (Johnson et al., 2012c). Theoretically it remains unclear whether the DBS is a component of BAS or a separate system. Dominance motivation can be understood as having trait and state components, although most studies have measured it as a trait.

Dominance motivation and self-perceptions of power are considered important in other psychopathologies, including narcissism, psychopathy, antisocial personality disorder, and alcohol-related problems (see Johnson et al., 2012c for review). However, dominance motivation and power have received relatively little consideration in mania literature (Johnson & Carver, 2012). Theorists have identified similarities between mania and dominant behaviour (Wilson & Price, 2006), noting that during mania, people with BD tend to demonstrate dominance and status-focused behaviours (Gardner, 1982; Janowsky, Leff, & Epstein, 1970). When depressed, individuals with BD focus more on feelings of inadequacy and perceive themselves and others as inferior and submissive (Gilbert, McEwan, Hay, Irons & Cheung, 2007). Therefore, it is suggested that cycles of mania and depression could represent a dysregulation in the DBS (Gilbert, McEwan, Bellew, Mills, & Gale, 2009).

Individuals at-risk of mania seem to have a persistently increased desire for power (Johnson et al., 2012c) along with self-perceptions of power that covary highly with changes in mood (Gilbert et al., 2007). Taylor and Mansell (2008) asked participants to work in pairs to build a house from Lego and found that higher scores on the Hypomanic Personality Scale (HPS; a measure of risk for mania) were correlated with high self and peer ratings of domination during the task. Within non-clinical populations, elevated power is associated with traits such as extraversion (Anderson, Keltner, & Kring, 2001), and dominance (Buss & Craik, 1981), and correlates with self-reported experiences of elevated positive mood (Watson & Clark, 1997).

Extrinsic goal setting is considered to be one sign of dominance motivation (Duriez, Vansteenkiste, Soenens, & De Witte, 2007). Indeed, heightened ambitions for fame, wealth, and political influence have been related to an increased risk for mania (Carver & Johnson, 2009; Fulford et al., 2008; Gruber & Johnson, 2009; Johnson & Jones, 2009), and these heightened ambitions have been related to lifetime diagnoses of mania (Johnson, Eisner, & Carver, 2009). Such ambitions have been found to predict the onset of BD (Alloy et al., 2012a) and there is evidence that ambitious extrinsic goals are related to a more severe course of mania (Johnson, Carver, & Siegel, as cited in Johnson et al., 2012c). Therefore, it is implied that ambitious extrinsic goals may have a causal role in the development of BD, and are not just a correlate of the disorder (Johnson et al., 2012c), or a 'scar' from previous episodes of mania. It is argued that the pattern of focus on success in these areas (i.e., public recognition) suggests that these individuals are focused on certain types of social dominance (Gilbert et al., 2007). Research into the emotional concomitants of the DBS identified that when power is threatened, anger is likely, and this is more

probable with increased dominance motivation (Archer & Webb, 2006). The affective and cognitive consequences of achieving or failing to achieve power are likely to be different depending on the person's level of dominance motivation (Johnson et al., 2012c). Theory and research (Chen, Lee-Chai, & Bargh, 2001; Fodor & Wick, 2009; McClelland, Koestner, & Weinberger, 1989) suggest that high dominance motivation results in increased reactivity to fluctuations in power. So, it seems vital to consider dominance motivation and power together in predicting cognitive and affective outcomes. If there is dysregulation in the DBS in BD, fluctuations in perceived power may help to explain symptoms (e.g., anger in response to blockage of power).

Johnson et al. (2012c) postulated that for individuals with BD who have an elevated need for power, fluctuations in perceived power trigger manic and depressive symptoms. Whilst dominance behaviour has been found to correlate with measures of risk for mania, more research on the DBS among those clinically diagnosed is required (Johnson et al., 2012c). Research has predominantly relied on analogue samples, covering subsyndromal symptoms and related personality traits, therefore it is unknown if the same effects would be found in a clinical population with clinically significant mania.

To date, there are no known studies that have investigated how perceptions of power fluctuate with mania symptoms in a BD population, and that distinguish between different types of approach goal pursuit (achievement and power). This would be a useful approach to test the DBS model and assess whether there is a general approach motivation dysfunction, or if this is specific to dominance in individuals with BD. Tracking individuals over a period of time with multiple observations would more likely capture the range of occasions in which goal progress and mania symptoms fluctuate in everyday life. Furthermore, diary data

relating to self-selected, idiographic goals will increase the external validity of the study compared to studies that rely on participants selecting goals from a set list.

Guided by the DBS theory, this study aimed to test whether, in individuals who meet criteria for BD, there is a relationship between perceived goal progress (power and achievement), perceptions of power, and symptoms of mania, and whether there is an association between power goal frustration and anger. The study will also test whether dominance motivation moderates the relationship between (i) power goal progress and mania, and (ii) power goal frustration and anger. The hypotheses were:

1. At the between-person and within-person level of analysis, there will be a positive relationship between progress towards power goals and symptoms of mania, whilst controlling for progress towards achievement goals, which will not be significantly associated with symptoms of mania.
2. At the between-person and within-person level of analysis, frustration / blockage of power goals will be associated with anger whilst controlling for achievement goal blockage, which will not be associated with anger.
3. At higher levels of trait dominance, the strength of the relationship will increase between (i) power goal progress and daily mania, and (ii) power goal blockage and daily anger. This relationship will not be found in relation to achievement goals.
- 4.

Method

Participants

Twenty-nine individuals currently meeting the DSM-IV criteria for BDI or II (on medication for BD $n = 27$, not on medication $n = 2$) as verified by Structured Clinical Interview [SCID-I-RV] (First, Spitzer, Gibbon & Williams, 2002), were recruited (65.5% female [$n = 19$]; age, $M = 45$ years, range = 29-71, $SD = 11$.). Inclusion criteria were (a) having English as a native language (b) being over 18 years old. Exclusion criteria were participants who were currently in a major depressive or manic episode, had experienced either mania or depression in the last month, were currently substance dependant, or were actively suicidal. Participants were recruited through Spectrum Connect, Bipolar UK, the AccEPT service, databases of potential participants held by the Mood Disorders Centre, and local advertising. Participants were offered a gift voucher as appreciation for their contribution to the study.

Design

A longitudinal design was employed, using daily diary methodology, over 14 days, to explore within-participant and between-participant associations between variables. The predictor variables were ambitious extrinsic goal setting, trait dominance, and daily progress and daily blockages on (i) an achievement goal and (ii) a power goal. The outcome variables were daily manic symptoms, anger, and self-perceptions of power.

Measures

As recruitment was conducted jointly with another trainee, a number of measures were completed by participants that will not be fully described and analysed in this paper. These measures related to exercise, as well as depression and additional manic symptoms.

Screening measure. The SCID is the most commonly used structured interview for assessing lifetime and current DSM diagnoses. The DSM-IV researcher

version (SCID-I-RV; First et al., 2002) was used and the sections administered were: current mania, current major depressive episode, past mania/ hypomania, past depression (if no past mania but past hypomania), substance use disorders, and psychotic screen. The interview includes standardised probes for assessing diagnostic criteria, as well as guidelines for evaluating each symptom. With regard to reliability, in BD populations the SCID (for DSM III-R) has been found to have high test re-test reliability ($r = .84$, Williams et al., 1992) and inter-rater reliability (Cohen's kappa = .79; Skre, Onstad, Torgersen, & Kringlen, 1991). Due to the lack of established gold standards for psychiatric diagnoses, validity data is more difficult to determine and "best estimate" diagnoses are often used as the clinical standard. The researchers were both trained to use the SCID by a qualified clinical psychologist, and a sample of seven were blind second rated by a qualified clinical psychologist and all confirmed identical diagnoses.

Baseline measures.

The Altman Self Rating Mania Scale (ASRM; Altman, Hedeker, Peterson, & Davis, 1997). The ASRM is designed to assess the presence of and / or severity of mania symptoms (Appendix A). This is a five-item scale with each item being rated 0-4, and a higher score reflects more manic symptoms. It has been found to have good reliability (Cronbach's alpha = .79 for mania subscale), and to differentiate individuals with and without mania (Altman et al., 1997). It was found to have good reliability at baseline in the current study (Cronbach's alpha = .74).

The Willingly Approached Set of Statistically Unlikely Pursuits (WASSUP; Johnson & Carver, 2006). The WASSUP assesses highly ambitious life goals and respondents rate how likely they are to set each goal on a scale of 0 to 5 (0 = *No chance I will set this goal for myself* to 5 = *definitely will set this goal for*

myself, Appendix B). There are seven factor-analytically derived subscales, but this study focussed on the 11-item popular fame subscale and wealth subscale, as these extrinsic goals have the clearest links to social dominance (Johnson & Carver, 2012). Johnson and Carver (2012) found the internal consistency to be good (popular fame: $r = .88$; financial success: $r = .78$) and the two subscales correlated moderately with each other ($r = .44$, $p < .05$). Within this study the popular fame and wealth subscale were combined and found to have good reliability (Cronbach's alpha = .89) with a large correlation between the popular fame and wealth scales ($r = .82$, $p < .01$).

The Personality Research Form-Dominance subscale (PRF-D; Jackson, 1999). The PRF-D subscale was used to assess self-rated trait dominance and use of/comfort with dominance behaviours (Appendix C). Internal consistency have been found to be good (Cronbach's alpha = .85) and test-retest reliabilities were high (.91) over a two-week testing interval (Johnson et al., 2012c). In this sample the Cronbach's alpha was .79.

Internal State Scale-Activation Subscale (ISS; Bauer et al., 1991). The ISS measures level of symptoms of hypomania and depression over the past 24 hours (Appendix D). In this study it was used both at baseline and as a daily measure. There are 16 items and the responses range from 0-100 in increments of 10. The first 15 items form four subscales, which have adequate internal consistency: activation (Cronbach's alpha = .84); perceived conflict (Cronbach's alpha = .81); wellbeing (Cronbach's alpha = .87); and depression (Cronbach's alpha = .92; Bauer et al., 1991). Scores on the activation subscale have been found to correlate significantly with clinicians' ratings of mania (Bauer et al., 1991). As the ISS rates manic and depressive symptoms independently, it recognises mixed states and

depressive symptoms that can occur with manic episodes. In this study the activation subscale was used to measure daily mania symptoms and the reliability of the subscale was found to be good at baseline (Cronbach's alpha = .92) and over the daily measures (Cronbach's alpha = .87).

Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, Williams, 1999) is the self-administered depression module of the PRIME-MD diagnostic instrument (Appendix E). It was found to have excellent internal reliability involving two populations, (Cronbach's alpha = .89 and .86), test-retest reliability (Cohen's Kappa = .84) and ROC analysis showed that the area under the curve for the PHQ-9 in diagnosing major depression was .95 (Kroenke, Spitzer, & Williams, 2001). In this study reliability was found to be good (Cronbach's alpha = .85)

Daily measures.

The Generalised Sense of Power Scale (SPS; Anderson & Galinsky, 2006). For this study, the SPS was modified from a state measure to a daily measure to address perceptions of power during the day, such that participants were asked to base their responses on the last 24 hour period (Appendix F). The scale has eight items that are rated on a scale of 1-7 (1= *disagree strongly*, 7 = *agree strongly*). It has been found to have good internal consistency (Cronbach's alpha = .88) and to be positively correlated with actual standing in power hierarchies (as cited in Johnson et al., 2012c). In this study Cronbach's alpha was .90.

The Dimensions of Anger Reactions Scale (DAR-5; Forbes et al., 2014). This self-report screening tool comprises five items addressing anger frequency, intensity, duration, aggression, and interference with social functioning (Appendix G), scored on a 1-5 scale (1 = *none, or almost none of the time* to 5 = *all, or almost all of the time*). It has been found to be a reliable and valid screening measure of common

anger reactions, and the internal consistency has been found to be high (Cronbach's alpha = .90). Good concurrent validity was obtained with subscales of the STAXI-2, a widely accepted valid measure of anger. In this study, participants were specifically asked to focus on their anger over the past 24 hours and the scale was found to have good reliability (Cronbach's alpha = .86).

Goal development. Goals were derived using a similar procedure to Sheldon et al. (2007) and participants were asked to identify personal strivings, defined by Emmons (1989) as enduring goals that are characteristic of a person (Appendix H). Participants were asked to select goals that were highly personally relevant in each of two domains: one achievement goal (i.e. concern with performing at or above a standard of excellence), and one power goal (described as an 'influence goal' in the materials that participants completed, to reduce social desirability concerns). Examples of such goals were provided. Participants were instructed that the goals should be ones that: a) would require daily effort, b) relate to the attainment of a desired state (i.e., an approach goal) rather than the avoidance of an undesirable state, and c) sufficiently abstract and ongoing so they could not be completely attained during the study. The scales are face valid and have been found to relate to other dimensions of goal pursuit in expected ways as single items (Emmons, 1986), which were appropriate in terms of reducing participant burden. At baseline, participants rated the following items for each identified goal:

Goal importance (Emmons, 1986)

This was assessed using one question 'How important is this goal to you?' and was rated on a seven-point scale, 1 = *not at all* to 7 = *very much*.

Goal difficulty (Emmons, 1986)

This was assessed using one question 'How difficult do you think the goal is to achieve?' and was rated on a seven-point scale, 1 = *extremely easy* to 7 = *extremely difficult*.

Goal expectancy (Emmons, 1986)

This was also assessed using one question 'How much progress do you expect to make on this goal over the duration of the study?' and was rated on a seven-point scale, 1 = *none at all* to 7 = *very much*.

Daily goal ratings (e.g., Sheldon et al., 2007, Meyer et al., 2004). Daily goal measures were adapted from previous studies investigating goals that demonstrated their construct validity. On a daily basis participants completed the following ratings for their achievement goal and power goal (Appendix I):

Goal progress

This was assessed in one question, 'How much progress have you made on [goal] over the past 24 hours?' and was rated on a seven-point scale, 1 = *none at all* to 7 = *very much*.

Goal Frustration

This was assessed using one question, 'To what extent has this goal been frustrated today?' and was rated on a seven-point scale, 1 = *none at all* to 7 = *very much*.

Procedure

Prior to study commencement, NRES ethical approval and psychology departmental ethical approval were given (Appendix J). Information packs were sent to relevant BD organisations to distribute, with contact details for expressions of interest (Appendix K). Potential participants were informed by post that they were required to identify one goal of each type (achievement and power). They were given

examples and a goals form (see Appendix H) to return along with a signed consent form (Appendix L), and suggested times when participants could be telephoned for the initial assessment.

After consent forms were received, the SCID interview was completed via telephone. At this time, the generated goals were checked for suitability and support offered to choose alternative goals if necessary. Participants who met the inclusion criteria were then recruited. Participants completed the baseline measures online, with the exception of two participants who completed baseline and diary measures on paper forms (evidence suggests that both methods yield comparable data; Green, Rafaeli, Bolger, Shrout, & Reis, 2006). Demographic information was obtained (age, gender) in paper form when participants returned their contact sheets. As part of the interview, details of whether participants were taking medication to treat BD were obtained.

Participants were sent links to the online daily diaries for each day and paper versions were supplied to the two participants who stated a preference for this. After participants completed their two weeks of diary input, they were sent a 'thank you' letter and £10 gift card to acknowledge their contribution to the study. They were provided contact details should they wish to receive further information and informed that, where specified, they would receive a copy of the overall results.

Data Screening

All screening and statistical procedures were performed on the data for the 29 participants. Outliers at the between- and within-person levels were detected by inspecting z-scores, descriptive data, and distributions using box plots and histograms. Outliers were detected for baseline and daily mania, WASSUP, and daily anger. WASSUP, baseline and daily mania scores, were \log_{10} transformed, and

anger scores were inverse transformed (and reflected to preserve directionality) to correct for skewed distribution, which also removed all outliers. After screening, data for all 29 participants were retained for analysis.

Analysis Plan

Data in the study consisted of days nested within individuals, so we used multilevel modelling (MLM). MLM allows the researcher to investigate relationships at the within-person and between-person levels of analysis without violating the assumption of independence. A further advantage of MLM is that it is able to accommodate missing data. Multilevel analyses (MLM) was performed using MLwiN software version 2.35 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). To test hypotheses one to three, random intercept multilevel models were constructed with predictors at the day-level (e.g., sense of power, anger, mania) entered as deviations around their person means (i.e., person-mean centred), with person-level variables (e.g., trait dominance) entered into the model centred around the grand mean (i.e., grand mean-centred). Person averages of the daily variables were then added to the models centred around the grand mean to explain between-person variance. These procedures ensured that between-person associations could be estimated independently from within-person associations (Enders & Tofighi, 2007). The residuals were approximately normally distributed for each model, suggesting that the parametric assumptions of the multilevel model were met.

Results

Twenty-three participants completed 14 days of diary entries. In total 13 days of data were missing across all participants and the fewest number of days completed by any one participant was 10 days (which was the pre-ordained criterion for excluding people based on insufficient data).

A paired *t*-test for achievement goal importance ($M = 6.07$, $SD = 1.10$) and power goal progress ($M = 6.28$, $SD = 1.00$), showed no significant difference between goal types, $t(28) = -.73$, $p = .47$. A paired *t*-test for achievement goal difficulty ($M = 4.83$, $SD = 1.49$) and power goal difficulty ($M = 5.34$, $SD = 1.29$), showed no significant difference between goal types, $t(28) = -1.68$, $p = .11$. A paired *t*-tests for achievement goal expectancy ($M = 5.03$, $SD = 1.66$) and power goal expectancy ($M = 4.52$, $SD = 1.30$), showed no significant difference between goal types, $t(28) = 1.60$, $p = .12$. Therefore, this indicates that achievement and power goals were comparable.

Preliminary Analyses

Table 1 presents descriptive statistics and correlations between the baseline measures. Available literature would predict that there would be a positive correlation between baseline symptoms of mania and i) ambitious extrinsic goal setting and ii) trait dominance scores. The relationship between baseline **ISS** scores and scores on the **WASSUP** was not significant and the relationship between baseline **ISS** scores and scores on the **PRF-D** was also not significant. A significant positive relationship emerged between i) **PRF-D and PHQ-9**, and ii) measures of mania (**ISS and ARSM**). Significant negative relationships were found between WASSUP and achievement goal expectancy and iv) WASSUP and power goal difficulty.

Table 1

Correlations and Descriptive Statistics involving Baseline Measures

| | WASSUP | PRF | ISS | ASRM | PHQ-9 | AGoal Imp | AGoal Diff | AGoal Exp | PGoal Imp | PGoal Diff | PGoal Exp | <i>M</i> | <i>SD</i> |
|------------|--------|------|------|------|-------|--------------|---------------|--------------|--------------|---------------|--------------|----------|-----------|
| WASSUP | – | | | | | | | | | | | 14.31 | 5.22 |
| PRF | -.23 | – | | | | | | | | | | 8.52 | 3.74 |
| ISS | .18 | .04 | – | | | | | | | | | 96.90 | 111.34 |
| ASRM | .19 | -.36 | .38* | – | | | | | | | | 3.34 | 3.10 |
| PHQ-9 | .17 | .40* | .33 | .17 | – | | | | | | | 8.66 | 5.86 |
| AGoal Imp | .17 | -.08 | -.02 | .23 | .26 | – | | | | | | 6.07 | 1.10 |
| AGoal Diff | .22 | .02 | -.04 | -.14 | .21 | .10 | – | | | | | 4.83 | 1.39 |
| AGoal Exp | -.47* | .14 | -.27 | -.22 | -.22 | .08 | -.31 | – | | | | 5.03 | 1.66 |
| PGoal Imp | .08 | -.07 | .08 | .30 | -.08 | -.05 | -.20 | .06 | – | | | 6.28 | 1.00 |
| PGoal Diff | -.41* | .19 | -.25 | -.13 | -.05 | .11 | .23 | .23 | .31 | – | | 5.34 | 1.29 |
| PGoal Exp | -.07 | .21 | .27 | -.30 | .09 | -.20 | -.21 | .32 | -.00 | -.28 | – | 4.52 | 1.30 |

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$. ASRM = Altman self-rating mania scale, ISS = Internal state scale, PHQ-9 = Patient health questionnaire, PRF = Personality research form, WASSUP = Willingly approached set of statistically unlikely pursuits, AGoalImp = Achievement goal importance, AGoalDiff = Achievement goal difficulty, AGoalExp = Achievement goal expectancy, PGoalImp = Power goal importance, PGoalDiff = Power goal difficulty, PGoalExp = Power goal expectancy.

Table 2 presents correlations between daily measures and baseline measures for both between-person relationships and within-person relationships. Literature would predict a positive correlation between trait dominance scores and i) mean daily mania and ii) mean daily sense of power scores, but there was no significant correlation between PRF-D and i) mean daily ISS and ii) mean daily SPS scores.

As shown in Table 2, a significant positive within-person correlation emerged between daily power goal progress and SPS scores, but this correlation was not significant at the between-person level. There was no significant correlation between achievement goal progress and SPS scores at either level of analysis.

The intra-class correlation (ICC) for SPS scores was .34, indicating that most of the variability in SPS scores was within-person relative to between-person (within-person variance = 41.13, between-person variance = 20.81). The ICC can also be interpreted as the average correlation between measures of self-perceived power taken from two randomly chosen days, for a given person. The relationship between progress towards power goals and self-perceptions of power was assessed in a multilevel model in which daily SPS scores was the criterion variable:

Daily achievement goal progress and daily power goal progress were entered simultaneously into this model. At the within-person level, progress on power goals was associated with increased SPS scores on the same day, $B = 1.31$, $SE(B) = 0.23$, $z = 5.79$, $p < .001$, but progress on achievement goals was not, $B = -0.00$, $SE(B) = 0.20$, $z = 0.00$, $p = 1$.

When average achievement goal progress and average power goal progress over the study period were added to the model to examine between-person relationships, mean daily progress on power goals was associated with greater mean SPS scores, $B = 1.60$, $SE(B) = 0.72$, $z = 2.22$, $p = .03$, whilst mean daily

achievement goal progress was not, $B = 0.45$, $SE(B) = 0.78$, $z = 0.58$, $p = .56$, at the between-person level. Therefore, as predicted, progress on power goals was uniquely associated with a greater **SPS** scores at both the within-person and between-person levels of analysis, independent of daily progress on achievement goals. As predicted, achievement goal progress was not uniquely associated with daily **SPS** scores at either level of analysis.

Additionally, significant positive between-person correlations were found between i) **baseline ISS scores and average daily ISS scores** and ii) **DAR and ISS** scores. Significant negative between-person correlations were found between i) **ISS and SPS scores** and ii) **DAR scores and SPS scores**.

Table 2

Correlations between Daily and Baseline Measures (between-person relationships presented above the diagonal, within-person relationships presented below the diagonal).

| | ISS-D | SPS | DAR | AGoal Prog | PGoal Prog | AGoal Frus | PGoal Frust | WASSUP | PRF | ASRM | ISS | PHQ-9 |
|---------------|-------|---------|--------|---------------|---------------|---------------|----------------|--------|------|------|-------|-------|
| ISS-D | - | -.60*** | .60*** | -.31 | -.23 | .19 | .21 | .23 | .04 | .28 | .77** | .33 |
| SPS | .00 | - | -.46* | .38 | .34 | -.36 | -.44 | -.25 | -.03 | -.19 | -.40* | -.23 |
| DAR | .10 | -.20*** | - | .25 | -.33 | .12 | .18 | .27 | .20 | .14 | .37 | .29 |
| AGoal Prog | -.03 | .06 | -.03 | - | .12 | -.07 | .00 | -.25 | .10 | -.28 | -.28 | -.34 |
| PGoal Prog | .08 | .30*** | -.01 | .22 | - | .03 | .04 | -.15 | -.07 | .06 | -.18 | -.14 |
| AGoal Frus | .03 | -.12 | .16 | -.28 | -.07 | - | .63** | .25 | -.04 | -.36 | .00 | .06 |
| PGoal Frus | .05 | -.15** | .10 | -.07 | -.31 | .28*** | - | .19 | -.15 | -.16 | .22 | -.20 |

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ISS = Internal state scale (baseline), ISS-D = Internal state scale (daily), SPS = Sense of power scale, DAR = Dimension of anger reactions, PRF = Personality research form, ASRM = Altman self-rating mania scale, PHQ-9 = Patient health questionnaire, AGoalProg = Achievement goal progress, AGoalFrus = Achievement goal frustration, PGoalProg = Power goal progress, PGoalFrus = Power goal frustration.

Hypothesis 1. At both the between-person and within-person level of analysis, there will be a positive relationship between progress towards power goals and symptoms of mania, whilst controlling for progress towards achievement goals.

As can be seen in Table 2, no significant negative relationship emerged between progress towards goals of either type and ISS scores at the within-person or between-person level of analysis.

The ICC for symptoms of mania was .69 indicating that most of the variability in mania was between-person relative to within-person (between-person variance = 0.56, within-person variance = 0.25). The relationship between progress towards power goals and ISS scores was assessed in a multilevel model in which daily ISS scores was the criterion variable.

Daily achievement goal progress and daily power goal progress were entered into this model simultaneously. At the within-person level, power goal progress was not associated with ISS scores on the same day, $B = 0.03$, $SE(B) = 0.02$, $z = 1.73$, $p = .08$, and neither was progress on achievement goals, $B = -0.01$, $SE(B) = 0.02$, $z = -0.88$, $p = .38$.

When average achievement goal progress and average power goal progress were added to examine the between-person relationships between these constructs, mean progress towards power goals was not associated with mean ISS scores, $B = -0.08$, $SE(B) = 0.12$, $z = -0.65$, $p = .52$, and neither was mean progress towards achievement goals, $B = -0.10$, $SE(B) = 0.13$, $z = -0.78$, $p = .44$, at the between-person level. Against prediction, progress towards power goals was not significantly associated with greater daily ISS scores at the within-person or between-person levels of analysis, after controlling for progress toward achievement goals.

Achievement goal progress was not uniquely associated with ISS scores at either level of analysis.

Hypothesis 2. At both the between-person and within-person level of analysis, frustration / blockage of power goals will predict anger whilst controlling for achievement goal blockage, which will not predict anger.

As can be seen in Table 2, no significant negative relationship emerged between frustration of goals of either type and DAR scores at the within-person or between-person level of analysis.

The ICC for DAR scores was .30, indicating that most of the variability was within-person relative to between-person (between-person variance = 0.03, within-person variance = 0.08). The relationship between frustration of power goals and DAR scores was assessed in a multilevel model in which daily SPS scores was the criterion variable:

Daily achievement goal frustration and daily power goal frustration were entered into this model simultaneously. Unexpectedly, at the within-person level, frustration of achievement goals was associated with greater DAR scores on the same day, $B = 0.02$, $SE(B) = 0.01$, $z = 2.52$, $p = .01$, but frustration of power goals was not, $B = 0.01$, $SE(B) = 0.01$, $z = 1.20$, $p = .23$.

When average daily achievement goal frustration and average daily power goal frustration were added to examine between-person relationships, mean frustration on achievement goals was not associated with mean DAR scores, $B = 0.02$, $SE(B) = 0.04$, $z = 0.43$, $p = .67$, and neither was mean frustration power goals, $B = 0.01$, $SE(B) = 0.04$, $z = 0.23$, $p = .08$. Therefore, on a day-to-day basis, frustration of achievement goals was associated with greater daily DAR scores, controlling for frustration of power goals, but frustration of power goals was not associated with

greater daily **DAR** scores controlling for frustration of achievement goals, as was predicted. There was no significant relationship between frustration of either goal type and daily **DAR** scores at the between-person level.

Hypothesis 3. At higher levels of trait dominance, the strength of the relationship will increase between (i) power goal progress and daily mania, and (ii) power goal blockage and daily anger. This relationship will not be found in relation to achievement goals.

Although we did not find expected relationships between power goal progress/blockage and daily **ISS/DAR** scores respectively, we proceeded with the analysis to test whether higher **PRF-D** scores were associated with the strength of the relationship between power goal progress and daily **ISS** scores. **PRF-D**, daily power goal progress, daily achievement goal progress and the interactions between (i) **PRF-D** scores and daily power goal progress and (ii) **PRF-D** and daily achievement goal progress were entered into the model as predictors of daily **ISS** scores. Inspection of the interaction terms revealed that **PRF-D** scores did not significantly moderate the within-person relationship between power goal progress and daily **ISS** scores, $B = -0.00$, $SE(B) = 0.01$, $z = -0.60$, $p = .55$, or the within-person relationship between achievement goal progress and daily **ISS** scores, $B = 0.01$, $SE(B) = 0.01$, $z = 1.00$, $p = .32$ at the within-person level. At the between-person level **PRF-D** did not significantly moderate the between-person relationship between power goal progress and daily **ISS** scores, $B = 0.10$, $SE(B) = 0.08$, $z = 1.39$, $p = .16$, or the between-person relationship between achievement goal progress and daily **ISS** scores, $B = -0.02$, $SE(B) = 0.06$, $z = -.35$, $p = .73$.

To explore whether higher levels of trait dominance are associated with the strength of the relationship between power goal frustration and anger, **PRF-D**

scores, daily power goal frustration, daily achievement goal frustration and the interactions between (i) PRF-D and daily power goal frustration and (ii) PRF-D and daily achievement goal frustration were entered into a model as predictors of daily DAR symptoms. Inspection of the interaction terms revealed that PRF-D did not significantly moderate the within-person relationship between power goal frustration and daily DAR scores, $B = 0.00$, $SE(B) = 0.00$, $z = 1.00$, $p = .32$, or the within-person relationship between achievement goal frustration and daily DAR scores, $B = 0.00$, $SE(B) = 0.00$, $z = 0.33$, $p = .74$. At the between-person level, PRF-D did not significantly moderate the relationship between power goal frustration and daily DAR scores, $B = -0.01$, $SE(B) = 0.01$, $z = -0.92$, $p = .36$, or the between-person relationship between achievement goal frustration and daily DAR scores, $B = 0.01$, $SE(B) = 0.01$, $z = 0.57$, $p = .57$.

Taken together, there was no support for the hypothesis that trait dominance moderated the relationship between daily power goal progress/frustration and daily manic symptoms/anger respectively.

Discussion

To the best of the author's knowledge, this is the first study to test how perceptions of power fluctuate with mania, distinguishing between different types of approach goal pursuit progress (achievement and power) and their unique relationships with mania in a BD population. Ecologically valid measures of personally valued goals were assessed daily. The study tested the DBS model investigating whether there is a general approach motivation sensitivity or if this is specific to dominance in BD.

DBS theory would predict that there would be a positive correlation between baseline symptoms of mania and dominance motivation (ambitious explicit goal

setting and trait dominance), but this was not found. The null result could relate to the small sample size to detect between-person differences. A sensitivity analysis indicated the minimum correlation size (in the population) the study was powered to detect was $r = .49$. Therefore, this study may not have been sensitive enough to detect small or medium-sized effects. There was little variation in trait dominance scores and therefore, it was difficult to detect significant associations involving them. The small degree of variability of scores for these measures could relate to the euthymic state of participants, given that participants that were currently manic/depressed were excluded. Previous research has found that in individuals at-risk of mania, PRF-D scores correlate positively with mania (Johnson, Carver & Siegal, as cited in Johnson et al., 2012) and they endorsed elevated aspirations on subscales on the WASSUP related to extrinsic motivation, independent of current mania symptoms (Johnson & Carver, 2006). As this is the only study to assess these constructs in a clinical population, it is possible the relationship between these concepts is not found in individuals with BD, but does predict a vulnerability to BD.

Despite being informed by DBS theory, there was no support for a correlation between trait dominance and i) mean daily symptoms of mania, and ii) average daily sense of power. Previous research has found dominance motivation to correlate positively with mania, and it is suggested that individuals at-risk of mania have a persistently increased desire for power (Johnson, Carver & Siegal, as cited in Johnson et al., 2012c). The current study was conducted within a clinical population and extends previous findings, so it is possible that dominance motivation and power predict vulnerability to BD but are not correlated within clinical populations. Alternatively, the null findings may relate to the small sample size to detect effects.

A significant positive relationship was found between power goal progress and perceptions of power at the between-person and within-person level. This provides support for the specificity of perceptions of power relating to power goals rather than approach goals more generally. However, power goal progress did not predict mania at the between-person or within-person level, and did not provide support for the DBS model that fluctuations in perceived power trigger manic episodes in BD (Johnson et al., 2012c). A strong test of this hypothesis was conducted as achievement goal progress was controlled for, and daily diary methodology was used. Shared variance between achievement and power could, however, result in lowered sensitivity. Future studies could ask participants to select multiple power and achievement goals or test over a longer period of time to increase sensitivity.

With regards to goal frustration, results favoured the unexpected goal domain. It was hypothesised that blockage of power goals would predict anger based on theory that when power is threatened anger is likely, and this is more probable with increased dominance motivation (Archer & Webb, 2006). At the within-person level, blockage of achievement goals was a unique predictor of anger, and blockage of power goals was not. At the between-person level, neither blockage of achievement or power goals predicted anger. The null results at the between-person level may be due to the insufficient power, or may indicate that the relationship between goal progress and power is not straightforward. The non-significant between-person findings could suggest that power/dominance is of less importance within clinically diagnosed populations than those at-risk of mania. The finding is difficult to explain based on DBS theory, and suggests that goal frustration is related to anger for achievement goals. It is possible that differences in the achievement and power

goals set by the participants could explain this finding, such as achievement goals being more difficult to achieve and therefore more vexatious to pursue. Perhaps progress on achievement goals was more measurable, and so it was more apparent when goal frustration occurred, or there were more opportunities for achievement goals to be blocked. Comparisons of mean achievement goal and power goal ratings (importance, difficulty and expectancy) showed no significant differences.

Lastly, it was hypothesised that trait dominance would moderate the relationship between daily power goal progress and daily manic symptoms, and daily power goal blockage and anger. This prediction was somewhat moot given the failure to find significant relationships between power goal progress/blockage and manic symptoms/anger respectively at the between-person or within-person levels. The small number of participants also limited power to detect this cross level interaction. The null results do not lend support to the DBS model, or previous research suggesting the affective and cognitive consequences of achieving or failing to achieve power are likely to be different depending on the person's level of dominance motivation (Johnson et al., 2012c). Furthermore, the results do not provide support to the goal dysregulation theory of BD more generally.

It is important to consider methodological limitations in relation to the largely null findings. As there was no control group it was not possible to make group comparisons, and the study is blind to differences that could exist between individuals with BD and healthy controls, or individuals with depression that would be predicted by the DBS model. The results suggest there is not a simple relationship between dominance/power and manic symptoms within a BD population, particularly if they are euthymic.

Statistical power to detect differences at the between-person level was limited by the relatively small sample size which meant that there was only sufficient power to detect large between-person effects. The larger number of observations at the within-person level meant that there was adequate power to detect medium effect sizes within persons, but small effects were unlikely to have been detected. Therefore, it would be pertinent to replicate the study with a larger sample and include a comparison group with depression and / or healthy controls to assess between-group differences, which may be clinically important even if they are only medium-sized in statistical terms.

The DBS model proposes that during stable periods, individuals with BD and those at-risk for the disorder endorse a high degree of dominance motivation and sense of power (Johnson et al, 2012c). In this study, a relationship between mania and dominance was not found, however, due to the lack of a control group it was not possible to compare the relationships between these constructs in clinical and non-clinical populations. Participants were euthymic, which could be one reason why associations were not found. The DBS is proposed to have multiple facets, and relying solely on self-reported power at the day level conceivably was not sufficient to capture these multiple facets. Additionally, perhaps only asking participants to select one power goal was not sensitive enough to capture the construct. Paradigms that involve observing social behaviour in interpersonal interactions are a useful way to study the DBS (Taylor & Mansell, 2008) and could be utilised in future studies.

Another potential limitation is that goal relevance or importance could have changed during the diary period. Mean goal importance ratings at baseline indicated that goals were important at study commencement. A simple Likert scale could check that participants remained motivated towards their goals. A further criticism of

the goal measures is that they were one-item scales, and may not have been sufficiently sensitive. Of note, only two participants were not taking medication to treat BD, and potentially medication could obscure the relationship between power / dominance and mania. Whilst a strength of the study was the naturalistic design, it meant that fluctuations in mania, anger, or power may have related to extraneous influences. The null results could have arisen if there were not enough daily fluctuations in key variables across the period studied. There was also the potential for demand characteristics artificially inflating correlations between variables, as all measures were self-report. Finally, participants may have predicted what the researcher was investigating, thus biasing participants' cross-sectional responses.

However, given that a relatively strong test of DBS theory was conducted in a clinical population, it is important to consider the limitations of the DBS theory in light of the null findings. The most obvious outcomes that would be predicted by the DBS theory were not observed in this study: there was no evidence to support the theory's prediction that individuals with BD have increased trait dominance, or that there is an overvaluation of or greater reactivity to power goals. However, the DBS model does not take into consideration developmental and interpersonal risk factors in the development of BD, or the interactions between cognitive, developmental and interpersonal factors. Schwannauer, Noble and Fraser (2011) found direct effects of dysfunctional regulation of emotion and lack of social support in predicting bipolar risk, and argue that current negative interpersonal experiences (e.g., difficulties in attachment relationships) are more significant in the development of the disorder compared with past experiences. DBS theory does not take into consideration such factors, which may be more relevant to manic symptoms in a clinical population. The social support individuals with BD receive and interpersonal experiences they

encounter are also likely to be very different from a healthy student population or analogue sample. Life experiences of students are likely to differ from those who suffer with a severe mental health problems. It has been argued that models need to include these complex multilevel and dynamic processes (Schwannauer, 2011). Future studies testing these models could include measures of life events within daily diary methodology.

As stated, a strength of the study is that it was conducted within a clinical population. Most of the literature has relied upon analogue samples and given that the DBS theory relates to BD, it is appropriate that this is tested within this population. Due to the lack of significant findings it is difficult to draw any clinical implications, and this is perhaps made more complicated because of the lack of a control group examining how individuals with BD differ from healthy controls. In this regard, Johnson et al. (2012) suggest that it is important to consider the implications of repeated experiences of losing power, and other consequences of mental illness stigma on influencing beliefs about and the importance of achieving rank. This was considered particularly important given that much of the research on mania and dominance has assessed at-risk populations, and manic symptoms and their consequences could reduce self-perceptions of power in the longer term (Johnson et al., 2012). Within this sample, 27 of the 29 participants had a diagnosis of BDI and a mean age of 45 years, so you could argue there is a high likelihood that a significant proportion had experienced chronic mania symptoms.

Although this study did not provide support for the DBS theory of mania, longitudinal studies assessing mania and perceptions of power over a protracted period could prove fruitful and address the notion that perceptions of power reduce due to the negative impact of mania over time. Also, it would be useful to examine

the same processes in different mood states of BD (e.g. during mania, depression, and euthymia) and assess whether there are differences during the mood states or predictors of shifts between them.

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Appendices

Appendix A: Altman Self-rating Mania Scale

Instructions:

1. There are 5 statements groups on this questionnaire: read each group of statements carefully.
2. Choose the one statement in each group that best describes the way you have been feeling for the past week.
3. Check the box next to the number/statement selected.
4. Please note: The word "occasionally" when used here means once or twice, "often" means several times or more and "frequently" means most of the time.

Question 1

- 0 I do not feel happier or more cheerful than usual
- 1 I occasionally feel happier or more cheerful than usual
- 2 I often feel happier or more cheerful than usual
- 3 I feel happier or more cheerful than usual most of the time
- 4 I feel happier or more cheerful than usual all of the time

Question 2

- 0 I do not feel more self-confident than usual
- 1 I occasionally feel more self-confident than usual
- 2 I often feel more self-confident than usual
- 3 I feel more self-confident than usual
- 4 I feel extremely self-confident all of the time

Question 3

- 0 I do not need less sleep than usual
- 1 I occasionally need less sleep than usual
- 2 I often need less sleep than usual
- 3 I frequently need less sleep than usual
- 4 I can go all day and night without any sleep and still not feel tired

Question 4

- 0 I do not talk more than usual
- 1 I occasionally talk more than usual
- 2 I often talk more than usual
- 3 I frequently talk more than usual
- 4 I talk constantly and cannot be interrupted

Question 5

- 0 I have not been more active (either socially, sexually, at work, home or school) than usual
- 1 I have occasionally been more active than usual
- 2 I have often been more active than usual
- 3 I have frequently been more active than usual
- 4 I am constantly active or on the go all the time

Appendix B: WASSUP (adapted)

For each item on this page, choose the answer (from the choices just below) that best reflects how likely you are to set that as a goal for yourself.

- 1 = NO CHANCE I will set this goal for myself
- 2 = Slight chance I will set this goal for myself
- 3 = Moderate chance I will set this goal for myself
- 4 = Very good chance I will set this goal for myself
- 5 = Definitely WILL set this goal for myself

| | | | | | | |
|----|---|---|---|---|---|---|
| 1 | Celebrities will want to be your friends. | 1 | 2 | 3 | 4 | 5 |
| 2 | Someone will write a book about your life. | 1 | 2 | 3 | 4 | 5 |
| 3 | You will appear regularly on TV. | 1 | 2 | 3 | 4 | 5 |
| 4 | You will be famous. | 1 | 2 | 3 | 4 | 5 |
| 5 | You will be on a magazine list of the sexiest people alive. | 1 | 2 | 3 | 4 | 5 |
| 6 | You will develop a TV show or a movie. | 1 | 2 | 3 | 4 | 5 |
| 7 | You will have 20 million dollars or more. | 1 | 2 | 3 | 4 | 5 |
| 8 | You will have a major role in a movie. | 1 | 2 | 3 | 4 | 5 |
| 9 | You will have a million dollars or more. | 1 | 2 | 3 | 4 | 5 |
| 10 | You will have more than 50 lovers in your lifetime. | 1 | 2 | 3 | 4 | 5 |
| 11 | You will run a Fortune 500 company. | 1 | 2 | 3 | 4 | 5 |

Appendix C: PRF- Dominance

Below you will find a series of statements which a person might use to describe themselves. Read each statement and decide whether or not it describes you. If you agree with a statement or decide that it does describe you, circle T (TRUE). If you disagree with a statement or feel that it is not descriptive of you, circle F (FALSE). Answer every statement either true or false, even if you are not completely sure of your answer.

| | | |
|---|---|---|
| I feel confident when directing the activities of others. | T | F |
| I would make a poor military leader. | T | F |
| I would like to be a judge. | T | F |
| I avoid positions of power over other people. | T | F |
| I try to control others rather than permit them to control me. | T | F |
| I don't like to have the responsibility for directing the work of others. | T | F |
| I would like to play a part in making laws. | T | F |
| I have little interest in leading others. | T | F |
| In an argument, I can usually win others over to my side. | T | F |
| I feel uneasy when I have to tell people what to do. | T | F |
| The ability to be a leader is very important to me. | T | F |
| Most community leaders do a better job than I could possibly do. | T | F |
| I am quite effective in getting others to agree with me. | T | F |
| I am not very insistent in an argument. | T | F |
| I would like to be an executive with power over others. | T | F |
| I would not want to have a job enforcing the law. | T | F |

Appendix D: Internal State Scale

| | | | | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| Today my mood is changeable | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I feel irritable | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I feel like a capable person | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I feel like people are out to get me | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I actually feel great inside | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I feel impulsive | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today I feel depressed | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |
| Today my thoughts are going fast | | | | | | | | | | |
| 0 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 100 |
| Not at all Rarely | | | | | | | | | | Very much so Much of the time |

Today it seems like nothing will ever work out for me

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel overactive

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel as if the world is against me

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel "sped up" inside

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel restless

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel argumentative

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel energized

0 **100**

Not at all
Rarely

Very much so
Much of the time

Today I feel:

0 **100**

Depressed
Down

Normal

Manic
High

Appendix E: PHQ-9

Over the last 2 weeks, how often have you been bothered by any of the following problems:

| | Not at all | Several days | More than half the days | Nearly every day |
|--|------------|--------------|-------------------------|------------------|
| 1. Little interest or pleasure in doing things | 0 | 1 | 2 | 3 |
| 2. Feeling down, depressed, or hopeless | 0 | 1 | 2 | 3 |
| 3. Trouble falling or staying asleep, or sleeping too much | 0 | 1 | 2 | 3 |
| 4. Feeling tired or having little energy | 0 | 1 | 2 | 3 |
| 5. Poor appetite or overeating | 0 | 1 | 2 | 3 |
| 6. Feeling bad about yourself- or that you are a failure or have let yourself or your family down | 0 | 1 | 2 | 3 |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 0 | 1 | 2 | 3 |
| 8. Moving or speaking so slowly that other people could have noticed? Or the opposite- being so fidgety or restless that you have been moving around a lot more than usual | 0 | 1 | 2 | 3 |
| 9. Thoughts that you would be better off dead or of hurting yourself in some way | 0 | 1 | 2 | 3 |

If you have checked off *any* problems, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all
Extremely difficult

Somewhat difficult

Very difficult

Appendix F: Generalised sense of power scale

In rating each of the items below, please use the following scale:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------|----------|----------------------|----------------------------------|-------------------|-------|-------------------|
| Disagree Strongly | Disagree | Disagree a little | Neither agree nor disagree | Agree a little | Agree | Agree Strongly |

In my relationships with others _____

I can get people to listen to what I say _____

My wishes do not carry much weight _____

I can get others to do what I want _____

Even if I voice them, my views have little sway _____

I think I have a great deal of power _____

My ideas and opinions are often ignored _____

Even when I try, I am not able to get my way _____

If I want to, I get to make the decisions _____

Appendix G: Dimensions of Anger Reactions-5

Thinking over the past 24 hours, circle the number under the option that best describes the amount of time you have felt this way.

| | None or almost none of the time | A little of the time | Some of the time | Most of the time | All or almost all of the time |
|--|---------------------------------|----------------------|------------------|------------------|-------------------------------|
| 1. I found myself getting angry at people or situations | 1 | 2 | 3 | 4 | 5 |
| 2. When I got angry I got really mad | 1 | 2 | 3 | 4 | 5 |
| 3. When I got angry I stayed angry | 1 | 2 | 3 | 4 | 5 |
| 4. When I got angry at someone I wanted to hit them | 1 | 2 | 3 | 4 | 5 |
| 5. My anger prevented me from getting along with people as well as I'd have liked to | 1 | 2 | 3 | 4 | 5 |

Appendix H: Goal Setting

Here I would like you to identify two personal goals. You should choose goals that are meaningful to you personally and not goals you think you 'should' be pursuing. These should be goals that you have been trying to achieve most of the time and that you typically strive to do (consciously or unconsciously). Therefore, these goals do not have to be objectives that you consciously keep in mind but they should be things that you find yourself trying to do in everyday life (whether or not you succeed). These goals should refer to desired outcomes that you are seeking to attain rather than undesirable things you are trying to avoid.

One goal should be an achievement goal and one goal should be an influence goal. An achievement goal would be a goal relating to the personal attainment of excellence, success or mastery. Achievement is a concern with doing things better, surpassing standards of excellence, or concern about success in competition with some standard of excellence. An influence goal would be a goal relating to the desire to impact upon other people and affect their behaviours and emotions. It's an individual's capacity to affect the behaviour or feelings of another person.

To show you what we mean by this, we have given some examples of "achievement" and "power" driven goals below. You might find it helpful to look at these before answering the questions below. I do not expect you to choose one of the examples given as your own goal, although you are permitted to do so. These examples are simply to give you an idea of what these types of goals might look like. What is important is that you choose one goal of each type that is most personally meaningful to you.

Goal Examples

| Achievement goals (<i>attainment of excellence, success or mastery</i>) | Influence goals (<i>impacting upon others / affect the feelings/behaviour of others</i>) |
|--|---|
| Outperform my work colleagues | Get other people listen to what I say |
| Work on getting a qualification | Be respected as a source of authority |
| Improve my chess ranking | Help my brother get back on the 'straight and narrow' |
| Reach a higher ranking in tennis | Increase my social status in the community |
| Be able to play a difficult piano piece | Have a leadership role in my organisation |
| Make progress on a DIY project at home | Guide my daughter to make the right choices in life |
| Improve my cookery skills | Become the 'go-to' person for technical issues at work |
| Learn a new foreign vocabulary | Always win arguments with other people |
| Create something truly new and original | Get my partner to commit more to our relationship |
| Complete an artistic piece of work | Be respected by friends and colleagues |

Goal 2- Influence directed goal

1. How important is this goal to you?

| | | | | | | |
|------------|---|---|---|---|---|--------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Not at all | | | | | | Very Much |

2. How difficult do you think the goal is to achieve?

| | | | | | | |
|-------------------|---|---|---|---|---|------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Extremely Easy | | | | | | Extremely Difficult |

3. How much progress do you expect to make towards this goal over the duration of the study?

| | | | | | | |
|----------------|---|---|---|---|---|--------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| None at all | | | | | | Very Much |

Appendix I: Goal progress

Using the scale below, report on your goal pursuit over the past 24 hours.

| | | | | | | |
|---------|---|---|---|---|---|------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| None at | | | | | | Very |
| all | | | | | | Much |

| | |
|--|--|
| 1. How much effort they have made on the [goal] since the last assessment? | |
| 2. How much progress have you made on [goal] since the last assessment? | |
| 3. How much progress do you expect to make on [goal] by the next assessment? | |
| 4. To what extent has this goal been frustrated today? | |

Appendix J (i): Ethics documentation - NRES



Health Research Authority

NRES Committee South West - Frenchay

Level 3, Block B

Whitefriars

Lewins Mead,

Bristol BS1 2NT

Email: nrescommittee.southwest-frenchay@nhs.net

Telephone: 0117 342 1335

Fax: 0117 342 0445

27 May 2015

Mrs Helena Blowers
32 Hallett Road
Castle Cary
Somerset
BA7 7LG

Dear Mrs Blowers

Study title: Relationship between physical activity, goal pursuit and mood in Bipolar disorder
REC reference: 15/SW/0069
IRAS project ID: 170945

Thank you for your response. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 15 May 2015

Documents received

The documents received were as follows:

| <i>Document</i> | <i>Version</i> | <i>Date</i> |
|--|----------------|-------------|
| Participant information sheet (PIS) [Participant information sheet for BD group] | 1.2 | 19 May 2015 |

Approved documents

The final list of approved documentation for the study is therefore as follows:

| <i>Document</i> | <i>Version</i> | <i>Date</i> |
|--|----------------|----------------|
| Copies of advertisement materials for research participants | 1 | |
| Copies of advertisement materials for research participants (controls) | 1 | |
| Covering letter on headed paper | | |
| Covering letter on headed paper | 1.0 | 28 April 2015 |
| Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) | | 08 August 2015 |
| GP/consultant information sheets or letters [Information for CMHT] | 1.1 | 21 April 2015 |
| GP/consultant information sheets or letters [Information sheet for GP] | 1.0 | 20 April 2015 |

A Research Ethics Committee established by the Health Research Authority

| | | |
|--|-----|------------------|
| Interview schedules or topic guides for participants | | |
| Ins. Cert. | | 01 August 2014 |
| IRAS Checklist XML [Checklist_26022015] | | 26 February 2015 |
| IRAS Checklist XML [Checklist_06032015] | | 06 March 2015 |
| IRAS Checklist XML [Checklist_06032015] | | 06 March 2015 |
| IRAS Checklist XML [Checklist_28042015] | | 28 April 2015 |
| IRAS Checklist XML [Checklist_29042015] | | 29 April 2015 |
| Letter from funder | | |
| Letter from sponsor | | 23 February 2015 |
| Letter from statistician (undated) | | |
| Letters of invitation to participant (Poster) | 1 | 23 December 2014 |
| Letters of invitation to participant (covering letter) | | undated |
| Letters of invitation to participant | 1.0 | 03 January 2015 |
| Participant consent form [Consent form BD group] | 1.1 | 21 April 2015 |
| Participant consent form [Consent form control group] | 1.0 | 21 April 2015 |
| Participant information sheet (PIS) [Control group information sheet] | 1.1 | 20 April 2015 |
| Participant information sheet (PIS) [Participant information sheet for BD group] | 1.2 | 19 May 2015 |
| REC Application Form [REC_Form_26022015] | | 26 February 2015 |
| Referee's report or other scientific critique report (for HB) | | 27 October 2014 |
| Referee's report or other scientific critique report (for HM) | | 27 October 2014 |
| Research protocol or project proposal | n/a | undated |
| Summary CV for Chief Investigator (CI) Helena Blowers | | |
| Summary CV for student (HM) | | |
| Summary CV for supervisor (student research) | | |
| Summary, synopsis or diagram (flowchart) of protocol in non technical language | 1 | 06 January 2015 |
| Validated questionnaire (BIS/BAS) | | |
| Validated questionnaire – Daily diary measures | 1 | 6 January 2015 |

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

15/SW/0069

Please quote this number on all correspondence

Yours sincerely



Naazneen Nathoo

REC Manager


Copy to: Mrs Gail Seymour

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Authority

Appendix J (ii): Ethics documentation – University Ethics

Reply all | Delete | Junk | ...

Your application for ethical approval (2015/929) has been accepted

 apache@exeter.ac.uk on behalf of Ethics Approval System <D.M.Salway@exeter.ac.uk>
02/06/2015
Moakes, Hannah

Reply all

You forwarded this message on 02/06/2015 11:47

Ethical Approval system

Your application (2015/929) entitled Physical activity, goals, and mood in bipolar disorder has been accepted

Please visit <http://www.exeter.ac.uk/staff/ethicalapproval/>

Please click on the link above and select the relevant application from the list.

Appendix K: Participant Information Sheet



Study of Bipolar disorder, physical activity and goal pursuit Participant Information Sheet

Our names are Helena Blowers and Hannah Moakes and we are Trainee Clinical Psychologists. We are doing a study exploring two separate aspects of Bipolar disorder i) the relationship between physical activity and mood, and ii) the relationship between the pursuit of goals and mania. We are also interested in how physical activity and goal pursuit relate to each other. Both of these studies could influence the development of interventions for individuals with Bipolar disorder.

We would like to invite you take part in this study, but before you decide whether or not you would like to participate, please read this information sheet carefully. Please feel free to contact us, at the contact details given below, if you have any further questions after reading this information sheet.

Aims of study

This study aims to look at the physical activity levels of individuals with Bipolar disorder, and how this may be associated with their symptoms of mania and depression. It also aims to look at the goals set by individuals with Bipolar disorder and how goal pursuit relates to symptoms of mania.

What is involved?

Should you wish to participate, you will be taking part in an initial interview that will be conducted over the phone, which asks about your current and previous Bipolar symptoms. This interview will take approximately 1 hour of your time, but timing of the interview would be agreed with you beforehand. The initial interview will be audio recorded to enable researchers to listen to it again to ensure accuracy of the researcher. The recordings will be stored in a password protected computer and only accessible to the researchers. The recordings will not be used for any other research projects in the future.

Following the interview, we would inform you whether or not you are eligible to take part in the study. If you are eligible for this study, this is not a clinical diagnosis of Bipolar disorder, and if you wish, you can consult your GP for further advice. If you decide to take part we will then send you a link to questionnaires that you would fill in anonymously. Alternatively, if you do not have access to the internet, we can send you the questionnaires in the post with a prepaid envelope to return them to us. We estimate these questionnaires should take approximately 30 minutes to complete, but could take longer.

Also, you will be asked to identify two goals that you plan to work towards during the duration of the study. You will be asked to identify one achievement goal and one social influence goal. Along with this information sheet you will find some examples of goals that might help you to generate your own personal goals. There is also a goal setting form that you will be asked to complete if you decide to participate in the study.

Once these have been completed you would be filling in daily diaries, at the end of each day, for two weeks. This will be done online, or for participants who don't have access to the internet this can be done on paper. At the end of week one and end of week two you will be asked to complete two additional questionnaires.

The diaries should take approximately 12- 15 minutes to complete each day, but may take longer. You will be asked about the physical activity/exercise you have done that day, rate your mood, feelings in general to life events and report on goal progress.

All your personal details will be kept confidential and stored in a secure place, and when the results from the study are written up, it will not include your name or any other identifiable information, just information about the range of participants in the studies, such as average age, gender and the results of questionnaires and diaries.

Why am I being asked to take part?

You have been invited to take part in this study because you are someone who has been diagnosed with Bipolar Disorder, or someone who thinks that this diagnosis may fit with your experiences.

Do I have to take part?

It is completely up to you whether or not you take part. If you decide you would like to take part, please contact us via the below details and we will send you a Consent form for you to fill in and return without cost. We will also arrange a time to ring you to complete the phone interview and send you a link to the questionnaires. If you decide to take part, you will still be able to end your participation at any time, without having to give a reason.

Are there any risks?

Taking part in these studies will require you to commit to fill in the daily diaries each evening for two weeks. Additionally, you will need to participate in the phone interview, where you will be asked questions that you may find difficult or upsetting. You will however be given the opportunity to discuss this with the researchers, and we will encourage you to contact your GP or care co-ordinator if you find any of the tasks upsetting.

Are there any benefits?

By taking part in these studies you would be helping us build the evidence base for Bipolar disorder research and possibly contributing to interventions being developed in the future. As a thank you for your time, we will send you a gift voucher following your completion in the study.

Where will the results be shown?

The researchers aim to publish the work in an academic journal and to report the findings at an academic conference. We will also give all participants who request one a summary of the results of the research, and will give this summary to the organisations who assisted with advertising our study. Your identity will not be revealed in any report or publication. Generally our research is reported on the University of Exeter Mood Disorders Centre website at: <http://www.centres.ex.ac.uk/mood>.

Will my taking part in this study be kept confidential?

We will notify your GP of your participation in this study. This is to ensure that he / she is aware of what this will involve for you and can take this into account if you have contact with one another during or after the study. We will also inform Spectrum that you are taking part, to ensure they can respond to any queries that may arise from you.

All information collected about you during the course of the research will be kept strictly confidential. Any information about you that is collected from the interview will have your name and address removed so that you cannot be recognised from it. We may include quotations from interviews within reports of the findings. However these will be anonymous and it will not be possible to identify from whom they came. Confidentiality will be broken only in exceptional circumstances, for example if it is felt by the researcher that you or someone else may be at immediate risk. In such circumstances it may be necessary for us to inform another person(s), for example your GP, but as far as possible we will do this in discussion with you.

Contact for further information

If you would like any independent advice about participating in research you can contact Folk.us at www.projects.ex.ac.uk/folk.uk/, PALS the local Patient Advice and Liaison Service, or INVOLVE at www.invo.org.uk/.

[If at any time during the study you wish to make a complaint then you can contact PALS, or Dr Tim Kurz, at T.R.Kurz@exeter.ac.uk \(Psychology Research Ethics Committee, University of Exeter\).](#)

The research workers on this study are Helena Blowers and Hannah Moakes. They can be contacted on :

Mood Disorders Centre
School of Psychology
University of Exeter
Exeter EX4 4QG
01392 264645 / ha285@exeter.ac.uk ; hm349@exeter.ac.uk

If you have any further questions please feel free to talk to Kim Wright or Nick Moberly, the supervisors on this project:

Dr. Kim Wright
Clinical Psychologist
Mood Disorders Centre
School of Psychology
University of Exeter
Exeter EX4 4QG
01392 265227
K.A.Wright@exeter.ac.uk

Dr Nick Moberly
Mood Disorders Centre
School of Psychology
University of Exeter
Exeter EX4 4QG
01392724656
N.J.Moberly@exeter.ac.uk

We would like to thank you for taking the time to read this information sheet.

Sincerely

Helena Blowers & Hannah Moakes

Appendix L: Consent Form

Centre Number:

Study Number:

CONSENT FORM

Title of Project: Physical Activity, Goals and Mood in Bipolar Disorder

Name of Researcher:

Please initial all boxes

| | | |
|---|--|--------------------------|
| 1 | I confirm that I have read and understand the information sheet dated 19.5.15 (version 1.2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. | <input type="checkbox"/> |
| 2 | I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. | <input type="checkbox"/> |
| 3 | I understand that data collected during the study, may be looked at by individuals from regulatory authorities or from the NHS Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records. | <input type="checkbox"/> |
| 4 | I agree to provide my contact details and GPs details in order to allow researchers to notify my GP of my participation and respond appropriately in the unlikely event of an immediate risk to me or to someone else. | <input type="checkbox"/> |

In addition you may indicate your preference below with respect to two further items, by initialling the box if you agree to the item

| | | |
|---|---|--------------------------|
| 5 | I agree to my interview to be audio-taped for research and data analysis purposes | <input type="checkbox"/> |
|---|---|--------------------------|

| | | |
|---|---|--------------------------|
| 6 | I would like to be sent information about the results of the research when they are available | <input type="checkbox"/> |
|---|---|--------------------------|

Name of Participant

Date

Signature

Name of Person
taking consent.

Date

Signature

Appendix M: Submission Guidelines for Authors from Journal of Abnormal Psychology

Masked Reviews

Masked reviews are optional and must be specifically requested in the cover letter accompanying the submission. For masked reviews, the manuscript must include a separate title page with the authors' names and affiliations, and these ought not to appear anywhere else in the manuscript.

Footnotes that identify the authors must be typed on a separate page.

Make every effort to see that the manuscript itself contains no clues to authors' identities.

Types of Articles

Brief Report

Brief reports cannot exceed 5,000 words in overall length (including references, tables, footnotes, author notes, appendices, and figure captions). Brief reports can have a maximum of two figures (there is no table limit).

Extended Article (submit as a regular article, note extended in cover letter)

- Extended articles are published within regular issues of the Journal (they are not free-standing). This article type is reserved for manuscripts that require extended exposition beyond the length of a regular article (e.g., reporting results of multiple experiments, multifaceted longitudinal studies, cross-disciplinary investigations, or studies that are extraordinarily complex in terms of methodology or analysis). Any submission that exceeds 12,000 words will automatically be considered an Extended Article.
- Extended articles should be submitted through the submission portal as regular articles, with the distinction of "Extended Article" being noted in the cover letter.

Regular Article

Regular Articles typically should not exceed 9,000 words in overall length (excluding figures).

Commentary

Commentaries on articles previously published in *Journal of Abnormal Psychology* are also considered for publication. Commentaries should contain original data relevant to the topic at hand. They are subject to the same process of peer review

and the same editorial criteria and standards as any other manuscript. If a commentary is deemed acceptable for publication, authors of the original submission are given the opportunity to reply to the commentary. Commentaries may be no more than half the length of the original article, and replies may be no more than half the length of the commentary. A commentary and reply will be published together. Except under rare circumstances, there will be only one round of comment and reply.

Cover Letters

All cover letters must contain the following:

- a statement that the material is original — if findings from the dataset have been previously published or are in other submitted articles, please include the following information:
 - Is the present study a new analysis of previously analyzed data? If yes, please describe differences in analytic approach.
 - Are some of the data used in the present study being analyzed for the first time? If yes, please identify data (constructs) that were not included in previously published or submitted manuscripts.
 - Are there published or submitted papers from this data set that address related questions? If yes, please provide the citations, and describe the degree of overlap and the unique contributions of your submitted manuscript.
- the full postal and email address of the corresponding author;
- the complete telephone and fax numbers of the same;
- the proposed category under which the manuscript was submitted;
- a statement that the authors complied with APA ethical standards in the treatment of their participants and that the work was approved by the relevant Institutional Review Board(s);
- whether or not the manuscript has been or is posted on a web site;
- that APA style (*Publication Manual*, 6th edition) has been followed;
- the disclosure of any conflicts of interest with regard to the submitted work;
- a request for masked review, if desired, along with a statement ensuring that the manuscript was prepared in accordance with the guidelines above.

Authors should also specify the overall word length of the manuscript (including all aspects of the manuscript, except figures) and indicate the number of tables, figures, and supplemental materials that are included.

Manuscript Preparation

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* (6th edition). Manuscripts may be copyedited for bias-free language (see Chapter 3 of the *Publication Manual*).

Review APA's Checklist for Manuscript Submission before submitting your article.

Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the *Manual*.

Below are additional instructions regarding the preparation of display equations, computer code, and tables.

Display Equations

We strongly encourage you to use MathType (third-party software) or Equation Editor 3.0 (built into pre-2007 versions of Word) to construct your equations, rather than the equation support that is built into Word 2007 and Word 2010. Equations composed with the built-in Word 2007/Word 2010 equation support are converted to low-resolution graphics when they enter the production process and must be rekeyed by the typesetter, which may introduce errors.

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- Go to the Text section of the Insert tab and select Object.
- Select MathType or Equation Editor 3.0 in the drop-down menu.

If you have an equation that has already been produced using Microsoft Word 2007 or 2010 and you have access to the full version of MathType 6.5 or later, you can convert this equation to MathType by clicking on MathType Insert Equation. Copy the equation from Microsoft Word and paste it into the MathType box. Verify that your equation is correct, click File, and then click Update. Your equation has now been inserted into your Word file as a MathType Equation.

Use Equation Editor 3.0 or MathType only for equations or for formulas that cannot be produced as Word text using the Times or Symbol font.

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Tables

Use Word's Insert Table function when you create tables. Using spaces or tabs in your table will create problems when the table is typeset and may result in errors.

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All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five keywords or brief phrases.

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List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.

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Hughes, G., Desantis, A., & Waszak, F. (2013). Mechanisms of intentional binding and sensory attenuation: The role of temporal prediction, temporal control, identity prediction, and motor prediction. *Psychological Bulletin*, 139, 133–151. <http://dx.doi.org/10.1037/a0028566>
- **Authored Book:**
Rogers, T. T., & McClelland, J. L. (2004). *Semantic cognition: A parallel distributed processing approach*. Cambridge, MA: MIT Press.
- **Chapter in an Edited Book:**
Gill, M. J., & Sypher, B. D. (2009). Workplace incivility and organizational trust. In P. Lutgen-Sandvik & B. D. Sypher (Eds.), *Destructive organizational communication: Processes, consequences, and constructive ways of organizing* (pp. 53–73). New York, NY: Taylor & Francis.

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Graphics files are welcome if supplied as Tiff or EPS files. Multipanel figures (i.e., figures with parts labeled a, b, c, d, etc.) should be assembled into one file.

The minimum line weight for line art is 0.5 point for optimal printing.

For more information about acceptable resolutions, fonts, sizing, and other figure issues, please see the general guidelines.

When possible, please place symbol legends below the figure instead of to the side.

APA offers authors the option to publish their figures online in color without the costs associated with print publication of color figures.

The same caption will appear on both the online (color) and print (black and white) versions. To ensure that the figure can be understood in both formats, authors should add alternative wording (e.g., "the red (dark gray) bars represent") as needed.

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The APA Ethics Office provides the full Ethical Principles of Psychologists and Code of Conduct electronically on its website in HTML, PDF, and Word format. You may also request a copy by emailing or calling the APA Ethics Office (202-336-5930). You may also read "Ethical Principles," December 1992, *American Psychologist*, Vol. 47, pp. 1597–1611.

Appendix N: Paired t-tests between goal progress and frustration

A paired *t*-test for achievement goal progress ($M = 2.86$, $SD = 2.00$) and power goal progress ($M = 2.90$, $SD = 2.04$), showed no significant difference between goal types, $t(28) = -.08$, $p = .93$. A paired *t*-tests for achievement goal frustration ($M = 3.17$, $SD = 2.12$) and power goal frustration ($M = 2.69$, $SD = 1.89$), showed no significant difference between goal types, $t(28) = 1.03$, $p = .31$.

Appendix O: Dissemination Statement

The results of this study will be disseminated to interested parties through feedback, journal publication and presentation.

Dissemination to participants and NHS services.

As stated on the participant information sheet, participants that requested feedback from the study will be given a summary of the results. Results will not be fed back to participants individually. Participants have been informed that they may contact researchers using the contact details provided on the information sheet if they had any queries.

Journal Publication

It is expected that the study will be submitted for publication to the Journal of Abnormal Psychology. See Appendix M for instructions for authors.

Presentation

On 13th June 2016, my research findings were presented to an academic audience, for peer review, as part of the Doctorate in Clinical Psychology at the University of Exeter.