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Visual imagery, mood, and goal appraisal in bipolar disorder

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Overview

The following portfolio consists of three parts: a systematic literature review, an empirical study and a set of appendices.

Part one is a systematic literature review, in which the theoretical, conceptual and empirical literature related to goal processes in bipolar disorder is reviewed. The review begins with an overview of the research in this area, and in particular the Behavioral Activation System dysregulation theory of bipolar disorder. It continues with a rationale for the current review. The paper describes the methods used to obtain included studies, and synthesises the results into conceptually similar goal processes. An overview of the findings and limitations of the research is followed by an analysis of the limitations of the review, clinical implications, suggestions for future research and conclusions.

Part two is an empirical paper, which explores whether a novel imagery task and novel goal appraisal task are useful methods for the investigation of whether mood episodes in bipolar disorder are related to cognitive processes that amplify the effect of imagery in bipolar disorder. The effect of visual and verbal processing on mood and goal appraisal for participants in a control group are considered and compared to a small clinical group. The preliminary research findings and conclusions are followed by a discussion of the study's clinical limitations and implications for future research.

Part three comprises the appendices, which support the previous two parts. This includes a reflective statement and critical appraisal of the research process.

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PART ONE: Systematic Literature Review

Psychological Goal Processes in Bipolar Disorder: A Systematic Review of the Literature

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This paper is written in the format ready for submission to Clinical Psychology Review.

Please see Appendix B: Guideline for authors for the systematic literature review

Word count: 11,209

Abstract

Bipolar disorder is a serious and debilitating mental health disorder, which has a high personal and societal cost. BAS dysregulation theories of bipolar disorder state that psychological factors are particularly relevant for understanding when and why new mood episodes are triggered. This systematic review aimed to evaluate the evidence for qualitatively different psychological processes in relation to goal pursuit for individuals with bipolar disorder or at risk for developing bipolar disorder. Scopus, Academic Search Elite, PsycINFO, PsyARTICLES, CINAHL and Medline databases were searched to identify relevant literature. Twenty-eight studies were found to meet the inclusion criteria. Evidence related to dispositional factors, goal beliefs, goal-setting, goal appraisal, goal striving and goal regulation were reviewed. There are some significant trends, particularly the importance of goal attainment beliefs for individuals with bipolar disorder. However, the range of study designs and participant samples, along with the inherent heterogeneity of the presentation of bipolar disorder make drawing firm conclusions difficult. Further research into this area could lead to innovations in psychological and psychosocial interventions, and help prevent or diminish the occurrence of clinically significant mood episodes in individuals for whom the pharmacological treatments currently available are not effective.

Keywords: bipolar disorder, goals

1. Introduction

Bipolar disorder is a mood disorder characterized by extreme episodes of depression and mania (APA, 2000), that affects approximately 1.5% of the adult population (Hyman, 2000). Bipolar disorder is estimated to be one of the leading causes of disability worldwide (World Health Organization, 2001), and to cost UK society £2 billion annually (Das Gupta & Guest, 2002). There is strong evidence that biological and genetic factors contribute to bipolar disorder. For example, there is approximately 80% concordance for monozygotic twins raised together (Bertelsen, 1979; Bertelsen, Harvald, & Hauge, 1977) and approximately 67% concordance for monozygotic twins raised separately (Price, 1968; McGuffin & Katz, 1989).

Many people with bipolar disorder are now successfully treated using mood-stabilising medications such as Lithium. However, mood-stabilising medication is not effective for approximately two-thirds of people with bipolar disorder (Goodwin, 2002; Prien & Potter, 1990). Alternative psychological treatments such as cognitive-behavioural therapy have been developed with mixed results (Lam, 2003; Scott et al., 2006) and are currently recommended by the National Institute for Health and Clinical Excellence (NICE) in addition to pharmacological treatment following recovery from an acute episode (NICE, 2006). However, psychological interventions have been under-researched and the National Institute for Mental Health (NIMH) described this area of research as "stagnated" (Hyman, 2000, p. 439).

One of the problems with research in this area is the heterogeneity of the target population. For example, some people regularly suffer from episodes of depression and mania, whereas others can go many years without experiencing a significant mood episode. It is often argued that bipolar disorder is better conceptualised as a spectrum, with presentations ranging from normal to severe, particularly as hypomania is often under-reported and perceived to be normal wellbeing (Angst, 2007). Purely biological explanations of bipolar disorder do not explain the heterogeneity of presentation adequately. Increased

understanding of the psychosocial factors underlying the course of bipolar disorder, are likely to lead to more effective psychosocial interventions in the future, in conjunction with pharmacological treatments.

The most influential psycho-biological model of bipolar disorder has been the behavioural activation system dysregulation theory of bipolar disorder (BAS; Gray, 1982, 1991 1994; see Power, 2005 for review). The BAS is one of two neuropsychological systems identified by Gray: the Behavioural Activation System, and Behavioural Inhibition System (BIS). The BIS is a conditioning system which focuses on stimuli that are associated with punishment or non-reward. BIS stimuli trigger behavioural inhibition, i.e. interruption of ongoing activity, accompanied by arousal and attention to the environment. The BAS governs approach or reward-seeking behaviour. Depue et al. (1987) proposed that for individuals with bipolar disorder, regulation of the BAS is weaker, leading to extreme activation and deactivation of the BAS reward system. This increased reactivity to reward-related stimuli and events increases vulnerability to mood variations, and could lead to mania and depression (Depue, Krauss & Spoont, 1987; Depue & Iacono, 1989; Fowles, 1988).

Increased activity and goal-directed behaviour in bipolar disorder is a well-documented feature of bipolar disorder and forms part of the DSM-IV diagnostic criteria for manic episodes (Benazzi, 2007; APA, 2000). However, there has been less research into whether the psychological mechanisms underlying goal pursuit are qualitatively different for individuals with and without bipolar disorder. In unipolar depression, the process of setting, appraising and pursuing goals has been found to be linked to the onset and course of mood episodes (Meyer, Beevers, & Johnson, 2004), and these ideas are starting to be applied to bipolar disorder. Urošević, Abramson, Harmon-Jones and Alloy (2008) have expanded on the original BAS dysregulation model by including cognitive appraisal processes of goal relevance and perceived self-efficacy. In other words, if an individual construes a life event as congruent

or incongruent with their personal goals, and perceive themselves as able to achieve that goal, the event becomes BAS-activating or BAS-deactivating.

Whilst Urošević et al.'s (2008) expanded model of BAS dysregulation has face validity, it was not clear whether the researchers reviewed the evidence of goal-related processes in a systematic manner. It also did not clearly distinguish between different aspects of goal-related cognitions – e.g. goal setting and goal appraisal. This review sought to clarify what is meant by "goal dysregulation", and what aspects of goal-related processes are qualitatively different for individuals with bipolar spectrum disorders.

The aim of this systematic review was therefore to examine the research related to goal dysregulation in bipolar spectrum disorders, and in particular:

1. To establish what types of internal goal-related processes have been researched in bipolar spectrum disorders

2. To establish whether certain aspects of internal goal-related processes have been found to be qualitatively different in bipolar spectrum disorder compared to a control population.

3. To evaluate the strength of this research evidence

4. To review how any differences fit with Urošević et al.'s (2008) expanded model of BAS dysregulation

2. Method

A systematic review of the published literature was performed with the aim of producing an unbiased picture of the literature to date examining goal-related psychological processes in bipolar disorder.

2.1 Search Strategy

Electronic databases Scopus, Academic Search Elite, PubMed, CINAHL, PsycINFO and PsycARTICLES were searched in May 2011. Searches were conducted with a combination of the

following keyword terms: "bipolar disorder" OR "bipolar I" OR "bipolar II" OR "bipolar affective" OR "bipolar spectrum" OR mani? OR hypomani? OR "manic depressi*" OR BPD OR BD) AND goal* (* indicates truncation). Broad search terms were used to identify a maximal number of relevant studies, which were then further refined to studies relevant to the review question. Further studies were discovered via a bibliographic review of the initially selected publications.

2.2   Study Selection: Inclusion and Exclusion Criteria

Studies were included in the review if they fit the following inclusion criteria: (1) use of a sample of participants with bipolar disorder, hypomania, or risk for mania (2) investigated goal-related psychological processes (3) publication in a peer-reviewed journal, (4) published in English. As bipolar disorder is often conceptualised as a spectrum of disorders, studies using participants from non-clinical samples who had been identified as at high risk of developing bipolar disorder using a hypomania scale were also included.

Studies were excluded from the review if they failed to meet the inclusion criteria stated above, or if they met the following exclusion criteria: (1) review article, (2) single case study, (3) animal study, (4) intervention study.

Following an initial search, a decision was made about the suitability of each paper by examining the title and abstract. If the inclusion criteria were not met, the articles were discarded at this stage. If it appeared that the inclusion criteria could be met, the full-text articles were more thoroughly reviewed before a final decision was made about inclusion based on the above criteria. The bibliographies of identified articles were then examined for relevant articles that had been missed by the initial search (See Appendix D: Systematic Literature Review Excluded Studies).

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| Review articles (n = 3) | Case study (n = 3) | Animal (n =1) | Not specific to bipolar disorder (n = 8) | Not relevant to personal goals (e.g. treatment goal, research goal) (n = 24) | Not relevant to psychological goal processes (n =7) | Intervention study (n =3) | Not written in English (n =1) |

Figure 1: Data extraction summary

2.3   Quality Rating

The quality of the reviewed studies was examined to evaluate the reliability and validity of the evidence reported. There are a number of quality rating schemes and checklists that have been devised for this purpose. A new checklist to suit the purpose of the review was devised by modifying the Downs and Black (1998) and STROBE (2007) checklists (see Appendix E: Quality Checklist for a copy of the quality rating checklist).

2.4   Details of Included and Excluded Studies

A total of 64 unique articles were produced by the electronic search. A further 14 were identified by searching the references of key papers. 39 papers were not relevant to the review question because they were not related to bipolar disorder (8), personal goals (24) or internal goal-related processes (7: goal behaviour, neurological correlates, and life events). Three studies were excluded because they examined goal-focused interventions. Three review papers, three case studies and one animal study were excluded. One study was not written in English and was therefore excluded. A further 14 papers were identified by searching the references of the identified papers (see Figure 1 for details of this process, and Appendix D: Systematic Literature Review Excluded Studies).

2.5   Data Extraction

For each included study, the following data was extracted: goal-process being investigated, aim of study, study design, details of sample, screening and demographic measures used, outcome measure, basic procedure, main findings and conclusions.

3. Results

A total of 28 studies were identified as suitable for inclusion within the review, published between 1963 and 2010. Table 1 summarises the data extracted from these papers.

3.1. Characteristics of Participant Samples

Study sample sizes ranged from 39 (Lozano & Johnson, 2001) to 2562 (Krumm-Merabet & Meyer, 2005; Meyer & Krumm-Merabet, 2003). 18 studies used participants with a clinical diagnosis of bipolar disorder and 10 used a non-clinical sample.

3.1.1. Studies with a Clinical Sample

Of the 18 studies that used a clinical group, 12 compared bipolar disorder participants with a control group. Seven compared bipolar disorder with no history of psychiatric disorder. Five of these seven examined euthymic bipolar I disorder (Fulford, Johnson, Llabre, & Carver, 2010; Ruggero & Johnson, 2006; Scott, Stanton, Garland, & Ferrier, 2000; Spielberger, Parker, & Becker, 1963; Wright, Lam, & Brown, 2008) and two examined bipolar spectrum disorders - bipolar II and cyclothymia (Alloy et al., 2009; Nusslock, Alloy, Abramson, Harmon-Jones, & Hogan, 2008). Three of the 18 studies compared bipolar disorder with unipolar depression and a control group with no history of psychiatric disorder (Johnson, Eisner & Carver, 2009; Mansell & Lam, 2006; Murphy et al., 2001). Mansell & Lam (2006) examined euthymic patients, whereas Johnson et al. (2009) and Murphy et al. (2001) used samples of individuals who may have been displaying clinical levels of mania and depression. Two studies compared euthymic bipolar I disorder with euthymic unipolar depression (Lam, Wright, & Smith, 2004; Wright, Lam, & Newsom-Davis, 2005).

Six of the 18 studies that used a clinical group had no control group for comparison. Of these six, two used a euthymic bipolar I group (Lam, Wright, & Sham, 2005; Lee, Lam, Mansell, & Farmer, 2010) and four used participants with a mixture of subclinical and clinical mood

symptoms (Francis-Raniere, Alloy, & Abramson, 2006; Lam & Wong, 1997; Lam, Wong, & Sham, 2001; Lozano & Johnson, 2001). Of the six that used no control group, Francis-Raniere et al. (2006) were the only group of researchers who used a sample of bipolar II, cyclothymia or bipolar NOS.

3.1.2. Studies with a Non-clinical Sample

Ten studies used a non-clinical group of participants. Of these ten, nine studies used the hypomanic personality scale (HPS: Eckblad & Chapman, 1986) as a measure of lifetime risk for mania (Meyer & Baur, 2009; Fulford, Johnson, & Carver, 2008; Gruber & Johnson, 2009; Johnson & Carver, 2006; Johnson, Ruggero, & Carver, 2005; Jones, Shams, & Liversidge, 2007; Krumm-Merabet & Meyer, 2005; Meyer et al., 2004; Meyer & Krumm-Merabet, 2003). One study used the Mania Scale (Plutchik, Platman, Tilles, & Fieve, 1970) to divide participants into a high-risk and low-risk group using the median score as a cut-off point (Stern & Berrenberg, 1979).

Of the ten studies, two compared high-risk for mania groups with a control or low-risk group (Meyer & Baur, 2009; Stern & Berrenberg, 1979). The other eight studies did not compare groups, instead correlating HPS score with other measures.

Of the ten non-clinical studies, eight used a sample of university students and two used younger students aged roughly 13-17 years old (Krumm-Merabet & Meyer, 2005; Meyer & Krumm-Merabet, 2003).

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Table 1:

Summary of Reviewed Articles

Study	Goal Process	Aim	Design	Sample	Screening and Demographic Measures	Outcome Measures	Experimental Manipulation or Basic Procedure	Main Findings	Conclusion	QR
Alloy et al. (2009)	Goal beliefs	To examine association of BAS–relevant and non-BAS-relevant cognitive styles in BD.	Longitudinal (Prospective) Questionnaires	n = 195 bipolar spectrum (bipolar II, cyclothymia); n=194 controls no Axis I psychopathology except phobia (overall n = 389)	GBI; exp-SADS-L	exp-SADS-C; BDI; HMI; DAS; SAS; DEQ; BIS/BAS	Baseline measures of cognitive style and mood. Diagnostic interview every 4 months.	BD individuals scored higher on BAS-relevant dimensions. BAS-related cognitive dimensions predicted mood episodes.	Profile of BAS-relevant cognitive styles may influence the course of mood episodes.	93.75%
Francis-Raniere, Alloy, & Abramson (2006)	Dispositional	To test whether the interaction of personality style and congruent life events predicted increases in mood symptoms in BD.	Longitudinal (Prospective) Questionnaires	n = 106 bipolar II, cyclothymia or bipolar NOS	GBI; SADS-L; DSM-IV; RDC	SAS, DEQ, DAS; LES; LEI; SADS-C	Personality measures at baseline. After 4 months, completed life events measures and diagnostic measure.	Self-criticism and performance evaluation interacted with congruent life events to predict increases in mood symptoms. Attachment-oriented personality style buffered against depression.	Findings are consistent with the event congruency hypothesis.	93.75%

Fulford, Johnson, & Carver (2008)	Dispositional; Goal setting; Goal striving; Goal moderation	To investigate psychological qualities associated with vulnerability to mania and narcissism, including excessively high goals and impulsivity.	Cross-sectional; Questionnaires	n = 233 university students	None.	HPS; NPI; BIS/BAS; AIM; RPA; NEO-FFI (Agreeableness subscale); AQ-SF; POG; WASSUP; SCS: CFC; BIS-11;	No experimental manipulation. Completed questionnaire.	Narcissistic and hypomanic tendencies related to higher affective and goal dysregulation. Impulsivity was related to higher hypomania but not narcissistic tendencies.	There are key commonalities and differences between those at risk for mania versus narcissism in a non-clinical population.	86.67%
Fulford, Johnson, Llabre, & Carver (2010)	Goal appraisal Goal striving; Goal moderation	To test the influence of goal progress on subsequent effort toward that goal.	Experimental, Repeated Measures; Experience-sampling method	n = 12 euthymic bipolar I disorder n=12 no history of mood disorder (overall n=24)	SCID; MHRSD; BRMRS	Likert scales (0-4): effort toward goal, how close to goal, expected goal progress.	Signalling device prompted participants to answer questions about 3 approach-related goals 3 times a day, for 21 days.	No differences for lower-than expected goal progress. After better-than-expected goal progress, people with BD decrease effort toward goals significantly less than controls.	Deficits in coasting may be a predictor of mania.	62.5%
Gruber & Johnson (2009)	Dispositional; Goal Appraisal	To examine whether risk for mania is related to dispositional positive affect and ambitious goal setting in bipolar disorder	Cross-sectional; Questionnaires	n=302 university students	None.	HPS, BDI-SF, ASRM, DPES, WASSUP, PANAS	No experimental manipulation.	Risk for mania strongly correlated with reward and achievement-focused emotions. HPS scores were more strongly related to extrinsic (fame, politics) rather than other-oriented (friends, family) ambitious life goals, and wealth.	Risk for mania is associated with focus on extrinsically-oriented rewards, pride and achievement-oriented emotions, compared to prosocial goals.	86.67%

Johnson & Carver (2006): Two studies.	Goal Appraisal	To examine whether people vulnerable to mania set elevated goals	Cross-sectional; Questionnaires	Study 1 (students): n= between 138 and 411 for different measures	None.	HPS IDD-L; SRMI; BDI-SF; Academic Performance: Scholastic Aptitude Test; BIS/BAS; WASSUP	Completed questionnaires in first week of semester. Additional scales completed 3-6 weeks later.	Lifetime vulnerability to hypomania related to trait reward sensitivity and to high goals for popular fame, political influence, and financial success.	At least two aspects of intense goal pursuit - high ambition and sensitivity to potential incentives are particularly present among people who are at risk for mania, even after controlling for current mood symptoms.	62.5%
	Goal Appraisal	To investigate lack of relationship between HPS and social goals found in study 1 with a modified WASSUP scale.	Cross-sectional; Questionnaires	Study 2: n = 888 undergraduate students	HPS; IDD-L; SRMI; BDI-SF	BIS/BAS; WASSUP	No experimental manipulation. All measures completed in first week of semester over two consecutive semesters.	Replicated study 1. HPS related to setting creative goals. Relation between HPS and goals strongest for goals that were endorsed more rarely by people with low HPS scores.		
Johnson, Eisner, & Carver (2009)	Goal appraisal	To examine whether life expectancies are higher for people with BD, and if this is related to history of mania and depression.	Cross-sectional; Questionnaires	Students – high on HPS/IDD-L n=16 bipolar with lifetime MDE; n=11 bipolar no MDE; [n=15 bipolar I; n=5 bipolar II; n=7 BD NOS]; n=35 h/o MDE; n=41 no h/o mood disorders (overall n = 103)	HPS, IDD-L, SCID	SCID; CES-D, SRMI, WASSUP	No experimental manipulation.	History of mania, but not depression was related to higher expectations of achieving popular fame and wealth and public recognition.	People with history of mania anticipate great success in domains involving public recognition.	86.67%

Johnson, Ruggero, & Carver (2005)	Goal appraisal; Goal moderation	To investigate how hypomanic symptoms predict incentive-related outcomes in a student sample.	Experimental, Repeated measures	n=156 undergraduate students	HPS; IDDL	ISS; Adjective rating (positive affect); Expectancies of success on Go Task; Goal-setting	Reaction-time procedure (button-pressing task). Expectancy of success rated before task and after success feedback and monetary reward.	Lifetime hypomanic vulnerability and current symptoms tended to predict higher success expectancy after reward. Lifetime hypomanic vulnerability related to higher goal-setting for future tasks after reward.	People with hypomanic tendencies show elevated goal-setting and over–interpret initial success, which may lead to excessive behavioural involvement.	87.5%
Jones, Shams, & Liversidge (2007): Two studies	Dispositional; Goal beliefs; Goal striving	Study 1: Explores links between approach and avoidance goals, hypomanic personality, and behavioural risk of hypomania. Also, between cognitive styles, and approach and avoidance goal pursuit.	Cross-sectional; Questionnaires	n = 172 students	None.	HPS; AGQ; DAS	No experimental manipulation. Questionnaires	HPS score was significantly related to AGQ approach, but not AGQ avoidance. There appeared to be no relationships between cognitive style, as measured by DAS, and any of the other measures.	Results suggest a specific pattern of achievement motivation in hypomanic personality, compared to other disorders.	75%
		Study 2: Explores relationship between approach and avoidance temperament and goals, and contributions to behavioural risk of hypomania.	Cross-sectional; Questionnaires	n = 230 students	None.	HPS; AGQ; BIS/BAS	No experimental manipulation. Web-based questionnaires.	Association found between BAS and approach goals, and BIS and avoidance goals. BAS fun seeking and reward responsiveness predicted HPS score.	Relationship between approach goals and hypomanic personality disappears when temperament considered.	

Krumm-Merabet, & Meyer (2005)	Goal striving	To examine which activities students with a hypomanic temperament pursue outside of school and how much time they engage in these activities.	Cross-sectional; Questionnaires	Students aged 13-17 n = 300 HPS high-risk group n=1709 control group (overall n = 2562)	HPS; EPI	HPS; CES-D; questions about performance in school, future success, and leisure activities.	No experimental manipulation. Questionnaires.	High scorers on hypomania scale spent more time socializing, pursuing sports, smoked and drank alcohol more often, and were more often involved in fights.	May support the dysregulation model of the BAS system as a vulnerability factor in bipolar disorders.	68.75%
Lam & Wong (1997)	Goal striving; Goal moderation	To investigate BD prodromes, coping strategies, and insight, and whether these are related to good social functioning.	Cross-sectional; Questionnaires	n = 40 bipolar I patients not in an acute episode	DSM-IV (medical notes);	MRC-SPS; IQ; BRMRS; BDI; CWPI	Interviewed about prodromes of depression and mania, coping strategies, insight, and social functioning.	Prodromes more frequently detected for mania. Current depression, coping with prodromes of mania, recognising depression prodromes, and insight contributed to social functioning.	Social functioning was related to insight and coping and detection of prodromes.	100%
Lam, Wong, & Sham (2001)	Goal striving; Goal moderation	To investigate which bipolar prodromal symptoms were reported over 18 months, and to investigate which coping strategies were related to good outcome.	Longitudinal Questionnaires	n = 40 patients with bipolar I disorder	SCID-P	BRMRS; CWPSI; SCID-P; BDI;	Interviewed for prodromal symptoms and coping strategies at recruitment and 18 months with assessment of relapse.	Mania prodromes tended to be behavioural. Depression prodromes more diverse. Use of behavioural coping strategies linked to fewer mood episodes.	Patients with bipolar disorder are able to report prodromal symptoms. This can be utilised in therapy.	68.75%

Lam, Wright, & Sham (2005)	Goal beliefs	To investigate how extreme goal-attainment beliefs contribute to SHPSS scores. To explore response of high SHPSS scorers to cognitive therapy.	Longitudinal Questionnaires	n=103 euthymic bipolar I patients randomised into cognitive therapy (n=51) and control groups (n=52).	SCID, BDI; BRMRS; MRC-SPS; MHVS; MCQ	SCID – relapse status, number of days in bipolar episodes; BDI; BRMRS; SHPSS; DAS:BD;;	The SHPSS was administered at baseline and at a 6-month follow-up.	At baseline, Goal-Attainment dysfunctional attitudes contributed to SHPSS scores. High scorers had increased chance of relapse after controlling for other factors.	Cognitive therapy was less efficacious for patients with a high sense of hyper-positive self.	93.75%
Lam, Wright, & Smith (2004)	Goal beliefs	To compare DAS factors in bipolar disorder and unipolar depression. To identify factors that correlate with past bipolar episodes.	Cross-sectional Questionnaires / Principal components analysis	n=143 euthymic bipolar I n=109 euthymic unipolar depression (overall n=252)	SCID; BDI; ISS	DAS-SV, BDI; ISS	Three factors were derived from the DAS-24: Goal attainment, Dependency and Achievement.	BD patients scored higher for "goal attainment". "Goal attainment" also correlated with number of past hospitalisations.	The Goal-attainment subscale captures the risky attitudes described by the BAS theory and the cognitive model for BD. Goal-attainment beliefs may predispose BD patients to more severe illness.	87.5%
Lee, Lam, Mansell, & Farmer (2010)	Goal beliefs; Goal striving	To investigate the relationship between SHPSS and preferred mood, and whether dysfunctional attitudes increase mania-escalating behaviour.	Cross-sectional; Questionnaires	n=54 euthymic bipolar I participants	SCID; BDI; BRMRS	BDI; modified ASRM; SHPSS; DAS:BD; Scenarios Rating Task	No experimental manipulation.	High goal-attainment scores on DAS predicted increased ratings of coping and intended activity (e.g. working harder) in hypothetical situations.	Individuals with high goal-attainment attitudes may be vulnerable to excessive goal striving.	93.75%

Lozano & Johnson (2001)	Dispositional	To investigate the relationship between personality traits and the course of bipolar disorder	Longitudinal questionnaires	n = 39 participants with remitted bipolar disorder	SCID	MHRSD; BRMRS NEO-FFI	Participants completed symptom severity measures monthly.	High Neuroticism predicted increases in depressive symptoms. High Conscientiousness (Achievement Striving) predicted increases in manic symptoms.	Specific personality traits may predict bipolar symptoms across time.	87.5%
Mansell & Lam (2006)	Goal moderation	To investigate whether decision-making becomes less constrained by advice from other people during goal-directed behaviour and elevated mood in BD.	Experimental, Repeated measures	n = 32 remitted bipolar I n = 32 remitted unipolar depression n = 32 control (overall n=96) Allocated to a high or low mood induction.	SCID; BDI; BRMRS	ISS; BDI; BRMRS; HRDS; VAS	Advice-taking assessed before and after mood induction. Participants attempted to collect tokens in task that incorporated advice about task.	The bipolar group opposed the advice given in the task after the high mood induction. This effect remained after controlling for possible confounds.	Bipolar disorder is characterized by a specific bias to shift to use less advice during goal-directed behaviour while in an elevated mood state.	87.5%
Meyer & Baur (2009)	Goal moderation	To investigate whether people at risk for BD show stronger emotional reactions (particularly positive affect) in goal-attainment situations.	Experimental. Repeated Measures	Students. n = 16 high risk for mania n = 56 control group (overall n = 72)	HPS; SCID	modified CES-D; APM	Intelligence test was followed by success feedback before dice task. Affect was repeatedly assessed.	High-risk individuals generally reported more PA than controls. Different aspects of PA (interest, activation and joy) showed different time courses.	Individuals at risk for bipolar disorder often report elevated levels of positive affect.	75%

Meyer, Beevers, & Johnson (2004)	Goal appraisal	To investigate whether there are differential patterns of goal appraisals among individuals with symptoms of depression and hypomania/mania	Cross-sectional; Questionnaires	n = 464 university students	None.	Brief adjective mood ratings (positive and negative mood), BDI-II, ASRM, GBI, PPT (rate goals for 10 appraisal domains).	No experimental manipulation.	High scores of hypomania and current PA linked with positive goal appraisal. History of clinically significant hypomania correlated with negative pessimistic goal appraisals. This was mediated by higher depression symptoms.	People who are vulnerable to mania have complex goal cognitions, involving both positive and negative self-regard	68.75%
Meyer & Krumm-Merabet (2003)	Goal appraisal	To investigate whether individuals with hypomanic tendencies differ from others in school performance and predictions of future performance.	Cross-sectional; Questionnaires	n=2562 students aged 14-16	None.	HPS; CES-D; Academic Performance (grades in last exam); Likert scale predicting academic performance; Predictions of future success (0-100%)	Completed questionnaires.	High scores on the hypomania scale were not associated with superior academic performance, or exaggerated success in the near future. HPS predicted overly optimistic estimations of achievement in the more distant future.	These findings are consistent with the model of dysregulation of the Behavioral Activation System.	93.75%

Murphy et al. (2001)	Goal appraisal; Goal striving	To compare decision-making cognition in mania and depression.	Experimental	n = 18 bipolar I manic (medicated) n =22 major depressive disorder n=26 controls with no psychopathology (overall n=66)	NART; MMSE; DSM-IV; RDC; SADS-L; YMRS; HRSD; MADRS; CID; BDI	Decision making task: total points, number of blocks lost, speed of decision making, quality of decision-making, percentage bets	Computerized decision-making task to win maximum points possible by placing "bets" on outcomes with variably-weighted probabilities.	Both patient groups were impaired on this task. Manic but not depressed patients made suboptimal decisions, and this correlated with the severity of their illness.	BD patients show impairments in cognitive function, particularly executive, functioning. Cognitive impairment differs for mania and depression.	75%
Nusslock, Alloy, Abramson, Harmon-Jones, & Hogan (2008)	Dispositional; Goal striving	To investigate what psychological mechanisms promote high accomplishment (and low impairment) among bipolar spectrum individuals.	Cross-sectional; Questionnaires (part of longitudinal investigation)	University students aged 18-24 n=54 bipolar spectrum (bipolar II, cyclothymia) n=66 no major psychopathology. (overall n=120)	GBI; exp-SADS-L; DSM-IV	Academic transcript data (cumulative grade point average, number of dropped classes, whether a student withdrew from schooling; BIS/BAS; INS	Participants completed the BIS/BAS and INS scales. They were later asked to provide a copy of their academic transcripts.	On average, BD individuals obtained lower grades and dropped more classes. Impulsivity was associated with poorer academic performance for all individuals. BD individuals with high BAS drive and low impulsivity earned higher grades.	High BAS sensitivity, paired with low impulsivity, may contribute to the high achievement sometimes observed among bipolar individuals.	86.67%

Study	Construct	Aim	Design	Sample	Diagnosis Measures	Other Measures	Procedure	Results	Conclusion	Quality
Ruggero & Johnson (2006)	Goal appraisal; Goal moderation	To investigate the reactivity of people with BD to a laboratory stressor, along with changes in positive and negative affect, confidence, and performance on a secondary task.	Experimental	n = 28 bipolar I disorder in full or partial remission; n = 40 no h/o mood disorder (overall n=68)	SCID; MHRSD; BRMRS; SEQ; MCSD; Vocabulary subtest from WAIS-III	VAS for success expectancy; POMS-SF; Performance on Anagram task (mean time).	Concept formation task with 3 levels of failure feedback (stressor) completed before rating expected success for an anagram task.	BD group had higher expectations of success (unrelated to the levels of the stressor administered). High stressor levels interfered with the BD group's performance on secondary task.	Tentative support for reactivity to the stressor among the bipolar group in terms of impaired anagram performance, but not affect or confidence.	87.5%
Scott, Stanton, Garland, & Ferrier (2000)	Goal beliefs; Goal appraisal	To compare cognitive functioning and deficits in healthy control subjects with those of euthymic BD patients.	Cross-sectional; Questionnaires	n = 41 euthymic bipolar I patients; n = 20 controls no psychiatric history (overall n=61)	DSM-IV:; HRSD; MSS	BDI; NART; AMT; DAS; SAS; SEQ; MEPS	Completed a battery of mood and cognitive style measures.	BD individuals had higher levels of dysfunctional attitudes, sociotropy, over-general recall, and were less able to generate solutions to social problem-solving tasks. Cognitive dysfunction was correlated with number of previous illness episodes.	Cognitive vulnerability is similar for BD and unipolar depression. It is not possible to distinguish whether cognitive dysfunction is a cause or effect of bipolar disorder.	62.5%
Spielberger, Parker, & Becker (1963)	Goal beliefs	To investigate achievement values and needs in BD.	Cross-sectional; Questionnaires	Male veterans aged 25 to 65; n = 30 remitted patients with bipolar disorder n=30 non-psychiatric controls (overall n=60)	Diagnosis according to Kallman's (1953) definition. Lewis & Piotrowski's (1954) mental status signs.	F-Scale; TFI; V-Ach; N-Ach	Completed 4 attitude scales.	Individuals with bipolar disorder scored significantly higher than controls on all of the experimental measures except Need Achievement.	BD group showed authoritarian attitudes, traditional opinions and stereotyped achievement values, but not internalized achievement motives.	75%

Study	Construct	Aim	Design	Sample	Measures	Measures 2	Procedure	Results	Conclusion	Quality
Stern & Berrenberg (1979)	Goal appraisal	To explore the illusion of control in BD: association between predictions of future success and previous outcomes on skill and chance tasks, and attributions of personal ability and effort. Effects were predicted to be enhanced for participants high in mania.	Experimental	Undergraduate psychology students (96 females; 60 males) n = 76 high mania n = 80 low mania (overall n=156)	MS	Likert scale: recall of number of successes; attribution of performance to task difficulty, ability, and effort; perception of how valid the task was as a measure of ability.	Completed either a skill or chance task and given either 20, 50, or 80% success feedback. Completed attribution questionnaire, and predicted future success in skill or chance task.	Predicted success on skill tasks was affected more by previous skill outcomes than by chance outcomes. For high mania group, predicted success on chance tasks was affected more by outcomes on a previous skill task and attributions for personal responsibility on a skill task.	The illusion of control operates differently for individuals with high and low mania. Individuals with mania may misattribute causal effect to self for desirable outcomes.	62.5%
Wright, Lam, & Brown (2008)	Dispositional	To investigate whether individuals with BD take longer to recover to baseline levels of BAS activity, following high levels of reward or frustration.	Longitudinal, Questionnaires	n = 40 bipolar I disorder, currently euthymic; n = 40 no h/o affective disorder (overall n=80)	BDI; BRMRS; SCID	BEM; ISS; BRMRS; BDI; BIS/BAS-F	All participants completed a daily event record of rewarding and frustrating events plus self-report measures over 28 days.	Association found between previous mood episodes and recovery time following reward and frustration. No other differences.	No evidence of association between BD diagnosis and slow recovery of BAS activity. Some support for link with number of previous episodes.	86.67%
Wright, Lam, & Newsom-Davis (2005)	Goal beliefs	To investigate whether dysfunctional attitudes are mood-state dependent in remitted bipolar I affective disorder.	Experimental, Repeated Measures	n=40 remitted bipolar I; n=40 remitted unipolar depression; n=40 no h/o affective disorder (overall n=120)	SCID; BDI; BRMRS	DAS-24, BEM; VAS	DAS completed before and after positive or negative mood induction. Mood ratings and DAS repeated.	After positive mood induction, the BD group changed DAS total score less than others. Scores on goal-striving and achievement changed less than unipolar group.	Supports presence of dysfunctional cognitions in bipolar I disorder that are resistant to minor mood increases.	100%

<u>Guide to acronyms:</u>

AGQ = Achievement goals questionnaire (Elliott & Sheldon, 1997); AIM = Affect Intensity Measure (Larsen & Diener, 1987); AMT = Autobiographical Memory Test (Brittlebank, Scott, Ferrier, & Williams, 1992); APM = Advanced Progressive Matrices (Raven, Court, & Raven, 1980); ASRM = Altman Self-Rating Mania Scale (Altman, Hedeker, Janicak , Peterson, & Davis, 1997); AQ-SF = Buss-Perry Aggression Questionnaire Short Form (Buss & Perry, 1992); BDI = Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961); BDI-SF = Beck Depression Inventory, Short Form (Beck & Beck, 1972); BEM = Behavioral Engagement Measure (Krauss, Depue, Arbisi, & Spoont, 1992); BIS/BAS = Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) Scale (Carver & White, 1994); BIS/BAS-F = adapted version of BIS/BAS including Frustration Responsiveness (Wright, Lam, & Brown, 2008); BIS-11 = Barratt Impulsiveness Scale version 11 (Patton, Stanford, & Barratt, 1995); BRMRS = Bech-Rafaelson Mania Rating Scale (Bech, Bolwig, Kramp, & Rafaelson, 1979); CES-D = Centre for Epidemiological Studies-Depression Scale (Radloff, 1977); CID = Clinical Interview for Depression (Paykel, 1985); CFC = Consideration of Future Consequences Scale (Strathman, Gleicher, Boninger, & Edwards, 1994); CWPRSI = Coping with Prodromal Symptoms Interview (Lam & Wong, 1997); DAS = Dysfunctional Attitude Scale (Weissman & Beck, 1978); DAS-24 (Short Version of Dysfunctional Attitude Scale (Power et al., 1994); DAS:BD = Short Version of Dysfunctional Attitude Scale for Bipolar Disorder (Lam, Wright, & Smith, 2004); DEQ = Depressive Experiences Questionnaire (Blatt, D'Afflitti, & Quinlan, 1976); DPES = Dispositional Positive Emotion Scales (Shiota, Keltner, & John, 2006); DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (American Psychiatric Association, 1994); EPI = Eysenck Personality Inventory (Eysenck & Eysenck, 1964); F-scale = California Fascism Scale (Adorno, Frenkel-Brunswik, Levinson & Sanford, 1950); GBI = General Behavior Inventory (Depue, Krauss, Spoont, & Arbisi, 1989); HMI = Halberstadt Mania Inventory (Alloy, Reilly-Harrington, Fresco, Whitehouse, & Zechmeister, 1999); HPS = Hypomanic Personality Scale (Eckblad & Chapman, 1986); HRSD = Hamilton Rating Scale for Depression (Hamilton, 1960); IDDL = Inventory to Diagnose Depression, Lifetime Version (Zimmerman & Coryell, 1987); INS = Impulsivity Noncomformity Scale (Chapman et al., 1984); ISS = Internal State Scale (Bauer et al., 1991); IQ = Insight Questionnaire (David, Buchanan, Reed, & Almeida, 1992); LEI = the Life Events Interview (Alloy & Abramson, 1999); LES = Life Events Scale (Francis-Raniere, Alloy, & Abramson, 2006); MADRS = Mongromery-Asberg Depression Rating Scale (Mongomery & Asberg, 1979); MCSD = Marlowe Crowne Social Desirability Scale (Crowne & Marlowe, 1964); MCQ = Medication Compliance Questionnaire (Lam et al., 2000); MEPS = Mean Ends Problem-Solving Procedure (Platt & Spivack, 1975); MHRSD = modified Hamilton Rating Scale for Depression (Miller, Bishop, Norman, & Maddever, 1985); MHVS = Mill Hill Vocabulary Scale (Court & Raven, 1995); MMSE = Mini Mental State Examination (Folstein, Folstein, & McHugh,1975); MRC-SPS = Medical Research Council Social Performance Schedule (Hurry, Sturt, Bebbington, & Tennant, 1983); MS = Mania Scale (Plutchik, Platman, Tilles, & Fieve, 1970); MSS = Manic State Scale (Bech, Bolwig, Dein, Jacobsen & Gram, 1976); N-Ach = Need Achievement Scale (McClelland, Atkinson, Clark & Lowell, 1954); NART = National Adult Reading Test (Nelson, 1982); NEO Five-Factor Inventory (Costa & McRae, 1992); NPI= Narcissistic Personality Inventory (Raskin & Hall, 1979); PANAS = Positive and Negative and Affective Schedule (Watson, Clark & Tellegen, 1988); POG = Positive Overgeneralization (Eisner, Johnson & Carver, 2008); POMS-SF = Profile of Mood States-Short Form (Sacham, 1983); PPT = Personal Projects Task; RDC = Research Diagnostic Criteria (Spitzer, Endicott, & Robins, 1978); RPA = Responses to Positive Affect (Feldman, 2008); exp-SADS-C = expanded Schedule for Affective Disorders and Schizophrenia-Change (Spitzer & Endicott, 1978); exp-SADS-L = expanded Schedule for Affective Disorders and Schizophrenia-Lifetime (Endicott & Spitzer, 1978); SAS = Sociotropy Autonomy Scale (Beck, Epstein, Harrison, & Emery, 1983); SCID-P = Structured Clinical Interview for DSM-III – Patient Version (Spitzer & Williams, 1985); SCID = Structured Clinical Interview for DSM-IV (First et al., 1996); SCS = brief Self Control Scale (Tangney, Baumeister & Boone, 2004); SEQ = Rosenberg Self-Esteem Questionnaire (Rosenberg, 1965); SHPSS = Sense of Hyper-positive Self Scale (Lam, Wright, & Sham, 2005); SRMI = Self-Rating Mania Inventory (Altman, Hedeker, Peterson & Davis, 2001); TFI = Traditional Family Ideology Scale (Levinson & Huffman, 1955); V-Ach = Value Achievement Scale (DeCharms, Morrison, Reitman & McClelland, 1955); VAS = Visual analogue scale; WAIS-III = Wechsler Adult Intelligence Scale-III (Psychological Corporation, 1997); WASSUP = Willingly Approached Set of Statistically Unrealistic Pursuits (Johnson & Carver, 2006); YMRS = Young Mania Rating Scale (Young, Biggs, Ziegler & Meyer, 1978).

3.1.3   Screening Measures for Confirmation of Diagnosis

Of the 18 studies which used a clinical sample, 10 confirmed diagnoses using the Structured Clinical Interview for DSM-IV or III (Fulford et al., 2010; Johnson et al., 2009; Lam et al., 2001; Lam et al., 2005; Lam et al., 2004; Lee et al., 2010; Lozano & Johnson, 2001; Mansell & Lam, 2006; Ruggero & Johnson, 2006; Wright et al., 2008; Wright et al., 2005). Three studies that did not use SCID (Alloy et al., 2009; Francis-Raniere et al., 2006; Nusslock et al., 2008) were part of the Longitudinal Investigation of Bipolar Spectrum (LIBS) Disorders Project, which used two phases of screening. First, the GBI was administered to identify potential participants, and then a semi-structured interview (exp-SADS-L) was used to confirm that they met criteria for DSM-IV diagnosis and Research Diagnostic Criteria. One study confirmed DSM-IV diagnosis using medical notes (Lam & Wong, 1997) and two further studies used DSM-IV criteria but did not specify how this was confirmed (Murphy et al., 2001; Scott et al., 2000). One study used an older system of diagnosis according to Kallman's (1953) definition and Lewis and Piotrowski's (1954) mental status signs (Spielberger et al., 1963).

3.1.4   Screening Measures for Current Mood Symptoms

Of the ten studies that specified a euthymic sample, nine used self-report mood measures to define current mood symptoms levels. One study used psychiatric judgement that the patients were in clinical remission (Spielberger et al., 1963). Details of the measures used to define euthymia for the other nine studies are displayed in Table 2.

Table 2

Screening Measures for Current Mood

Study	Depression Score	Mania Score
Fulford, Johnson, Llabre, & Carver (2010)	MHRSD<10	BRMRS<7
Lam, Wright, & Sham (2005); Lee, Lam, Mansell, & Farmer (2010)	BDI < 30	BRMRS<9
Lam, Wright, & Smith (2004)	BDI ≤16 ISS depression = wellbeing≥125	ISS hypomanic/manic wellbeing score ≥125 ISS activation≤200
Mansell & Lam (2006)	BDI ≤16	BRMRS<7
Ruggero & Johnson (2006)	MHRSD<15	BRMRS<15
Scott, Stanton, Garland, & Ferrier (2000)	HRSD<6	MSS<20
Wright, Lam, & Brown (2008)	BDI ≤15	BRMRS<6
Wright, Lam, & Newsom-Davis (2005)	BDI <15	BRMRS<6

3.2 Study Quality Ratings

The quality of the studies ranged from 62.5% (Fulford et al., 2010; Johnson & Carver, 2006; Scott et al., 2000; Stern & Berrenberg, 1979) to 100% (Lam & Wong, 1997; Wright et al., 2005).

3.3 Study Design

Of the 28 studies included in the review, 6 used a longitudinal design (Alloy et al., 2009; Francis-Raniere et al., 2006; Lam et al., 2001; Lam et al., 2005; Lozano & Johnson, 2001; Wright et al., 2008). Seven studies used an experimental design (Johnson et al., 2005; Mansell & Lam, 2006; Meyer & Baur, 2009; Murphy et al., 2001; Ruggero & Johnson, 2006; Stern &

Berrenberg, 1979; Wright et al., 2005). The remaining 15 studies used a cross-sectional design. Of these, one (Lam et al., 2004) carried out a principal components analysis.

3.4 Goal Processes

The literature review revealed that a range of factors have been investigated in relation to psychological goal processes and hypomania or bipolar disorder. This review focused on internal goal processes, and did not cover goal-attainment life events or other external triggers that may also influence these processes. As different terminology has been used throughout the literature, the studies have been divided into conceptually similar categories: dispositional factors, goal beliefs, goal setting, goal appraisal, goal striving and goal regulation (or response to goal feedback). It should be noted that despite the categorisation used, these processes do not operate in isolation, and there is some overlap between processes in many of the studies reviewed.

3.4.1 Dispositional Factors

Eight of the studies reviewed examined dispositional factors, i.e. temperament or personality traits that could affect goal processes (Alloy et al., 2009; Francis-Raniere et al., 2006; Fulford et al., 2008; Gruber & Johnson, 2009; Jones et al., 2000; Lozano & Johnson, 2000; Nusslock et al., 2008; Wright et al., 2008). The BAS dysregulation model of bipolar disorder proposes that individuals with bipolar disorder (and those with higher levels of hypomania-relevant personality traits) are temperamentally more prone to persistent behavioural activation (Depue & Iacono, 1989).

Three studies found evidence for raised BIS/BAS sensitivity in individuals with bipolar disorder, compared to a non-psychiatric population. Higher scores were found for BAS Fun-seeking and BAS Drive (Nusslock et al., 2008; Fulford et al., 2008), while Jones et al. (2000) found that BAS Fun-seeking and Reward Responsiveness significantly predicted risk for mania (as measured by HPS) in a university sample. Using a different measure of personality, the

NEO-FFI, Lozano and Johnson found that high scores on Neuroticism scales predict increases in depressive symptoms, whereas high Conscientiousness scores, and in particular its Achievement Striving subscale predicted increases in manic symptoms.

Gruber and Johnson (2009) found that in a sample of university students, higher HPS scores (indicating higher risk for mania) were associated with reward (joy) and achievement-focused (pride) positive emotions (as measured by the DPES), with weaker relations to prosocial (compassion, love) positive emotions. Dispositional differences in elevated positive emotion for high HPS scorers were therefore thought to be specific to reward and achievement-oriented emotions.

Alloy et al. (2009) used a series of measures (DAS, SAS, DEQ, BIS/BAS) to examine cognitive styles thought to be BAS-relevant and non-BAS-relevant. After controlling for current mood symptoms of depression and (hypo)mania, the bipolar group scored more highly than a group of non-psychiatric controls on BAS-relevant measures of performance concern (DAS), autonomy (SAS), and self-criticism (DEQ), but not BIS or non-BAS dimensions of approval-seeking (DAS), sociotropy (SAS) and dependency (DEQ). Scores of Autonomy were found to mediate the association between high BAS sensitivity, and diagnosis of bipolar disorder. Higher autonomy and self-criticism predicted likelihood of hypomanic/manic episodes over a 3.2 year follow-up, and lower likelihood of depressive episodes.

Francis-Raniere et al. (2006) expanded on these findings by testing whether personality style (BAS, SAS, DEQ) interacted with life events to increase mood symptoms. It was found that self-criticism and performance evaluation interacted with congruent life events to predict increases in mood symptoms (i.e. mania symptoms for positive events, and depression for negative events). An attachment-oriented personality style was also found to buffer against depression.

One study that was less supportive of the BAS dysregulation model found no association between bipolar and control groups for levels of reward and frustration experienced, magnitude of initial response, or time taken to recover following reward and

frustration (Wright et al., 2008). However, history of mania was associated with prolonged BAS activation following reward, and both history of mania and depression were associated with prolonged recovery following frustration.

3.4.2   Goal Beliefs

Eight studies examined goal beliefs and attitudes related to goals (Alloy et al., 2009; Jones et al., 2000; Lam et al., 2004; Lam et al., 2005; Lee et al., 2010; Scott et al., 2000; Spielberger et al., 1963; Wright et al., 2005). It has been proposed that dysfunctional beliefs related to extreme goal-attainment and perfectionism may be particularly relevant to the course of bipolar disorder. These beliefs would be consistent with a drive to achieve, and sensitivity to signals of reward as predicted by BAS theory.

Goal-related beliefs have been primarily investigated using the Dysfunctional Attitudes Scale (DAS). Five of the studies reviewed confirmed a relationship between DAS beliefs and bipolar disorder (Scott et al., 2000; Lam et al., 2004; Lam et al., 2005; Alloy et al., 2009; Lee et al., 2010). Individuals with bipolar disorder were found to score more highly on the DAS than individuals with no history of psychiatric disorder, particularly for perfectionism and need for approval (Scott et al., 2000), and autonomy (Alloy et al., 2009) after subjective mood ratings were taken into account. Individuals with bipolar disorder also scored more highly than individuals with unipolar depression on a DAS "goal attainment" factor subscale, which reflects beliefs related to the importance of goal striving, and being seen in a positive light (Lam et al., 2004). Scores on the Goal Attainment subscale correlated with previous hospitalisations due to manic episodes. It is possible that these beliefs may be a risk factor for more severe illness, although correlational studies cannot confirm causation. Goal Attainment beliefs on DAS have also been found to predict sense of hyper-positive self (SHPS) scores, after controlling for mood (Lam et al., 2005; Lee et al., 2010). SHPS measures the extent to which people with bipolar disorder value attributes that are associated with being "mildly high" (e.g. dynamism, persuasiveness, productiveness).

A study by Spielberger et al. (1963) found that individuals with bipolar disorder scored significantly higher than controls on measures of traditional opinions and stereotyped achievement values, but not on a measure of internalized achievement motives. Researchers should draw conclusions based on self-report measures with caution, and be mindful of the difference between stated beliefs and internalised motivation or behaviour.

Wright et al. (2005) found no significant differences in baseline DAS scores for individuals with remitted bipolar I disorder, remitted unipolar depression, and no history of affective disorder. However, following positive mood induction, the DAS scores of the bipolar disorder group for goal-attainment and achievement were found to change less than the other groups. Dysfunctional cognitions in bipolar I disorder may therefore be unusually resistant to minor mood increases. The final study reviewed found no significant relationships between hypomanic personality (HPS) and cognitive style (DAS) in a sample of university students (Jones et al., 2007).

3.4.3   Goal Setting

A number of studies have purported to measure goal setting in bipolar disorder using the Willingly Approached Set of Statistically Unlikely Pursuits (WASSUP; Johnson & Carver, 2006). However, closer examination of the literature reveals that this measure has been administered using two different sets of instructions, which may lead to different processes being measured. The WASSUP consists of thirty items which load onto subscales tapping different types of aspiration e.g. fame, and political influence. Respondents are asked to rate how likely they think each of the goal outcomes are from 1 (no chance of occurring) to 5 (definitely will occur). Although this is discussed by the authors in terms of goal setting, this appears to be demonstrating appraisal of outcome success, as the scenarios have not been self-generated. One study by Fulford et al. (2008) used a different set of instructions to measure the likelihood of setting each goal on a scale from 1 (NO CHANCE I will set this goal for myself) to 5 (definitely WILL set this goal for myself), which is a more straightforward

measure of intention to set goals. They found that both lifetime manic symptoms (HPS) and

narcissistic tendencies (NPI) were related to Popular Fame and Financial subscales of the

WASSUP. Unfortunately, as this study sampled university students only, no firm conclusions

can be drawn about goal setting in bipolar disorder.

One further correlational study by Johnson et al. (2005) measured goal setting

following reward feedback, and found that a history of hypomania predicted higher goal-

setting after reward. However, hypomania was not found to be associated with expectancy of

success at baseline. Unfortunately, there was no comparison of success expectancy between

low-risk for mania and high-risk for mania groups. In fact, to date, the literature in this area

has been entirely conducted using non-clinical samples.

3.4.4   Goal Appraisal

Appraisal of a goal is likely to affect whether that goal is pursued: is the goal seen as

important, pleasurable, or stressful? Twelve of the reviewed studies examined goal appraisal

(Fulford et al., 2008; Fulford et al., 2010; Gruber & Johnson, 2009; Johnson & Carver, 2006;

Johnson et al., 2005; Johnson et al., 2009; Meyer & Krumm-Merabet, 2003; Meyer et al., 2004;

Murphy et al., 2001; Ruggero & Johnson, 2006; Scott et al., 2000; Stern & Berrenberg, 1979).

Seven of these twelve studies were conducted on non-clinical samples.

The research related to appraisal of goals has mostly focused on success expectancy.

Three of the four studies that used the WASSUP as an outcome measure asked participants to

appraise goals in this way (Gruber & Johnson, 2009; Johnson & Carver, 2006; Johnson, Eisner &

Carver, 2009). High scores on the HPS (lifetime vulnerability to hypomania) were found to be

associated with rating extrinsically-oriented goals of fame, and politics as likely, but not other-

focused goals related to family and friends or wealth (Gruber & Johnson, 2009). Johnson et al.

(2009) found that a history of mania was linked to higher expectations of fame, wealth, and

public recognition. In addition, Johnson and Carver (2006) found an association between high

HPS scores and high ratings of financial success and creative goals. Current symptoms of mania

were found to correlate with increased ratings of fame, friends, family and wealth items on WASSUP by Gruber and Johnson (2009).

Meyer and Krumm-Merabet (2003) found that whilst high scores on the HPS were not associated with superior academic performance or predicted academic success in the near future, the HPS was predictive of overly-optimistic estimations of achievement in the distant future (e.g. getting a dream job). Fulford et al. (2010) also found that individuals with bipolar disorder had higher expectations for goal progress than control participants.

The "illusion of control" is the association between predictions of future success and previous outcomes on skill and chance tasks, and attributions of personal ability. This illusion has been found to operate differentially for individuals high in mania (Stern & Berrenberg, 1979). For the high mania group, predicted success on chance tasks was affected more by outcomes and attributions of personal responsibility on a previous skill task. Mania may lead individuals to misattribute desirable outcomes to personal effort on their part.

Ruggero and Johnson (2006) gave different levels of failure feedback to individuals with bipolar disorder, before measuring confidence for a subsequent task. One of the less emphasised findings of this study was that individuals with bipolar disorder differed significantly from controls for success expectancy at baseline level. Baseline success expectancy also significantly correlated with post-feedback success expectancy. This contrasts somewhat with Johnson, Ruggero and Carver (2005) who found that measures relating to hypomania and high positive affect were not associated with expectancy of success at baseline in an undergraduate population. This may indicate problems with using a non-clinical group to measure processes relevant to bipolar disorder, and could be investigated further in the future.

The POG scale measures overgeneralization after small successes, e.g. "If I succeed at something it makes me feel I will succeed in other areas as well". In a study by Fulford et al. (2008), all three POG subscales (social, lateral, upward) were found to significantly correlate with lifetime manic symptoms (HPS) and narcissistic tendencies (NPI). Scott et al. (2000) also

found that individuals with bipolar disorder had impaired over-general recall on an autobiographical memory task, even after controlling for current mood. It is likely that an overgeneralizing cognitive style could impact upon goal appraisal.

Murphy et al. (2001) found that manic individuals made poorer-quality decisions than depressed and control participants on a computerized betting task. As a group, they tended to attempt to earn reward from the less-likely response option, i.e. using a risky betting strategy. This correlated with Young Mania Rating scores, suggesting that increased manic symptoms is associated with poorer decision-making. However, not all manic patients were impaired on this measure, and it could be a future goal of research to distinguish the patient characteristics that separate the impaired decision-making group, from the non-impaired group.

Although these studies are all relevant to goal appraisal in bipolar disorder, the only study that actively researched goal appraisal was conducted by Meyer et al. (2004). They found that high scores for hypomania and current positive affect was linked to positive goal appraisal (more likely to be attained, enjoyable, controllable, not difficult, and not stressful). However, history of clinically significant hypomania was correlated with more negative goal appraisals, mediated by current higher depression scores amongst those with previous clinically significant hypomania or mania. It is important not to oversimplify the cognitions involved in mania and hypomania as they are linked to both positive and negative emotions. Unfortunately, this study examined university students only, which will have limited variability in the study and eliminated potentially useful information specifically related to bipolar disorder.

3.4.5   Goal Striving

Nine studies examined goal striving, or activity directed towards a goal (Fulford et al., 2008; Fulford et al., 2010; Jones et al., 2007; Krumm-Merabet & Meyer, 2005; Lam & Wong, 1997; Lam et al., 2001; Lee et al., 2010; Murphy et al., 2001; Nusslock et al., 2008). Three of these studies utilised a non-clinical sample.

There is some evidence that goal striving is increased in individuals with bipolar disorder. For example, Fulford et al. (2010) found that individuals with bipolar disorder reported significantly more overall effort towards goals than control participants over the course of a three week experience-sampling study. In addition, high goal-attainment scores on the DAS in individuals with bipolar disorder have been found to predict increased intended activity in hypothetical goal-attainment situations (Lee et al., 2010).

Krumm-Merabet and Meyer (2005) found that adolescents with a "hypomanic temperament" spent more time than controls socializing with friends and pursuing sports rather than doing homework. They also drank alcohol and smoked more and were more often involved in fights. This could be indicative of increased engagement in rewarding and pleasurable activities. However, there are also problems with applying findings in a non-clinical sample to clinical groups. Particular subscales of the HPS could be linked to these behaviours, rather than a general "risk for mania" factor (Schalet, Durbin, & Revelle, 2011).

Jones et al. (2007) examined whether there is a link between approach and avoidance goals and hypomania. Participants rated whether items on the AGQ reflected their typical behaviour. Tendency towards approach goals was associated with a tendency towards hypomania (in contrast to typical responses in anxiety and depression: Dickson & MacLeod, 2004). However, the relationship disappeared when approach temperament on the BIS/BAS scale was taken into account.

Nusslock et al. (2008) found that on average bipolar disorder individuals obtained lower grades at university than control participants, and that impulsivity was associated with poorer academic performance. However, this trend was not true for bipolar disorder individuals with high BAS drive and low impulsivity. This may explain why some bipolar disorder individuals are high-achieving, despite the general trend for poorer performance.

Impulsivity has been implicated in experimental studies of goal-directed behaviour in bipolar disorder (e.g. Murphy et al., 2001). Although participants with bipolar disorder displayed impulsive decision-making on a betting task compared to controls, this behaviour

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was not consistent throughout the task, and they also displayed more conservative betting behaviour. Fulford et al. (2008) also found that lifetime manic tendencies (HPS) significantly correlated with measures of self-control (SCS) and impulsiveness (CFC; BIS-11).

Lam and Wong (1997) found that patients with bipolar disorder could reliably report prodromal symptoms, i.e. early warning signs that might indicate the start of a mood episode before it begins. One of the most easily reported mania prodromal symptoms was "more goal-directed behaviour" which was endorsed by 55.5% of participants. Lam et al. (2001) expanded upon this by following participants over a period of 18 months. Significantly fewer individuals who reported the use of behavioural coping strategies to curb excessive behaviour during the mania prodromal stage experienced a manic episode, even after baseline mood levels were controlled for.

3.4.6   Goal Regulation

There is some evidence that individuals with bipolar disorder respond differently to goal feedback (e.g. success or failure feedback). Seven studies examined goal moderation in response to feedback (Fulford et al., 2010; Johnson et al., 2005; Lam & Wong, 1997; Lam et al., 2001; Mansell & Lam, 2006; Meyer & Baur, 2009; Ruggero & Johnson, 2006). Two of these studies utilised a non-clinical sample.

An experience-sampling study by Fulford et al. (2010) confirmed that in general, unexpectedly low progress towards a goal leads to subsequent increased goal effort, and unexpectedly high progress leads to decreased effort (coasting). However, goal effort decreased significantly less following goal progress for individuals with bipolar disorder (i.e. less coasting). High levels of failure feedback were also found to interfere more with the performance of a bipolar group on a subsequent anagram task than for control participants (Ruggero & Johnson, 2006). When individuals with bipolar disorder are engaged in goal-directed behaviour and experiencing elevated mood, their decision-making may also become less constrained by advice from other people (Mansell & Lam, 2006).

By contrast, a study by Johnson et al. (2005) that used a button-pressing task to measure reaction time following success feedback and monetary reward found no correlation between hypomania scores and reaction-time change following reward. It is unclear whether this is due to the task used. Another study by Meyer and Baur (2009) also found that Individuals with high hypomania scores (HPS) did not react more positively to success feedback than control participants, although they did show higher levels of positive affect overall.

There is some evidence that if individuals with bipolar disorder recognise their excessive goal-striving behaviour, they can use behavioural strategies to reduce the likelihood of future mood episodes. Individuals who reported curbing of excessive behaviour in response to mania prodromes were less likely to experience a manic episode (Lam & Wong, 1997; Lam et al., 2001)

4.   Discussion

This review aimed to systematically synthesise the literature related to internal goal processes and bipolar spectrum disorders in order to establish (1) what goal processes have been researched in relation to bipolar disorder, (2) whether these processes are qualitatively different in bipolar disorder compared to a control population, (3) to evaluate the strength of this research evidence, and (4) to review how the evidence fits with Urošević's (2008) expanded model of BAS dysregulation. 28 studies were included in the review. Although the evidence was mixed, there appear to be some clear patterns in the literature, which will be discussed below.

4.1. Overview of Reviewed Studies

All of the studies reviewed were related to goal processes in some way. However, the studies were extremely diverse in design, participant group, and subject matter. Synthesis of the evidence also becomes difficult when there is no consensus over the best measures to use, or the model that is being investigated.

Some trends do appear to have emerged from reviewing the evidence. There is relatively strong evidence of dispositional differences between individuals with bipolar disorder and non-psychiatric controls, which are present even when current mood symptoms are controlled for. There is also a reasonably strong evidence for heightened goal attainment beliefs in individuals with bipolar disorder, although it would be interesting to see a follow-up to Spielberger et al.'s (1963) study which highlighted a mismatch between reported traditional goal-attainment beliefs, and internalized achievement motivation. Although this study emerged from psychoanalytic theory, it could also be understood in terms of cognitive dissonance, or competing goal beliefs. The literature related to goal beliefs is particularly useful, as all studies were conducted using clinical samples.

Elevated goal setting in bipolar disorder is a widely reported finding in this area (e.g. Johnson, 2005), and is therefore surprising that this was the area most short of relevant research evidence, and the research that does exist utilised non-clinical samples. Goal appraisal is better researched, but this is mostly confined to appraisal of the likelihood of success, with the exception of the study by Meyer et al. (2004). Seven of the twelve studies that investigated goal appraisal did not use a clinical sample. In terms of Urošević's expanded model of BAS dysregulation, there appears to be some evidence that fits with the importance of efficacy appraisal (or success expectancy), but none of the studies identified examined the appraisal of goal relevancy. Whilst goal relevancy would appear to be an important factor in goal pursuit, future research could examine this in more detail. Research could also examine other aspects of goal appraisal. For example, do individuals with bipolar disorder set more ambitious goals, because they perceive them to be less challenging, or more interesting?

There is a fairly well-observed pattern of excessive goal striving in mania prodromal stage for individuals with bipolar disorder, but other differences have also been reported for goal achievement, and impulsivity. There also appears to be mixed evidence of differential goal moderation or response to goal feedback. This may be due to the heterogeneity of tasks used

to measure goal pursuit and goal regulation, and due to the heterogeneity of the groups sampled.

4.2. Limitations of the Research

The quality ratings of the studies ranged from 62.5% to 100%, showing a marked variability. There were some patterns to the limitations found in the studies. It could be difficult to ascertain the representativeness of the study sample if the eligibility criteria and recruitment strategy were not clearly outlined. Also, many studies did not report exact probability scores. A few studies also appeared to be "data-dredging", particularly some of the correlational studies. Multiple regressions were carried out, and it was difficult to know how reliable significant findings would be.

Of the 28 studies reviewed, the majority used a cross-sectional study design, and many of these used only correlational measures. Whilst these studies provide interesting information, there are problems with assuming causality between factors, especially when drawing conclusions about the time-course of mood episodes and symptoms of bipolar disorder. Longitudinal studies are better able to draw conclusions about time-related factors.

Although it is important to research bipolar disorder across the spectrum of severity, there appears to be an over-reliance in the literature on university students as participants, presumably due to convenience factors. Students are not necessarily representative of the general population on factors such as socioeconomic status, ethnicity etc. Another possibility is that this group is likely to place greater importance on achieving academic success. Hypomania scales are essentially a research measure rather than a clinical measure that are used to indicate risk for bipolar disorder.

Prospective studies have found that elevated scores on the HPS have been associated with likelihood of developing hypomanic and manic symptoms, as well as diagnoses of bipolar disorder (Meyer & Hautzinger, 2003; Blechert & Meyer, 2005; Kwapil et al., 2000). Among participants with a history of mood disorder, high HPS scores have been found to predict a

more severe course of depression and more suicide attempts (Klein, Lewinsohn, & Seeley, 1996). However, the HPS was not successful in predicting the development of bipolar disorder in adolescents with no previous history of mood disorder, despite being linked to poorer psychosocial functioning (Lewinsohn, Seeley & Klein, 2003).

The HPS was not originally validated against any criterion measures. A re-analysis of the scale by Schalet, Durbin and Revelle (2011) found that only some of the HPS items reflect symptoms of mania. A hierarchical cluster analysis suggested that the general HPS factor was weak, and identified 3 cluster subscales: Social Vitality, Mood Volatility, and Excitement. These subscales were found to be conceptually distinct, and correlated differentially with other personality and psychopathology measures. For example, high scorers on a Mood Volatility subscale may be vulnerable to depressive episodes, whereas high scorers on Social Vitality and Excitement items may be less likely to develop depression compared with average HPS scorers (Schalet, Durbin, & Revelle, 2011).

There is some support for the utility of the HPS for identifying individuals at risk for bipolar disorder in a non-clinical sample, but these findings are not conclusive. The multidimensional structure of the HPS indicates that "hypomanic personality" is not synonymous with the clinical syndrome of hypomania. In particular, the Excitement cluster is closely related to positivity and adaptive functioning, rather than maladaptive functioning. Focusing exclusively on risk factors ignores potential protective factors in the development of psychological disorders. It is also not clear whether the total HPS score (general factor) or particular subscales of the HPS predict the development of manic episodes. Analysis based on HPS total scores should therefore be interpreted cautiously (Schalet, Durbin & Revelle, 2011). Studies which utilised scales that measure "risk for mania" should aim to replicate their findings with a clinical population.

Another relevant issue is the heterogeneity of bipolar disorder as a condition itself. The many different forms of bipolar disorder – bipolar I disorder, bipolar II disorder, cyclothymia, hypomania etc. have different courses of symptoms, which may be revealed to be

triggered by different psychological and social factors. Only one study looked at actively manic and depressed patients, and the mechanisms and psychological processes operating during a mood episode may be different to those between mood episodes. There was also a large disparity between cut-off points used to define mania and depression (see Table 2). Whilst these cut-off points are arbitrary points on a dimensional scale, the lack of consensus makes it more difficult to directly compare studies.

4.3. Limitations of the Review

There are some important limitations to the review that should be highlighted. The search terms were kept deliberately broad in order to include as many relevant studies as possible. However, many of the eventually included studies were not discovered during the electronic search. This appears to have been due to the word "goal" not being included in the abstract or as a keyword of some of the studies. There may be other relevant studies that were not included because they have used different terminology, and not emphasised that the study examined a goal process. Many of the excluded studies were done so on the basis of the judgement of the primary researcher. Although the reasons for exclusion have been defined, it is possible that a degree of subjectivity entered the study at this point. A similar criticism can be made of the inclusion of studies on the basis of manual reference searches. Whilst this was approached in a systematic way, human error could have led to relevant literature being overlooked at this point in the process.

Only literature published in a peer-reviewed journal was included in the review. This enables a basic quality standard to be met. However, there could be relevant and useful research published in books or other formats such as unpublished dissertations or theses that were overlooked. Researchers tend to submit research with significant findings for publication, meaning that there is an inherent "publication bias", which may overlook relevant null results.

4.4. Future Research

In the past research has focused on the biological and genetic basis of bipolar disorder. However, this review has highlighted some of the psychological processes that have been examined, and crucially, some of the gaps in this research. There have been some interesting research findings related to goal setting and goal appraisal processes in bipolar disorder. However, these findings would benefit from replication in clinical populations, rather than relying too heavily on student samples and measures of sub-clinical hypomania. A greater focus on well-conducted longitudinal studies would also aid firmer conclusions about the course of mood episodes in bipolar disorder and directions of causality for some of the correlational findings that have been highlighted.

4.5. Clinical Implications

There are some important clinical implications to this review. Whilst bipolar disorder is widely considered to be a biological disorder, there is a growing research base that indicates that psychological variables can influence mood symptoms, and the timing of mood episodes. One particularly clinically relevant study was conducted by Lam et al. (2001), which indicated that if people can learn to recognise their own prodromal variations in behaviour, cognition and affect, and apply relevant coping strategies they are less likely to experience a clinically significant mood episode of mania or depression. If people can be made aware of their goal-attainment beliefs, reactivity to affect and biases in appraisal, this can be utilised as part of a cognitive (or alternative) psychological therapy to aid prevention of mood episodes. This is particularly relevant for individuals for whom pharmacological treatment has been unsuccessful.

4.6. Conclusions

The review provides an overview of the empirical research on psychological processes related to personal goals that may impact on the course and symptoms of bipolar disorder. Although some trends were evident, particularly the importance of goal-attainment beliefs, the range of study designs and participant samples, along with the inherent heterogeneity of the presentation of bipolar disorder make drawing firm conclusions difficult. Further research into this area could lead to innovations in psychological and psychosocial interventions, and help prevent or diminish the occurrence of clinically significant mood episodes in individuals for whom the pharmacological treatments currently available are not effective.

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PART TWO: Empirical Study

Visual Imagery, Mood, and Goal Appraisal in Bipolar Disorder:

A Feasibility Study Utilising Novel Procedures

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This paper is written in the format ready for submission to Behaviour Research and

Therapy. Please see Appendix C: Guideline for authors for the empirical paper

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Abstract

This research investigated the utility and feasibility of novel methodology (imagery task and goal appraisal task) for a future investigation of whether visual imagery amplifies mood in bipolar disorder, and influences the appraisal of personal goals. Control participants rated personal goals before and after completing a visual imagery or verbal processing task (either imagining themselves completing a goal, or describing completion of a goal). Mood was rated throughout the study on a visual analogue scale. The novel imagery task appeared to elicit more imagery than the verbal task as predicted. However, there was no systematic effect of task on mood or ratings of goal appraisals. There was no change in goal appraisal for a large proportion of participants. This could indicate that the novel goal appraisal task was ineffective at measuring change in goal appraisal, or that goal appraisal ratings are relatively stable within a control group. A small group of individuals with bipolar disorder was found to score more highly on the Impact of Future Events Scale, compared to the control group. This research has implications for the feasibility of future studies of imagery in bipolar disorder.

Keywords: Affective Disorders, Cognitive Processes, Cognitive Therapy

1. Introduction

Bipolar disorder, previously known as manic depression, is a psychological disorder characterised by episodes of clinical depression and episodes of mania (American Psychiatric Association [APA], 2000), and affects approximately 1.5% of the adult population (Hyman, 2000). The psychological processes that are associated with depression and mania have been found to be distinct from each other (Van der Gucht, Morriss, Lancaster, Kinderman, & Bentall, 2009). Researchers in the field have been particularly interested in mania, as mania distinguishes bipolar disorder from unipolar depression and other mental health disorders (APA, 2000; Murphy & Sahakian, 2001).

Cognitive-behavioural therapy has been found to be effective at treating bipolar disorder in individuals with fewer than 12 previous mood episodes (Scott, et al., 2006). Beck (1976) defined cognitions as mental activity that could take the form of words and phrases (verbal cognitions) or images (visual cognitions). Within recent years, there has been increasing interest in the use of imagery techniques as well as more traditional verbal therapy techniques (Holmes, Arntz & Smucker, 2007a). Although visual imagery techniques are well evidenced for specific psychological disorders, in particular, PTSD, depression, social phobia, and specific phobias, they do not appear to have been systematically studied in relation to bipolar disorder (Holmes et al., 2007a).

The experience of visualising an object or situation has been described as "seeing with the mind's eye" (Kosslyn, Ganis, & Thompson, 2001, p.635). Neuroimaging studies have shown that there are similar fMRI activation patterns for imagery and perception in the brain (e.g. O'Craven & Kanwisher, 2000). Mental imagery is closely linked to emotion, and "appears to play a special role in representing emotionally charged material" (Kosslyn, 1994, p. 405). For example, visual imagery has been demonstrated to increase ratings of anxiety (Holmes & Mathews, 2005) and positive emotion (Holmes, Mathews, Dalgleish, & Mackintosh, 2006) compared to verbal processing conditions. It has also been suggested that having higher trait

levels of imagery (tendency to be a "visualizer" rather than a "verbalizer") could be a risk

factor for developing a psychological disorder (Holmes, Geddes, Colom, & Goodwin, 2008b;

Dadds, Hawes, Schaefer, & Vaka, 2004)).

A study by Mansell and Lam (2004) found that a high percentage of bipolar patients

had visual imagery for autobiographical memories, which could indicate increased trait levels

of imagery in individuals with bipolar disorder. However, there has been little other research

investigating the use of imagery in bipolar disorder. It has been suggested that people under-

report their experience of visual imagery, when they aren't asked directly about imagery

(Holmes et al., 2008b). By focusing on verbal explanations of an individual's experience,

clinicians and researchers may inadvertently overlook imagery as a source of assessment

information.

Expanding on previous evidence that positive imagery can amplify positive emotion in

a non-clinical student population (Holmes, Coughtrey, & Connor, 2008a), Holmes et al. (2008b)

have predicted that individuals with bipolar disorder are highly susceptible to imagery, and

that mental imagery serves as an "emotional amplifier" of mood states in bipolar disorder. In

particular, it was predicted that positive imagery amplifies elated mood states, which could

culminate in the onset and recurrence of mania.

Imagery can allow people to "re-experience" events that have happened in their lives.

However, images of events that have never been experienced can also be created. This has

been called "prospective" imagery, "pre-experiencing" or mental "time travel" (Holmes et al.,

2008b). Deeprose and Holmes (2010) predict that intrusive prospective imagery of future

events may be a particularly problematic feature of bipolar disorder, and may lead to greater

likelihood of behaviour towards the imagined goal in real life. Deeprose and Holmes (2010)

have designed a questionnaire to measure the impact of intrusive "pre-experiencing" or

imagery of specific, future events: the Impact of Future Events Scale (IFES). Initial investigation

has found that the impact of intrusive prospective imagery is significantly correlated with

current dysphoria (BDI-II) score in a non-clinical sample (Deeprose & Holmes, 2010) and high

risk for bipolar disorder in a non-clinical sample (Deeprose, Malik & Holmes, 2011), as measured by the Mood Disorder Questionnaire (MDQ; Hirschfeld et al., 2000). However, this measure has not yet been used to investigate mood in individuals with bipolar disorder.

Another developing area of research in bipolar disorder is the area of personal goals. Research suggests that people with bipolar disorder set more ambitious goals than the general population (Johnson & Carver, 2006) and that goal attainment is related to symptoms of mania (Nusslock, Abramson, Harmon-Jones, Alloy, & Hogan, 2007; Johnson, et al., 2000). Compared to controls, individuals with hypomania have also been found to rate future goals as less stressful and difficult (Meyer, Beevers, & Johnson, 2004), and predict higher levels of future success and increase levels of goal setting following positive feedback (Stern & Berrenberg, 1979; Johnson, Ruggero, & Carver, 2005). The mechanisms that drive these effects have not been fully explained.

Conway, Meares and Standart (2004) have conceptualised imagery as a "mental representation of a future goal", which might strengthen the interpretation that there is a real positive goal state to be achieved and acted upon (Holmes et al., 2008b; Johnson, 2005). In other words, imagining yourself completing a future goal could increase the likelihood of completing this goal in real life (Deeprose & Holmes, 2010; Libby, Shaeffer, Eibach, & Slemmer, 2007). This ties in with Holmes et al.'s (2008b) theory, as mood elevation, which is amplified in bipolar disorder, could "influence behaviour by approach towards such goals" (p. 1254).

In a recent naturalistic study of goal striving and affect using daily experience-sampling methodology, increases in positive affect did not predict changes in effort planned towards goals for individuals with or without bipolar disorder (Fulford, 2008). However, the naturalistic design could have meant that measures of affect were more related to life events or external variables than specifically to an individual's goals. Positive affect has previously found to influence goal engagement in laboratory experiments (Carver, 2003).

If visual imagery were demonstrated to act as an "emotional amplifier", or to influence goal appraisal, this would have clinical relevance as these factors could be related to the onset

or course of episodes of mania or depression (Jones et al., 2005) and increase our understanding of cognitive processing in bipolar disorder. This research could lead to developments in the use of psychological interventions in the treatment of bipolar disorder, and in particular the use of imagery rescripting as part of a cognitive-behavioural (CBT) approach.

As there has been little previous research in this area there are no well-established measures for examining goal appraisal and goal-setting in bipolar disorder. A novel goal-setting and goal-appraisal task was combined with a novel imagery task to examine whether links between the two could feasibly be measured within the same study. An exploratory pilot study was carried out with a control group to evaluate the utility and feasibility of the novel imagery task and goal appraisal task as proposed methods for investigating the role of imagery in amplifying mood and goal appraisal in individuals diagnosed with bipolar disorder compared to a non-clinical control group. As a tendency to use mental imagery every day could influence how effective imagery is at manipulating mood, this was also examined as a co-variate (SUIS), along with the impact of intrusive imagery about future events (IFES). The preliminary findings of the pilot study could then be used to guide the methodology of future research.

A novel imagery task was designed to investigate the effect of imagery on mood and goal appraisal.

1. It was hypothesised that individuals in the "imagery" group would report using more visual imagery than the "verbal" group (between-subjects analysis).

2. It was hypothesised that mood would change in a positive direction following each of three selected scenario setting tasks (within-subjects analysis). It was also predicted that mood following imagery and verbal tasks would change in a positive direction compared to baseline, and that this mood change would be larger following the use of imagery compared to verbal processing (between-subjects analysis).

A novel goal appraisal task was designed to investigate the effect of mood and imagery upon goal appraisal.

3. It was hypothesised that ratings of goal appraisals would change following an imagery or verbal task, and that this change would be larger following the use of imagery compared to a verbal task (between-subjects analysis). It was hypothesised that the amount of change would not vary dependent on the scenario used (within-subjects analysis).

4. It was hypothesised that changes in ratings of goal appraisals would be correlated with changes in mood (within-subjects analysis).

Trait Factors

5. It was hypothesised that trait imagery use (as measured by the SUIS) and the impact of imagery (as measured by the IFES) would affect the magnitude of mood and goal appraisal change, following an imagery or verbal task (within-subjects analysis).

Clinical Application: A small clinical group was used to investigate whether preliminary findings suggested that patterns of responding to the imagery and goal appraisal task would be similar to the patterns of responding within a control group.

6. It was hypothesised that individuals with bipolar disorder would report a larger impact of intrusive prospective imagery in the previous week, as demonstrated by higher scores on the IFES, compared to a non-clinical control group.

2. Method

2.1 Design

This study examined both between-subjects and within-subjects variables. Control group participants were randomly assigned to either an imagery or verbal task (between-subjects). Measures of mood and ratings of goals were repeated for all participants (within-subjects).

2.2 Participants

Statistical package G*Power 3.1 was used to calculate the sample size required for this study (Faul, Erdfelder, Lang, & Buchner, 2007). An a priori power analysis indicated that a sample size of approximately 9-16 participants in each of the two groups would be needed to have 80% power for detecting a large effect size (d=1.04/d=1.45) using a .05 level of statistical significance for a two-tailed between-groups t-test. The estimated effect sizes were taken from a previous study from which elements of the new method were adapted (Holmes et al., 2006).

Control participants who had never suffered from bipolar disorder were recruited from local and internet advertisements, and by word of mouth. Control participants were included in the study if they had no personal psychiatric history. Participants in both groups had to be able to speak and read English fluently in order to take part in the study.

Participants with a history of bipolar disorder were recruited from the lists of interested GPs and psychiatrists. A number of mental health charities were also approached, and advertisements were placed on the internet and in GP surgeries. Participants were included in the study if they had a diagnosis of bipolar I disorder according to the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition (SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002a). Participants were excluded from the study if they scored above moderate levels of depression, mania, or anxiety on the screening measures: Beck Depression Inventory, Second Edition (BDI-II; Beck, Steer, & Brown, 1996), Young Mania Rating Scale (YMRS; Young, Biggs, Ziegler, & Meyer, 1978), and Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). Participants were also excluded if they had a diagnosis of primary substance abuse.

2.3 Materials

2.3.1 Current Mood Symptoms

In order to measure current mood symptoms, the Beck Depression Inventory-second edition (BDI-II: Beck, Steer, & Brown, 1996), Beck Anxiety Inventory (BAI: Beck, Epstein, Brown, & Steer, 1988) and Young Mania Rating Scale (YMRS: Young, Biggs, Ziegler, & Meyer, 1978) were used.

The BDI-II is a self-report measure of depressive symptoms experienced within the last two weeks. There are 21 questions scored between 0 and 3, with a maximum score of 63. The scores are compared with the interpretative ranges defined by Beck et al. (1996). A score >19 indicates moderate depression. The BDI-II correlates positively with other scales for depression, and has been found to have a high diagnostic efficiency (93% true positive and 18% false positive; Beck et al., 1996). It also has high internal consistency with a coefficient alpha of .92, and high one week test re-test reliability, r=.93 (Beck et al., 1996).

The BAI is a self-report measure of anxiety symptoms. There are 21 questions scored between 0 and 3, with a maximum score of 63. A score >15 indicates moderate anxiety (Beck & Steer, 1993). This scale has a high internal consistency with alpha .92 and one week test-retest reliability .75 (Beck et al., 1988). The BAI correlates significantly with other self-reported and clinician-rated scales of anxiety (Beck et al., 1988).

The YMRS is a clinician-rated measure of current mania symptoms. The YMRS has 11 items, and scores range from 0 to 60. The YMRS has good psychometric properties, including inter-rater reliability of 0.93 and predictive validity of 0.66 (Young et al., 1978). Scores on the YMRS>11 represent clinically significant symptom levels of mania.

2.3.2 Confirmation of Diagnosis

Absence of current or past mood and substance misuse disorders in the control group was confirmed using SCID-I/NP (First, Spitzer, Gibbon, & Williams, 2002b). For the clinical group, diagnosis of bipolar disorder and absence of primary substance abuse was confirmed

using Modules A, D and E of the SCID-I/P (First, Spitzer, Gibbon, & Williams, 2002a). The SCID

has been found to have superior validity for diagnostic assessment over standard clinical

psychiatric interviews (e.g. Fennig, Craig, Lavelle, Kovasznay, & Bromet, 1994). It also has good

inter-tester reliability, with kappa ranging from .60 to .83 (Lobbestael, Leurgans, & Arntz,

2010).

2.3.3 Trait Imagery Scales

As a tendency to use mental imagery every day could influence how effective imagery

is at manipulating mood, this was measured using the Spontaneous Use of Imagery Scale

(SUIS: Reisberg, Pearson, & Kosslyn, 2003; Kosslyn, Chabris, Shephard, & Thompson, 1998).

The SUIS has 12 items rated on a 5-point scale ("never appropriate" to "always completely

appropriate"). Reisberg et al. (2003) found that the mean score (across all items) for 150

participants was 3.1 (range: 1.2 to 4.7). Mean scores below 2.5 have been classified as "low

imagery use" and above 3.5 as "high imagery use" (Reisberg et al., 2003; Holmes et al., 2006).

Participants also completed the Impact of Future Events Scale (IFES: Deeprose &

Holmes, 2010), which measures the impact of prospective imagery. The IFES has 24 items

rated on a scale from 0 "not at all" to 4 "extremely". Scoring for the IFES is a summation of the

total responses. The IFES has been found to have adequate test-retest reliability (r = .73, p

<.001), and good internal consistency of 0.87 (Deeprose et al., 2011).

2.3.4 Mood: Visual Analogue Scale

In order to examine the effect of various experiment stages upon mood, repeated

mood measures were taken throughout the experiment, using a 100mm visual analogue scale

ranging from 0 "I do not feel at all happy" to 10 "I feel extremely happy". Visual analogue

scales are simple to complete, tend to have a high rate of compliance, and have been found to

have high reliability and validity (e.g. Ahearn, 1997). By using a visual analogue scale subjective

experience of mood is more accurately captured as participants' responses are not forced into

a discontinuous grading scale and responses are not limited by suggesting particular qualities to the participant (Folstein & Luria, 1973).

Respondent error has been found to be reduced if the VAS is presented horizontally, without defining intermediate points (McCormack, Horne, & Sheather, 1988). Aitken (1969) recommended that VAS were suited to within-subject repeated measures, although the VAS has been used to effectively discriminate between-subjects too (McCormack et al., 1988). VAS mood scales have previously been used to measure the mood of individuals with bipolar disorder (e.g. Farmer et al., 2006).

2.3.5   First and Second Goal Appraisal

All participants were asked to rate their identified personal goals on a 0-7 Likert scale for importance, ambition, previous success, and planned effort within the next three weeks. These dimensions are thought to be particularly important for measuring planned goal-directed action (e.g. Fulford, 2008) or particularly relevant to bipolar disorder (Johnson & Carver, 2006). This scale was re-administered following the imagery or verbal task (see Appendix Q: First Goal Appraisal; Appendix U: Second Goal Appraisal).

2.3.6   Imagery and Verbal Task Rating Scales

Participants in the "imagery" condition were asked to rate various factors related to their imagery on a 0-7 Likert scale. This included vividness and detail (Holmes, Geddes, Colom, & Goodwin, 2008b), how distressing and comforting the image was and how real it felt (Holmes, Crane, Fennell, & Williams, 2007b). Participants were also asked to what extent their image used first person perspective, and observer-perspective, as this has been previously found to impact mood (Holmes et al., 2008a; Wimalaweera & Moulds, 2008; Kross, Ayduk, & Mischel, 2005).

2.3.7   Subjective Experience Scales (adapted from Holmes, Mathews, Mackintosh and

Dalgleish, 2008d)

Participants in both groups were asked to rate how easy they found their task on a

Likert scale from 1 "not at all" to 9 "extremely", (see Appendix T: Subjective Experience

Questions). They were also asked to what extent they felt that they had used visual imagery

(mental pictures and sensory impressions) or verbal processing (words and sentences) during

the task.

2.4 Procedure

Ethical approval was gained from the National Research Ethics Service and two local

Research and Development boards (see Appendix F: REC & Research Governance

documentation). Participants provided written consent (See Appendix H: Participant Consent

form), and then completed the initial screening measures: BDI-II and BAI. The YMRS was

completed based on observations of the experimenter, combined with self-report by the

participant. Participants who met the study inclusion criteria were then interviewed using

Modules A, D, and E of the SCID-I/P and SCID-I/NP to confirm absence of current or past mood

disorders or primary substance abuse for the control group and confirm diagnosis of bipolar

disorder and absence of primary substance abuse for the clinical group. Participants were also

asked to complete two trait measures: SUIS and IFES, in order to measure tendency to use

imagery everyday and the impact of intrusive imagery. Once it had been established that

participants fit the appropriate criteria for the study, they were introduced to the mood rating

visual analogue scales, and asked to complete a baseline measure of their mood (See Appendix

M: Visual Analogue Scale). Throughout the experiment, participants were repeatedly required

to rate their mood using a visual analogue mood scale in order to establish which of the

experiment stages were linked to changes in mood.

2.4.1 Scenario Setting

The scenario-setting task was novel to the experiment, and was adapted from previous studies. Three scenarios were used to establish whether the content of a goal would affect the results of the experiment. Participants were cued with three positive scenarios selected from the list of subjective probability items used by MacLeod, Byrne and Valentine (1996): "You will be able to cope easily with pressure", "You will have lots of good times with friends", and "You will be very fit and healthy" (p.85). These scenarios were selected to ensure that participants used a range of positive memories. Because all participants received the same cues, it would be possible to compare the thematic content of the goals. This would not be possible with open-ended task instructions. Participants were asked to think how each situation might apply to their own life and write down the first scenario that came to mind in a sentence. They were asked to re-rate their mood after each cued scenario in order to establish whether thinking of the scenario affected their mood (See Appendix P: Scenarios and Goal Setting Sheet).

2.4.2 Goal Setting Task and First Goal Appraisal

Participants were then given an explanation of a personal goal, emphasising that a goal could be something that you are trying to do (approach goal) or something that you are trying to avoid (avoid goal) and could be general e.g. "trying to make others happy", or specific "trying to make my spouse happy" (Moffitt & Singer, 1994). Six examples (three approach goals, three avoidance goals) were used to illustrate the concept using the sentence stems "I will try to..." and "I will try not to...." (adapted from Moffitt & Singer, 1994; see Appendix O: Goal Setting Instructions). Participants were requested to think of a personal goal that they would set themselves in relation to each of their three identified scenarios. Each goal was rated for importance, ambition, previous success, and planned effort (see "Materials" section). After rating each goal, participants re-rated their mood, before setting their next personal goal.

2.4.3   Main Task: Imagery or Verbal Task

Participants were randomly assigned to an experimental task using a random number generator: odd numbers were assigned to the imagery task, and even numbers to the verbal task. For each personal goal, participants in the imagery condition were asked to form a mental image of themselves completing this goal for 60 seconds (adapted from Prospective Imagery Task (PIT): Holmes, Lang, Moulds, & Steele, 2008c; Stöber, 2000). Participants were asked to rate their mood immediately after the generation of each image. Participants then rated their image for vividness and detail, how distressing and comforting the image was, how real it felt, and whether the image used first person perspective or observer perspective (see "Materials" section for more detail; see Appendix R: Imagery and Verbal Task Instructions; Appendix S: Imagery Rating Questions). This was repeated for each of the three goals.

Participants in the "verbal task" condition were asked to describe aloud, in as much detail as possible, the steps that they would take to complete their goal for up to one minute. They were given no instructions regarding the use of mental visual imagery. After rating their immediate mood, participants were asked whether they had seen an image in their mind whilst completing the task. If an image was seen they were asked to complete the same rating scales as the individuals in the imagery task.

After the first imagery or verbal task participants were asked to repeatedly rate their current mood every 30 seconds for five minutes using the same visual analogue scales as before, as prompted by the experimenter. Following each rating, the response paper was folded by the experimenter so that the previous response could not be seen by the participant. This instruction was added to establish the course of participant's mood over time, with minimal intervention from the experimenter. The results of this analysis are not relevant to the current hypotheses and are therefore not reported further.

2.4.4   Subjective Experience

Participants then completed subjective experience questions on task difficulty, use of imagery, and use of verbal thoughts as detailed in "Materials" section.

2.4.5   Second Goal Appraisal

Participants were reminded of their first goal and asked to re-rate the goal for the same attributes as before (see Appendix U: Second Goal Appraisal). They were also asked if they would alter their goal in any way.

2.4.6   Repetition of Task

The imagery and verbal task was repeated for the 2nd and 3rd goals, followed by goal re-ratings. On the 2nd and 3rd occasions, mood was only measured once, rather than using the repeated measures.

3   Results

3.1 Participant Recruitment

In total, 49 participants were recruited to take part in this study: 30 control participants and 19 with bipolar disorder. Of this number, two participants were excluded from the control group for history of significant mental health disorder (1), and history of significant substance misuse (1). Thirteen were excluded from the bipolar group due to high levels of depression (6), not meeting the SCID criteria for bipolar disorder (3), not fitting the age criteria (1), withdrawing consent (2) or history of significant substance misuse (1). This meant that a total of 28 participants in the control group and 6 in the bipolar group were included in the final analysis. Participants were randomly allocated to a visual or verbal task using a computerised random number generator. For the control group, 13 participants were

allocated to the visual task, and 15 were allocated to the verbal task. For the bipolar group, there were 3 participants allocated to each task.

3.2. Distribution of Data

Computer package SPSS version 16.0 was used to examine the kurtosis and skewness of data (see Appendix V: Distribution of Data). The skewness of all sets of key data was adequate, as they were below the guideline figure of 2.58 indicated by Field (2000) for small samples. This indicates that parametric statistical tests are likely to be appropriate. However, for a few statistics related to change in goal appraisal, kurtosis scores exceeded the guideline figure, indicating that the distribution curve of the data set is more pointed than a normal distribution curve. This may have been affected by the small sample size. Findings that rely on these statistics should be interpreted with more caution.

3.3. Part 1: Investigating Utility of Proposed Measures

3.3.1 Novel Imagery Task

The novel imagery task was designed to measure the effect of imagery compared to verbal processing upon mood ratings. In order to examine the utility of this procedure, two main analyses were conducted. First the subjective use of imagery between the two groups was compared by examining subjective ratings of imagery and verbal processing for both groups, and spontaneous use of imagery in the verbal group. Secondly the pattern of mood ratings throughout the course of the experiment was examined in order to determine whether the three scenarios used were effective at increasing mood as was initially predicted.

3.3.1.1 Comparison of Subjective Ratings of Imagery Use By Group

Following the visual or verbal task, participants were asked to rate subjectively how difficult they found the task from 1 "extremely easy" to 9 "extremely difficult", and how much they thought they used imagery or verbal thoughts and sentences from 1 "not at all" to 9 "all

the time". Unfortunately this information is not available for one participant due to

respondent error. The mean subjective ratings are displayed below in Table 3.

Table 1

Subjective Experience of Task (Means and Standard Deviations)

	Visual Task (n=13)	Verbal Task (n=14)
Difficulty	6.31 (2.10)	6.07 (1.73)
How much was imagery used?	7.46 (1.56)	5.93 (2.20)
How much were verbal thoughts used?	3.62 (2.33)	4.29 (2.40)

An independent t-test showed that there was a significant difference between the

amounts of reported imagery at the .05 level between the two groups. As predicted,

individuals in the visual group reported using significantly more imagery than individuals in the

verbal group (p=.02, d=0.84). However, there were no significant differences between the

reported amounts of verbal processing and subjective difficulty for the two tasks at the .05

level. This may indicate that the verbal task was not a strong measure of verbal processing, or

that verbalization was more automatic across tasks, despite the instructions.

3.3.1.2 Spontaneous Use of Imagery In the Verbal Condition

Participants were asked whether or not they had seen any imagery after describing

how they would complete their goals. Some individuals in the verbal condition were found to

have spontaneously used imagery, even though t. For the first goal, 86.67% (13/15) individuals

reported using visual imagery. For the second goal, 80% (12/15) individuals reported using

visual imagery, and for the third goal, 86.67% (13/15) individuals reported using imagery. This

demonstrates that a high proportion of individuals in the verbal task condition spontaneously

utilised visual imagery, without being instructed to do so.

3.3.1.3 Mood Ratings Across the Course of the Experiment

Mood was rated on a visual analogue scale at multiple timepoints, in order to examine the course of mood ratings throughout the experiment. A total of 23 mood ratings were taken for each participant at baseline, following 3 scenario-setting tasks, following 3 goal-setting tasks, following 3 visual or verbal tasks, following 3 re-ratings of goals, and a series of repeated mood measures following the first goal re-rating. The individual mood profiles can be examined in Appendix W: Mood Profiles. The mean mood ratings for participants in the two groups across the course of the experiment are illustrated below in Figure 1.
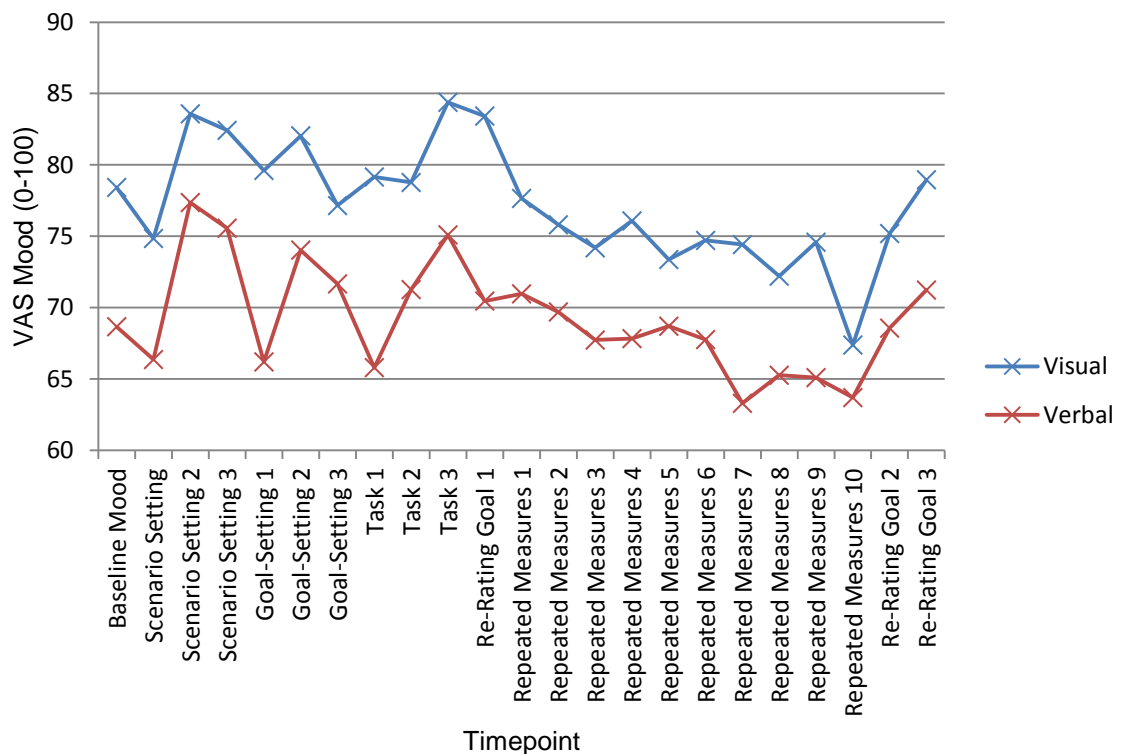
Figure 1: Mood change across stages of experiment

As the scenarios were designed to be positive, it was predicted that mood ratings would increase following the scenario-setting activity for each cued scenario. As demonstrated in Figure 1, there was a broadly similar pattern of mood ratings across the two groups. However, the mood ratings related to the first scenario ("a situation where you will be able to

cope easily with pressure"), participants' mood appeared to decrease, which was not initially predicted.

A two-way within-subjects ANOVA was conducted to investigate the effect of scenario (1, 2, 3) and stage of experiment (Scenario setting, Goal Setting, Post-Task, Re-Rating Goal) upon mood ratings using baseline mood as a co-variate. There was a significant effect of scenario upon mood ratings at the .05 level: $F(2, 52) = 4.85$, $p=.01$, power = 0.77, $\eta p^2=.16$ (see Table 2). On average, mood decreased after tasks related to the first cued scenario, whereas it increased for the second and third scenarios. There was also a significant interaction between scenario and baseline mood at the .05 level: $F(2, 52) = 4.03$, $p=.02$, power = 0.69, $\eta p^2=.13$. There was no significant effect of experiment stage upon mood ratings and no significant interaction between scenario and experiment stage at the .05 level.

Table 2

Effect of Scenario on Mean Mood Ratings

	Mean	Std. Error
Baseline mood	73.20	2.00
Scenario 1	72.80	1.61
Scenario 2	76.10	2.04
Scenario 3	76.80	2.41

There is a differential effect on mood ratings dependent on the scenario used, with mood decreasing compared to baseline for scenario 1, but increasing for scenarios 2 and 3. The three scenarios are not equivalent as initially predicted.

3.3.1.4 Individual Differences in Mood Ratings

Using mean mood ratings could mask individual differences in responding to the task. Closer examination of individual mood profiles (see Appendix W: Mood Profiles), confirmed

that participants' mood changed in both directions (more positive and more negative),

disproving the initial hypothesis that mood would change in a positive direction (see Table 3).

There was wider variance for negative mood change than for positive mood change.

Table 3

Change in Mood from Baseline to Post-Task

	Positive Mood Change		Negative Mood Change	
	Mean and SD	n	Mean and SD	n
Visual Task (n=14)	10.63 (6.44)	9	-14.88 (17.01)	4
Verbal Task (n=15)	8.52 (6.72)	10	-11.97 (13.21)	5

The magnitude of mood change was also calculated by taking the absolute value of the

change (i.e. disregarding negative signs). In this way, the size of mood change for each group

could be calculated, without being influenced by the direction of mood change (see Table 4). A

one-way ANOVA was used to calculate whether there was an effect of task (imagery or verbal)

on mean mood change. The effect of task upon mean mood change or magnitude of mood

change was not statistically significant at the *p*<.05 level. Additional analysis of imagery factors

linked to mood change is reported in Appendix X: Additional Analysis on Imagery Ratings.

Table 4

Means and Standard Deviations for Mean Mood Change from Baseline Following Visual or Verbal Task

	Visual Task	Verbal Task
Baseline Mood	78.42 (9.65)	68.67 (11.16)
Mean Mood Change	2.35 (15.63)	2.06 (13.46)
Absolute Value of Mood Change	11.50 (10.34)	9.72 (9.18)

Note: For mean mood change, a positive figure denotes an increase in mood and a negative figure indicates a decrease in mood compared to baseline.

3.3.2   *Novel Goal Appraisal Task*

A novel goal appraisal task was designed to investigate the effect of mood and imagery upon ratings of goal appraisal. In order to examine the utility of this procedure, two main analyses were conducted. First the effect of an imagery or verbal task upon changes in ratings of goal appraisal was examined. Secondly, the link between changes in ratings of goal appraisal and change in ratings of mood was examined.

3.3.2.1 Change in Ratings of Goal Appraisal Following Imagery or Verbal Tasks

It was hypothesised that individual ratings of goal appraisals would change following an imagery or verbal task, and that the magnitude of mood change would be greater for the imagery group. Participants each rated 3 goals for how important they were, how ambitious, how much success they had had in the past, and how much effort they planned into achieving the goal in the next 3 weeks along a 0-7 scale. It was hypothesised that participants would appraise goals as more important and less ambitious, and would plan to put more effort towards them following a visual task compared to a verbal task. The change in goal appraisal between the first and second goal appraisal ratings was calculated for each participant. Table 5 illustrates the percentage of participants for which there was no change in goal appraisal.

An examination of Table 5 reveals that there was considerable variability between the amounts of change in the ratings of goal appraisal. For some participants there was a degree of change in ratings of goal appraisal over the two tasks. However, a large proportion of the ratings appear not to have changed, which demonstrates that this task was sensitive to minor shifts in goal appraisal over time for a subset of participants only. The mean changes in goal appraisal ratings are reported in Table 6.

Table 5:

Percentage of Participants with No Change in Goal Appraisal

		Important	Ambitious	Past Success	Planned Effort
Goal 1	Visual	61.54% (8/13)	30.77% (4/13)	23.08% (3/13)	53.85% (7/13)
	Verbal	60% (9/15)	33.33% (5/15)	66.67% (10/15)	40% (6/15)
Goal 2	Visual	53.85% (7/13)	30.77% (4/14)	69.23% (9/13)	69.23% (9/13)
	Verbal	73.33% (11/15)	40% (6/15)	40% (6/15)	66.67% (10/15)
Goal 3	Visual	38.46% (5/13)	38.46% (5/13)	61.54% (8/13)	53.85% (7/13)
	Verbal	33.33% (5/15)	53.33% (8/15)	53.33% (8/15)	46.67% (7/15)

The four goal attributes (importance, ambition, past success, planned effort) were analysed separately. For each of the attributes, an ANOVA was conducted to measure whether there was a between-subjects effect of task (visual, verbal) or within-subjects effect of goal (1, 2, 3) on ratings of goal appraisal. There was a significant effect of goal for change in ratings of goal ambition: $F(2, 52) = 4.90$, $p=.01$, observed power = .78, $\eta p^2 =.16$. There were no other significant effects of task or goal at the .05 level for any of the goal attributes.

Table 6

Mean Change in Ratings of Goal Appraisals

		Visual Task	Verbal Task
Goal 1	Importance	-0.31 (1.25)	-0.33 (1.29)
	Ambition	0.77 (0.20)	1.32 (1.32)
	Past Success	-0.62 (2.02)	-0.53 (1.92)
	Planned Future Effort	0.00 (1.41)	0.07 (1.33)
Goal 2	Importance	0.38 (0.77)	0.27 (0.80)
	Ambition	0.00 (1.91)	0.00 (1.77)
	Past Success	-0.15 (1.21)	-0.07 (1.16)
	Planned Future Effort	-0.15 (0.90)	-0.27 (0.96)
Goal 3	Importance	0.15 (1.07)	0.14 (0.99)
	Ambition	0.23 (2.01)	0.27 (1.87)
	Past Success	-0.38 (0.96)	-0.33 (0.89)
	Planned Future Effort	1.92 (2.29)	1.93 (2.40)

3.3.2.2 Correlation Between Change in Ratings of Goal Appraisal

Changes in ratings of goal appraisal were analysed using Spearman's rank correlation (Table 7a). Both the mean change of goal appraisal ratings and the absolute value of change (i.e. disregarding direction of change) of goal appraisal ratings were considered.

Table 7a
Spearman's Rank Correlations of Mean Change in Goal Appraisal Ratings

		Mean Change of Goal Appraisal Ratings			Absolute Value of Change of Goal Appraisal Ratings			
		Ambitious	Past Success	Planned Effort	Important	Ambitious	Past Success	Planned Effort
Mean Change of Goal Appraisal Ratings	Important	.15	.07	.23	.24	.44*	.15	.21
	Ambitious		-.04	-.02	.42*	.05	.16	.39*
	Past Success			-.28	.00	.09	-.39*	-.21
	Planned Effort				-.05	-.01	.34	.46*
Absolute Value of Change of Goal Appraisal Ratings	Important					.11	.48*	.30
	Ambitious						.14	.10
	Past Success							.28

*Note. *p<.05 (2-tailed)*

There were no significant correlations between mean change in ratings of goal appraisals for the four rated goal attributes (importance, ambition, past success, planned effort). However, when the absolute value of change in goal appraisal ratings was considered, there were a number of significant correlations at the .05 level. There was a significant correlation between mean change of ratings in goal importance and absolute value of change in ratings of goal ambition, as well as a significant correlation between mean ratings of goal ambition and absolute value of change of ratings of goal importance and absolute value of change of ratings of planned effort. There was also a negative significant correlation between mean change in ratings of past success and absolute value of change of ratings of past success. This is because, on average, participants rated past success more conservatively upon re-rating, compared to other goal attributes. There was a significant correlation between mean change in ratings of planned effort and absolute value of change in ratings of planned effort.

There was also a significant correlation between absolute value of change in ratings of goal importance and absolute value of change in ratings of past success.

3.3.2.3 Correlation Between Change in Ratings of Goal Appraisal and Mood

It was hypothesised that changes in ratings of goal appraisal would be correlated with changes in mood. Changes in ratings of goal appraisal were correlated with mean changes in VAS mood and absolute value of VAS mood change (Table 7b and Table 7c respectively).

Table 7b

Spearman's Rank Correlations of Change in VAS Mood with Mean Change in Goal Appraisal Ratings

	Mean Change of Goal Appraisal Ratings			
	Important	Ambitious	Past Success	Planned Effort
Mood Post-Task	.01	-.08	.41*	-.01
Mean Mood Change^	.01	.00	.21	.03
Absolute Value of Mood change	.24	.42*	.16	-.04

Note. ^from baseline to post-Visual/Verbal task
*$p<.05$ (two-tailed)

There was a significant correlation between mean mood following the visual or verbal task, and change in appraisals of past success at the .05 level. There was also a significant correlation between the absolute value of mood change and change in ratings of goal ambition.

Table 7c

Spearman's Rank Correlations of Change in VAS Mood and Absolute Value of Mean Change of Goal Appraisal Ratings

	Absolute Value of Change of Goal Appraisal Ratings			
	Important	Ambitious	Past Success	Planned Effort
Mood Post-Task	-.18	.02	-.18	-.18
Mean Mood Change^	-.06	-.27	-.13	-.17
Absolute Value of Mood change	.43*	.26	.10	.24

Note. ^from baseline to post-Visual/Verbal task
*p< .05 (two-tailed)

There was a significant correlation between the absolute value of VAS mood change and the absolute value of change in ratings of goal importance. There were no other significant correlations between absolute value of change in ratings of goal appraisal and change in mood ratings.

3.3.3   Trait Imagery Use and Impact of Imagery

It was hypothesised that trait imagery use (as measured by the SUIS) and the impact of imagery (as measured by the IFES) would affect the magnitude of mood and goal appraisal change, following an imagery or verbal task.

3.3.3.1 Spontaneous Use of Imagery

A 2x2 between-subjects ANOVA were carried out to investigate the effect of task (visual, verbal) on magnitude of mood and goal appraisal change (mood, importance, ambition, past success, planned effort) using SUIS score as a covariate. There was a significant effect of task: $F_{(1, 25)} = 5.93$, $p=.022$ on magnitude of change of ratings of planned effort, with individuals in the visual group showing more change in ratings of effort than individuals in

verbal group. There was also a significant effect of SUIS on magnitude of change of ratings of planned effort: $F(1, 25) = 4.94$, $p=.036$).

3.3.3.2 Impact of Future Events Scale

A 2x2 between-subjects ANOVAs were carried out to investigate the effect of task (visual, verbal) on magnitude of mood and goal appraisal change (mood, importance, ambition, past success, planned effort), using IFES score as a covariate.

There was a significant main effect of task on magnitude of change of ratings of planned effort: $F(1, 25) = 6.55$, $p=.017$. There was a significant effect of IFES on magnitude of change in VAS mood ratings from baseline to post-task $F(1,25) = 6.42$, $p=.018$. There was a significant effect of IFES on magnitude of change of ratings of goal importance $F(1,25) = 8.165$, $p=.008$. There was also a significant effect of IFES on magnitude of change of ratings of planned effort: $F(1, 25) = 7.262$, $p = .012$.

3.4 Part 2: Application of Results in a Pilot Clinical Group

3.4.1 Clinical characteristics of the bipolar disorder group

A small clinical group was recruited to examine whether the trends observed in the non-clinical sample might be repeated in a clinical group. Caution should be used when interpreting these trends due to the small sample numbers involved.

The mean age of onset for bipolar disorder was 27.67 years (SD =7.97), and the mean age of diagnosis was 37.4 years (SD=13.05). The mean number of previous depressive episodes was 14.00 (SD = 22.11), and mean number of manic episodes was 4.25 (SD = 2.36). The mean number of times hospitalised due to mental health difficulties was 18.00 (SD = 39.75). 100% (6/6) of the clinical group was currently taking mood stabilising or antidepressant medication. 33.3% (2/6) were also taking medication for other medical conditions.

3.4.2 Participant Demographic Characteristics

The mean age of the bipolar disorder group was 55.83 years (SD=7.49), and the control group was 42.57 years (SD=11.29). An independent t-test revealed that there was a significant difference between the groups for age at the .05 level ($t(32)=2.73$, $p=.01$, two-tailed, $d=1.38$). The categorical demographic characteristics of the clinical and control groups: sex, marital status, highest level of education, and employment status, are outlined in Table 8.

Table 8

Demographic Characteristics and X² Test Results for Exact Significance

	Clinical (Bipolar Disorder)				Control				X^2
Sex	Male	Female			Male	Female			.641
	50% (3/3)	50% (3/3)			32.1% (9/28)	67.9% (19/28)			
Marital	M	D	N		M	W	N		.369
Status	66.7%	16.7%	16.7%		78.6%	3.6%	17.9%		
	(4/6)	(1/6)	(1/6)		(22/28)	(1/28)	(5/28)		
Highest	Sec	UG	PG		SF	U	PG	O	.001***
level of	50%	33.3%	16.7%		17.9%	14.3%	46.4%	21.4%	
education	(3/6)	(2/6)	(1/6)		(5/28)	(4/28)	(13/28)	(6/28)	
Employment	PT	FT	U	R	FT				<.001***
status	16.7%	16.7%	33.3%	33.3%	100% (28/28)				
	(1/6)	(1/6)	(2/6)	(2/6)					

*** =p<.001

M=Married; W=Widowed; D=Divorced; S=Separated; N=Never Married

Sec = Secondary school up to 16; SF = Sixth Form; UG=Undergraduate Degree; PG=Postgraduate Degree; O=Other

PT = Employed part-time; FT=Employed full-time; U=Unemployed; R=Retired

A X^2 test was used to compare the categories for the two groups. There were no significant differences found between the two groups for sex, or marital status at the .05 level. However, there were significant differences found for education level and employment status at the .001 level. Individuals in the bipolar group were more likely to have left school at a young age, and less likely to have completed postgraduate or other qualifications. Individuals in the bipolar group were more likely to be unemployed or retired, whereas the control group were currently in full-time employment.

3.4.3   Comparison of Baseline Measures and Impact of Intrusive Imagery

Table 9 presents the mean score and standard deviations for baseline measures: BDI, BAI, YMRS, SUIS, IFES, and baseline VAS for the clinical group and controls. An independent t-test was performed to compare the two groups for these baseline measures. Levene's test for equality of variance demonstrated that the equal population variances assumption was met for all t-tests (p>.05) except for BAI score (p=<.001), where an adjusted t-test was used.

Independent t-tests were used to compare baseline measures for visual and verbal groups. There was a significant difference between the baseline mood ratings of the control group (visual M=78.4, SD=9.6, verbal M=68.7, SD=11.2, p=.02, d=0.93). Individuals in the visual group had a significantly higher baseline mood compared to individuals in the verbal control group. There were no other significant differences between the two groups at the .05 level for age, BDI, BAI, YMRS, SUIS, or IFES.

Table 9

Means and Standard Deviations for Baseline Measures

	Bipolar disorder	Control	T-test	*d*
BDI	9.33 (4.23)	3.11 (3.13)	<.001***	1.67
BAI	7.00 (5.44)	2.96 (2.22)	.130	0.97
YMRS	4.33 (2.42)	1.89 (1.55)	.003*	1.20
SUIS	3.67 (0.62)	3.10 (0.76)	.098	0.82
IFES	37.40 (15.18)	25.29 (9.48)	.022*	0.96
Baseline Mood	72.83 (8.12)	73.20 (11.42)	.942	-0.04

*=p<.05, **=p<.01, ***=p<.001

BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; YMRS = Young Mania Rating Scale; SUIS = Spontaneous Use of Imagery Scale; IFES = Impact of Future Events Scale

It was hypothesised that individuals with bipolar disorder would experience more intrusive prospective imagery than a non-clinical control group, as demonstrated by higher scores on the IFES. The t-test demonstrated that there was a significant effect of group (bipolar disorder, non-clinical control) on IFES score, with individuals with bipolar disorder scoring significantly higher than individuals in the control group at the .05 level. There were also significant differences between the two groups for BDI and YMRS. Participants with bipolar disorder had higher current depression and mania symptoms. There were no differences between the two groups for current anxiety symptoms and trait levels of imagery use (*p*>.05), although the non-significant trend was for higher current anxiety and higher trait imagery in the bipolar group.

3.4.4 Novel Imagery Task

3.4.4.1 Comparison of Subjective Ratings of Imagery Use by Group

Table 10

Subjective Experience of Task for Clinical Group

	Visual Task (n=3)	Verbal Task (n=3)
Difficulty	6.00 (2.00)	7.33 (2.08)
How much was imagery used?	7.33 (0.58)	6.00 (1.73)
How much were verbal thoughts used?	3.00 (1.00)	4.00 (4.36)

An independent t-test showed no significant differences between the two groups at the .05 level, although the non-significant trend was for more imagery to be used in the visual group, and more verbal thoughts to be used in the verbal group.

3.4.4.2 Spontaneous Use of Imagery In the Verbal Condition

For the first and second goals, 100% (3/3) individuals in the verbal group reported using visual imagery even though they were not instructed to do this. For the third goal 66.67% (2/3) individuals reported using imagery. As with the control group, a high proportion of individuals in the verbal task condition spontaneously utilised visual imagery, without being instructed to do so.

3.4.4.3 Mood Ratings Across the Course of the Experiment

As before, mood was rated on a visual analogue scale at 23 points throughout the task. The individual mood profiles can be examined in Appendix W: . The mean mood ratings for participants in the two groups across the course of the experiment are illustrated below in Figure 2.
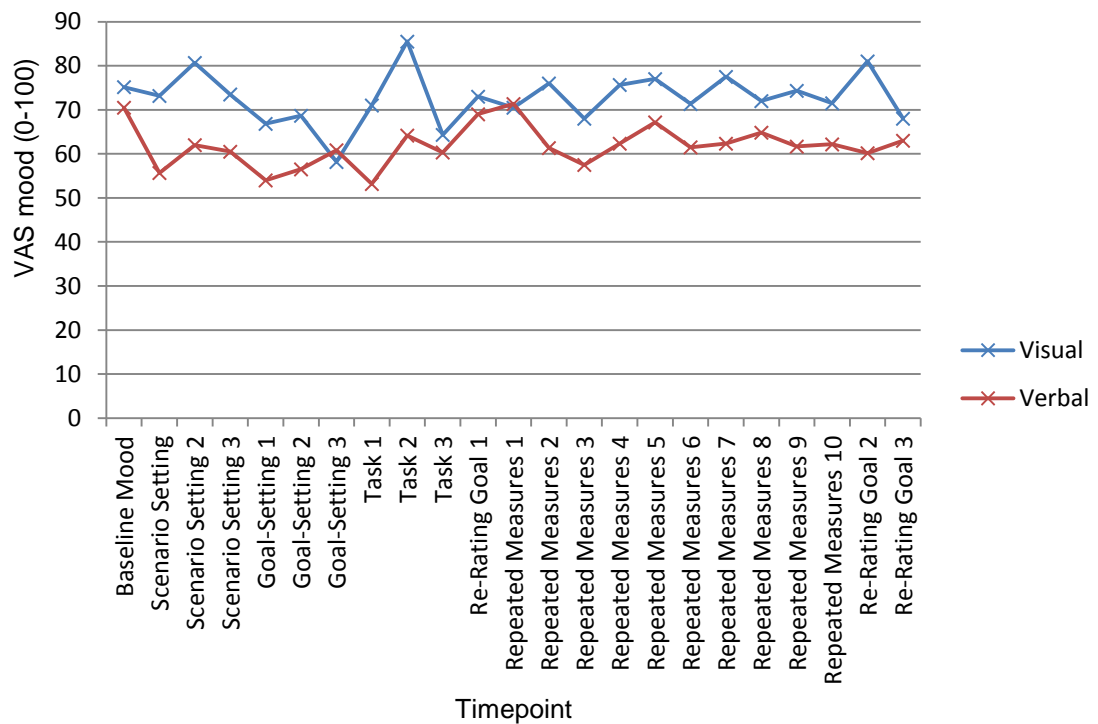
Figure 2: Mood change across stages of experiment for clinical group

As the size of the sample is small, it is likely to be influenced more by individual variation in mood profiles. As before, mood appeared to decrease following the first scenario-setting task, but also for the third task. Mood increases following the second scenario but only increases above baseline for the imagery group, not the verbal group. The mean mood ratings for the three scenarios were calculated across the four principal stages of the experiment (scenario setting, goal-setting, main task, re-rating goals). These values are reported below in Table 11. The second scenario "You will have lots of good times with friends" appears to have had the most positive effect on mood ratings, although mood is still at baseline level when averaged across the two tasks.

Table 11

Effect of Scenario on Mean Mood Ratings for Clinical Group

	Mean	Std. Error
Baseline mood	72.83	5.88
Scenario 1	64.48	5.88
Scenario 2	69.83	5.49
Scenario 3	63.58	5.78

3.4.4.4. Individual Differences in Mood Ratings for the Clinical Group

As before, using mean mood ratings could mask individual differences in responding to the task. Individual mood profiles are reported in Appendix W: Mood Profiles. As with the control group, some participant's mood ratings changed in a positive direction, and some in a negative direction (see Table 12). Again, the initial hypothesis that mood would change in a positive direction was not supported.

Table 12

Change in Mood from Baseline for Clinical Group

	Positive Mood Change		Negative Mood Change	
	n	Mean	n	Mean and SD
Visual Task (n=3)	1	15.50	2	-10.08 (3.65)
Verbal Task (n=3)	1	4.50	2	-19.17 (19.09)

The magnitude of mood change was also calculated by taking the absolute value of the change (i.e. disregarding negative signs). In this way, the size of mood change for each group could be calculated, without being influenced by the direction of mood (see Table 13). There appeared to be a greater mean mood decrease for the verbal task compared to the visual task. However, the absolute values of mood change appeared to be similar.

Table 13

Means and Standard Deviations for Mean Mood Change from Baseline Following Visual or

Verbal Task

	Visual Task	Verbal Task
Baseline Mood	75.17 (6.17)	70.5 (10.50)
Mean Mood Change	-1.56 (14.99)	-11.28 (19.21)
Absolute Value of Mood Change	11.89 (4.06)	14.28 (15.94)

Note: For mean mood change, a positive figure denotes an increase in mood and a negative figure indicates a decrease in mood compared to baseline.

3.4.5   Novel Goal Appraisal Task

3.4.5.1 Change in ratings of goal appraisal following imagery or verbal tasks

The change in ratings of goal appraisal for each goal was calculated for each participant. Table 14 illustrates the percentage of participants for which there was no change in goal appraisal.

An examination of Table 14 reveals that there was considerable variability between the amounts of change in the ratings of goal appraisal. For some participants there was a degree of change in ratings of goal appraisal over the two tasks. However, a large proportion of the ratings appear not to have changed, which demonstrates that this task was only sensitive to minor shifts in goal appraisal over time for a subset of participants. The mean changes in goal appraisal ratings are reported in Table 15.

Table 14:

Percentage of Participants with No Change in Goal Appraisal for Clinical Group

		Important	Ambitious	Past Success	Planned Effort
Goal 1	Visual	33.33% (1/3)	66.67% (2/3)	33.33% (1/3)	33.33% (1/3)
	Verbal	33.33% (1/3)	0% (0/3)	33.33% (1/3)	66.67% (2/3)
Goal 2	Visual	66.67% (2/3)	33.33% (1/3)	66.67% (2/3)	33.33% (1/3)
	Verbal	66.67% (2/3)	66.67% (2/3)	33.33% (1/3)	66.67% (2/3)
Goal 3	Visual	33.33% (1/3)	33.33% (1/3)	33.33% (1/3)	33.33% (1/3)
	Verbal	66.67% (2/3)	100% (3/3)	33.33% (1/3)	66.67% (2/3)

Table 15

Mean Change in Ratings of Goal Appraisals for Clinical Group

		Visual Task	Verbal Task
Goal 1	Importance	-0.67 (0.58)	0.00 (1.00)
	Ambition	-1.00 (1.73)	0.67 (3.21)
	Past Success	-1.00 (1.00)	-1.67 (1.53)
	Planned Future Effort	-0.67 (0.58)	0.33 (0.58)
Goal 2	Importance	-0.33 (0.58)	-0.33 (0.58)
	Ambition	1.00 (1.00)	0.33 (0.58)
	Past Success	-0.33 (0.58)	0.67 (0.58)
	Planned Future Effort	0.00 (1.00)	0.33 (0.58)
Goal 3	Importance	1.00 (1.00)	-0.33 (0.58)
	Ambition	0.33 (1.53)	0.00 (0.00)
	Past Success	0.67 (0.58)	-1.00 (1.00)
	Planned Future Effort	0.00 (1.00)	-0.33 (0.58)

3.4.5.2 Correlation Between Change in Ratings of Goal Appraisal for Clinical Group

Due to the small sample size, correlational analyses were not repeated for the clinical group as they would not have had sufficient power.

3.4.6   Feasibility Calculation

Based on the reported power and effect sizes, a feasibility calculation was undertaken to estimate the sample sizes needed to use this methodology to compare the effect of imagery on mood and goal appraisal with both a bipolar and control group. An independent t-test comparing the means of two groups, with an effect size $d = 0.84$, would require a total sample n of 48 in order to reach the 80% power threshold for a two-tailed hypothesis. As there was no significant effect of task upon mood change, this was not calculated.

4.   Discussion

This exploratory pilot study aimed to investigate the utility and feasibility of a novel imagery task, novel goal appraisal task, and a repeated visual analogue scale as proposed methods for investigating the role of imagery in amplifying mood and goal appraisal in individuals diagnosed with bipolar disorder compared to a non-clinical control group.

4.1 Novel Imagery Task

A novel imagery task was designed to investigate the effect of imagery compared to verbal processing on mood ratings and goal appraisal. The spontaneous use of imagery in the verbal group, subjective use of imagery for both groups, and mood ratings throughout the experiment were examined in order to determine whether the three scenarios used were effective at increasing mood as was initially predicted. Subjective ratings of use of imagery showed that individuals in the imagery group reported using significantly more imagery than individuals in the verbal group at the .05 level. However, there were no significant differences between the reported amounts of verbal processing and subjective difficulty for the two tasks

at the .05 level. This may indicate that the verbal task was not a strong measure of verbal processing, or alternatively that verbalization was more automatic across tasks, despite the instructions. A replication with a small clinical group found non-significant trends that individuals in the visual group reported using more imagery, and individuals in the verbal group reported using more words. A high proportion of individuals in the verbal task for both clinical and control samples spontaneously utilised visual imagery, without being instructed to do so, demonstrating the difficulty of designing a "pure" measure of verbal processing. It is difficult to prevent the spontaneous use of imagery, and it would be important to continue to monitor this in future experiments.

Mood was rated on a visual analogue scale at various points throughout the procedure. It was hypothesised that mood would change in a positive direction following each of three scenario setting tasks. However, the mood ratings related to the first scenario ("a situation where you will be able to cope easily with pressure"), participants' mood appeared to decrease, which was not initially predicted. There was a significant effect of scenario upon mood ratings when baseline mood was taken into account. On average mood decreased for tasks related to the first cued scenario, but increased for the second and third scenarios. It is likely that being cued to think about a situation where they could cope easily with pressure caused participants to focus more on "pressure" than on "coping". This indicates that the first scenario is not fit for purpose and should not be used in any repetition of this experiment in the future. Initial results from the small clinical sample indicated that scenario 2 "you will have lots of good times with friends" appears to have had the most positive effect on mood ratings. This scenario may be the most effective for positive mood change in future experiments.

For both the non-clinical and clinical groups, there were individual differences in responding to the task. Whilst for the majority of participants mood changed in a positive direction, for a subset of participants in both task conditions (visual and verbal processing), mood decreased. For this reason, it was important to consider the magnitude or absolute value of mood change and examine individual mood profiles. Using mean values could obscure

differences in responding. There was no effect of task on mean mood change or magnitude of mood change from baseline to following the main task, which is contrary to the initial hypothesis. However, it may be that the effect of imagery is not as strong for a control group, as it would be in a clinical sample, and does not contradict Holmes et al. (2008b)'s assertion that imagery is an "emotional amplifier" in bipolar disorder.

4.2 Novel Goal Appraisal Task

A novel goal appraisal task was designed to investigate the effect of mood and imagery upon goal appraisal. The effect of imagery and verbal tasks upon changes in ratings of goal appraisal was examined, as well as the link between changes in ratings of goal appraisal and change in ratings of mood.

There was considerable variability between the amounts of change in the ratings of goal appraisal. For some participants there was a degree of change in goal appraisal ratings over the two tasks. However, a large proportion of the ratings appeared not to have changed for participants in the clinical and non-clinical groups, which demonstrated that this task was only sensitive to minor shifts in goal appraisal over time for a subset of participants. There was no significant effect of task (visual or verbal) for any of the changes in goal attributes, which disproved the hypothesis that goal appraisal ratings would change more following the use of imagery compared to a verbal task in a control group. There was a significant effect of goal on change in ratings of goal ambition at the .05 level, which adds weight to the evidence that the three scenarios used were not equivalent as had originally been predicted. There were no other significant effects of task or goal for any of the attributes.

The correlational analysis appeared to demonstrate links between changes in appraisal of goal importance, goal ambition and planned effort. However, due to the large number of comparisons, few firm conclusions can be drawn from these associations. Alternative measures of goal appraisal should be pursued in the future. There was a significant correlation between mean mood following the visual or verbal task, and change in appraisals of past

success at the .05 level. There was also a significant correlation between the absolute value of mood change and change in ratings of goal ambition. As the association is correlational, it is not possible to pinpoint causal factors, but concepts of past success and failure may be important in influencing the mood of individuals in the control group. When goals are rated as being more ambitious, this appears to be linked to a larger change in ratings of mood.

There was a significant correlation between the absolute value of VAS mood change and the absolute value of change in ratings of goal importance. There were no other significant correlations between absolute value of change in ratings of goal appraisal and change in mood ratings.

There is some evidence to support the hypothesis that changes in ratings of goal appraisals would be correlated with changes in mood. However, these associations were not consistent, and due to the large number of comparisons, they should not be over-interpreted. Due to the large proportion of participants for whom goal appraisal ratings did not change, and the small shifts in goal appraisal, it is recommended that the goal appraisal task is reviewed further before being used in further research.

4.3 Trait Factors

It was hypothesised that trait imagery use (as measured by the SUIS) and the impact of imagery (as measured by the IFES) would affect the magnitude of mood and goal appraisal change, following an imagery or verbal task.

When SUIS was taken into account there was a significant effect of task on magnitude of change of ratings of planned effort, with individuals in the visual group showing more change in ratings of planned effort than individuals in the verbal group.

When IFES was taken into account, there was a significant main effect of task on magnitude of change of ratings of planned effort at the .05 level. There was also a significant effect of IFES on magnitude of change in VAS mood ratings from baseline to post-task at the .05 level. There was a significant effect of IFES on magnitude of change of ratings of goal

importance and magnitude of change of ratings of planned effort at the .05 level. The impact of intrusive imagery scale is a particularly interesting construct as it was associated with numerous factors, and should be investigated further in the future.

4.4 Impact of Intrusive Imagery

Deeprose and Holmes (2010) theorised that "an excess of prospective imagery … contribute[s] to the pattern of mood fluctuation that characterises [bipolar] disorder" (p. 201). It was predicted that individuals with bipolar disorder would experience more intrusive prospective imagery than a non-clinical control group, as demonstrated by higher scores on the IFES. Initial findings in a small clinical group confirmed that individuals with bipolar disorder had significantly higher scores on the IFES compared to the control group at the .05 level. This fits with previous research by Deeprose and Holmes (2010) and Deeprose et al. (2011), who found raised IFES scores to be linked to dysphoria and risk for mania in non-clinical control participants. It appears that prospective intrusive imagery is linked to mood symptoms for both clinical and non-clinical participants, and should be researched more thoroughly in order to fully understand the mechanisms behind this.

4.5 Limitations

There are some important methodological limitations to take into account when interpreting the results of this study. Although a number of well-validated measures were used within this study. However, the measures of goal appraisal were Likert scales, which were adapted from previous studies. Exploration of the distribution of the data showed high levels of kurtosis for some of the measures of goal appraisal. This may have been due to the small sample size. However, given that goal appraisal ratings were found not to change within a short period of time, it may be helpful for future studies to develop and validate a new scale for this purpose, or adapt an established scale such as the Willingly Approached Set of Statistically Unlikely Pursuits (Johnson & Carver, 2006).

Another limitation is the relatively small number of participants in the clinical group. Recruitment proved to be difficult with low numbers of responders. In addition, a number of individuals were excluded for not meeting the research criteria. The small sample size may have reduced the sensitivity of the analysis and increased the likelihood of type 2 errors, i.e. concluding that no difference exists between the two groups, when a difference is present but undetected.

The large number of analyses performed also increases the likelihood of type 1 errors, i.e. concluding that a result is significant when it is due to chance. There may have been other confounding variables such as current mood symptoms, duration of illness, severity, and effects of medication, which may be related to cognitive style (Scott & Pope, 2003), and were not controlled for in the present analysis. Examinations of post-hoc power for the control group analyses indicated that observed power was at or near the generally accepted 80% value for all analyses. However, it was not possible to carry out analyses on the small clinical sample. Future research could examine the potential effect of these factors in more detail.

Levels of exclusion were higher than levels of inclusion for the clinical group, which means that the representativeness or external validity of the included sample of participants should be examined carefully. Participants were currently in a euthymic state, i.e. not suffering from current severe levels of depression or mania. This was necessary in order to increase homogeneity within the group, for what is naturally an extremely heterogeneous disorder. A twelve-year study of individuals with bipolar disorder found that a degree of depressive symptoms were present for nearly half of the time, suggesting that this may be normal for many individuals with bipolar disorder (Judd et al., 2002). There is a fine balance in research into bipolar disorder between having a group that is representative of the wider population, and having a group that is too heterogeneous in presentation to make useful comparisons. It is possible that the study's findings may have been different if participants displayed current symptoms of mania or depression.

The difficulties with recruitment also raise concerns about the feasibility of the study. It is possible that the length of the study, combined with the lack of incentive offered made people less inclined to volunteer. It is also possible that potential participants felt overwhelmed by the volume of information offered in the participant information sheet, although it would be difficult to condense this within current research ethical guidelines. Future studies should ensure that the studies are less effortful for participants, by decreasing the length of time required for participation, and the number of measures to be completed. If the study could be administered remotely via computer connection, this would also increase ease of administration. Based on reported power and effect sizes, it is recommended that a sample of at least 48 participants be recruited for future research.

Another problem was that although participants were randomized to visual or verbal group, and the two groups were equivalent for most baseline measures, there was a significant difference between the two groups for baseline measure of mood (although not current mood symptoms). Because mood change was calculated, this should not affect the findings of the study.

There were also some demographical differences between the bipolar and control groups e.g. level of education and employment. There is evidence that this is reflective of the clinical group being studied, as bipolar disorder has been found to interfere with the ability to find and maintain employment (Bowden, 2005).

Despite the identified limitations, this study provides a useful starting point for further research in this area. Ideas for future research are discussed below.

4.6 Implications for Further Research

Future research should investigate the link between visual imagery, mood, and goal-setting in bipolar disorder, using the second and third goal-setting scenario, but omitting the first scenario. A repetition with a large clinical sample of participants would be able to state more definitively whether visual processing causes a larger mood change in bipolar

participants than verbal processing. Longitudinal research could also help to disentangle some of the relationships observed between imagery ratings and mood change for all participants.

Future research should also develop and validate better measures of goal appraisal in order to examine the shifts in goal appraisal that were observed in this study in a more systematic manner. A particular strength of the study was that participants set their own goals in response to experimenter cues, meaning that the goals used were likely to be more ecologically valid. Further qualitative research could examine goal setting in participants with bipolar disorder. As participants in this study were currently euthymic, future research could also examine cognitive processes related to imagery, mood, and goal-setting during manic and depressed episodes.

4.7 Conclusions

The findings of this study explore the utility and feasibility of two novel procedures: a novel imagery task and a novel goal appraisal task for investigating the role of imagery in amplifying mood and goal appraisal in individuals diagnosed with bipolar disorder compared to a non-clinical control group. The three scenarios used were not found to be equivalent as had been initially predicted. The second scenario: "you will have lots of good times with friends" produced the most consistent positive mood changes. The first scenario, "you will cope easily with pressure" was found to be particularly unhelpful, as it was more likely to decrease mood ratings. Individual mood profiles revealed that positive mood change could not be assumed, and the absolute value of mood change needed to be taken into account rather than mean mood changes which could be misleading.

There was some evidence of variability in goal appraisal within a short period of time, but only for a subset of participants. Goal appraisal may be a more stable than initially predicted, or the novel measure may not be sensitive enough to changes in goal appraisal.

There could be differences between a control group and a clinical group of individuals with bipolar disorder for the stability of goal appraisal. This could be examined further in the future.

As predicted, individuals with bipolar disorder reported a higher impact of prospective imagery, as measured by the IFES scale, compared to the control group. This provides some support for Deeprose et al.'s (2010) assertion that "an excess of prospective imagery ... contribute[s] to the pattern of mood fluctuation that characterises [bipolar] disorder". This finding should be replicated with a larger clinical sample.

Although the methodological limitations affect the extent to which firm conclusions can be drawn from this study, this piece of research is the first of its kind, and the findings with a non-clinical group provide guidance for the methodology of future research.

Research in this field has important clinical implications. A high proportion of individuals in the verbal processing condition were found to have spontaneously used visual imagery when describing a goal, highlighting that the use of imagery-based cognitions is widespread. If visual imagery were demonstrated to act as an "emotional amplifier", or to influence goal appraisal, this could indicate that these factors are related to the onset or course of episodes of mania or depression (Jones et al., 2005) and increase our understanding of the timing of these episodes. This research could lead to developments in the use of psychological interventions in the treatment of bipolar disorder, and in particular the use of imagery rescripting as part of a cognitive-behavioural (CBT) approach.

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PART THREE: Appendices

Appendix A: Reflective statement

I have found the process of carrying out research largely frustrating, occasionally exciting, and often disappointing. Planning and carrying out a large-scale research project has been a useful learning experience, but not an entirely pleasant one. A particular strength of my research is that it is investigating new, ground-breaking theory that could provide new insight into the mechanics of cognition in bipolar disorder. Its scope is ambitious, and the methodology was designed to provide the best possible data, using a mixture of "gold-standard" measures and more novel approaches.

I have always thought that research is an important and necessary process, in order to gain new scientific knowledge and guide best practice in health and social care settings. However, I also believe that it is possible to be a brilliant clinician, giving the best possible care to patients without carrying out new research. I have found that one of the main frustrations of my research project was that I didn't feel I had the time and space to give the project my full attention, in the midst of clinical and academic work, and whilst trying to maintain links with the vital support network of family and friends that helped ensure my own mental health was not neglected. Whilst I would have liked to prioritise research as I believe that research should be done to the highest possible standard, I did not feel this could be done at the expense of developing effective clinical skills, or meeting the necessary academic standards of the course.

My experience on clinical placements has often been that qualified clinical psychologists do not undertake large-scale research projects, despite having the skills to do so. One placement was the exception, as there was an established research team, but the projects that were undertaken were on a smaller scale than this project, and used a readily-available patient base to provide data. As this was not an NHS service, the ethics and research governance process seemed to be less unwieldy, and less time-consuming. This meant that many of the barriers that make research in the NHS difficult were minimised. This was an example of good practice that I will try to use as a model for future research. However, as I have learned that I do not work well when juggling competing priorities, and that I will always

regard patient care to be my number one priority, I would find it difficult to carry out research within a clinical post, unless part of a supportive and motivated team, and with regular protected time in which to carry out research-related work.

If another researcher were planning to embark on a similar project, I would warn them that the reality of the research process is time-consuming and difficult. I would recommend, if possible, taking part in research as part of a team rather than working independently. In particular, I would recommend having administrative support planned into the project, as many hours of photocopying, and preparing and sending letters will use up valuable time that could have been used for networking, more active recruitment of participants, and reflecting on the progress of the project, and making alterations if necessary. My other piece of advice would be to trust your instincts. Whilst designing my project, I had reservations that using a particular method and recruiting in a particular manner would prove difficult. Against my better judgement I allowed myself to be persuaded that the most rigorous method, using only "gold-standard" measures would be necessary to make my research the best-quality it could be. Whilst this is true, pragmatism is also important when carrying out research. If a potential participant is asked to give up too much time, for no tangible reward, they are unlikely to take part in your study. Relying on other people to recruit participants for you is also difficult. Although individual clinicians involved in recruitment may be interested in your research and enthusiastic about your prospects for recruitment, their everyday clinical work will also be their priority. Unless they have a full understanding of the time pressures involved, and are reminded repeatedly about the research, you may face a long wait for suitable participants. I would also advise future researchers to cultivate personal networks that may be of use, professionally, as many of my most useful research leads were through personal contacts.

I found the process of gaining ethical clearance and research governance unnecessarily bureaucratic and prohibitively time-consuming. For example, a typographic error in my original ethics submission meant that my project had to go back to the ethics board, as one of the sections of the questionnaire that I was using had been missed off. This was despite the fact

that the questionnaire had already been cleared for use in the study. This delayed the start of my project recruitment by about a month. Individual R&D boards also required minor changes to letters and information sheets that resulted in delays.

It was decided to write the SLR paper in accordance with the submission criteria for Clinical Psychology Review and the empirical paper in accordance with the submission criteria for Behaviour Research and Therapy following a great deal of consideration. Both journals are peer-reviewed, and as such, are known to publish journal articles of a high standard that have been approved by experts in the field of psychology. The proposed journals also have respectable impact factors compared to other journals in the same field. Clinical Psychology Review specifically aims to publish reviews that would be of interest to clinical psychologists, covering a diverse range of subject areas. Previous reviews related to bipolar disorder and goal regulation have been previously published by this journal (e.g. Johnson, 2005; Urošević, Abramson and Harmon-Jones, 2008). Behaviour Research and Therapy particularly specialise in articles related to cognitive behaviour therapy (CBT). Within their remit, articles related to "theoretical and experimental analyses of psychopathological processes [including] predictors, moderators and mechanisms of behaviour change" are accepted (http://www.elsevier.com/locate/brat). The empirical paper would therefore appear to fit within the aims and scope of this journal. In addition, a number of the key papers related to the empirical paper have been previously published in Behaviour Research and Therapy, including the paper by Holmes, Geddes, Colom and Goodwin (2008b) that prompted the undertaking of the research outlined in the empirical paper.

Appendix B: Guideline for authors for the systematic literature review

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2. Case study (Coote & Kevis, 2007; Drisko, 2005; Rebeiro-Gruhl & Laporte, 2008)

3. Animal study (Flaisher-Grinberg & Einat, 2009)

4. Not specific to bipolar disorder (Destoop, De Bruijn, Hulstijn, & Sabbe, 2009; Flaherty, 2011; Ferguson, Conway, Endersby, & Macleod, 2009; Preskorn & Flockhart, 2009; Previc, 2006;Ragin & Oltmanns, 1987; Stein, Mann, & Hunt, 2007; Twenge et al., 2010)

5. Not related to personal goals (e.g. treatment goal, research goal etc). (Cloutier, Hagner, Malloy, & Cotton, 2006; Cooklin, 1974; Corrigan, Barr, Driscoll, & Boyle, 2008; Culpepper, 2010; Harvey, 2006; Hitsman, Moss, Montoya, & George, 2009; Keck, Frye, & E., 2007; Lefley, 2009; Lewis, Spencer, Haas, & DiVittis, 1987; Marshall, Oades, & Crowe, 2009; Megivern, Pellerito, & Mowbray, 2003; Nierenberg, 2010; Robertson, 2006; Roman & Gillig, 2006; Sachs & Rush, 2003; Sala, Axelson, & Birmaher, 2009; Schön, Denhov, & Topor, 2009; Stackert & Bursik, 2006; Starnino, et al., 2010; Tse, 2002; Tse & Yeats, 2002; Sala, Axelson, & Birmaher, 2009; Warden, et al., 2010; Wong-McDonald, 2007)

6. Not related to internal goal-related processes:
   a. Environmental triggers e.g. life events: (Johnson, et al., 2000; Johnson, et al., 2008; Nusslock, Abramson, Harmon-Jones, Alloy, & Hogan, 2007; Urošević S. , et al., 2010)
   b. Behavioural correlates: (Benazzi, 2006; Benazzi, 2007)
   c. Biological correlates: (Harmon-Jones, et al., 2008)

7. Intervention study (de Andrés, et al., 2006; Johnson & Fulford, 2009; Sajatovic, et al., 2009)

8. Not written in English (Hsu, Yu, & Chen, 2010)

Please note that in some cases, a study could have been excluded for more than one reason. In these instances, studies have only been counted once.

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Appendix E: Quality Checklist

			Yes=1	No=0	N/A or unknown
Title/Abstract	1.	Does the abstract provide an informative and balanced summary of what was done and found?			
Introduction	2.	Has the scientific background and rationale for the investigation been reported?			
	3.	Are the objectives and hypotheses clearly described?			
Method	4.	Are the main outcomes to be measured clearly described in the Introduction or Methods section?			
	5.	Were the main outcome measures used valid and reliable?			
	6.	Are the characteristics of the patients included in the study clearly described? a. Eligibility criteria (inclusion/exclusion) b. Sources and methods of selection of participants c. Design specific factors: *Cohort study*—methods of follow-up *Case-control study*—rationale for the choice of cases and controls			
	7.	Were the subjects asked to participate in the study representative of the entire population from which they were recruited?			
	8.	Were subjects who agreed to take part representative of the population from which they were recruited?			
	9.	Is the proportion of participants who agreed to take part stated?			
Results	10	Are the main findings of the study clearly described to enable checking of major analyses and conclusions?			
	11	Does the study provide estimates of the random variability in the data for the main outcome? a. Non-normally distributed: inter-quartile range b. Normally distributed: standard error, standard deviation, confidence intervals			
	12	Have actual probability values been reported for the main outcomes except where the probability value <0.001?			
Data Analysis	13	Were the statistical tests used clearly described?			
	14	Were the statistical tests used to measure the main outcome appropriate? E.g. non-parametric for small sample sizes			
	15	Were all analyses planned at the outset of study (are any results based on "data dredging"?)			
Conclusions	16	Are the results clearly linked to original hypotheses?			

Appendix F: REC & Research Governance documentation

NHS

National Research Ethics Service

East Yorkshire & North Lincolnshire REC
Yorkshire and the Humber Research Ethics Office
First Floor
Millside
Mill Pond Lane
Leeds
LS6 4EP

Telephone: 0113 3050127

15 November 2010

Miss Hannah Anstey
Department of Clinical Psychology
Hertford Building
University of Hull
HU67RX

Dear Miss Anstey

Study Title:	**Investigation of the use of mental visual imagery and how it affects mood ratings and goal setting in individuals with bipolar disorder.**
REC reference number:	**10/H1304/37**

Thank you for your letter dated 9th August 2010, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered in correspondence by a sub-committee of the REC. A list of the sub-committee members is attached.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

The Committee has not yet been notified of the outcome of any site-specific assessment (SSA) for the non-NHS research site(s) taking part in this study. The favourable opinion does not therefore apply to any non-NHS site at present. I will write to you again as soon as one Research Ethics Committee has notified the outcome of a SSA. In the meantime no study procedures should be initiated at non-NHS sites.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of

the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where the only involvement of the NHS organisation is as a Participant Identification Centre (PIC), management permission for research is not required but the R&D office should be notified of the study and agree to the organisation's involvement. Guidance on procedures for PICs is available in IRAS. Further advice should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Investigator CV		02 August 2010
Protocol	5.3	09 August 2010
CV - Hannah Anstey		09 August 2010
REC application		10 August 2010
Summary/Synopsis	1	09 August 2010
Advertisement	1	09 August 2010
Letter of invitation to participant	1	09 August 2010
Participant Information Sheet	4	10 October 2010
Participant Consent Form	3	10 October 2010
GP/Consultant Information Sheets	1	10 October 2010
Questionnaire: SUIS		
Questionnaire: YMRS		
Questionnaire: BDI-II		
Questionnaire: BAI		
GP Invitation Letter	1	09 August 2010
Demographics Form	1	09 August 2010
Summary of Proposed procedure	1	09 August 2010
Exclusion Information Sheet	1	09 August 2010
Impact of Future Events Scale		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/H1304/37	Please quote this number on all correspondence

With the Committee's best wishes for the success of this project

Yours sincerely

Dr David Horton
Chair

Email: Nicola.mallender-ward@leedspft.nhs.uk

Enclosures:	*List of names and professions of members who were present at the meeting and those who submitted written comments*
	"After ethical review – guidance for researchers
Copy to:	*Mr Stephen Walker* *R&D Governance/Clinical Audit Development Manager* *Humber NHS Foundation Trust*

NHS

National Research Ethics Service

East Yorkshire & North Lincolnshire REC

Yorkshire and the Humber Research Ethics Office
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Mill Pond Lane
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Tel: 0113 3050127

16 November 2010

Miss Hannah Anstey
Department of Clinical Psychology
Hertford Building
University of Hull
HU67RX

Dear Miss Anstey

Study title:	**Investigation of the use of mental visual imagery and how it affects mood ratings and goal setting in individuals with bipolar disorder.**
REC reference:	**10/H1304/37**
Amendment number:	**1**
Amendment date:	**26 October 2010**

Thank you for your letter of 26 October 2010, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	Version	Date
GP/Consultant Information Sheets	2	26 October 2010
Participant Information Sheet	5	26 October 2010
Notification of a Minor Amendment		26 October 2010

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

Yours sincerely

Mrs Nicola Mallender-Ward
Committee Co-ordinator

E-mail: Nicola.mallender-ward@leedspft.nhs.uk

Copy to: *Mr Stephen Walker*

National Research Ethics Service

East Yorkshire & North Lincolnshire REC

Yorkshire and the Humber Research Ethics Office
First Floor
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Mill Pond Lane
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LS6 4EP

Tel: 0113 3050127
Fax:

07 December 2010

Miss Hannah Anstey

Department of Clinical Psychology
Hertford Building
University of Hull
HU67RX

Dear Miss Anstey

Study title:	**Investigation of the use of mental visual imagery and how it affects mood ratings and goal setting in individuals with bipolar disorder.**
REC reference:	**10/H1304/37**
Amendment number:	**AM1**
Amendment date:	**05 November 2010**

The above amendment was reviewed on 23 November 2010 by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Protocol	5.4	05 November 2010
Notice of Substantial Amendment (non-CTIMPs)	AM1	05 November 2010

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

10/H1304/37:	Please quote this number on all correspondence

Yours sincerely

Mrs Nicola Mallender-Ward
Committee Co-ordinator

E-mail: Nicola.mallender-ward@leedspft.nhs.uk

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Mr Stephen Walker*

National Research Ethics Service

NRES Committee Yorkshire & The Humber - Humber Bridge

Yorkshire and the Humber Research Ethics Office
First Floor
Millside
Mill Pond Lane
Leeds
LS6 4RA

Tel: 0113 3050127
Fax:

14 April 2011

Miss Hannah Anstey
Department of Clinical Psychology
Hertford Building
University of Hull
HU67RX

Dear Miss Anstey

Study title:	**Investigation of the use of mental visual imagery and how it affects mood ratings and goal setting in individuals with bipolar disorder.**
REC reference:	**10/H1304/37**
Amendment number:	**AM03**
Amendment date:	**27 March 2011**

The above amendment was reviewed on 08 April 2011 by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Revised research proposal	5.5	27 March 2011
GP/Consultant Information Sheets	2	27 March 2011
Participant Information Sheet: Exclusion information sheet - revised	4	27 March 2011
Notice of Substantial Amendment (non-CTIMPs)		27 March 2011
Covering Letter		27 March 2011

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

This Research Ethics Committee is an advisory committee to the Yorkshire and The Humber Strategic Health Authority
The National Research Ethics Service (NRES) represents the NRES Directorate within
the National Patient Safety Agency and Research Ethics Committees in England

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

10/H1304/37:	Please quote this number on all correspondence

Yours sincerely

Dr David Horton
Chair

E-mail: nicola.mallender-ward@nhs.net

Enclosures: List of names and professions of members who took part in the review

Copy to: Mr Stephen Walker, Humber NHS Foundation Trust

Research & Development Department
Trust Headquarters
Willerby Hill
Beverley Road
WILLERBY
HU10 6ED

23/12/2010

Miss Hannah Anstey
Department of Clinical Psychology
University of Hull
Cottingham Road,
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HU6 7RX

Dear Miss Hannah Anstey

Re: R&D N°: 10/08/454   REC N°: 10/H1304/37

Investigation of the use of mental visual imagery and how it affects mood ratings and goal setting in individuals with bipolar disorder.

I am please to notify you formally that NHS permission for research has been granted for this study by Humber NHS Foundation Trust.

Date of commencement of NHS permission for research: 23/12/2010

As your research is not taking place at Humber NHS Foundation Trust, *you will need to await R&D approval from the trusts in which your research is based in to undertake your research there.*

NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

Document	Version	Date
• Protocol	5.4	05/11/2010
• GP / Consultant Information Sheet	2	26/10/2010
• Participant Information Sheet	5	26/10/2010
• CV – Hannah Anstey	-------	09/08/2010
• Participant Consent Form	2	10/10/2010
• GP Invitation Letter	1	09/08/2010
• Demographics Form	1	09/08/2010
• Exclusion Information Sheet	1	09/08/2010

Indemnity for this study is provided by the NHS Indemnity scheme.

Humber NHS Foundation Trust conducts all research in accordance with the requirements of the Research Governance Framework, and the NHS Intellectual Property Guidance. In undertaking this study you agree to comply with all reporting requirements, systems and duties of action put in place by the trust to deliver research governance, and you must comply with the Trust information management and data protection policies. In addition, you agree to accept the responsibilities associated with your role that are outlined within the Research Governance Framework as follows:

• That satisfactory honorary contracts/letters of access are obtained and copied to Humber NHS Foundation Trust Research Governance team prior to the commencement of any research activity (including those required by new researchers joining the study post-approval).
• The study follows the agreed protocol
• All amendments (including changes to the local research team) need to be submitted in accordance with guidance in IRAS.

- All changes in the status of the project should be reported to the Humber NHS Foundation Trust Research Governance team.
- That the PI co-operates with appropriate monitoring activity carried out by the Humber NHS Foundation Trust Research Governance team.
- Participants should receive appropriate care while involved in the study
- The integrity and confidentiality of clinical, other records and data generated by the study will be maintained.
- All adverse events must be reported using the Trust's Adverse Incidents Policy.
- The research sponsor or the Chief Investigator, or the local Principal Investigator at a research site, may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety.
    - The R&D office should be notified that such measures have been taken. The notification should also include the reasons why the measures were taken and the plan for further action.
    - The R&D Office should be notified within the same time frame of notifying the REC and any other regulatory bodies.
- Any suspected misconduct by anyone involved in the study must be reported
- Permission is only granted for the activities for which a favourable opinion has been given by the REC [and which have been authorised by the MHRA if applicable]
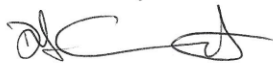
Please note - you must ensure that the protocol is followed at all times. Should you need to amend the protocol, please follow the national research ethics service procedures. You should forward a copy of all amended versions of the protocol and/or documentation together with written confirmation that a favourable opinion has been given by the REC, to the R&D office at the trust, and confirmation that there has been no change in the NHS permission status should be obtained prior to further research activity commencing.

You will be required to complete electronic progress reports and a final monitoring form on completion . As part of this requirement, please ensure that you are able to supply an accurate breakdown of research participant numbers for this trust (recruitment target, actual numbers recruited). To reduce bureaucracy, progress reporting is kept to a minimum, however, if you fail to supply the information requested, the trust may withdraw approval.

Please note that the NHS organisation is required to monitor research to ensure compliance with the Research Governance Framework and other legal and regulatory requirements. This is achieved by random audit of research.

I would like to wish you every success with this project

Yours sincerely

Duncan Courtney
Clinical and Research Governance Manager

Working Together for a Healthier Future

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Date: 17 January 2011

Dear Miss Anstey

Re: Investigation of the use of mental visual imagery and how it affects mood ratings and goal settings in individuals
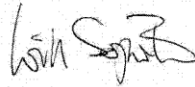
I write to confirm that NHS Wirral R&D Department has received the necessary documentation for the above study. The project has been registered on our database.

Approval is given subject to the attached terms. Please ensure you and all members of the research team are familiar with these terms before commencing your research.

We note you have received approval from NHS Ethics on 15 November 2010 at East Yorkshire and North Lincolnshire Research Ethics Committee. As the study involves direct contact with patients, you will be issued with an NHS to NHS letter of access.

I wish you every success in your research. If you require any further information or assistance please do not hesitate to contact R&D Department on 0151 495 5480.

Yours sincerely

Dr Will Sopwith
Head of Research and Development

Copy to   Humber NHS Foundation Trust
                    File

Before starting the study, please sign both copies of this letter to confirm that you accept the responsibilities outlined above. Keep one copy in your study site file and return the other to the R&D Department in the envelope provided.

Agreement Date: 21/01/2011

Principal Investigator Signature: _Hannah Anstey_

(Please sign and RETAIN this copy for your records)

Wirral Primary Care Trust
Chairman: Mrs Frances Street
Chief Executive: Ms Kathy Doran

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Terms of Approval:-

- All research undertaken under this approval must be conducted in line with guidance given with the Research Governance Framework (DH 2005) a copy of which is available at http://www.dh.gov.uk/en/Researchanddevelopment/index.htm
- The R&D Office must be informed as soon as possible of
    - The actual start date of the project
    - Any changes to the protocol throughout the course of the project
    - Any amendments to sent to MHRA or Research Ethics Committee
    - Any changes to the management of the project
    - Any extensions to the project, and associated additional funding, if applicable
- No substantial amendment may be implemented at this site before written R&D approval has been given for said amendment.
- Under the terms of the EU Clinical Trials Directive: Medicines for Human Use Regulations 2004, the Principal Investigator in a commercial clinical trial is required to notify the Sponsor of any Serious Unexpected Suspected Adverse Drug Reaction (SUSAR). The Trust R&D office would also require a copy of this notice. Adverse reactions occurring in non-commercial clinical trials, for which the Trust is the Sponsor, should also be notified to the R&D office.
- All research taking place on Trust premises is subject to the Trust auditing programme. Investigators are required to make themselves available for any auditing, on a mutually agreed date.
- Investigators are required to complete and submit any self-assessments that may be requested by the R&D Office from time to time.
- Investigators are required to provide any other information that may be requested by the R&D Office from time to time.
- Any evidence of fraud and/or misconduct in research must be immediately brought to the attention of the R&D Office.
- All research undertaken under this approval must comply with both the Health and Safety at Work Act and the Data Protection Act.
- The R&D Office must be informed once the study is completed or terminated early.
- Investigators will be required to complete a progress report for the Trust every six months.
- The R&D Office must receive a summary of the main findings within three months of completion.

Standardised Process for Electronic

Approval of Research

R&D EBP Service
Academic Unit
St Catherine's Hospital
Church Road
Birkenhead
Wirral
CH42 0LQ
Tel: 0151 604 7333
Fax: 0151 653 3441

15th April 2011

Miss Hannah Anstey
Trainee Clinical Psychologist
University of Hull,
Department of Clinical Psychology & Psychological Therapies,
Hertford Building,
Cottingham Road,
Hull
HU6 7RX

Dear Hannah,

Re: Research Governance Decision Letter

Unique SPEAR Identifier: 1051
REC Reference Number: 10/H1304/37
Protocol Version and Date: RP5.5 Imagery and Goal Setting in Bipolar Disorder (27/03/11)
Project Title: Investigation of the Use of Mental Visual Imagery and How it Affects Mood Ratings
and Goal Setting in Individuals with Bipolar Disorder.

Further to your request for research governance approval, we are pleased to inform you that
Cheshire and Wirral Partnership NHS Foundation Trust has approved the study. Please note when
contacting the R&D office about your study you must always provide the project reference numbers
provided above.

Trust R&D approval covers **CMHTs in Wirral and Chester** within the Trust; however, you should
ensure you have liaised with and obtained the agreement of individual service/ward managers
before commencing your research.

Your Responsibilities:

As a researcher you are responsible to comply with research governance procedures and your
study may be monitored by the R&D EBP service. Should you wish to publish your results,
approval must be sought to protect the trusts' corporate identity and any information going into the
public domain needs to be screened. We request that you submit your recruitment figures to
research@cwp.nhs.uk on a **monthly** basis and inform the R&D EBP service once you have
finished recruiting in the trust so that your records can be updated. Upon completion of your
research, please submit a **final summary report.**

Please take the time to read the attached 'Information for Researchers – Conditions of Research
Governance Approval' leaflet, which give the conditions that apply when research governance
approval has been granted. Please contact the R&D Office should you require any further
information. You may need this letter as proof of your approval.

Care • Well-being • Partnership   © Cheshire and Wirral Partnership NHS Foundation Trust

We would like to point out that hosting research studies incurs costs for the Trust such as: staff time, usage of rooms, arrangements for governance of research. We can confirm that in this instance we will not charge for these. However we would like to remind you that Trust costs should be considered and costed at the earliest stage in the development of any future proposals.

May I wish you every success with your research.

Yours sincerely

Helen Newell
Research and Effectiveness Officer

cc :   Research Governance Sponsor – Mr Stephen Walker, Humber NHS Foundation Trust
          Academic Supervisor – Dr Miles Rogish, University of Hull
          Employing Organisation – Humber NHS Foundation Trust/ University of Hull

Enc: Approval Conditions Leaflet
          Induction & ID Badge Information
          TrustTECH Leaflet

Appendix G: Participant Information sheet

Information about the research

Imagery, mood, and goal setting in bipolar disorder

We would like to invite you to take part in our research study. Before you decide whether to take part we would like you to understand why the research is being done and what it would involve for you.

- Part 1 tells you the purpose of this study and what will happen to you if you take part.
- Part 2 gives you more detailed information about the conduct of the study.

Please ask the researcher if there is anything that is not clear. Please feel free to talk to others about the study if you wish.

Part 1

What is the purpose of the study?

The purpose of this study is to increase our understanding of bipolar disorder, and in particular the links between visual imagery, mood, and goal setting behaviour. This could lead to the development of better psychological interventions for bipolar disorder in the future.

Why have I been invited?

Both people with bipolar disorder and people who have never suffered from bipolar disorder will take part in this research. You have been invited either because you identified yourself as being interested in taking part, or a health worker who works directly with you thought that you may be interested in taking part. If this is the case, he or she should have asked your permission before giving us your details.

Do I have to take part?

No, it is up to you to decide to join the study. You will be given a copy of the information sheet to keep. If you agree to take part, we will then ask you to sign a consent form. You are free to withdraw at any time, without giving a reason, and your data will not be used. This would not affect the standard of care you receive.

What will happen to me if I take part?

- The study will take between 1 hour 15 minutes and 1 hour 40 minutes in total.
- You will be asked to fill in a number of questionnaires and perform some simple tasks, such as rating your mood, or setting yourself a personal goal. This study is a randomized trial. This means that we put people into different groups and give the two groups different tasks. We then compare the results to see what effect the task had. At the end of the experiment you will be told which group you were assigned to.
- You will asked what treatments you are currently receiving (e.g. medication, talking therapies), but taking part in this experiment will not affect these treatments.
- During the experiment, yourself and one researcher will be present. You will not meet other research participants.
- After the experiment has finished, you will not be approached again, or asked to provide follow-up information.

Expenses and payments
Unfortunately, expenses or payment are not available for this study.

What will I have to do?
If you agree to take part in this study you may be asked to attend an initial appointment of approximately 25 minutes. This appointment consists of an interview, in which the experimenter asks some standardised questions about bipolar disorder, your mood, and mental health history. This is to ensure that you meet the criteria to be included in this research study, and that you have been placed in the right group.
During the second appointment, which will last approximately 1 hour 15 minutes, you will be asked to fill in a number of questionnaires related to your mood and use of imagery in everyday life. You will be asked to imagine some positive scenarios, and set yourself some personal goals. Depending on the group that you have been assigned to, you may be asked to imagine yourself completing these goals, or explain how you would go about doing so. You will then be asked some further questions about this process. You will rate your mood throughout the experiment.
You can choose whether you would like to attend one long appointment, or split these appointments to two occasions. You will be expected to carry on with any medical or psychological treatments as usual.

What are the possible disadvantages and risks of taking part
At the beginning of the study you will be asked a series of questions to determine if you are currently experiencing symptoms of depression, anxiety or mania. If current symptoms of a clinical level are identified this will be explained to you immediately, and you will not take part in this research. You will then be directed on to further sources of help.

What are the possible benefits of taking part?
We cannot promise the study will help you but the information we get from this study will help improve understanding of bipolar disorder

What happens when the research study stops?
At the end of the study you will be able to ask any questions that you have. After this, there will be no further contact, unless you have indicated that you would like to be informed of the results of the study.

What if there is a problem?
Any complaint about the way you have been dealt with during the study or any possible harm you might suffer will be addressed. The detailed information on this is given in Part 2.

Will my taking part in the study be kept confidential?
Yes. We will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

This completes part 1. If the information in Part 1 has interested you and you are considering participation, please read the additional information in Part 2 before making any decision.

Part 2

What if relevant new information becomes available?
Sometimes new information about the disorder being investigated becomes available whilst the study is being completed. If this happens, the primary researcher will tell you and discuss whether you should continue in the study. You may be asked to sign an agreement outlining this discussion.

What will happen if I don't want to carry on with the study?
You may withdraw your participation at any stage of the study, up to seven days after completing the study. Following this time, it may not be possible to remove your data from the analysis. If you decide you would like to withdraw from the study before this point, any data collected from you will be destroyed and will not be used in analysis of the results. There will be no negative consequences of withdrawal from this research.

What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak to the researchers on 01482 464101 who will do their best to answer your questions.
 If you remain unhappy and wish to complain formally, you can do this via the NHS Complaints Procedure. Details of this will be available from your local hospital. You can also contact NHS Direct on 0845 4647 for advice about making a complaint

Harm:
In the event that something does go wrong and you are harmed during the research and this is due to someone's negligence then you may have grounds for a legal action for compensation against the Humber NHS Foundation Trust but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you (if appropriate).

Will my taking part in this study be kept confidential?
- Your participation in this study will be kept confidential.
- Research data will all be collected during the study. Other sources of information, e.g. medical records will not be used.
- All questionnaire data will be anonymised and identified only by a participant number that is assigned at the beginning of the study. Your name will not be used in any report or published document.
- All data will be stored in a secure place for 5 years, whilst the results of the research are being prepared for publication. After this, all questionnaires etc. will be destroyed.

Involvement of the General Practitioner/Family doctor (GP)
Your GP will be notified that you are taking part in this study as a professional courtesy. During the study, if you are found to be experiencing high levels of depression, mania or you will be advised to inform your GP of this. However, your GP will not receive any personal information that you give to the experimenter as part of the study. All study information will remain confidential. Your participation in this study will not affect your current or future medical or psychological treatment.

What will happen to the results of the research study?
It is intended that this research will be published in a peer-reviewed journal, which is accessible to the public. If you would like to be informed of the results of the research, we will keep your personal details on file, and send you information about the results of the research.

Who is organising and funding the research?
The chief investigator is being paid to carry out this research by the Humber NHS Foundation trust as part of their job role. However, this piece of research is receiving no external funding, and there are no identified conflicts of interest.

Who has reviewed the study?
All research in the NHS is looked at by independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given a favourable opinion by the East Yorkshire and Northern Lincolnshire Research Ethics Committee.

Further information and contact details
If you would like further information on taking part in research you may wish to look at the NHS Choices website: http://www.nhs.uk/Conditions/Clinical-trials/Pages/Introduction.aspx or the National Research Ethics Service: http://www.nres.npsa.nhs.uk/

For further information, you can also contact the primary researcher by post, telephone or
e-mail with any questions:

Hannah Anstey
Trainee clinical psychologist
Department of Clinical Psychology and Psychological Therapies
Hertford Building
University of Hull
HU6 7RX

Telephone number:
     07895645050
     01482 464101
E-mail: H.E.Anstey@2008.hull.ac.uk

**Thank you for considering taking part in this study and taking
the time to read this information sheet.**

Appendix H: Participant Consent form

THE UNIVERSITY OF HULL

Participant Identification Number for this trial:

CONSENT FORM

Title of Project: Imagery, mood, and goal setting in bipolar disorder

Name of Researcher: Hannah Anstey

Please tick as appropriate

1. I confirm that I have read and understand the information sheet dated 26th October 2010 (version 5) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐

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.

☐

3. I agree to take part in the above study.

☐

4. I consent to my GP being informed that I am taking part in the above study.

My doctor's name is _____

Practice name and address: _____

_____

☐

5. I would like to be informed about the results of this study. Please contact me at the address below:

Address:_____

Postcode:_____

E-mail address:_____

Telephone number: _____

☐

_____ _____ _____
Name of participant   Date   Signature

_____ _____ _____
Name of person taking consent Date   Signature taking consent

This information will be stored securely, in a different place to any confidential data that you submit as part of this research study. There are two copies of this form: one for you to keep and one for the researcher.

Appendix I: Participant Exclusion Information Sheet

Thank you for agreeing to participate in this research

Unfortunately, for one of the following reasons you are not eligible to take part (researcher to indicate those that apply):

1. On the Beck Depression scale you scored more than 19 out of a total of 63 for symptoms of depression.

2. On the Beck Anxiety scale you scored more than 15 out of a total of 63 for symptoms of anxiety.

3. On the Young Mania Rating Scale you scored more than 11 out of a total of 60 on the Young Mania Rating Scale.

What does this mean?
These scores are cut-off scores that *may* indicate high levels of depression, anxiety, or mania. However, people's mood does fluctuate and these screening instruments *do not diagnose* depression, anxiety or mania. Your score may be increased for another reason, e.g. if you are currently suffering from a physical health problem or you are upset about something in your life. These are normal "ups and downs".

Why can't I take part in this research?
Unfortunately, if you score too highly on any of these measures, this might affect the way you approach the other tasks in this study, which would affect the results of the research.

What should I do next?
If you have previously suffered from bipolar disorder, we would advise you to inform your GP that you were found to have a clinical level of depression/mania/anxiety on the above scale if these mood lasts for more than a couple of days. Your GP can then monitor your wellbeing, and may be able to advise you of appropriate treatments that are available to you.

If you have never previously been diagnosed with a mental health problem, please do not be unnecessarily alarmed. If you are concerned about the score that you have received, please discuss this further with your GP, who will be able to give you information about the help that is available in your local area.

If you do not want to talk to your doctor, you can call the NHS Stressline daily between 8am and 10pm on 0300 123 2000. Trained health advisors will offer you advice, and direct you to a wider package of financial and mental health support.

If you are feeling distressed or in despair you can also contact the Samaritans on their confidential 24-hour helpline: 08457 90 90 90.

Please take the time to ask the researcher any questions that you have about these scales, and what this score might mean for you.

Young Mania Rating Scale (YMRS)

Guide for Scoring Items – The purpose of each item is to rate the severity of that abnormality in the patient. When several keys are given for a particular grade of severity, the presence of only one is required to qualify for that rating.

The keys provided are guides. One can ignore the keys if that is necessary to indicate severity, although this should be the exception rather than the rule.

Scoring between the points given (whole or half points) is possible and encouraged after experience with the scale is acquired. This is particularly useful when severity of a particular item in a patient does not follow the progression indicated by the keys.

1. *Elevated Mood*
   0   Absent
   1   Mildly or possibly increased on questioning
   2   Definite subjective elevation; optimistic, self-confident; cheerful; appropriate to content
   3   Elevated, inappropriate to content; humorous
   4   Euphoric; inappropriate to content; singing

2. *Increased Motor Activity – Energy*
   0   Absent
   1   Subjectively increased
   2   Animated; gestures increased
   3   Excessive energy; hyperactive at times; restless (can be calmed)
   4   Motor excitement; continuous hyperactivity (cannot be calmed)

3. *Sexual Interest*
   0   Normal; not increased
   1   Mildly or possibly increased
   2   Definitive subjective increase on questioning
   3   Spontaneous sexual content; elaborates on sexual matters; hypersexual by self-report
   4   Overt sexual acts (towards patients, staff, or interviewer)

4. *Sleep*
   0   Reports no decrease in sleep
   1   Sleeping less than normal amount by up to one hour
   2   Sleeping less than normal by more than one hour
   3   Reports decreased need for sleep
   4   Denies need for sleep

5. *Irritability*
   0   Absent
   2   Subjectively increased
   4   Irritable at times during interview; recent episodes of anger or annoyance on ward
   6   Frequently irritable during interview; short, curt throughout
   8   Hostile, uncooperative; interview impossible

6. *Speech (Rate and Amount)*
   0   No increase
   2   Feels talkative
   4   Increased rate or amount at times, verbose at times
   6   Push; consistently increased rate and amount; difficult to interrupt
   8   Pressured; uninterruptible, continuous speech

7. *Language – Thought Disorder*
   0   Absent
   1   Circumstantial; mild distractibility; quick thoughts
   2   Distractible; loses goal of thought; changes topics frequently; racing thoughts
   3   Flight of ideas; tangentiality; difficult to follow; rhyming; echolalia
   4   Incoherent; communication impossible

8. *Content*
   0   Normal
   2   Questionable plans, new interests
   4   Special project(s); hyperreligious
   6   Grandiose or paranoid ideas; ideas of reference
   8   Delusions; hallucinations

9. *Disruptive – Aggressive Behavior*
   0   Absent; cooperative
   2   Sarcastic; loud at times; guarded
   4   Demanding; threats on ward
   6   Threatens interviewer; shouting; interview difficult
   8   Assaultive; destructive; interview impossible

10. *Appearance*
   0   Appropriate dress and grooming
   1   Minimally unkempt
   2   Poorly groomed; moderately disheveled; overdressed
   3   Disheveled; partly clothed; garish makeup
   4   Completely unkempt; decorated; bizarre garb

11. *Insight*
   0   Present; admits illness; agrees with need for treatment
   1   Possibly ill
   2   Admits behavior change, but denies illness
   3   Admits possible change in behavior, but denies illness
   4   Denies any behavior changes

Name: _____

Rater: _____

Date: _____

Score: _____

Appendix K: Spontaneous Use of Imagery Scale

Participant ID: _____   Date: _____

SUIS

Please read each of the following descriptions and indicate the degree to which each is appropriate for you. Do not spend a lot of time thinking about each one, but respond based on your thoughts about how you do or do not perform each activity. If a description is always completely appropriate, please write "5"; if it is never appropriate, write "1"; if it is appropriate about half of the time, write "3"; and use the other numbers accordingly.

_____ 1. When going to a new place, I prefer directions that include detailed descriptions of landmarks (such as the size, shape and color of a gas station) in addition to their names.

_____ 2. If I catch a glance of a car that is partially hidden behind bushes, I automatically "complete it," seeing the entire car in my mind's eye.

_____ 3. If I am looking for new furniture in a store, I always visualize what the furniture would look like in particular places in my home.

_____ 4. I prefer to read novels that lead me easily to visualize where the characters are and what they are doing instead of novels that are difficult to visualize.

_____ 5. When I think about visiting a relative, I almost always have a clear mental picture of him or her.

_____ 6. When relatively easy technical material is described clearly in a text, I find illustrations distracting because they interfere with my ability to visualize the material.

_____ 7. If someone were to tell me two-digit numbers to add (e.g., 24 and 31), I would visualize them in order to add them.

_____ 8. Before I get dressed to go out, I first visualize what I will look like if I wear different combinations of clothes.

_____ 9. When I think about a series of errands I must do, I visualize the stores I will visit.

_____ 10. When I first hear a friend's voice, a visual image of him or her almost always springs to mind.

_____ 11. When I hear a radio announcer or DJ I've never actually seen, I usually find myself picturing what they might look like.

_____ 12. If I saw a car accident, I would visualize what had happened when later trying to recall the details.

_____

For office use only:

_____ / 60

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Appendix L: Impact of Future Events Scale

Impact of Future Events Scale

Please identify **three future events** which you have been thinking about by imagining over the past 7 days (e.g. positive or stressful life events). For each event, please indicate whether your imagining of it was positive or negative by circling the appropriate response below.

1. _____ (Positive/Negative)
2. _____ (Positive/Negative)
3. _____ (Positive/Negative)

Below is a list of comments made by people about imagining events in the future. Please read each item, indicating how frequently each comment was true for you during the past 7 days due to imagining the future. If they did not occur during that time, please circle the "not at all" answer.

Please circle the answer closest to the way you have felt about future life events over the past 7 days	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. I believed my thoughts about the future would definitely happen and would become real	0	1	2	3	4
2. I had trouble staying asleep	0	1	2	3	4
3. Other things prompted me to think about the future	0	1	2	3	4
4. I felt irritable and angry	0	1	2	3	4
5. I avoided letting myself get emotional when I thought about the future or was reminded about it	0	1	2	3	4
6. I thought about the future when I didn't mean to	0	1	2	3	4
7. Any reminders evoked feelings about the future	0	1	2	3	4
8. I stayed away from reminders of the future	0	1	2	3	4
9. Pictures about the future popped into my mind	0	1	2	3	4
10. I was jumpy and easily startled	0	1	2	3	4
11. I tried not to think about the future	0	1	2	3	4
12. I was aware that I had a lot of feelings about the future, but I didn't deal with them	0	1	2	3	4
13. My feelings about the future were kind of numb	0	1	2	3	4
14. I found myself acting or feeling like it was really happening	0	1	2	3	4
15. I had trouble falling asleep	0	1	2	3	4
16. I had waves of strong feelings about the future	0	1	2	3	4
17. I tried to remove thoughts of the future from my mind	0	1	2	3	4
18. I had trouble concentrating	0	1	2	3	4
19. Reminders of the future caused me to have physical reactions, such as sweating, faster breathing, or a racing heart	0	1	2	3	4
20. I had dreams about the future	0	1	2	3	4
21. I felt watchful and alert	0	1	2	3	4
22. I tried not to talk about the future	0	1	2	3	4
23. I felt energetic and excitable	0	1	2	3	4
24. I felt elated and optimistic	0	1	2	3	4

Appendix M: Visual Analogue Scale

<u>**Mood Rating 1**</u>

Please place a vertical mark on the line below to indicate your current mood.

0 ———————————————————— **10**

I do not feel at all happy   **I feel extremely happy**

Appendix N: Scenario Setting Instructions

Research study: imagery, mood and goal setting in bipolar disorder

5. Scenario Setting

You will be given three scenarios to think about. Consider each scenario carefully, and think about how it might relate to your own life. Write down a sentence describing your personal scenario on the sheet provided.

Research study: imagery, mood and goal setting in bipolar disorder

6. Scenario 1

Consider the following scenario:

You will be able to cope easily with pressure.

Think about how this might relate to your own life, and write this down in the space provided on your "Scenarios and Goals" sheet.

Research study: imagery, mood and goal setting in bipolar disorder

8. Scenario 2

Consider the following scenario:

You will have lots of good times with friends.

Think about how this might relate to your own life, and write this down in the space provided on your "Scenarios and Goals" sheet.

Research study: imagery, mood and goal setting in bipolar disorder

10. Scenario 3

Consider the following scenario:

You will be very fit and healthy

Think about how this might relate to your own life, and write this down in the space provided on your "Scenarios and Goals" sheet.

Appendix O: Goal Setting Instructions

Research study: imagery, mood and goal setting in bipolar disorder

12. Goal Setting

A personal goal is something that you intend to achieve. This could be something that you are trying to do, or something that you are trying to avoid. It could also be general (e.g. I will try to lose weight) or specific (e.g. I will spend 30 minutes every day tidying my house).

Examples:

I will try to... compliment my spouse every day.
I will try not to... bite my nails.
I will try to... lose weight.
I will try not to... be late to work this week.
I will try to... spend 30 minutes every day tidying my house.
I will try not to... buy things that I don't need.

Review the first scenario that you wrote down. Try to set yourself a personal goal in relation to this scenario. Write it down on the sheet provided.

Appendix P: Scenarios and Goal Setting Sheet

Scenarios and Goal Setting

Scenarios
You will be given three situations to think about. Think about how they might be related to your own life. Write down the scenario that first comes to mind in a sentence.

Write your three scenarios in the spaces provided below.

Scenario 1: _____

_____

Scenario 2: _____

_____

Scenario 3: _____

_____

Goal Setting
A personal goal is something that you intend to achieve. This could be something that you are trying to do, or something that you are trying to avoid. It could also be general (e.g. I will try to lose weight) or specific (e.g. I will spend 30 minutes every day tidying my house).
Write your personal goals in the spaces provided below. Start each goal with either "I will try…" or "I will try not to…"
Goal 1: _____

Goal 2: _____

Goal 3: _____

Appendix Q: First Goal Appraisal

Research study: imagery, mood and goal setting in bipolar disorder

13. First Goal

Answer the following questions in relation to the first goal that you have written down.

* **1. How important is this goal to you right now?**

◯ 0 Not at all important   ◯ 1   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7 Extremely Important

* **2. How ambitious is this goal?**

◯ 0 Not at all ambitious   ◯ 1   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7 Extremely ambitious

* **3. How much success have you had with this goal in the past?**

◯ 0 No past success at all   ◯ 1   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7 Extremely successful in the past

* **4. How much effort do you plan on putting toward this goal in the next 3 weeks?**

◯ 0 No effort at all   ◯ 1   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7 Maximal effort

Appendix R: Imagery and Verbal Task Instructions

Research study: imagery, mood and goal setting in bipolar disorder
22. Imagery Task: Goal 1

Review the first goal you set yourself.

During the next 60 seconds, imagine yourself completing this goal.

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35. Verbal Task

Review the first goal you set yourself.

During the next 60 seconds, describe out loud how you might go about completing this goal.

Appendix S: Imagery Rating Questions

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29. Imagery Questions: Goal 2

* 1. How vivid was your image?

○ 0 Not at all vivid   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Extremely vivid

* 2. How detailed was your image?

○ 0 Not at all detailed   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Extremely detailed

* 3. How distressing was your image?

○ 0 Not at all distressing   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Extremely distressing

* 4. How comforting was your image?

○ 0 Not at all comforting   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Extremely comforting

* 5. How real did your image feel?

○ 0 Not at all real   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Extremely real

* 6. To what extent were you viewing your image from a first-person perspective?

(With a first-person perspective you are looking out at your surroundings through your own eyes, as if the events were actually taking place).

○ 0 Not at all first-person perspective   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Entirely first-person perspective

* 7. To what extent were you viewing your image from an observer perspective?

(With an observer perspective you see yourself within the scene, as well as your surroundings).

○ 0 Not at all observer perspective   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7 Entirely observer perspective

Appendix T: Subjective Experience Questions

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34. Your Experience

That is the end of the imagery task.

Think back over the three goals that you imagined completing, and answer the following questions about how you found the imagery task.

* 1. How easy did you find it to complete this task?

◯ 1   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7   ◯ 8   ◯ 9
Extremely   Neither easy   Extremely
difficult   or difficult   easy

* 2. To what extent were you thinking using images (mental pictures and sensory impressions) during the task?

◯ 1 Not   ◯ 2   ◯ 3   ◯ 4   ◯ 5 Half   ◯ 6   ◯ 7   ◯ 8   ◯ 9 All
at all   the time   the time

* 3. To what extent were you thinking using verbal thoughts (words and sentences) during the task?

◯ 1 Not   ◯ 2   ◯ 3   ◯ 4   ◯ 5 Half   ◯ 6   ◯ 7   ◯ 8   ◯ 9 All
at all   the time   the time

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47. Your Experience

That is the end of the verbal task.

Think back over the three goals that you described completing, and answer the following questions about how you found the verbal task.

* 1. How easy did you find it to complete this task?

○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7	○ 8	○ 9
Extremely difficult				Neither easy or difficult				Extremely easy

* 2. To what extent were you thinking using images (mental pictures and sensory impressions) during the task?

○ 1 Not at all	○ 2	○ 3	○ 4	○ 5 Half the time	○ 6	○ 7	○ 8	○ 9 All the time

* 3. To what extent were you thinking using verbal thoughts (words and sentences) during the task?

○ 1 Not at all	○ 2	○ 3	○ 4	○ 5 Half the time	○ 6	○ 7	○ 8	○ 9 All the time

Appendix U: Second Goal Appraisal

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48. Re-rating First Goal

Look again at the first goal you have written down. Answer the following questions in relation to this goal.

* 1. How important is this goal to you?

○ 0 Not at all important　　○ 1　　○ 2　　○ 3　　○ 4　　○ 5　　○ 6　　○ 7 Extremely important

* 2. How ambitious is this goal?

○ 0 Not at all ambitious　　○ 1　　○ 2　　○ 3　　○ 4　　○ 5　　○ 6　　○ 7 Extremely ambitious

* 3. How much success have you had with this goal in the past?

○ 0 No success at all　　○ 1　　○ 2　　○ 3　　○ 4　　○ 5　　○ 6　　○ 7 Extremely successful in the past

* 4. How much effort do you plan on putting toward this goal in the next 3 weeks?

○ 0 No effort at all　　○ 1　　○ 2　　○ 3　　○ 4　　○ 5　　○ 6　　○ 7 Maximal effort

* 5. Given the opportunity, would you now alter this goal in any way?

○ Yes

○ No

6. If yes, in what way would you now alter this goal? Please state below:

```
                          5
                          6
```

Appendix V: Distribution of Data

Figures above the guideline figure of 2.58 indicated by Field (2000) for skewness for small samples have been highlighted.

Table 16a

Distribution of Data for Control Group

		Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Baseline measures	BDI	0.00	11.00	3.11	3.13	0.98	0.44	0.16	0.86
	BAI	0.00	8.00	2.96	2.22	0.62	0.44	-0.41	0.86
	YMRS	0.00	5.00	1.89	1.55	0.19	0.44	-1.07	0.86
	SUIS	1.54	4.33	3.10	0.76	-0.21	0.44	-0.75	0.86
	IFES	8.00	55.00	25.29	9.48	1.05	0.44	2.44	0.86
	Baseline Mood	49.50	100.00	73.20	11.42	-0.33	0.44	0.79	0.86
Mean Imagery Ratings	Vivid	2.00	7.00	4.76	1.31	-0.42	0.44	-0.58	0.86
	Detailed	2.00	7.00	4.24	1.40	-0.05	0.44	-0.76	0.86
	Distressing	0.00	2.67	0.48	0.85	1.76	0.44	1.71	0.86
	Comforting	0.00	6.33	3.80	1.98	-0.60	0.44	-0.59	0.86
	Real	1.00	7.00	4.36	1.77	-0.46	0.44	-0.74	0.86
	First Person	0.00	7.00	5.29	1.92	-1.08	0.44	0.54	0.86
	Observer	0.00	4.67	1.40	1.56	0.75	0.44	-0.92	0.86
Subjective Experience	Difficulty	2.00	9.00	6.19	1.88	-0.18	0.45	-0.46	0.87
	Visual	2.00	9.00	6.67	2.04	-0.75	0.45	-0.27	0.87
	Verbal	1.00	8.00	3.96	2.35	0.32	0.45	-1.05	0.87
	Mean Mood Post-Task	33.67	99.83	75.39	17.02	-0.61	0.44	0.09	0.86
	Mean Mood Change	-39.33	20.67	2.19	14.23	-1.42	0.44	2.48	0.86
	Magnitude of mood change	0.17	39.33	10.55	9.60	1.47	0.44	2.44	0.86
Mean Change in Goal Appraisal	Important	-2.00	1.67	0.11	0.69	-0.47	0.44	**2.88**	0.86
	Ambitious	-1.67	3.33	0.13	1.07	0.87	0.44	1.82	0.86
	Past Success	-3.00	1.00	-0.21	0.83	-1.47	0.44	**3.27**	0.86
	Planned Effort	-1.67	2.33	0.25	0.88	0.03	0.44	1.10	0.86
Magnitude of Change in Goal Appraisal	Important	0.00	2.00	0.63	0.48	1.07	0.44	1.46	0.86
	Ambitious	0.00	3.33	1.01	0.65	1.65	0.44	**4.95**	0.86
	Past Success	0.33	3.00	0.71	0.60	2.36	0.44	**6.96**	0.86
	Planned Effort	0.00	2.33	0.89	0.67	0.72	0.44	-0.63	0.86

Table 16b

Distribution of Data for Clinical Group

		Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Baseline measures	BDI	5.00	16.00	9.33	4.23	0.61	0.85	-0.26	1.74
	BAI	1.00	14.00	7.00	5.44	0.20	0.85	-2.22	1.74
	YMRS	2.00	8.00	4.33	2.42	0.56	0.85	-1.14	1.74
	SUIS	2.83	4.50	3.67	0.62	0.14	0.85	-1.03	1.74
	IFES	17.00	59.00	37.40	15.18	0.17	0.91	1.23	2.00
	Baseline Mood	60.00	82.00	72.83	8.12	-0.47	0.85	0.00	1.74
Mean Imagery Ratings	Vivid	4.00	7.00	5.00	1.15	1.21	0.85	0.91	1.74
	Detailed	3.33	7.00	4.78	1.47	0.63	0.85	-0.96	1.74
	Distressing	0.00	3.50	1.03	1.38	1.37	0.85	1.71	1.74
	Comforting	1.00	6.33	3.39	1.87	0.46	0.85	0.21	1.74
	Real	3.33	7.00	4.89	1.41	0.25	0.85	-0.59	1.74
	First Person	1.67	7.00	5.11	1.89	-1.46	0.85	2.20	1.74
	Observer	0.33	7.00	3.56	2.66	0.08	0.85	-1.65	1.74
Subjective Experience	Difficulty	4.00	9.00	6.67	1.97	-0.25	0.85	-1.83	1.74
	Visual	5.00	8.00	6.67	1.37	-0.52	0.85	-1.88	1.74
	Verbal	1.00	9.00	3.50	2.88	1.81	0.85	**3.55**	1.74
	Mean Mood Post-Task	48.33	97.50	66.42	16.63	1.53	0.85	**3.35**	1.74
	Mean Mood Change	-32.67	15.50	-6.42	16.31	-0.45	0.85	0.89	1.74
	Magnitude of mood change	2.00	32.67	12.67	10.93	1.45	0.85	2.38	1.74
Mean Change in Goal Appraisal	Important	-0.33	0.67	-0.11	0.40	1.95	0.85	**3.66**	1.74
	Ambitious	-1.33	1.00	0.22	0.98	-1.06	0.85	-0.75	1.74
	Past Success	-1.33	0.33	-0.44	0.69	0.05	0.85	-1.72	1.74
	Planned Effort	-0.33	0.33	-0.06	0.25	0.31	0.85	-0.10	1.74
Magnitude of Change in Goal Appraisal	Important	0.00	1.00	0.56	0.40	-0.08	0.85	-1.55	1.74
	Ambitious	0.67	1.33	1.00	0.30	0.00	0.85	-1.88	1.74
	Past Success	0.33	1.67	0.89	0.54	0.38	0.85	-1.48	1.74
	Planned Effort	0.00	1.00	0.50	0.46	0.00	0.85	-2.30	1.74

Reference

Field, A. P. (2000). *Discovering statistics using SPSS for Windows: advanced techniques for the beginner.* London: SAGE.

Appendix W: Mood Profiles

Figures 2-5 display individual participants' mood profiles across the course of the experiment, separated by task (visual, verbal) and group (control, bipolar).
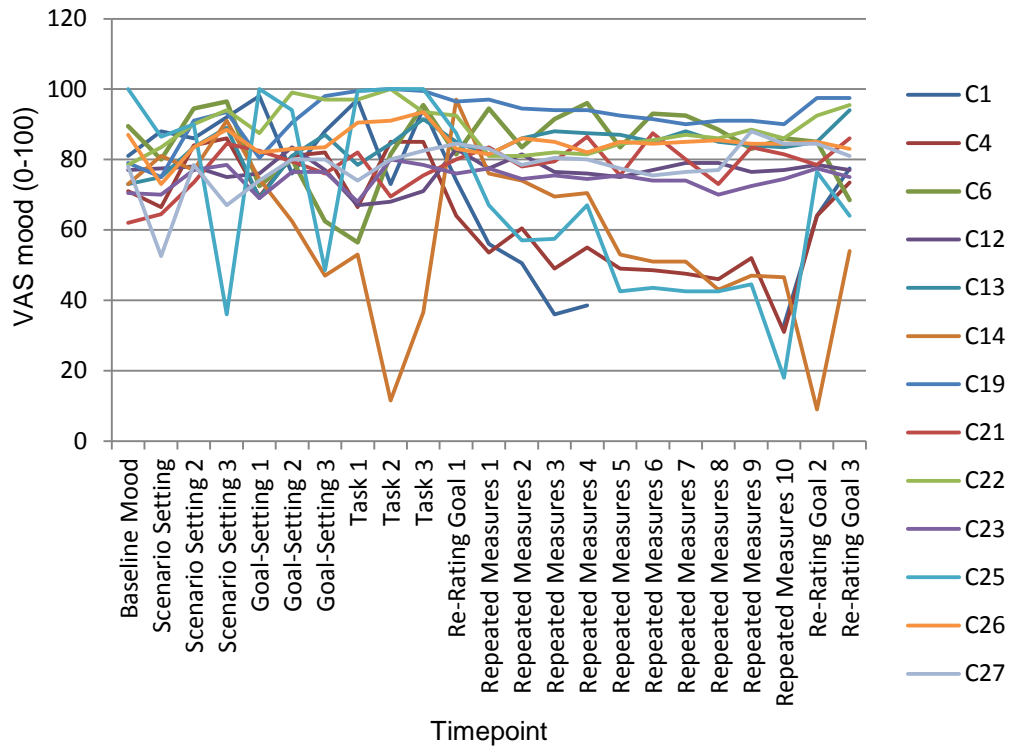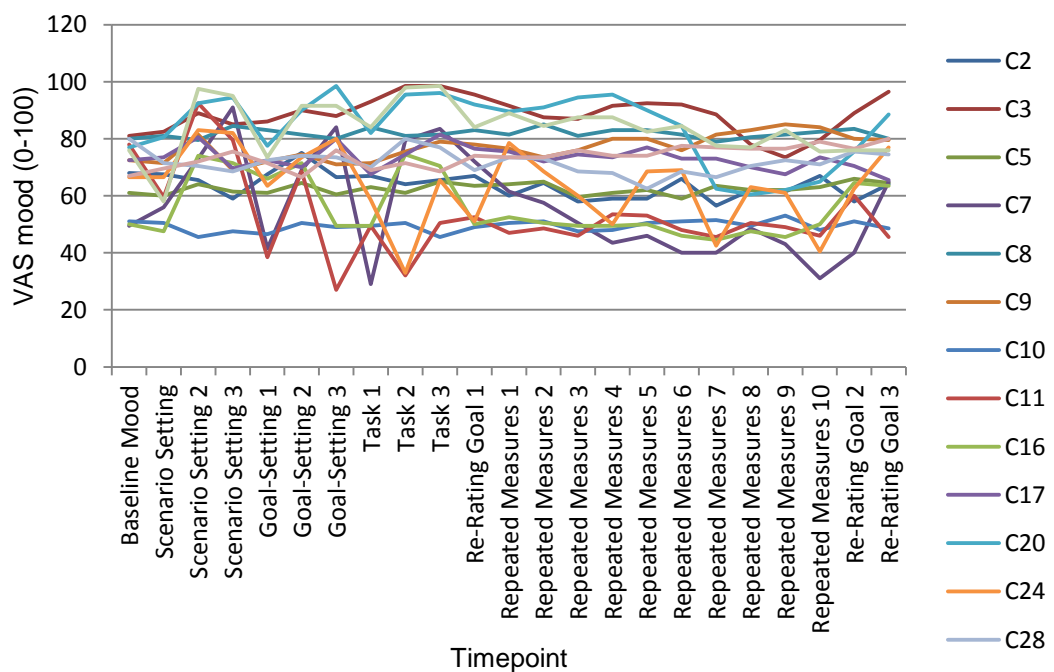

Figure 3: Mood ratings for control visual group

Figure 4: Mood ratings for control verbal group
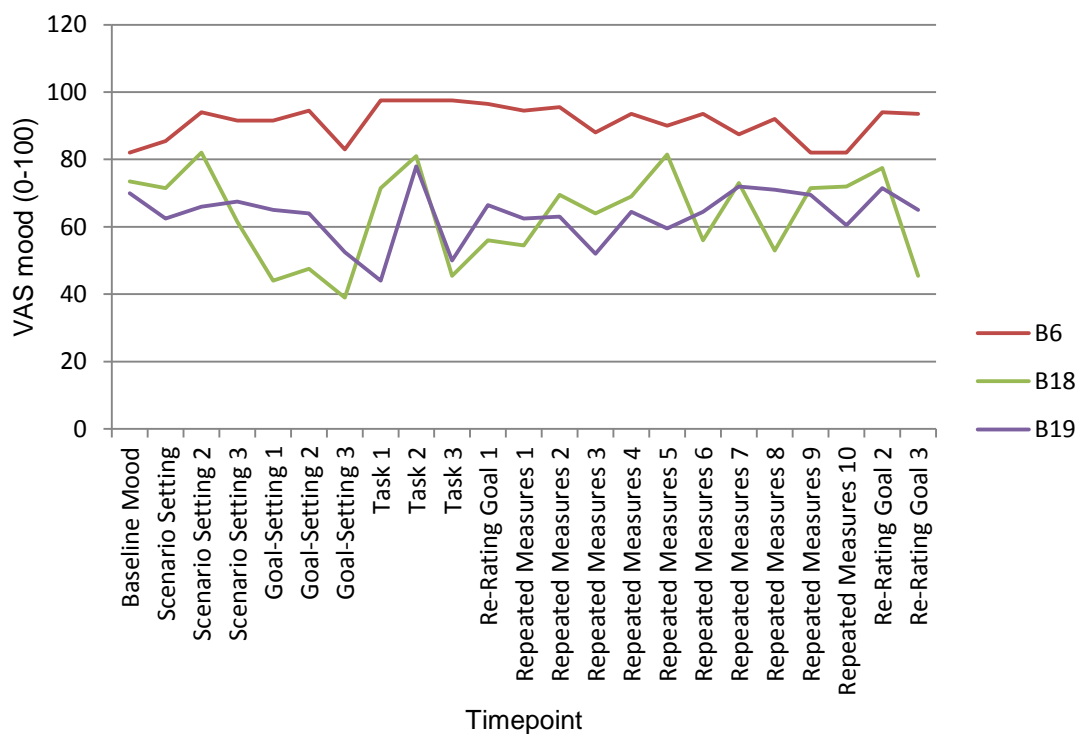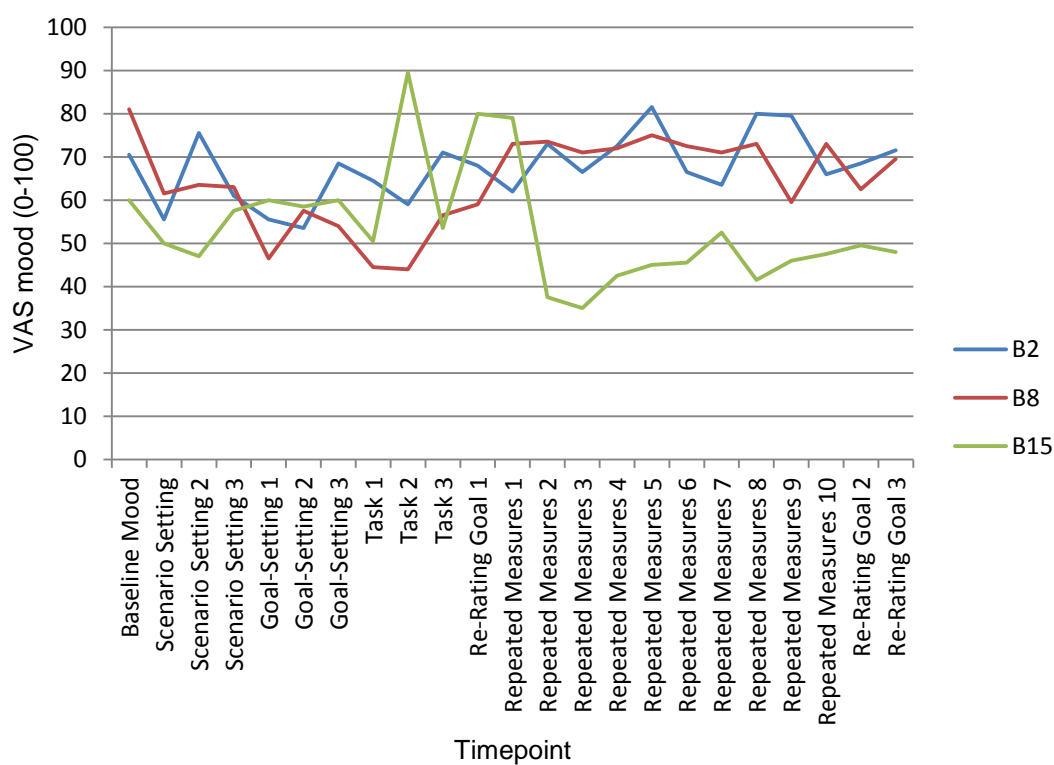
Figure 5: Mood ratings for bipolar visual group

Figure 6: Mood ratings for bipolar verbal group

Appendix X: Additional Analysis on Imagery Ratings

Imagery Ratings Across Three Goals

All participants rated imagery for three different personal goals. In order to examine whether imagery ratings were equivalent across the three goals, each of the seven imagery variables (vividness, detailed, distressing, comforting, realistic, first-person perspective and observer perspective), data were analysed using separate 2x2x3 fixed ANOVAs with between-subjects factors experimental group (bipolar, control) and task (visual, verbal), and within-subjects factor of goal (1, 2, 3).

There was a significant effect of task on how comforting images were $F(1,24)=5.54$, $p=.03$, and a significant effect of group on use of observer perspective, $F(1,24)=4.51$, $p=.04$. No other between-subjects effects were statistically significant at the .05 level. There were no statistically significant within-subjects effects of goal (1,2,3) at the .05 level for any of the imagery factors. Mean imagery ratings were calculated across the three gfgoals and used for further calculations

Imagery Ratings for Control Participants

Following the visual or verbal task participants rated imagery on a 0 "not at all" to 7 "extremely" scale for vividness, detail, distressing, comforting, how real the image felt, first-person perspective, and observer perspective. Table 5 compares the mean imagery ratings for all groups and tasks. As not all individuals in the verbal task reported seeing visual imagery there are 8 "missing" sets of ratings when calculating means.

A 2x2 factorial ANOVA for group (bipolar group, control) and task (visual, verbal) found that images in the visual task were rated as significantly more comforting than those in the verbal task ($p=.006$). Individuals in the bipolar group were significantly more likely to view images from an observer perspective than individuals in the control group ($p=.01$). There were no other significant differences between the mean imagery ratings at the $p<.05$ level.

Table 17a

Mean Imagery Ratings and Standard Deviation for All Groups

	Vivid	Detailed	Distressing	Comforting	Real	First-person perspective	Observer perspective
Visual	5.23	5.03	0.41	5.08	4.95	5.87	1.82
	(0.90)	(1.07)	(0.77)	(1.15)	(1.20)	(1.24)	(1.63)
Verbal	4.35	3.57	0.54	2.70	3.86	4.79	1.04
	(1.50)	(1.31)	(0.94)	(1.90)	(2.05)	(2.29)	(1.46)

Correlations between Imagery Ratings and Mood Change

A Spearman's rank correlation was used to analyse the correlation between ratings of imagery (vividness, detail, how "real" it felt, and first person perspective, mood change from baseline to immediately after the imagery or verbal task, and current symptom levels) for all control participants who reported seeing imagery, regardless of which task they were assigned to (see Table 17b).

Table 17b demonstrates that there was a significant correlation between ratings of how vivid, detailed, comforting, and realistic images were rated to be at the .01 level. Mood post-task was significantly correlated with how detailed and comforting images were rated to be. Mean mood change, and mood-post task were significantly correlated with each other. This is not surprising as mood post-task was used to calculate mood change. However, mean mood-change was not significantly correlated with any other variables at the .05 level. Magnitude of mood change was significantly correlated at the .05 level with how realistic and distressing images were rated to be.

How distressing an image was perceived to be was significantly correlated at the .05 level with use of an observer perspective. Current symptoms of mania were significantly correlated at the .05 level with use of observer perspective, and decreased use of first-person perspective. There was also a significant correlation at the .05 level between current

symptoms of anxiety and likelihood of using an observer perspective. There was also a

significant negative correlation at the .01 level between the use of first-person perspective and

observer perspective, which fits with the conceptualisation of these as two distinct viewpoints

that can be used in visual imagery. Current depression symptoms were also significantly

correlated with current anxiety symptoms at the .01 level.

Spearman's Rank Correlation for Imagery Factors for Control Group (n=28)

	Detailed	Distressing	Comforting	Real	First person	Observer	Mood Post-Task	Mood Change^	Non-directional mood change	BDI	BAI	YMRS
Vivid	.90**	.03	.72**	.682**	.39*	.16	.31	.16	.20	-.21	-.07	-.08
Detailed		-.11	.77**	.78**	.43*	.03	.42*	.22	.27	-.12	-.05	.02
Distressing			.03	.22	-.36	.52**	-.40*	-.46*	.47*	.28	.20	.13
Comforting				.75**	.27	.27	.33	.11	.33	.21	.13	.27
Real					.28	.15	.23	.05	.37	-.07	-.04	.06
First person perspective						-.39*	.22	.16	-.12	-.09	-.08	-.33
Observer perspective							-.05	-.14	.04	.26	.35	.45*
Mood Post-Task								.75**	-.41*	-.16	-.24	.18
Mean Mood Change^									-.43*	-.19	-.44*	.11
ND mood change										.18	.22	.03
BDI											.44*	.27
BAI												.37

^ Mean mood change from baseline to post-visual/verbal task

Comparing Correlations for Ratings of Imagery and Mood for Visual and Verbal Task

The data set was split by task, so that participants in the "imagery" and "verbal" groups could be compared (Tables 17c and 17d). As Table 17c demonstrates, for the imagery group, there were no significant correlations between mood change or magnitude of mood change and any other imagery factors. However, for the imagery group, there was a significant negative correlation between current symptoms of depression, anxiety and mania, and how vivid images were rated to be. This pattern is not found for the verbal group (see Table 8).

As before, there were significant correlations between how vivid, detailed, and realistic images were. There was also a significant correlation at the .01 level between ratings of how realistic and comforting images were. There was a significant correlation at the .05 level between viewing images from a first-person perspective, and how vivid, detailed and realistic images felt. As before, there was a significant negative correlation at the .01 level between use of first-person and observer perspectives.

For participants who completed the verbal task, there was a significant correlation at the .05 level between mean mood post-task and mood change, which would be expected. There were no other significant correlations for any aspects of mood change.

There was a significant correlation at the .01 level between ratings of vividness, detail, how comforting images were, and how realistic they were. There was also a significant correlation at the .01 level between how distressing images were, and use of an observer perspective, which was not seen in the imagery group. There was also a significant correlation at the .05 level between use of observer perspective and current symptoms of depression. There was a significant correlation at the .01 level between current symptoms of depression, and symptoms of anxiety and mania. Current symptoms of depression were correlated with use of an observer perspective. Symptoms of mania were correlated with an observer perspective and negatively correlated with use of a first-person perspective. As before, there was a significant negative correlation between use of first-person and observer perspective.

Table 17c

Spearman's Rank Correlation for Imagery Factors for Visual Task

	Detailed	Distressing	Comforting	Real	First person	Observer	Mood Post-Task	Mood Change^	Non-directional mood change	BDI	BAI	YMRS
Vivid	.84**	-.2.4	.37	.62*	.66*	-.30	.12	.05	.31	-.45	-.59	-.51
Detailed		-.39	.45	.79**	.79**	-.58*	.23	.11	.35	-.26	-.51	-.40
Distressing			-.15	-.27	-.46	.29	-.45	-.19	.44	.57*	.12	-.28
Comforting				.81**	..27	-.34	.07	-.08	.58*	.13	-.32	.03
Real					.66*	-.62*	.33	.14	.40	.02	-.58*	-.22
First person perspective						-.75**	.28	.17	.04	-.29	-.49	-.41
Observer perspective							-.10	-.06	-.24	.15	.40	.17
Mood Post-Task								.83**	-.59*	-.16	-.33	.45
Mean Mood Change^									-.44	-.20	-.45	.41
ND mood change										.27	-.06	-.35
BDI											.35	.03
BAI												.39

^ Mean mood change from baseline to post-visual/verbal task

Table 17d

Spearman's Rank Correlation for Imagery Factors for Verbal Task

	Detailed	Distressing	Comforting	Real	First person	Observer	Mood Post-Task	Mood Change^	Absolute value of mood change	BDI	BAI	YMRS
Vivid	.94**	.18	.79**	.86**	.23	.30	.31	.27	.12	-.22	.08	.03
Detailed		.09	.75**	.76**	.18	.22	.39	.37	.20	-.26	-.01	.12
Distressing			.22	.48	-.32	.78**	-.36	-.69**	.52*	.08	.36	.50
Comforting				.72**	.09	.44	.27	.28	.23	.15	.13	.29
Real					.08	.47	.06	.01	.37	-.24	.13	.12
First person perspective						-.42	.09	.19	-.27	-.09	-.00	-.46
Observer perspective							-.17	-.24	.30	.31	.19	.69**
Mood Post-Task								.72**	-.34	-.31	-.37	-.21
Mean Mood Change^									-.41	-.18	-.49	-.22
Absolute value of mood change										.04	.54*	.39
BDI											.50	.50
BAI												.25

^ Mean mood change from baseline to post-visual/verbal task