Autobiographical Memory Specificity and Cognitive Style Across the Bipolar Disorder Spectrum

A thesis submitted to the University of Manchester for the degree of Doctor of Philosophy in the Faculty of Medical & Human Sciences

2011

Robert Christopher Dempsey

School of Psychological Sciences

Contents

Section 2 Cognitive Styles & the Vulnerability to Hypomania

Section 3 Autobiographical Memory & Problem Solving

Final Word Count = 96, 403 words

List of Tables

List of Tables (continued)

List of Figures

List of Abbreviations

AMT	Autobiographical Memory Test
BAS	Behavioural Activation System
BIS	Behavioural Inhibition System
CaRFAX	The Capture and Rumination, Functional Avoidance, and Executive Processes and Control Model of Autobiographical Memory
CBT	Cognitive Behavioural Therapy
CES-D	Center for Epidemiological Studies Depression Scale
DYS	Dysregulation of BAS
ECT	Electro-Convulsive Therapy
ESK	Event-Specific Knowledge
HIQ	Hypomania Interpretations Questionnaire
HPS	Hypomanic Personality Scale
ICS	Interacting Cognitive Subsystems
IDQ	Interpretations of Depression Questionnaire
IPSRT	Interpersonal and Social Rhythm Therapy
ISS	Internal States Scale
MEPS	Means-End Problem Solving task
PANAS	Positive and Negative Affect Schedule
PSS	Problem Solving Scale
RCT	Randomised Controlled Trial
RPA	Responses to Positive Affect Scale
RRS	Ruminative Responses Scale
RSQ	Response Styles Questionnaire
SCEFT	Sentence Completion for Events in the Future Test
SCEPT	Sentence Completion for Events from the Past Test
SPAARS	Schematic Propositional Analogical and Associative Representation Systems framework
UMEPS	University Means-End Problem Solving Task
WASSUP	The Willingly Approached Set of Statistically Unlikely Pursuits Scale

The University of Manchester

Robert Christopher Dempsey

PhD in Psychology

2011

Autobiographical Memory and Cognitive Style across the Bipolar Disorder Spectrum

Abstract

Bipolar disorder is characterised by intense fluctuations in mood, including the experience of severe episodes of depression, mania and hypomania. The experience of bipolar disorder can also be associated with biases in various cognitive processes, including rumination in response to positive and negative mood states and tendencies to make dysfunctional self-appraisals. Preliminary research has also suggested that bipolar disorder may be associated with deficits in the recall of specifically detailed autobiographical memories.

The lack of specificity in the recall of autobiographical memories, known as the "overgeneral" recall bias, refers to tendencies to generate generalised memory representations as the memory recall process is terminated prior to the activation of specifically detailed memories. This overgeneral recall of autobiographical memories can also contribute to ruminative thought patterns, impair the generation of effective solutions to problems, and is associated with poor illness outcomes. The overgeneral bias has been extensively researched within major depressive disorder and suicidality, but has been comparatively under-researched in bipolar disorder and in vulnerable individuals.

A series of eight studies were designed to: (i) investigate the cross-sectional associations across measures of positive and negative rumination and self-appraisal with the vulnerability to hypomania, and investigate the associations of these cognitive styles with prospective mood symptoms in an at-risk sample; (ii) investigate the cognitive vulnerability to hypomania in relation to rumination, problem-solving and autobiographical memory specificity; (iii) conduct a preliminary investigation into the associations between goal-related memory processes and extreme goal-pursuit in relation to hypomania vulnerability; (iv) investigate whether the vulnerability to hypomania and future bipolar disorders is associated with similar patterns of overgeneral memory recall on a standardised cue memory task; and (v) investigate the patterns of autobiographical memory specificity within a remitted bipolar sample.

The heightened vulnerability to future bipolar disorders was associated with tendencies to engage in both positive and negative forms of ruminative thought processes, and with poorer psychosocial problem-solving, however, this relationship with problem-solving was not independent of current mood symptoms. The results of two studies indicated that the heightened vulnerability to hypomania was associated with an overgeneral memory bias across two different assessments of memory specificity, in direct contrast to previous research. Individuals diagnosed with bipolar disorder also reported more extreme overgenerality during memory recall than a sample of age and gender-matched healthy controls, but were able to recall some specifically detailed negative memories in short response latencies compared to non-bipolar control participants.

The research presented within this thesis supports the notion of a continuum of increasing overgenerality in the bipolar disorder spectrum, inclusive of at-risk individuals to people formally diagnosed with bipolar disorder. Although bipolar disorder appears to be associated with a trait-based overgeneral memory bias, bipolar individuals appear to have ready access to some specific negative memories even during remission from symptoms. The clinical implications of this research, methodological considerations in the assessment of memory specificity, and directions for further investigations into the nature of autobiographical memory recall in bipolar spectrum disorders are discussed.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Copyright Statement

Acknowledgements

Firstly I would like to thank my parents for their continued support and patience during the process of this PhD. I would also like to thank my supervisors, Dr Trish Gooding and Professor Steven Jones, for their continued supervision and enthusiasm, despite the substantial change from the initial research programme to the work presented in this thesis, which I am particularly grateful for.

I am also grateful to a number of people for their assistance with various aspects of the work in this thesis, including: Phil Alsop, Dr Eve Applegate, Professor Mark Bauer, Dr Doron Cohen, Kevin Corran, Dr Alyson Dodd, Professor Graham Dunn, Jess Green, Professor Sheri Johnson, Charlotte Rhian Lowe, Christina Pearce, Dr Peter Taylor, Freya Wagstaff, the Wigan MDF Group, and the Greater Manchester South NHS Research Ethics Committee for their helpful advice in relation to Study Eight. I would also like to acknowledge Professor Benjamin Rodriguez and two anonymous reviewers from the Journal of Clinical Psychology for their helpful comments on the manuscript based upon the study presented in Section 2.1. Finally, I would like to acknowledge and thank all those participants who took part in the studies presented in the thesis, many of whom volunteered their time for little or no incentive, for which I am extremely grateful.

The thesis is dedicated to the memory of my grandparents, Patricia & Bryan Brett and Eileen Dempsey, and the memory of my friend Sue Fielder.

The Author

Robert Dempsey graduated from the University of Manchester in 2006 with a BSc (Hons) in Psychology. Robert initially commenced his PhD research investigating the mental representation of emotional information using a language processing paradigm in relation to the experience of psychopathological syndromes, but changed the central research question of his PhD in 2008 to investigate the specificity of autobiographical memory recall in the Bipolar Disorder Spectrum. Robert also worked as a Research Assistant on the Reaching a Balance Trial, which investigated the efficacy of the Triple P Positive Parenting Programme for parents with Bipolar Disorder, whilst completing his PhD.

Section 1.1

Literature Review:

The Epidemiology & Phenomenology of Bipolar Disorder

This section will provide a review of the literature detailing the epidemiology of bipolar disorder, and will review the current diagnostic criteria, the symptoms, treatments, and the illness outcomes associated with bipolar disorder.

1.1.1 *Introduction*

Bipolar Disorder is a pervasive mental health condition which is characterised by dynamic swings in mood and self esteem and is highly associated with a variety of co-morbid mental and physiological health problems (Simon et al., 2004; McIntyre et al., 2006). Individuals diagnosed with bipolar disorder typically experience fluctuations between periods of relatively normal functioning and stable mood states, in addition to relapses into manic, hypomanic, depressive and mixed state episodes of illness. Rates of relapse can be high, with as many as 50% of bipolar patients found to relapse within 2 years of first remission from symptoms, and up to 73% of patients relapse within 5 years, despite continued treatment by medication (Gitlin, Swendsen, Heller & Hammen, 1995). Bipolar disorder is estimated to have a lifetime prevalence of approximately 1-1.5% in the general population (Bebbington & Ramana, 1995), although some estimates have suggested prevalence rates as high as 5% in the community when accounting for softer forms of bipolar disorder (Lewisohn, Klein & Seeley, 1995).

Bipolar Disorder is highly heritable amongst family members (Bertelsen, Harvald & Hauge, 1977; McGuffin et al., 2003), leading to the suspicion that some form of genetic vulnerability exists for bipolar affective illnesses. However no specific gene has been identified as being solely responsible for conferring a genetic vulnerability to bipolar disorder (Craddock & Sklar, 2009), although a number of potential candidate genes have been identified (Craddock & Jones, 1999).

Bipolar disorder is associated with significant levels of disability particularly during acute episodes of the illness (Huxley & Baldessarini, 2007) and is one of the leading global causes of disability (Murray & Lopez, 1996). Whilst bipolar disorder can present a significant burden to the patient and their significant others, there is also a considerable economic cost associated with bipolar disorder. It has been estimated that bipolar disorder may cost the UK economy up to £4.9 billion per annum (based upon 2007 prices) (Fajutrao, Locklear, Priaulx & Heyes, 2009), through costs to the healthcare system and the reliance on government benefits (Das Gupta & Guest, 2002).

Age of Onset

Bipolar Disorder can be diagnosed at any age and is frequently misdiagnosed (Perlis, 2005). Bipolar patients are often misdiagnosed with schizophrenia and major depressive disorder (Baca-Garcia et al., 2007b), which complicates the task of ascertaining the true age of onset of bipolar affective illnesses. The average age of first onset of bipolar symptoms is generally considered to be in the twenties, with various studies and literature reviews suggesting average ages of onset of approximately 26-28 years of age (Goodwin & Jamison, 1990; Lam, Wright & Sham, 2005; Baldessarini et al., 2010), although the first appearance of bipolar symptoms can occur prior to this age. Indeed, a recent web-based survey of 1024 bipolar patients reported a mean age of onset of symptoms of 18.5 years, but a mean age at first diagnosis of bipolar disorder of 32.9 years (Depp et al., 2009).

A large scale epidemiological study has also reported that 28% of bipolar patients reported a very early onset of bipolar disorder prior to the age of 13 years, with an additional 38% reporting a first onset of bipolar disorder of between 13 and 18 years of age (Perlis et al., 2004). Early ages of onset are associated with more severe courses of bipolar affective illness, greater co-morbid health problems and with poorer illness outcomes (Perlis et al., 2004). Earlier onset of bipolar disorder has been associated with more severe psychotic symptoms (Bellivier, Golmard, Henry, Leboyer & Schürhoff, 2001), greater substance abuse (Cate Carter, Mundo, Parikh & Kennedy, 2003), poorer responses to lithium medication (Schürhoff et al., 2000)**,** more frequent recurrences of bipolar episodes, shorter inter-episode periods of normal functioning (Perlis et al., 2004), and with greater risks of attempted suicide (Cate Carter et al., 2003; Perlis et al., 2004). Bipolar disorders with later ages of onset, later than 40 years of age, are associated with less severe illness courses than early onset bipolar disorder. Interestingly, earlier ages of onset have also been associated with a greater prevalence of bipolar disorder amongst family members than later onset, suggesting that earlier and late onset bipolar disorder may represent different subtypes of bipolar affective illness (Schürhoff et al., 2000).

1.1.2 *Symptoms of Bipolar Disorder*

Depression

A major depressive episode, as defined by the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (4th Edition) (DSM-IV: APA, 2000), is a period of at least two weeks where there has been a predominantly depressed mood and/or a loss of interest or pleasure in nearly all activities (APA, 2000). For a diagnosis of a depressive episode to be made at least four of the following additional symptoms must be observed, including: changes in appetite, weight, sleep or psychomotor

activity; loss of energy; feelings of guilt or worthlessness; difficulties in thinking, concentrating, or making decisions; and/or recurrent thoughts of death or suicidal ideation. These symptoms must have been newly present or have worsened during the depressive mood state, and persisted for most of the day, nearly everyday, for at least two weeks (APA, 2000). A depressive episode should be accompanied by significant feelings of stress and impairments to social, occupational and any other important areas of functioning. As with the other mood episodes featured in the DSM, the diagnosis of a major depressive episode must not include symptoms which meet the criteria for a mixed episode. Similarly, the depressed episode must not be due to a substance, in the form of medication or illicit substances, or due to a general medical condition. Finally, the depressive symptoms should not be better accounted for by the recent experience of bereavement.

Mania

A manic episode is a distinct period of time consisting of an abnormal, persistently elevated, expansive or irritable mood, which lasts for a minimum period of one week (APA, 2000). However, the criterion of a week-long duration may be ignored if immediate hospitalisation of a manic patient is required. The abnormal mood episode must also be accompanied by at least three additional symptoms for a diagnosis of a manic episode to be made. These symptoms include: increased self-esteem or grandiosity, being more talkative or pressurised in speech, increased goal directed activity or psychomotor agitation, the experience of a flight of ideas or racing thoughts, distractibility, a reduced need for sleep, and excessive involvement in activities of a highly risky, yet pleasurable nature, such as unrestrained spending, increased sexual behaviour or promiscuity, reckless driving and the use of recreational drugs (APA, 2000).

The disturbance of mood during mania should be sufficiently severe to cause impairments in occupational functioning, social activities and relationships. In cases where there is a threat of harm to the self or others, hospitalisation of the patient may be necessary. For the diagnosis of a manic episode to be made the previously specified symptoms should not meet the criteria for a mixed episode and should not be explained by the presence of a general medical condition, or be due to antidepressant medication, electroconvulsive therapy, or substance abuse.

Mixed Episode

A mixed episode refers to a period of time where the individual experiences rapidly alternating moods, including irritability, euphoria and sadness, accompanied by the symptoms of both a manic and a major depressive episode (APA, 2000). The criteria for

both a manic episode and a major depressive episode must have been met for nearly every day for at least a period of one week. The mood disturbance associated with a mixed episode should also cause impairments in occupational functioning, social activities and relationships, and may require hospitalisation if there is a fear of harm to the self or others or if the disturbance is associated with psychotic features. The symptoms of a mixed episode should not be caused by a general medical condition or by the physiological effects of a substance, whether medication or a recreational drug.

Hypomania

A hypomanic episode is distinguished from a manic episode by the experience of an abnormal and persistently elevated, expansive or irritable mood for a period of at least four days which is different from the individual's normal mood profile (APA, 2000). The individual must have experienced at least three symptoms of a manic episode as previously described (e.g., inflated self-esteem, increased goal-directed activity). A hypomanic episode must represent a change in the individual's usual functioning and mood which is not characteristic when non-symptomatic, which is noticeable by other individuals, including friends and relatives (APA, 2000). In contrast to a manic episode, hypomania should not represent a severe impairment to social or occupational functioning, should not require hospitalisation, and should not be associated with psychotic symptoms (e.g., hallucinations, delusions).

The DSM-IV diagnostic criteria for hypomania are somewhat controversial, with criticism particularly centred on the four day diagnostic criterion for the duration of a hypomanic episode. Recent epidemiological research has suggested that up to 30% of hypomanic episodes may last less than four days, often with durations of between 2-3 days, although up to 30% of hypomanic episodes can have durations greater than four weeks (Benazzi & Akiskal, 2006). There has been a growing call for a review of the duration criteria for hypomania, especially as hypomanic episodes with minimum durations of 2-3 days are able to distinguish between outpatients with unipolar depression and bipolar II disorder (Benazzi, 2001). It has been suggested that the four day criterion for hypomania could potentially misdiagnose up to one third of bipolar II patients with major depressive disorder (Benazzi & Akiskal, 2006), with potentially serious implications upon the treatment and clinical outcomes for those patients receiving such misdiagnoses.

Comorbidity in Bipolar Disorder

Bipolar Disorder is highly comorbid with a range of psychiatric conditions and general medical conditions, with estimates that around 60-65% of bipolar patients have some form

of comorbid diagnosis (Cassano, Pini, Saettoni, Rucci & Del'Osso, 1998; McElroy et al., 2001). Bipolar disorder is highly comorbid with a range of anxiety disorders (McElroy et al., 2001; Perlis et al., 2004; Simon et al., 2004), sleep disorders (Harvey, Schmidt, Scarnà, Semler & Goodwin, 2005), psychoses (Keck et al., 2003), substance abuse disorders (Regier et al., 1990; McElroy et al., 2001; Kilbourne et al., 2004), and a range of general medical health conditions (Kilbourne et al., 2004; McIntyre et al., 2006). As many as 50% of bipolar outpatients have comorbid axis I anxiety disorders (McElroy et al., 2001; Simon et al., 2004). In relation to psychosis, a community based study reported that as many as 68% of bipolar patients reported histories of psychotic symptoms, with high prevalences of delusions of reference (62% of patients), grandiosity (61%) and persecution (51%), as well as auditory (37%) and visual hallucinations (32%) reported during previous mood episodes (Keck et al., 2003).

In relation to sleep disturbance, manic episodes are often associated with a decreased need for sleep (Loudon, Blackburn & Ashworth, 1977; Serretti & Olgiati, 2005). Many manic individuals are able to function without sleep for up to several days whilst still feeling full of energy (APA, 2000). In contrast, depressive episodes can be associated with insomnia (Winokur, Clayton & Reich, 1969) and difficulties in falling asleep (Casper et al., 1985), whilst over-sleeping (hypersomnia) is less common in depressive episodes than insomnia (Casper et al., 1985). Sleep disturbances appear to be diminished outside of bipolar mood episodes (Harvey et al., 2005; Jones, Hare & Evershed, 2005b), yet many euthymic bipolar individuals still report poor qualities of sleep (Harvey et al, 2005; Harvey, 2008). Many psychological therapies now incorporate techniques which encourage the stabilisation of daily activities and the maintenance of regular sleeping patterns (Frank et al., 1997; Frank et al., 2005; Jones & Burrell-Hodgson, 2008).

In comparison with the general population, high rates of substance abuse have been associated with bipolar disorder (Regier et al., 1990), including high lifetime rates of alcohol, tobacco, cocaine, and cannabis abuse (Agrawal, Nurnberger Jr & Lynskey, 2011). Higher rates of substance abuse are found in younger age groups and in males more than females (Cassidy, Ahearn & Carroll, 2001). Interestingly, both bipolar and non-bipolar individuals with diagnosed substance abuse disorders appear to endorse similar reasons for engaging in substance abuse behaviours (Bizzarri et al., 2007), these include the alleviation of psychopathological symptoms, maintenance of positive mood states, attempts to increase energy, alleviating boredom, and for aiding relaxation (Bizzarri et al., 2007).

Bipolar disorder is also highly comorbid with a number of general medical conditions. A recent large scale epidemiological study observed that bipolar disorder was associated with high prevalences of conditions such as migraines, chronic fatigue

syndrome, asthma, Crohn's disease and hypertension, with the existence of additional comorbid chronic medical disorders associated with more severe courses of bipolar disorder (McIntyre et al., 2006). Similarly, high prevalences of comorbid cardiovascular complaints as well as endocrinological conditions, such as diabetes and pancreatitis, are highly associated with bipolar disorder (Kilbourne et al., 2004). The diagnosis of bipolar disorder can be associated with significant medical comorbidities which may reduce the individual's physiological well-being.

1.1.3 *The Diagnosis of Bipolar Disorder*

1.1.3.1 The DSM-IV Criteria for Bipolar Affective Disorders

The current UK diagnostic criteria for bipolar disorder are based upon the specifications outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition produced by the American Psychiatric Association (DSM-IV: APA, 1994). The DSM-IV currently specifies a number of subtypes of bipolar affective illness, including: Bipolar I Disorder, Bipolar II Disorder, Cyclothymia, and Bipolar Disorder Not Otherwise Specified. Descriptions of each of these diagnostic subtypes are presented below.

Bipolar I Disorder

Bipolar I Disorder is associated with the experience of both manic and depressive mood states, and is distinguishable from the other bipolar subtypes by the occurrence of at least one manic or mixed episode, which is usually accompanied by the experience of one or more major depressive episodes. Diagnoses of Bipolar I Disorder are often made on the evidence that the patient has experienced a manic episode, which are unique to Bipolar I Disorder. A range of epidemiological studies and literature reviews suggest lifetime prevalences of Bipolar I Disorder of 0.4-1.6% in community samples (Kessler, Rubinow, Holmes, Abelson & Zhao, 1997), to as high as 3.3% (Grant et al., 2005).

Bipolar II Disorder

The clinical course of Bipolar II Disorder is characterised by the experience of at least one major depressive episode accompanied by the experience of at least one hypomanic episode (APA, 1994). A diagnosis of Bipolar II Disorder is also based upon the absence of manic and mixed episodes. The lifetime prevalence of Bipolar II Disorder in community studies has ranged from estimates of 0.5% to 1.4% in adults (Bebbington & Ramana, 1995; Merikangas et al., 2007), and approximately 1% in adolescents (Lewisohn et al., 1995).

Research has suggested that Bipolar II Disorder is often associated with the experience of a depressive episode at first contact with a healthcare professional, and is

often diagnosed at a later age than Bipolar I Disorder (Baldessarini et al., 2010). Difficulties in identifying previous hypomanic episodes could explain the suggested later age of onset of Bipolar II disorders, as the diagnostic criteria for hypomania specifies that it is a change in behaviour which is not significantly impairing (APA, 2000), which may be difficult to detect by a clinician. Because Bipolar II Disorder is differentiated from a diagnosis of Major Depressive Disorder by the experience of past hypomania, patients are often misdiagnosed with Major Depressive Disorder. Indeed, high prevalences of individuals satisfying the DSM criteria for Bipolar II Disorder have been found in samples of depressed outpatients (Benazzi, 1999).

Cyclothymia

Cyclothymic Disorder, as defined by the DSM-IV-TR, "is a chronic, fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous periods of depressive symptoms" (APA, 2000, p.398). For a diagnosis of cyclothymia to be made these fluctuations in symptoms must have been present for the past two years, within which the patient must not have been without the symptoms for more than two months at any time. Estimates of the lifetime prevalence of cyclothymic forms of bipolar affective illnesses range from 0.4% to 1% in community samples (APA, 2000; Regeer et al., 2004).

Bipolar Disorder Not Otherwise Specified

Bipolar Disorder Not Otherwise Specified (NOS) incorporates any remaining disorders with bipolar features that do not meet the diagnostic criteria for any of the previously specified disorders. A diagnosis of Bipolar Disorder NOS may feature more rapid cycling forms of bipolar disorder, the experience of recurrent hypomania without depression, or forms of bipolar disorder where it is unclear whether the disorder is caused by an underlying general medication condition or induced by a substance (APA, 2000).

Course Specifiers

In addition to the main diagnostic categories associated with bipolar disorder, a course specifier may be applied to a diagnosis. These specifiers include rapid cycling, seasonal patterns and longitudinal course specifiers, the latter of which provides further clarification regarding the illness course of Bipolar I and Bipolar II Disorders according to the patterns of symptom recurrence and periods of recovery from symptoms (e.g., with or without full inter-episode recovery, APA 2000).

The Bipolar Disorder Spectrum

There is a growing consensus that bipolar spectrum disorders are located on a continuum of increasing severity and impairment (Akiskal & Mallya, 1987; Merikangas et al., 2011), inclusive of clinically diagnosed bipolar disorders to less impairing and severe bipolar-like phenomena which may be experienced by healthy non-bipolar individuals. The continuum conceptualisation of bipolar disorders suggests that the entire population is located at some point on the bipolar spectrum, as opposed to the conceptualisation of bipolar disorder as being a discrete disorder which is substantially distinct from normal functioning. It has also been suggested that bipolar disorder may form a continuum with depressive and schizophrenic disorders given the high degree of similarity in the symptomatic experiences shared across these disorders (Möller, 2003; Benazzi, 2007).

At present, there are four main clinically recognised forms of bipolar disorder, as previously discussed in this section, although a number of softer forms of bipolar disorder have been proposed and identified which share a number of symptomatic features with the more severe bipolar disorders, albeit to a less extreme and impairing degree. These include cyclothymia, "minor bipolar disorder" pertaining to the experience of mild depressive episodes and hypomania (Angst et al., 2003), pure hypomania without the experience of depressive episodes (Angst et al., 2003; Seal, Mansell & Mannion, 2008), and hyperthymic or hypomanic personality temperaments relating to the habitual and lifelong experience of hypomania-like states and euthymia without the experience of discrete hypomanic episodes (Akiskal & Akiskal, 1992; Seal et al., 2008). The continuum conceptualisation also suggests that it is clinically important to target those individuals with vulnerabilities to bipolar disorder, as well as those individuals early in the course of bipolar disorder (Jones & Burrell-Hodgson, 2008), to prevent the development and ongoing experience of clinically severe and impairing bipolar symptoms.

The conceptualisation of the bipolar spectrum has also led to attempts to research potential risk factors for future bipolar disorder in healthy individuals. However, there are difficulties associated with the identification of those individuals at-risk for bipolar disorder, particularly as the risk phenotypes may vary significantly between individuals in respect to the possible combinations of genetic, behavioural, physiological and environmental factors which confer risk (Depue et al., 1981). There is also a substantial ethical concern with potentially wrongly identifying healthy individuals to be at-risk, or even diagnosed with bipolar disorder, raising the chance of observing false positives when investigating the risk for bipolar disorders. The investigations into the role of cognitive processes in relation to the vulnerability to bipolar disorder presented in this thesis may assist in reducing these false positives by better understanding the psychological

mechanisms associated with an elevated risk for bipolar disorder, which may assist in discriminating between those individuals at a low and high-risk for bipolar disorder. (Please note that a full review of the bipolar spectrum concept is beyond the scope of the current thesis, for reviews of the spectrum and challenges associated with investigating the continuum please see Depue et al., 1981, and Benazzi, 2007)

1.1.3.2 The Reliability & Stability of Bipolar Diagnoses

The recurrent nature of bipolar disorder presents a considerable challenge in the effective diagnosis and treatment of the condition. There are a number of factors which further complicate the diagnosis of bipolar disorder in addition to mood lability, including problems in identifying past illness episodes, the highly co-morbid nature of bipolar affective illnesses with other disorders, as well as interference from long-term substance abuse and medication regimes (Kessing, 2005). Due to the fluctuating nature of bipolar mood symptoms, assessments made at different time points may observe qualitatively different presentations of bipolar disorder, hindering an accurate diagnosis of bipolar disorder (Chen, Swann & Johnson, 1998). A recent large scale review of hospital records indicated that as few as 23% of patients received a consistent diagnosis of bipolar disorder across a minimum of 75% of medical evaluations (Baca-Garcia et al., 2007a, 2007b). Across a number of studies, approximately 30% of patients diagnosed as bipolar at initial assessment changed diagnosis at follow-up (Chen et al., 1998; Kessing, 2005). Frequent changes in diagnoses have also been noted between bipolar disorder, schizophrenia, and psychotic disorders for some patients (Chen et al., 1998; Kessing, 2005; Baca-Garcia et al., 2007b).

1.1.4 *Treatment for Bipolar Disorder*

1.1.4.1 Physiological Therapies

Although a detailed discussion and critique of the therapeutic interventions used to treat bipolar disorder is beyond the scope of the current thesis, the following section will provide an overview of the main treatments available for bipolar disorder. This will be limited to an overview of the medications prescribed for bipolar disorder, with a more detailed overview presented for the psychological therapies for bipolar disorder.

Medication

Patients with bipolar disorder are typically treated with medication, with lithium carbonate most frequently prescribed to alleviate the severity of bipolar symptoms and to stabilise mood (Geddes, Burgess, Hawton, Jamison & Goodwin, 2004). There is a significant body

of research which advocates the efficacy of lithium therapy for bipolar disorder, with the maintenance of lithium medication being associated with improved symptom severity, particularly for mania, with weaker evidence for reductions in depressive symptoms and depressive relapses (Geddes et al., 2004). Consistent lithium prophylaxis (maintenance therapy) has also been associated with reductions in the number of attempted suicides (Tondo et al., 1998), as well as with a reduced frequency and duration of future hospitalisations (Maj, Pirozzi, Magliano & Bartoli, 1998).

However, lithium remains a somewhat controversial medication. There is some uncertainty regarding lithium's precise mechanism of action, with lithium found to effect a variety of neurotransmitter systems (Lenox & Hahn, 2000). There is also concern over the onset of action from lithium administration until therapeutic effects are observed, with at least 10 days required before improvements in symptoms are noted (Rivas-Vazquez, Johnson, Rey, Blais & Rivas-Vazquez, 2002). Many bipolar patients also fail to demonstrate adequate improvements in symptom severity following initial lithium therapy (Kleindienst & Greil, 2003), or demonstrate a late non-response, the occurrence of affective episodes despite years of remission and full compliance with lithium prophylactic therapy (Maj, Pirozzi & Magliano, 1996). There is also a low ratio between a therapeutic dose and a harmful toxic dose due to the natural toxicity of lithium carbonate (Bowden, 2000), and as a consequence patients require regular blood monitoring to prevent side effects (Nemeroff, 2000; Rivas-Vazquez et al., 2002). There is also the potential for accidental or attempted overdose using lithium, particularly in suicidal individuals (Montagnon, Saïd & Lepine, 2002), although lithium has been associated with lower rates of suicide in comparison to other mood stabilisers (Goodwin et al., 2003). Lithium has also been associated with a range of health complaints, including weight gain (Garland, Remick & Zis, 1998), hypothyroidism (Kleiner, Altshuler, Hendrick & Hershman, 1999), and other kidney-related complaints, such thirst and urination (Gitlin, 1999). Lithium has also been associated with a number of cognitive side-effects, with negative effects noted upon memory, speed of information processing and reaction times (Honig, Arts, Ponds & Riedel, 1999). However, the short-term discontinuation of lithium has been associated with improvements in memory (Kocsis et al., 1993). For some patients, lithium can assist in maintaining long periods of remission, yet many patients experiencing more severe forms of bipolar disorder experience poor outcomes from lithium therapy (Maj et al., 1998).

High rates of relapse and hospitalisation are noted in bipolar patients receiving lithium therapy, particularly in those patients who immediately cease taking their medication (Scott & Pope, 2002). Successful withdrawal from lithium may require weeks of dosage adjustment (Baldessarini et al., 1996). It is perhaps unsurprising that more

patients are prescribed a combination of medications, including mood stabilisers, anticonvulsants, antipsychotics and/or antidepressants, alongside medications for co-morbid disorders and general medical conditions (Rivas-Vazquez et al., 2002).

Many bipolar patients also receive antidepressant medication to assist in alleviating depressive symptoms. In those patients who do not demonstrate adequate reductions in symptom severity following antidepressant medication, the alternative offered is typically a different antidepressant or an increased dosage of the current medication (Hirschfield et al 2002). However, a recent review highlighted that the increase of antidepressant medication in the short term is associated with moderate improvements in symptoms, but also frequent switches into manic episodes (Post et al., 2003a). The same review also suggested that the discontinuation of antidepressant medication should be avoided in those bipolar patients who do respond to antidepressants, as discontinuation appears to be associated with an increased risk of depressive relapse (Post et al., 2003a). There is generally mixed evidence for the efficacy of adjunctive antidepressant treatment with bipolar patients, with one trial reporting no additional benefit of adjunctive antidepressant medication compared to mood stabilisers administered with a placebo (Sachs et al., 2007).

Anti-psychotic medications, such as clozapine and chlorpromazine, are increasingly prescribed to bipolar patients, irrespective of whether the patient is currently psychotic. Atypical anti-psychotics, the most recent generation of anti-psychotic medications, have been observed to have mood regulatory properties, and are typically used as medication for mania and psychotic-mania (Keck, McElroy & Strakowski, 1998). Antipsychotics are also more likely to be prescribed to younger patients, and to patients with comorbid substance abuse disorders or comorbid post-traumatic stress disorder (Sajatovic, Valenstein, Blow, Ganoczy & Ignacio, 2006).

Although medication may assist in alleviating the most severe symptoms associated with bipolar disorder, there are a number of limitations. Individuals with bipolar disorder may find it difficult to take their prescribed medication at the required time, or may be disinclined to take their medication on a regular basis, particularly if the medication is associated with adverse side effects (Perlick, Rosenheck, Kacyznski & Kozma, 2004). A review suggested that between 23% to 68% of bipolar patients do not fully adhere to medication (Perlick et al., 2004). In recognition of this, there has been an increased focus in recent years upon improving treatment adherence in bipolar patients through the use of adjunctive psychotherapy and psychoeducation (Sajatovic, Davies & Hrouda, 2004). Both of these techniques emphasise the necessity of taking prescribed medication on a regular basis, and inform the patient of the potential consequences of not taking their medication.

1.1.4.2 Psychological Therapies

Psychological therapies for bipolar disorder have only recently been developed and subjected to empirical study, with the current published research literature somewhat in its infancy. However, preliminary research suggests that some form of psychological therapy can assist in improving illness outcomes for individuals with bipolar disorder.

Psychoeducation

Psychoeducation is a key component of many psychological therapies for bipolar disorder, the primary aim of which is to improve the patient's and their family member's understanding of their condition, including the causes, consequences, and treatments (Smith, Jones & Simpson, 2010). Psychoeducation also aims to destigmatise the condition in question and improve relationships between patients and family members. Psychoeducation can be delivered by itself or as part of another intervention, in one-to-one sessions with a therapist or in a group, and is frequently incorporated in the early phases of cognitive-behavioural and family-focused therapies. A number of psychoeducational approaches have been used, with interventions focusing upon improving medication adherence, improving the early recognition of early signs (prodromes) of bipolar episodes, and in maintaining periods of normal functioning outside acute illness episodes.

An early trial by Perry and colleagues (1999) trained recently relapsed bipolar patients to identify the prodromes associated with the onset of a manic or depressive episode. Although Perry and colleagues did not take an explicitly psychoeducational approach, significant improvements in the time to the first manic relapse and reductions in the frequency of manic relapses in the 18 months post-therapy were observed (Perry, Tarrier, Morriss, McCarthy & Limb, 1999). However, no between-group differences were noted between patients who received the training intervention and those on the waiting list in terms of the number of depressive relapses and the time taken to the first depressive relapse at follow-up. Perry and colleagues' (1999) study suggested that this may reflect the fact that bipolar patients often report difficulties in recognising depressive prodromes which may be less distinct than manic prodromes, and less distinguishable from subsyndromal depressive symptoms (Perry et al., 1999; Lam, Wong & Sham, 2001).

More positive outcomes have since been reported in a large scale randomised controlled trial (RCT) of a group psychoeducation intervention for bipolar outpatients (Colom et al., 2003). Bipolar patients attending psychoeducation reported fewer relapses and longer survival rates to their next mood episode over a two year follow-up compared to a control group of patients who attended regular non-structured group meetings (Colom et al., 2003). Psychoeducation was also associated with fewer and shorter durations of

hospitalisations and with improved medication adherence at two year follow-up. A five year follow-up observed that the psychoeducation group continued to report longer times to relapse, fewer recurrences of episodes, reductions in the time spent hospitalised, and less time spent acutely ill over the five years (Colom et al., 2009b). The comprehensive psychoeducation delivered by Colom and colleagues would appear to be successful in preventing subsequent recurrences of bipolar episodes over the long term. Interestingly, Colom et al (2009b) observed that psychoeducation appeared to be much more effective at preventing manic relapses at a five year follow-up than at two years, and suggested that psychoeducation should be treated more as disease management training rather than a means for passing on information to patients regarding their mental health condition.

A subgroup analysis of patients diagnosed with bipolar II disorder from Colom and colleagues' studies (2003, 2009b) observed that psychoeducation was associated with fewer total episodes, fewer hypomanic and depressive episodes than the control group at a five year follow-up (Colom et al., 2009a). Although this analysis should be treated with caution as it was not conducted on a psychoeducational programme tailored specifically for bipolar II disorder, Colom and colleagues (2009a) suggest that psychoeducation may assist in improving outcomes for bipolar II patients. This is despite Colom's (2003, 2009b) previous studies indicating greater preventative effects of psychoeducation for manic relapses, where mania is a feature of bipolar I disorder, not bipolar II.

Whilst psychoeducation appears to assist in improving the outcomes for bipolar patients, this approach is not without its limitations. Psychoeducation would appear to be unsuitable for use in currently episodic patients, who may lack the prerequisite motivation and insight when acutely ill to fully benefit from a program of psychoeducation. It has been suggested that psychoeducation may function best as a preventative therapy in euthymic patients rather than as a means of improving outcomes for currently ill patients (Vieta, 2005; Miklowitz, 2008). Psychoeducation also appears to be a favourable for use with both bipolar patients and their relatives. Following psychoeducational interventions for patients and their relatives, improvements have been noted in knowledge of bipolar disorder and improved familial relationships, as well as reductions in relatives' expressed emotion and symptom-related burden, at a one year follow-up (Bernhard et al., 2006).

Cognitive Behavioural Therapy (CBT)

An early pilot study of a twenty week depression-focused CBT intervention reported significant decreases in depressive symptoms across groups of eleven bipolar and eleven unipolar patients at post-treatment (Zaretsky, Segal & Gemar, 1999). Zaretsky and colleagues (1999) suggested that bipolar patients may require more intensive CBT than the

relatively standardised treatment offered in their study. However, despite the small scale nature of the study significant reductions in depressive symptoms were noted, providing one of the early indications of the promise of CBT for bipolar disorder.

A pilot study of a relapse-prevention approach to CBT for bipolar disorder also reported encouraging results (Lam et al., 2000). Patients were randomly assigned to either a six month course of CBT or to ongoing treatment-as-usual. At a 12 month follow-up, patients in the treatment-as-usual group had experienced more bipolar episodes and more hospitalisations than the CBT group, with the majority of the CBT group not experiencing relapses post-therapy (Lam et al., 2000). The CBT group also reported reduced symptom severity, improved functioning, medication adherence, and coping with manic prodromes compared to the control group. Interestingly, no significant difference between the groups was reported for coping with depressive prodromes at the post-treatment time point, supporting previous observations that bipolar patients appear to have particular difficulties in identifying the early symptoms of depression (Lam & Wong, 1997; Perry et al., 1999). Despite such positive findings, there are some potential confounds in Lam and colleagues' (2000) study, particularly in the absence of a control to account for the increased contact with a healthcare professional during the CBT intervention. In a larger scale replication of this pilot study, bipolar patients receiving CBT reported significantly fewer bipolar episodes, fewer fluctuations in manic symptoms, fewer days in acute bipolar episodes and fewer hospitalisations at a twelve month follow-up than those receiving treatment as usual (Lam et al., 2003). Again, patients in the CBT group reported improved coping with manic but not depressive prodromes, at both six and twelve months follow-up (Lam et al., 2003).

Scott and colleagues (2006) conducted the first multi-site RCT of CBT for acutely ill patients and patients with severe bipolar disorder. A total of 253 patients were randomised to receive a six month CBT intervention or ongoing treatment as usual, and were followed up over a twelve months. More than half of the patients experienced a recurrence of a bipolar episode during the follow-up period, with no differences in relapse rates between the CBT and control groups, although more depressive than manic relapses were noted overall (Scott et al., 2006). The absence of a standardised treatment-as-usual provision across sites may not have accounted for discrepancies between sites in terms of the available healthcare. In addition, forty percent of Scott and colleagues' (2006) patients failed to complete the full programme of CBT (see Lam, 2006, for a detailed critique). In light of this, and the high rates of relapse noted in both the treatment and control groups, Scott and colleagues suggested that CBT may not be suitable for use with patients with complex and severe presentations of bipolar disorder (Scott et al., 2006). The authors also suggested that CBT may be more effective when used with bipolar patients with less

complex presentations and with patients who have been recently diagnosed, as these patients may be more able to commit to a programme of CBT (Scott et al., 2006).

Following the failure of Scott and colleagues' (2006) trial, Jones and Burrell-Hodgson (2008) reported a case series of a CBT intervention delivered to seven patients with recent first diagnoses of bipolar disorder. Based upon a previously established CBT approach (Lam, Jones, Hayward & Bright, 1999), participants completed a short psychoeducation phase, training in prodrome detection, coping skills for managing mood fluctuations, and training in maintaining regular sleep and activity patterns. Participants received six months of CBT and were followed up for six months, and completed self-report measures of mood, symptoms, coping styles and dysfunctional attitudes, and wore actigraphic watches as an objective measure of sleep and circadian rhythm regularity. Improvements in symptom severity, reductions in hopelessness, and more stable behaviour patterns were noted by the end of therapy, but no significant reduction in dysfunctional attitudes was observed (Jones & Burrell-Hodgson, 2008). Improvements were also noted in prodrome detection and the use of adaptive coping skills when encountering the early signs of mania, but such improvements were less prominent for depression (Jones & Burrell-Hodgson, 2008). Although the study was small scale, the CBT programme offered by Jones and Burrell-Hodgson (2008) appeared to be effective for use with patients with recent bipolar diagnoses. The application of CBT and symptom management training in the early phases of bipolar disorder may assist in softening the impact of subsequent chronic episodes, and may improve long term patient outcomes. A large scale replication of Jones and Burrell-Hodgson's (2008) study is required to determine the efficacy of targeting CBT earlier in the illness course of bipolar disorder.

Whilst CBT has provided some encouraging findings for the reductions of manic symptoms, there has been mixed success in alleviating bipolar depressive symptoms. A trial conducted by Scott and colleagues, randomised 42 bipolar patients to a waiting list control group or a CBT group, the latter receiving a six month intervention of psychoeducation, prodrome identification, relapse prevention training, and training in cognitive and behavioural techniques for symptom management (Scott, Garland & Moorhead, 2001). CBT was associated with greater improvements in functioning and greater reductions in depressive than manic symptoms compared to the control group, with fewer relapses and hospitalisations also noted in the CBT group in the eighteen months post-therapy compared to the eighteen months pre-treatment. However, an RCT comparing CBT, incorporating emotive techniques such as imagery, versus ongoing treatment-as-usual (TAU) failed to demonstrate between-group differences in medication adherence, time to relapse, or the number of days experiencing affective symptoms following a six

month CBT intervention (Ball et al., 2006). Whilst there was a trend for the CBT group to have shorter times to depressive relapses than TAU group at post-treatment, this trend disappeared once baseline depressive symptoms were accounted for (Ball et al., 2006). Clinician made assessments of changes in symptom indicated that the CBT group had greater improvements in depressive symptoms and overall bipolar symptoms, with a trend noted for manic symptoms, from the 18 months pre-treatment to 12 months post-treatment. Whilst the level of dysfunctional attitudes and depressive symptoms in the CBT group improved at post-treatment, this difference compared to the TAU group did not remain at follow-up. Although Ball and colleagues' (2006) study demonstrated some changes in symptom severities following CBT, many of the between-group comparisons failed to reach significance, limited by the study's low statistical power.

However, a more recent trial reported that bipolar patients who received a combination of psychoeducation and CBT reported 50% fewer days depressed in the year following therapy, in comparison to a control group who received psychoeducation alone (Zaretsky, Lancee, Miller, Harris & Parikh, 2008). Whilst no group differences in rates of hospitalisation, medication adherence, or psychosocial functioning were noted over the one year follow-up period, participants in the control group received greater increases in antidepressant medication (Zaretsky et al., 2008). The combination of a comprehensive psychoeducation programme and CBT reduced the need for additional antidepressant medication, suggesting that adjunctive CBT and psychoeducation may provide patients with the ability to more effectively self-manage their depressive symptoms without requiring additional psychopharmacological interventions.

The combination of CBT with medication monitoring has also shown promise when used with patients with dual diagnoses of bipolar and substance abuse disorders (Schmitz et al., 2002). Although Schmitz and colleagues failed to detect any changes in substance abuse behaviours following the intervention, improvements were noted in mood symptoms and medication adherence in the CBT group. Similar improvements in medication adherence and reductions in bipolar symptom severity were also observed in a small scale trial of CBT used with bipolar patients who experienced relapses whilst receiving lithium prophylaxis (Fava, Bartolucci, Rafanelli & Mangelli, 2001). CBT has also shown promise when delivered in a group format, with improvements in psychosocial functioning and symptom severity noted in a group of predominantly euthymic bipolar patients (Patelis-Siotis et al., 2001). However, larger scale studies exploring the efficacy of group CBT for bipolar disorder are required. Future studies should also incorporate suitable control comparison groups to allow for meaningful comparisons to be made between outcomes for CBT interventions and treatment-as-usual (Jones, 2004).

Preliminary studies have also explored how mindfulness-based CBT (MBCT), which incorporates traditional CBT techniques with mindfulness-awareness meditation strategies which aim to discourage ruminative thought processes, are associated with symptom alleviation in bipolar disorder. A pilot study of an eight week MBCT intervention noted reductions in depressive symptom severities in both bipolar and unipolar patients, with significant reductions in anxiety severities being noted at post-treatment for the bipolar patients receiving MBCT (Williams et al., 2008). A similar study of MBCT for bipolar patients currently between episodes reported reductions in depressive symptoms and suicidal ideation, with smaller reductions in manic symptoms and anxiety also noted following 8 weeks of MBCT (Miklowitz et al., 2009).

In sum, CBT for bipolar disorder appears to possess promise and is highly acceptable for the majority of patients (Scott et al., 2001). Research has suggested that CBT can be associated with improvements in mood symptoms, psychosocial functioning and medication adherence. There are also benefits to the healthcare system, with a cost-effectiveness study indicating that the use of CBT with bipolar patients may offset costs on other healthcare services (Lam, McCrone, Wright & Kerr, 2005c). However, there are a number of limitations which may restrict the efficacy of CBT for bipolar disorder. In particular, CBT may be limited for use with currently euthymic patients or with those who have recently been diagnosed. Acutely ill patients may be unable or unwilling to commit to CBT, or may require more intensive CBT to deal with challenges associated with current symptoms. In addition, bipolar patients with a “sense of hyper-positive self”, the belief that attributes associated with hypomanic symptoms represent the normal healthy self, respond poorly to CBT, such beliefs may require specifically targeted therapeutic approaches in order to be resolved (Lam et al., 2005a). The failure of Scott and colleagues’ (2006) trial would suggest that acutely ill patients require more intensive interventions than those currently reported in the literature, particularly to deal with complex presentations, comorbid syndromes and current mood difficulties. Alternatively, ongoing support may be required with acutely ill patients over a long-term period.

Interpersonal & Social Rhythm Therapy (IPSRT)

Interpersonal and social rhythm therapy combines therapeutic techniques which aim to improve interpersonal functioning and symptom management, with techniques which aim to improve the regularity of social rhythms and activities. IPSRT is composed of psychoeducation, social rhythm therapy which promotes regular daily activities and the modulation of stimulation through activity scheduling, and interpersonal therapy, which focuses upon the associations between mood symptoms and relationships (Frank, 2005;

Swartz, Frank, Frankel, Novick & Houck, 2009). Although few studies have investigated the efficacy of IPSRT for bipolar disorder.

Frank and colleagues (1997) compared two groups of patients with bipolar I disorder who received either an IPSRT invention or ongoing clinical management of symptoms and medication adherence. Whilst the groups were comparable in the severity of their current symptoms at the end of the interventions, the IPSRT group's social rhythms had stabilised to a greater degree than those patients who received ongoing clinical management (Frank et al., 1997). A second study (Frank et al., 2005) randomised acutely ill bipolar I patients into receiving one of four combinations of IPSRT and clinical maintenance during the acute illness phase and for a two year follow-up period (i.e. acute IPSRT-maintence IPSRT, acute CM-maintence IPSRT, etc.). Whilst no differences were found between the groups for the time taken for the stablisation of affective symptoms, or for the proportion of patients who achieved full remission, those patients who had received IPSRT in the acute phase of illness had longer survival times until their next episode as well as increased social rhythm regularity. The ability to increase the stability and regularity of social rhythms during the acute phase was also associated with the reduced probability of symptom recurrence during the two year follow-up, suggesting that IPSRT has promise in stabilising social rhythms in bipolar individuals who have enrolled in the treatment whilst currently experiencing an acute episode of illness (Frank et al, 2005).

A recent pilot study has indicated that IPSRT may be efficacious in treating depression in patients with bipolar II disorder (Swartz et al., 2009). Although the study was limited by its low statistical power, small sample size and lack of a control comparison group, 41% of patients experienced reductions in depression severities by the twelfth session of IPSRT, with 53% reporting reductions in depression severities and 29% of patients achieving full remission of symptoms by the twentieth IPSRT session (Swartz et al., 2009). Frank and colleagues (1997, 2005) have suggested that IPSRT may be of particular benefit when used with recently acute patients who may have a particular appetite for making considerable lifestyle and social rhythm changes.

Family Therapy

Miklowitz and colleagues (2000) reported one of the first RCTs of family focused therapy for bipolar disorder. Patients who had recently experienced mood episodes were randomised into receiving ongoing clinical management or family focused therapy, the latter consisting of sessions of psychoeducation, interpersonal communication training and problem-solving training with their relatives. Those patients who received family therapy had fewer relapses in the year post-therapy, improvements in depressive symptoms, and

longer times to relapse compared to patients receiving ongoing clinical management (Miklowitz et al., 2000). The family-focused intervention was also associated with improvements in patients whose family members expressed high levels of emotion. High expressed emotion amongst family members is indicative of emotionally over-involved, hostile and overly critical family environments, which is associated with poorer illness outcomes in patients whose families are high in expressed emotion (Honig, Hofman, Hilwig, Noorthoorn & Ponds, 1995). Promising data for the effectiveness of family therapies for bipolar disorder were also reported in a trial in which currently manic bipolar patients were randomised to receive either family focused psychoeducational therapy or individual treatment (Rea et al., 2003). Over a two year follow-up, patients who had received family-focused therapy were less likely to be hospitalised and had experienced fewer relapses than those who had received individual treatment, which included psychoeducation, symptom management and problem solving training (Rea et al., 2003).

Summary of therapies for Bipolar Disorder

Although the research literature exploring the efficacy of psychological interventions for bipolar disorder is still relatively new, there is promise in the use of psychotherapeutic interventions with bipolar individuals. Whilst it would appear that there exist many disparate psychological therapeutic approaches for bipolar disorder, there is a considerable amount of overlap in the content of these interventions. Most therapeutic approaches incorporate psychoeducation, with focuses in later stages upon relapse prevention, training in prodrome identification, effective problem-solving, improving interpersonal relationships, with the importance of maintaining regular daily activities, social rhythms and regular sleep routines also stressed to the patient.

Due to the infancy of the research literature investigating the effectiveness of psychological interventions for bipolar disorder, it is not currently possible to specify whether one intervention is more effective than another in improving illness outcomes for patients (Zaretsky, 2003; Beynon, Soares-Weiser, Woolacott, Duffy & Geddes, 2008). Although more studies are being conducted and published, Jones (2004) has previously highlighted that many therapeutic trials for bipolar disorder have been statistically underpowered, due to poor experimental designs, and have often lacked a clear theoretical basis. There is a growing consensus that the efficacy of psychotherapy for bipolar disorder is largely dependent on the patient's current state, with more intensive forms of CBT, including focuses on reducing and managing current symptoms, thought to be necessary for use with currently unwell patients and with patients with severe forms of the bipolar disorder than the therapies currently available (Rizvi & Zaretsky, 2007).

1.1.5 *Illness Courses & Outcomes for Bipolar Disorder*

Relapse

Bipolar Disorder is notably associated with high rates of relapse, with recurrences of affective symptoms being considerably more impairing in comparison to symptom recurrences in unipolar depression (Goldberg, Harrow & Grossman, 1995). As many as one third of bipolar patients experience relapses despite continued adherence to mood stabiliser medication (Solomon, Keitner, Miller, Shea & Keller, 1995). However, a prospective study observed higher rates of relapse in lithium-medicated bipolar patients, with 50% of patients found to relapse within two years of their first remission from symptoms, whilst 73% of patients relapsed within five years (Gitlin et al., 1995). In comparison, some studies have observed that adherence to medication, including lithium and other mood stabilisers, is associated with lower rates of relapse and improved illness outcomes (Maj et al., 1998). Many psychological therapies for bipolar disorder have been associated with reduced rates of relapse and improved illness outcomes, following the results of randomised controlled trials of interpersonal and social-rhythm therapy, CBT, and psychoeducation (Frank et al., 2005; Lam, Hayward, Watkins, Wright & Sham, 2005b; Colom et al., 2009b). It has been estimated that around 90% of patients may experience full syndromal recovery from bipolar disorder, where they no longer satisfy the DSM criteria for bipolar mood episodes (Huxley & Baldessarini, 2007).

Management of Bipolar Disorder

A growing number of individuals with bipolar disorder choose to self-manage their condition. Although, many psychological therapies for bipolar disorder are collaborative in nature and allow for the patient to take an active role in their treatment (Scott, 2001). Individuals with bipolar disorder often try a wide range of methods when attempting to self-manage their condition. An interview study reported that bipolar individuals identified that accepting their diagnosis, gaining adequate sleep, managing stress, being prescribed suitable medication, and being mindful of their illness during day-to-day activities and of potential triggers and early warning signs were strategies that assisted in their management of bipolar disorder (Russell & Browne, 2005). A recent web-based survey reported that bipolar individuals rated that avoiding dangerous activities (e.g., drinking too much alcohol), taking medication as directed, and acting as an advocate for other bipolar individuals as being the three most helpful activities in successfully managing their condition (Depp et al., 2009). These studies suggest that the effective self-management of bipolar disorder is dependent on the individual determining which are the most effective strategies for managing their own condition (Russell & Browne, 2005; Depp et al., 2009).

Positive Experiences in Bipolar Disorder

Research has traditionally focused upon the psychopathological nature of bipolar mood disorders without necessarily considering the positive experiences and potential benefits that an individual with bipolar disorder may experience. Common experiences of many bipolar individuals include feelings of increased creativity, energy, inspiration, goal-focus and concentration (Galvez, Thommi & Ghaemi, 2011), particularly during the experience of hypomanic mood states (Murray & Johnson, 2010). Indeed, hypomanic episodes have been associated with elevated scores on assessments of global functioning in patients with bipolar II disorder (Benazzi, 2004). In comparison to other mental health conditions, individuals with bipolar disorder often have high levels of educational attainment, including achieving university degrees and postgraduate qualifications, and can maintain employment, albeit during periods of euthymia (Depp et al., 2009).

Mortality & Suicide

Although the symptoms of bipolar disorder can be managed through medication regimes, psychological therapies and self-management strategies, bipolar disorder can still be highly associated with high levels of suicidal ideation and with the engagement in non-lethal and lethal suicide behaviours. Indeed, studies comparing the lifetime rate of attempted suicide have indicated that bipolar disorder is associated with higher suicide risk compared to other mental illnesses, including major depression (Chen & Dilsaver, 1996; Lam et al., 1999; Newman, 2005). Estimates of the lifetime prevalence of suicide attempts in bipolar disorder have been as high as 50% (Goodwin & Jamison, 1990), whilst more conservative estimates have placed the risk of attempted suicide at 15% (Simpson & Jamison, 1999).

A variety of risk-factors for suicide in bipolar patients have been highlighted, with feelings of hopelessness and histories of previous suicide attempts appearing to be significant predictors of suicide in bipolar disorder (Hawton, Sutton, Haw, Sinclair & Harriss, 2005). Meta-analyses have also suggested that non-lethal suicide behaviours, such as self-harm, can be predicted by family histories of suicide, an early onset of symptoms, the severity of depressive symptoms, rapid-cycling disorders, experiences of mixed affective episodes, the presence of comorbid anxiety disorders, and alcohol and drug abuse (Tondo et al., 1998; Dalton, Cate-Carter, Mundo, Parikh & Kennedy, 2003; Simon et al., 2004; Hawton et al., 2005). From a therapeutic perspective, reductions in suicidal behaviour and ideation have been noted in bipolar patients receiving lithium medication (Tondo et al., 1998), and mindfulness-based cognitive therapy (Miklowitz et al., 2009).

Section 1.2

Literature Review:

Psychological Theoretical Models of Bipolar Disorder

This section will present an overview of the major psychological theoretical frameworks of Bipolar Disorder, with communalities between and limitations across these theories discussed.

1.2.1 *Behavioural Activation, Inhibition & Dysregulation*

The behavioural activation and inhibition systems are two motivational systems which have been developed from a neuropsychological perspective (Gray, 1987, 1990). The behavioural activation system (BAS) is sensitive to signals of reward, and is associated with positive affectivity, approach and engagement behaviours. The behavioural inhibition system (BIS) is responsive to aversive stimuli, signals of threat and non-reward, and is associated with negative affect and with inhibitions in behavioural responses to stimuli, such as avoidance behaviours. The dysregulation of the behavioural activation system is considered to play an important role in bipolar disorder, across both manic and depressive states (Depue & Iacono, 1989). Over-activation of the BAS is implicated in manic symptomatology, whilst BAS under-activation and elevated BIS activity is associated with depression (Urošević, Abramson, Harmon-Jones & Alloy, 2008).

Studies have used the BIS/BAS questionnaires to explore the self-reported sensitivity of these motivational systems in bipolar patients and in at-risk individuals (Carver & White, 1994). BAS activity is captured by three subscales assessing drive, the engagement in fun seeking behaviours and reward responsivity, with a single subscale measuring behavioural inhibition (BIS). A number of analogue studies have observed that the behavioural risk for hypomania is associated with increased BAS sensitivity (Johnson & Carver, 2006; Jones, Shams & Liversidge, 2007; Jones & Day, 2008; Applegate, El-Deredy & Bentall, 2009), although some studies have failed to observe significant correlations between hypomania risk and reward responsivity (Fulford, Johnson & Carver, 2008; Carver & Johnson, 2009). Some studies have reported either negative or no significant correlations between hypomania-risk and BIS (Meyer, Beevers, Johnson & Simmons, 2007; Applegate et al., 2009), supporting the hypothesis that it is the BAS system which is implicated in bipolar disorder and the risk for hypomania.

Mansell and colleagues (2008) noted that all three BAS measures, not BIS, correlated with a history of hypomanic symptoms in an analogue sample, but this association was not significant when accounting for the presence of dysfunctional self-

appraisals (Mansell, Rigby, Tai & Lowe, 2008). Elevated BAS sensitivity has also been associated with elevated manic symptoms amongst at-risk individuals for bipolar disorder (Meyer, Johnson & Carver, 1999). The associations between BAS sensitivity and current manic symptoms were also observed in a bipolar sample, where BIS scores were negatively associated with mania (Van der Gucht, Morriss, Lancaster, Kinderman & Bentall, 2009). BAS sensitivity has also predicted the intensification of manic symptoms over 24 months in individuals diagnosed with bipolar I disorder (Meyer, Johnson & Winters, 2001). Lower BAS and higher BIS levels have been reported by patients with major depressive disorder, with lower BAS sensitivities associated with greater severities of depressive symptoms and with poorer illness outcomes at 8 months (Kasch, Rottenberg, Arnow & Gotlib, 2002). In students prone to mood disorders, high BIS has been associated with more severe depression symptoms (Meyer et al., 1999; Meyer et al., 2007), with lifetime histories of depressive symptoms (Carver & Johnson, 2009), and proneness to future depression (Alloy et al., 2006).

Holzwarth & Meyer (2006) extended the BIS/BAS scales to incorporate a self-report measure of BAS dysregulation, and noted a trend for elevated scores on the BAS Dysregulation scale in a group of bipolar-prone individuals compared to controls. Interestingly, whilst an analogue study reported that none of the BAS or BIS scales predicted mood symptoms at a 3 month follow-up, scores on the BAS Dysregulation measure did predict the severity of prospective depressive symptoms (Dodd, Mansell, Sadhnani, Morrison & Tai, 2010).

As the heightened sensitivity of the BAS system is considered to predispose individuals to bipolar disorder, Alloy and colleagues (2006) screened students into high and moderate groups according to scores on the BAS scales and then explored the prevalence of lifetime bipolar spectrum disorders between these groups. Participants in the high BAS group were significantly more likely to have had a lifetime bipolar spectrum illness than the moderate BAS group. The high BAS group also scored higher on measures of impulsivity and proneness to future hypomanic symptoms, supporting the hypothesis that over-sensitivity of the BAS system is a risk factor for clinically significant levels of bipolar disorders (Alloy et al., 2006).

In sum, evidence suggests that the dysregulation of the behavioural activation system is associated with fluctuations of mood in bipolar disorder, and in conferring the vulnerability to mood disorders in at-risk individuals. Whilst the theory refers to behavioural inhibition and activation systems, research suggests that it is the sensitivity or dysregulation of the BAS which is implicated in bipolar disorder (Alloy et al., 2006). Elevated BAS sensitivity has been associated with the severity of manic symptoms, with

the vulnerability to bipolar disorder in at-risk individuals, whilst lower BAS activation have been implicated in lowered affective states and depression.

There is also some evidence to suggest that the BAS system influences cognitive processes, with elevated BAS sensitivity associated with higher expectancies of positive events occurring and with a greater reported frequency of previously experienced positive events (Beevers & Meyer, 2002). Interestingly, BIS was not associated with the recall of negative events or with the anticipation of future negative events. Beevers and Meyer (2002) also noted that a lack of positive experiences and expectancies about the future mediated the relationship between low BAS sensitivity and depressive symptoms. Although Beevers and Meyer only assessed the past experience of positive events on a simple questionnaire scale, their findings could suggest that the level of BAS activation determines the availability of past events during recall, which influences the relationship between BAS activation and affective symptoms.

Alloy and colleagues (2009) identified a number of cognitive styles relevant to the nature of the behavioural activation system. These cognitive styles included dimensions relating to performance evaluation, autonomy and self-criticism, and were observed to differentiate individuals with bipolar disorder and demographically matched control participants. These BAS-relevant cognitive processes were also predictive of the likelihood of the onset of bipolar affective episodes over a 3 year follow-up period (Alloy et al., 2009). Bipolar individuals with higher autonomy scores were less likely to develop major depressive episodes than those with lower autonomy scores, whilst higher scores on measures of autonomy and self-criticism predicted the onset of hypomanic and manic episodes when controlling for current and past bipolar symptoms (Alloy et al., 2009). One explanation for the association between BAS and its effects upon cognitive processes is that increased BAS activity may activate positive self-schemas. Increases in goal-directed behaviours and elevated expectancies for the future following BAS activation may be mediated by a positive self-worth schema, which when activated directs behaviour and cognitive processes into maintaining positive mood states. The Schematic Propositional Analogical and Associative Representation Systems (SPAARS) model, discussed later in this chapter, provides a potential pathway for this, where physiological and behavioural activation may be appraised in a positive manner which activates positive self-schematic models leading to approach behaviours and the maintenance of positive moods.

Whilst the BAS account provides an explanation for the occurrence of manic and depressive symptoms, it is currently unclear how other symptomatic traits of bipolar disorder, such as psychosis, result from BAS activity and/or dysregulation. The BAS literature is also reliant upon the self-reported sensitivity of the BAS and BIS systems

according to scores on a widely used questionnaire measure, which may be subject to biases in introspective reporting compared to objective measures. Although, a small literature has suggested that there exist specific neurobiological pathways relating to BAS and approach motivation (e.g., Harmon-Jones & Allen, 1997).

1.2.2 *The Depression Avoidance Hypothesis*

Abraham's (1911) hypothesis that the development of manic and hypomanic states serves as a defence mechanism against depressive cognitions has been revived in a theory now commonly referred to as "Depression Avoidance". In a cognitive reformulation of the manic defence hypothesis, Neale (1988) proposed that a combination of unstable self-esteem and the setting of unachievable or unrealistic goals contribute to a predisposition to bipolar disorder in vulnerable individuals. Threats to the individual's labile self-esteem, such as the recall of memories for negative life events, lead to the endorsement of grandiose thoughts and appraisals about the self in the attempt to reduce the impact of negative cognitions, to keep unpleasant thoughts out of consciousness (Neale, 1988). Indeed, high prevalences of grandiose delusions have been noted in bipolar disorder (Keck et al., 2003), particularly in currently manic patients (Goodwin & Jamison, 1990). Ascents in mood, potentially leading to manic states, result from the endorsement of these negative appraisals and grandiose thoughts about the self, with mania serving a somewhat dysfunctional protective function from undesirable and unpleasant cognitions.

Empirical support for the depression avoidance theory has been provided by studies exploring self-esteem lability, cognitive style and attributional style in bipolar disorder, where similar cognitive processes appear to underlie mania and bipolar depression. Discrepancies between implicit and explicit measures of self-esteem have been reported by Winters & Neale (1985), with higher self-reported (explicit) self-esteem noted in remitted bipolar individuals compared to remitted unipolar patients. However, on an implicit attributional style measure, the Pragmatic Inference Task (PIT), bipolar individuals made more internal attributions for failure scenarios, mirroring performances by remitted unipolar patients (Winters & Neale, 1985). Interestingly, the bipolar participants also scored higher on measures of social desirability and self-deception, suggesting that the bipolar patients were masking their underlying low self-esteem. Winters and Neale (1985) suggested that these findings may reflect a low self-worth schema in bipolar patients, which is concealed by the external appearance of elevated self-esteem.

While a seven day diary study noted comparable mean levels of self-esteem in healthy controls and remitted bipolar patients, bipolar participants reported more elevated and fluctuating self esteem compared to a group of remitted unipolar patients (Knowles et

al., 2007). Remitted bipolar patients also reported more extreme fluctuations in both positive and negative affect, but demonstrated a negative attributional style on the PIT in a similar manner as the unipolar patients, making more internal attributions for negative than positive events (Knowles et al., 2007). Again, a discrepancy between explicit high self-esteem and a pattern of negative attitudes towards the self on an implicit measure was reported in bipolar individuals, supporting the theory that bipolar disorder is associated with an underlying negative self-schema, which may be concealed by transient levels of elevated self-esteem. Scott and Pope (2003) also reported elevated levels of both positive and negative self-esteem in hypomanic bipolar patients in comparison to depressed-bipolar, remitted-bipolar, and remitted-unipolar patients. Greater variability of self-esteem in currently manic, depressed and euthymic bipolar patients compared to non-bipolar controls has also been reported by Van der Gucht and colleagues (2009), in a replication of the diary procedure used by Knowles et al. (2007). Increased lability of self-esteem and the use of abnormal affect regulatory strategies have also been reported in children of bipolar parents, a vulnerable population for bipolar illnesses (Jones et al., 2006b).

A later study comparing currently-manic, currently-depressed bipolar individuals with healthy controls, reported that manic participants attributed more positive events to internal factors and more negative events to external factors on an explicit self-report measure (the Attributional Style Questionnaire), but performed in the opposite direction on the implicit PIT, making more depressive and pessimistic attributions (Lyon, Startup & Bentall, 1999). Manic participants also attributed more positive than negative words as true of themselves, but recalled more negative words during a memory recall task, and demonstrated slowed colour naming for negative words on the Stroop Task (Lyon et al., 1999). Slower colour naming on the Stroop task has also been noted in individuals at a behavioural risk for mania, with hypomanic personality traits associated with the slower naming of depressive-related compared to euphoria-related words (Bentall & Thompson, 1990; French, Richards & Scholfield, 1996). This interference for depression-related stimuli on the Stroop task may reflect a selective attention bias means of coping with depressive tendencies in hypomanic personality (French et al., 1996). However, some studies have failed to observe differences in colour naming latencies for positive and negative stimuli on the Stroop task between bipolar and unipolar patients (Kerr, Scott & Phillips, 2005), and between bipolar patients and non-bipolar controls (Lex, Meyer, Marquart & Thau, 2008). There has also been mixed support for the presence of negative attributional styles in bipolar disorder. Van der Gucht and colleagues (2009) failed to find differences in negative attributional styles when using the PIT with manic, depressed and remitted bipolar individuals, and healthy controls.

A key strength of the depression avoidance hypothesis is that it provides an explanation for why mania can be preceded by depressed states in bipolar individuals, as well as for the presence of underlying dysphoria in manic and euthymic states (Bentall, Tai & Knowles, 2006). The depression avoidance hypothesis also provides a reasonable explanation for the sensitivity towards self-negative information by bipolar individuals and at-risk individuals, despite these individuals appearing to be in positive moods and hypo/manic states. Depression avoidance is somewhat complimentary with other psychological approaches, particularly the response styles literature, where research has suggested that hypomania and mania may be associated with dysfunctional attempts to cope with depressed mood states and cognitions (Thomas & Bentall, 2002) (see "Response Styles Theory" section 1.2.3 below). As such, the depression avoidance hypothesis is seen to comprise two propositions: that mania vulnerability is associated with depressogenic psychological processes, and that mania arises from dysfunctional attempts to avoid negative emotions and cognitions (Thomas, Knowles, Tai & Bentall, 2007). Mania may also act as a mask or a pleasant distraction away from current depressive feelings, although bipolar individuals may require ever more extreme forms of distraction to avoid experiencing more intense depressive feelings. Hence the observation that mania is often associated with gambling activities and risky behaviours (Thomas et al., 2007).

1.2.3 *Response Styles Theory*

Nolen-Hoeksema first proposed that gender differences in the prevalence of depression could be explained by differences in how males and females respond to the experience of negative emotions and depressive symptoms (Nolen-Hoeksema, 1991). These response styles included rumination, a repetitive passive focus on the causes and consequence of one's current emotional state and circumstances, and distraction, where attention is focused away from current depressive symptoms onto more pleasant or neutral thoughts about the self in order to avoid unpleasant emotional states (Nolen-Hoeksema & Morrow, 1993). Nolen-Hoeksema (1991) suggested that the observable gender differences in the prevalence of unipolar depression related to a tendency for women to ruminate whilst men tend to reduce their negative mood state through distraction. Research conducted in dysphoric individuals has observed that inducing ruminative cognitive styles is associated with exacerbations in depressive mood states, whilst reductions in depression were associated with distracting attention away from thinking about the self and current mood states (Nolen-Hoeksema & Morrow, 1993).

Treynor and colleagues (2003) provided a refinement to the Response Styles Theory, where different subtypes of negative ruminative cognitive styles emerged in a

factor analysis of the Ruminative Responses Scale (Nolen-Hoeksema & Morrow, 1991), a self-report measure of rumination originally derived from Nolen-Hoeksema's Response Style Questionnaire. These subtypes included: brooding, a maladaptive focus upon the discrepancy between one's current self and unachieved goals; reflection, a more adaptive focus upon improving one's current depressed state through cognitive problem-solving; and depression-focused rumination, a ruminative focus on current depressive symptoms (Treynor, Gonzalez & Nolen-Hoeksema, 2003). Tendencies to engage in brooding have since been associated with exacerbations in negative moods and depressed states across non-clinical samples (Treynor et al., 2003; Burwell & Shirk, 2007) and samples of clinically depressed patients (Bagby & Parker, 2001; Lo, Ho & Hollon, 2008). Suicidal individuals also appear to readily engage in brooding than reflective responses to negative experiences (Crane, Barnhofer & Williams, 2007a), whilst brooding has been associated with suicidal ideation (Miranda & Nolen-Hoeksema, 2007).

A small number of studies have explored the role of negative forms of ruminative cognitive styles in bipolar disorder, and in individuals who are considered to be at an elevated behavioural risk for hypomania. Hypomanic personality traits, a known vulnerability factor for bipolar disorder (Eckblad & Chapman, 1986; Kwapil et al., 2000), have been associated with elevated rumination, as well as distraction, and the engagement in dangerous activities in response to negative mood states (Thomas & Bentall, 2002). Knowles and colleagues (2005) reported that hypomanic personality traits were more strongly associated with rumination and engaging in risky activities than engaging in distraction and problem-solving in response to depressed mood states (Knowles, Tai, Christensen & Bentall, 2005).

In individuals with diagnoses of bipolar disorder, higher self-reported rumination scores have been observed in remitted patients compared to currently depressed and manic individuals (Thomas et al., 2007). Currently manic patients also reported greater use of risk-taking and active-coping in response to depression compared to remitted and depressed patients (Thomas et al., 2007). However, Van der Gucht and colleagues (2009) reported higher self-reported rumination in a group of currently depressed bipolar patients in comparison to currently manic and euthymic patients. Both studies reported more extreme self-reported rumination in remitted bipolar patients compared to control groups of healthy, non-bipolar individuals. Ruminative cognitive styles may form part of the cognitive vulnerability to relapse in bipolar disorder, particularly as rumination appears to be prevalent during remission from symptoms.

There has also been a recent focus upon the potential role of positive forms of rumination and their potential relationship with mania and the vulnerability to bipolar

disorder. It has been suggested that individuals may engage in positive forms of rumination in order to maintain or bolster positive emotional states (Feldman, Joormann & Johnson, 2008). To assess positive forms of rumination Feldman and colleagues devised the Responses to Positive Affect scale (RPA) as a counterpart to the Ruminative Responses Scale (Feldman et al., 2008). The RPA has a three factor structure capturing three distinct responses to positive emotional states, including: emotion-focused positive rumination, the focus upon amplifying positive moods; self-focused rumination upon the self and the pursuit of goals; and dampening, encompassing attempts to reduce the intensity of positive emotional states (Feldman et al., 2008).

The RPA has so far demonstrated good reliability as a measure of positive rumination, and has demonstrated good convergent validity with the expected associations being observed with depressive and manic symptoms, negative rumination, mania vulnerability, and in samples of bipolar and unipolar patients (Feldman et al., 2008; Johnson, McKenzie & McMurrich, 2008a; Johnson & Jones, 2009). Hypomanic personality traits have been positively associated with tendencies to engage in emotion-focused and self-focused positive rumination, and to a lesser extent dampening responses to positive affect, in undergraduate samples (Carver & Johnson, 2009). In the same study, only dampening was associated with lifetime histories of depressive symptoms (Carver & Johnson, 2009). Elevated tendencies to dampen positive affect in individuals with hypomanic personalities have been reported elsewhere, and have been suggested to reflect a need to regulate heightened positive emotions and restrict over-responding to positive affect (Johnson & Jones, 2009). In terms of clinical studies, individuals with bipolar disorder and major depressive disorder have been observed to report elevated ruminative tendencies in response to negative mood states, but only the engagement in positive rumination has been associated with bipolar disorder (Johnson et al., 2008a).

There is growing convergence in the research literature regarding the role of response styles in the bipolar disorder spectrum, with positive forms of rumination seeming to be important in the vulnerability to hypomania in at-risk individuals. However, it is currently unclear how positive and negative forms of rumination interact over longer periods of time in terms of the development and changes in affective symptoms. There has also been a lack of research exploring how the different subtypes of negative rumination as suggested by Treynor and colleagues' (2003) factor analysis are associated with affective symptoms and mood disorders.

1.2.4 *The Beckian Cognitive Models*

Dysfunctional attitudes form a key component of Beck's cognitive models for depression and for mania, and are thought to underlie the cognitive vulnerability to mood disorders. Beck's depression model proposes that dysfunctional self-schemas are formed following childhood experiences, with depression associated with a negative cognition triad of the self, the world and the future (Beck, 1976). These schematic models revolve around personal themes such as the desire to be successful or a need for approval, and become activated during later life following stressful experiences and life events relating to the schema's thematic content. Schemas serve to direct thinking styles, including negative automatic thoughts, and behaviour patterns, leading to the onset of depressed mood states (Beck, 1976). Currently held dysfunctional attitudes reflect the thematic content of these schematic models, with attitudes relating to needs for perfectionism, dependency and approval from others being associated with the vulnerability to mood disorders. It has been argued that these self-schemas may act in a bidirectional manner in bipolar disorder, where a schema's thematic content (e.g., a need to be successful) may change polarity depending on the individual's current mood state and the experience of recent life events (e.g., from "I'm very/extremely successful" to "I'm a failure") (Newman, Leahy, Beck, Reilly-Harrington & Gyulai, 2002). Beck's model suggested that mania is the opposite of depression, and features a positive cognitive triad of the self, world and future (Newman et al., 2002). However, it was unclear from this model whether dysfunctional attitudes underlying bipolar disorder were similar to those underlying unipolar depression.

The Dysfunctional Attitudes Scale (DAS) was developed as a self-report measure of negative attitudes and maladaptive beliefs relating to the negative cognitive triad described in Beck's cognitive model of depression (Weissman & Beck, 1978). A number of studies have explored the similarity of dysfunctional attitudes in bipolar disorder and unipolar depression to determine whether the same cognitive vulnerability is shared across the disorders. Higher DAS scores have been observed in euthymic bipolar patients compared to non-bipolar control participants, with higher scores noted on the Perfectionism and Need for Approval subscales (Scott, Stanton, Garland & Ferrier, 2000). Whilst Scott and Pope (2003) found no differences in dysfunctional attitudes between unipolar and bipolar patients, currently hypomanic bipolar patients reported higher levels of dysfunctional beliefs than euthymic bipolar patients, but lower levels than depressed bipolar patients. This pattern was reversed for self-reported self-esteem, with the remitted bipolar patients reporting the highest self-esteem, depressed bipolar patients the lowest, and hypomanic patients reporting levels between the two groups. Goldberg and colleagues (2008) observed that remitted bipolar patients reported less extreme scores on the DAS

than unipolar depressed patients, but more extreme scores than healthy controls (Goldberg, Gerstein, Wenze, Welker & Beck, 2008). However, a recent study reported similar levels of dysfunctional attitudes across bipolar and unipolar patients (Jones, Twiss & Anderson, 2009). Two studies conducted in analogue samples have failed to observe associations between hypomanic personality traits and dysfunctional attitudes (Jones et al., 2007; Jones & Day, 2008), whilst a separate study noted a small positive correlation between hypomanic personality and the DAS (Jones, Mansell & Waller, 2006a). However, Jones and Day (2008) did note positive correlations between positive and negative forms of self-appraisals with dysfunctional attitudes.

As the original subscales of the DAS were based upon data collected in unipolar patients, Lam et al (2004) assessed the factor structure of the 24-item DAS scale in a bipolar sample. Three factors representing "Goal-attainment", "Dependency", and "Achievement" were identified, but Lam and colleagues failed to observe differences in DAS scores between bipolar and unipolar patients. However, when patients who were likely to be in a depressive episode were excluded from the analyses, the bipolar patients scored significantly higher on the Goal-attainment subscale than the unipolar patients. This goal-attainment component reflected attitudes regarding striving to attain positive emotional states, control over emotions, possessing the ability to excel at any task, and being able to solve problems without requiring much effort (Lam, Wright & Smith, 2004). Higher scores on the subscales of the DAS-24 have been reported in euthymic bipolar patients, particularly for the dependency and achievement subscales, compared to non-bipolar controls (Lomax, Barnard & Lam, 2009).

At least one study has failed to observe significant differences in DAS scores between bipolar and control participants (Lex et al., 2008). However, the lack of between-group differences in that study may be due to the remitted bipolar patients being largely free of residual depressive symptoms (Lex et al., 2008). That said, an earlier study reported more extreme DAS scores in remitted bipolar patients compared to non-bipolar controls, and observed that a majority of the bipolar participants had elevated levels of residual depressive symptoms despite being rated by clinicians as euthymic (Scott et al., 2000). Jones and colleagues (2005) also noted higher DAS scores in remitted unipolar patients compared to bipolar and control participants, but this difference was non-significant once current depressive symptoms were accounted for (Jones et al., 2005a). During remission, activation of underlying self-schemas and beliefs through exacerbations in depressive moods may be required in order for dysfunctional attitudes to become more readily accessible. Although some studies suggest that similar levels of dysfunctional attitudes are prevalent in bipolar disorder and unipolar depression, implying that the cognitive

vulnerability to future relapses may share similar markers in relation to dysfunctional attitudes about the self. However, one study indicated that the induction of either a negative or positive mood state was associated with little change in DAS scores in remitted bipolar patients, suggesting that dysfunctional attitudes may be more stable and trait-like in bipolar disorder (Wright, Lam & Newsom-Davis, 2005).

The presence of dysfunctional attitudes is often assessed as a measure of the vulnerability to relapse and consequently forms a target for many cognitive behavioural therapies for bipolar disorder. Although an early trial of CBT for bipolar depression failed to observe improvements in dysfunctional attitudes at the end of therapy (Zaretsky, Segal & Gemar, 1999), a recent study reported improvements following six months of CBT (Ball et al., 2006). However, this improvement was not maintained at a later 18 month follow-up. Dysfunctional attitudes relating to a sense of a "Hyper-Positive Self" in bipolar individuals have been associated with poorer responses to CBT (Lam, Wright & Sham, 2005). Goal-attainment scores on the DAS were also observed to make significant contributions to the severity of scores on the "Sense of Hyper-Positive Self" measure devised by Lam and colleagues (2005), supporting the notion that overly positive beliefs about the self are associated with cognitions relating to extreme goal-attainment.

The dysfunctional attitudes literature is limited by the use of different versions of the DAS across different population of patients. Whilst Lam et al.'s (2004) factor analysis identified specific forms of dysfunctional attitudes associated with bipolar disorder; many studies conducted in bipolar samples have not used their refinement of the DAS scale (e.g., Lex et al., 2008). The use of the DAS scale also assumes that participants have the prerequisite insight into their own beliefs and that participants are being truthful when completing the scale (Mansell & Scott, 2006). A recent study using a sentence completion task as an indirect measure of dysfunctional attitudes observed that currently manic, depressed and remitted bipolar patients produced significantly more positive responses on the completion task than healthy controls (Thomas, Bentall, Knowles & Tai, 2009). The authors suggested that the high frequency of positive responses may reflect an underlying negative self-schema, and may reflect depression avoidance. However, this study did not use an established dysfunctional attitudes measure to assess how responses on the sentence completion task represent dysfunctional attitudes. Further research is required to determine whether endorsement of dysfunctional attitudes can be successfully captured by indirect tasks such as the sentence completion procedure.

1.2.5 *The Appraisal of Internal States*

The instability hypothesis proposed by Goodwin and Jamieson (1990) proposed that a vulnerability to disruptions in circadian rhythm activity is fundamental to the development and experience of bipolar disorder. Circadian rhythms are patterns of physiological processes which occur over 24-hour periods and are maintained by physical (e.g., day-night cycles) and psychological (e.g., social and behavioural) zeitgebers, external cues which synchronise the internal clock of the individual in relation to the environment (Jones, 2001). Both disturbances in sleep and activity levels are a prominent feature of bipolar disorder (Harvey et al., 2005; Jones et al., 2005b), and are symptomatic of bipolar depression and mania (APA, 2000), and have also been noted in at-risk groups including individuals with hypomanic personality traits (Meyer & Maier, 2006; Ankers & Jones, 2009), and in children of bipolar parents (Jones et al., 2006b).

Jones (2001) proposed a new model of bipolar disorder which combined the instability hypothesis for circadian rhythms with Healy and Williams' (1989) proposition that changes in circadian rhythms are subjected to cognitive distortions, with such changes being attributed to personal rather than situational factors. In addition, Jones incorporated a multi-level structure of emotion based upon the Schematic Propositional Analogical and Associative Representation Systems model (SPAARS; Power & Dalgleish, 1997) to allow for more complex interactions between cognitive and emotional processes, and to better account for the presence of mixed states in bipolar disorder (Jones, 2001). Beck's cognitive models of mania and depression have previously struggled to account for mixed states and more complex cognitive-emotional interactions, despite the potential for complex patterns of emotion to occur in bipolar individuals (Jones, 2001; 2006). The SPAARS model describes two routes to the production of emotion from cognition, an associative route and a route involving the schematic appraisal of propositional cognitions.

In the SPAARS model (see Figure 1.2.1), external stimuli are initially processed through an analogical system which processes information from across a number of sensory-specific systems, including systems specific to olfactory, auditory, visual, tactile, and proprioceptive information. The analogical system processes information from across these sensory modalities into an implicit representation, which does not require a linguistic representation for meaning. The propositional level is the intermediate level of semantic representation in the SPAARS model and incorporates abstract language-based models, which are explicit and discrete in nature. The schematic model level is the highest level of representation which integrates information from the other processing systems into a more complex level of knowledge beyond simple propositional concepts (Power & Dalgleish, 1997). Schemas can be changeable and flexible depending on the content of the

information entering the system. The associative level allows for the experience of emotion without the influence of the schemas contained in the higher-order schematic model level. Associations are produced between frequently occurring events and their schematic interpretations and subsequent emotional states, meaning that in future schematic interpretation is no longer required. The SPAARS framework allows for two levels of emotion generation, at the associative and schematic model levels, and provides a mechanism for the production of multiple and conflicting emotions. The propositional level cannot directly elicit emotional states, but cognitions in the propositional level are mediated by appraisals from the schematic models.

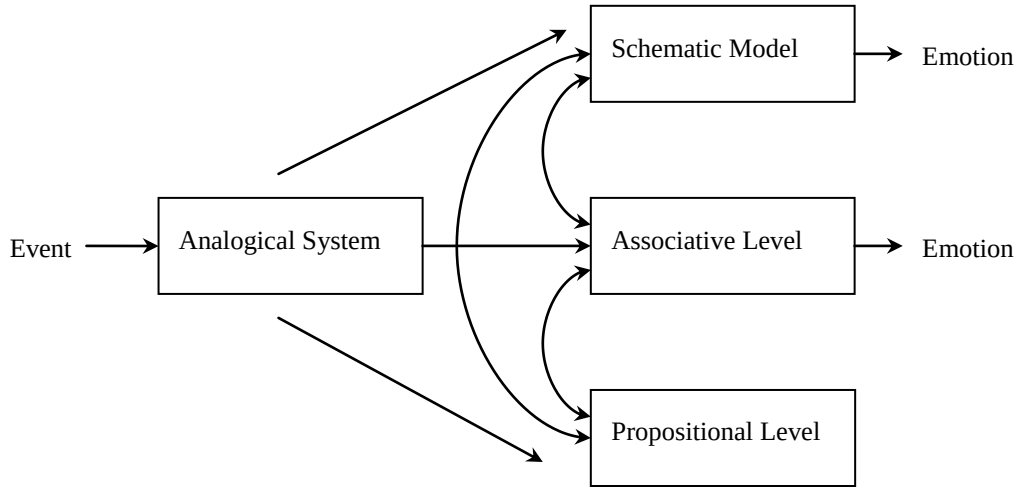


Figure 1.2.1 The Schematic Propositional Analogical and Associative Representation Systems framework

In relation to mania, Jones (2001) suggests that the experience of life events exert effects on the analogical system, resulting in disruptions to circadian rhythms which lead to physiological and cognitive changes indicating increased energy and alertness. These changes are subjected to an internal attribution bias leading to positive propositional cognitions, specifically of positive self-appraisals relating to the changes in the analogical system (e.g., “I am full of energy and ready to take on the world”, Jones, 2001). The propositional appraisals are integrated at the schematic model level with information from other levels to produce positively biased self-schemas, which influence future behaviour patterns. A schema describing the self in an overly-positive manner facilitates the experience of more intense positive emotional states and behaviours which further exacerbate such feelings. Jones (2001) implicates disturbances in circadian rhythms and the production of internal schematic appraisals and attributions in the exacerbation of

mood states and in directing behaviour patterns, such as increased drive, sleep loss, and risk-taking, which cause further circadian rhythm disruption in a feedback loop. Indeed, social rhythm disrupting life events have been associated with the onset of manic, but not depressive episodes in bipolar patients, providing partial support for Jones' model of mania (Malkoff-Schwartz et al., 1998).

Similar processes are thought to underlie depression in bipolar disorder. Jones (2001) suggested that the severity of the circadian rhythm disturbance noted by the analogical system may play a significant role in determining whether mania or depression result from the appraisal process. An event which prompts analogical indications of fatigue and reduced physical and cognitive activity is appraised at the propositional level in a self-negative manner (e.g., "it is because of my personal faults that I feel this tired"). At the schematic model level, a combination of the analogical input of tiredness with a self-negative schema, which could describe the self as defective and that the future outlook is hopeless, is associated with avoidance and withdrawal behaviours leading to exacerbations in negative mood states. Following repeated pairings of the analogical sensations of fatigue with negative appraisals and withdrawal behaviours, the associative route to depression becomes reinforced and more prominently activated. Jones (2001) suggested that depression via the associative route of emotion becomes increasingly experienced as "coming out of the blue", contributing to feelings of helplessness.

To capture the internal attributions as implicated in his model, Jones and colleagues devised a self-report measure of positive self-dispositional appraisals known as the Hypomania Interpretations Questionnaire (HIQ: Jones, Mansell & Waller, 2006). The HIQ asks participants to provide ratings for a number of hypomania-relevant experiences in relation to an overly-positive appraisal, or a normalising appraisal. In the original development and validation of the HIQ, Jones and colleagues (2006) noted that scores on the hypomanic appraisals measure of the HIQ, and, to a lesser extent, dysfunctional attitudes, independently predicted scores on the hypomanic personality scale in an at-risk sample. This association between positive self-appraisals and a higher risk for mania has since been replicated in a number of analogue studies (Jones & Day, 2008; Ankers & Jones, 2009; Johnson & Jones, 2009). The HIQ was later administered to a sample of individuals diagnosed with bipolar disorder and a non-bipolar control group, with significantly higher scores on the HIQ observed in the bipolar group (Jones et al., 2006a). In addition, a logistic regression determined that scores on the hypomanic appraisal scale were the primary predictor of group membership between the bipolar and control groups, with scores on a measure of manic symptomatology making a small contribution to the regression equation (Jones et al., 2006a). Interestingly, the bipolar group reported lower

positive mood states than the control group but still produced more hypomanic interpretations. Jones and Day (2008) later developed a negative self-appraisal measure similar to the HIQ, termed the "Interpretations of Depression Questionnaire" (IDQ). Whilst scores on the IDQ were not predictive of hypomanic personality scores in an analogue population, scores on the HIQ hypomanic self-appraisal scale, greater behavioural activation and lower behavioural inhibition made significant contributions to the variance in hypomanic personality trait scores (Jones & Day, 2008). Negative self-appraisals on the IDQ were observed to be modestly positively correlated with hypomanic personality traits.

A study exploring sleep quality and circadian rhythm stability noted that the endorsement of hypomanic self-appraisals and the greater variability of bedtimes distinguished group membership between individuals at a high and a low-risk for hypomania, supporting Jones' model (Ankers & Jones, 2009). The high-risk group in this study also reported more variable sleep quality and sleep patterns than low-risk individuals, but few between-group differences in circadian rhythm stability and variability were noted. The study by Ankers and Jones (2009) provides preliminary support for the notion that a combination of circadian rhythm disruption and appraisal styles contribute to the vulnerability to bipolar disorder, although further research is required to replicate these findings in clinical samples.

In sum, Jones's (2001) reformulation of the SPAARS model implicated the appraisal of internal state in the development of bipolar symptomatology, where changes in physiological processes and the schematic appraisal of these changes facilitate emotional states and regulatory behaviours. Support for the model has been provided by Ankers and Jones' (2009) study of circadian rhythm regularity in a high bipolar risk sample, and the previously discussed studies which have associated the overly positive appraisal of hypomania in the behavioural risk for mania and risk for bipolar disorder (Jones et al., 2006a; Jones & Day, 2008; Johnson & Jones, 2009).

In relation to therapeutic applications of Jones' (2001) model for bipolar disorder, Jones and Burrell-Hodgson (2008) reported a pilot study of a CBT approach delivered to patients with recent first diagnoses of bipolar disorder. By targeting CBT early in the course of bipolar affective illness, prior to the development of associative links where later mood episodes may become more easily triggered by environmental stimuli, Jones and Burrell-Hodgson's study demonstrated improvements in their patients' use of adaptive coping skills, prodrome detection, feelings of hopelessness as well as improvements in bipolar symptoms. Improvements in circadian rhythms regularity and activity levels have also been noted from a number of CBT trials, including those delivered by Jones and Burrell-Hodgson (2008) and the Interpersonal and Social Rhythm Therapy (IPSRT)

studies, where improvements in affective symptoms and longer times to relapse were also noted following CBT (Frank et al., 1997; Frank et al., 2005).

1.2.6 *Interacting Cognitive Subsystems (ICS)*

Interacting Cognitive Subsystems (Barnard & Teasdale, 1991), like SPAARS, is a multi-level theoretical framework which allows for complex interactions to arise between cognitive and affective processes. Barnard and Teasdale (1991) have used ICS to describe a framework for unipolar depression, particularly for dysfunctional cognitive-affective relationships, and described an ICS-based approach for cognitive therapy. ICS proposes that the human cognitive system is organised into nine separate yet interacting subsystems, each of which is specialised for processing specific forms of information (see Figure 1.2.2, below).

At the centre of the ICS framework are two bidirectional subsystems which process different types of meaning: the propositional and implicational codes. Both of these subsystems are considered to be important in the processing of emotion. The propositional subsystem processes small semantic units known as propositions which describe easily understandable forms of meaning. These propositions are expressible in single sentences and can take the form of simple true-false statements. The implicational subsystem processes higher order but more implicit forms of semantic representation, with implicational representations of meaning taking the form of schematic models of experiences. These schematic models are produced from the combination of information which has been abstracted from across the various subsystems and the memory stores located at each subsystem, as well as the currently stored propositional information. The schematic models are considered to be holistic representations of the information in the ICS framework, which are also generic, abstract and personal in nature and represent recurring themes and patterns drawn from experience. The implicational level of meaning is considered to be important in emotion production, as this is where propositional meaning is integrated with input from the sensory subsystems. The implicational system is the only level of representation which can directly produce emotion, with the potential modification of emotional processing thought to require modification of the schematic models located in this higher order level of meaning (Teasdale, 1999). In contrast to the SPAARS model (Power & Dalgleish, 1997) ICS does not incorporate a direct associative route to the production of emotion. Rather emotion in ICS is seen to be mediated by a process of appraisal from the higher-order schematic models (Jones, 2001).

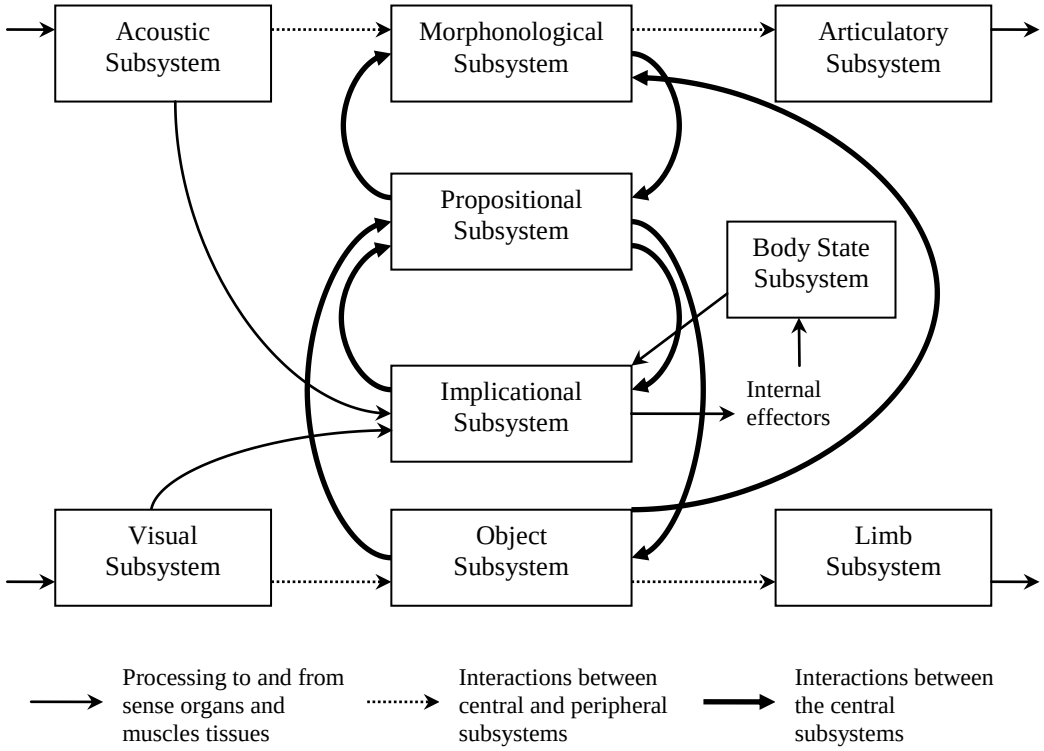


Fig 1.2.2 The Interacting Cognitive Subsystems framework
(ICS: Barnard & Teasdale, 1991)

The propositional and implicational subsystems become interlocked during depressed mood states, with negative propositions about the self being continually generated leading to the regeneration of negative schematic models in the implicational subsystem (Barnard & Teasdale, 1991). This interlocking is maintained as processing is focused upon the propositional level of meaning, with the current propositions reinforced and maintained by feedback from the sensory subsystems, e.g., self-negative propositions resulting from less activated bodily states such as feelings of fatigue and losses of energy. As the same self-negative schema is generated during depressed states, processing becomes focused upon the propositional code leading to ruminative-like thought (Lomax et al., 2009). The regeneration of negative self-schemas also leads to the regeneration of negative propositions about the self, following proprioceptive feedback at the level of the implicational system and schematic models, resulting in a negative feedback loop which maintains depressive states. This ruminative propositional mode of thought perpetuates depression through an excessive pondering of personal inadequacies and deficiencies highlighted by the over-analysis of propositional meanings, similar in nature to the brooding subtype of rumination (Treynor et al., 2003).

The ICS account of processing during manic states describes almost the opposite of form of processing compared to depression. Whilst depressed states are thought to be

associated with a propositional mode of processing, mania is considered to be associated with a focus upon the content of the implicational code, particularly the schematic models. As opposed to the implicational schematic models undergoing low rates of change during depressed states, in mania, high rates of implicational code change as well as the excessive attention paid to the generic meaning of the implicational system contribute to a more unregulated interaction between the implicational and propositional codes. In contrast to the processing of self-negative schematic models in depression, self-schemas during manic states are considered to be more positive and/or mixed in affective polarity (Power, 2005). The polarity of the schematic models is considered to vary over time during mixed bipolar episodes, contributing to the appearance of mixed emotional states (Barnard, 2004).

In sum, ICS proposes that depressive states are associated with propositional, analytical and ruminative forms of processing, where thinking patterns are focused upon the analysis of discrepancies in propositional statements about the self. Meanwhile manic states are associated with more implicational forms of processing, where thinking patterns are focused more on generic forms of meaning and less attention is placed upon the analysis of the relationships between propositional information. Lomax and colleagues (2009), using a simple question and answer task to assess propositional and implicational forms of processing, found that bipolar participants were more likely to answer questions relating to implicational forms of meaning, suggesting that the currently euthymic patients were focusing more on the abstract implicational-level self-schemas.

Lomax and colleagues (2009) have provided some early support for the notion that more implicational forms of processing are associated with bipolar disorder, particularly in positive mood states. Further research is still required to explore the forms of processing that are associated with depressed, manic, euthymic, and mixed affective states, to assess whether the processing modes associated implicated within the ICS framework are present in bipolar disorder. However, as ICS was originally devised as a theoretical framework and not as a specific theory of cognitive-emotional processes, it is unclear whether ICS can ever be fully falsified through empirical testing (Barnard & Teasdale, 1991). ICS does provide a reasonable explanation for the differences in cognitive processing between manic and depressive states, and has been applied in the explanation of the overgeneral autobiographical memory phenomenon (e.g., Delduca, Jones & Barnard, 2009).

There has also been an attempt to apply the principles of ICS to cognitive therapy, where emphasis is placed upon addressing implicational level cognitions and schematic models, as well as physiological arousal, through meditation and mindfulness (Clarke, 1999; Teasdale, 1999). Attempts to create alternative modes of processing, aside from dysfunctional propositional processing, are a key component of Mindfulness Based

Cognitive Therapy (MBCT) which has provided some encouraging results for bipolar disorder. A small-scale trial of MBCT conducted in patients in remission from bipolar and unipolar disorders reported reductions in depressive symptoms for across groups, with greater improvements in levels of anxiety noted in the bipolar group (Williams et al., 2008). A subsequent trial noted reduced suicidal ideation and depressive symptoms severity in a group of euthymic bipolar individuals following an 8 week MBCT intervention, with smaller reductions in the severity of manic symptoms and anxiety also noted (Miklowitz et al., 2009). These early trials would suggest that targeting MBCT during periods of remission between episodes is effective in reducing the focus upon propositional forms of processing associated with the cognitive vulnerability to depression.

1.2.7 *Summary*

Six prominent theoretical models for bipolar disorder have been presented in this chapter (see Table 1.2.1 for a summary). These theories implicate various cognitive processes in the exacerbation of symptoms in bipolar affective disorder, as well as in conferring a vulnerability to mood disorders in at-risk individuals.

The BAS theory suggests that the under and over-activation of the behavioural approach system is associated with manic and depressive states respectively (Meyer et al., 1999; Van der Gucht et al., 2009), with a dysregulated BAS thought to underpin the vulnerability to bipolar disorder (Urošević et al., 2008). A range of cross-sectional and prospective studies have been conducted using the BIS/BAS questionnaires (e.g., Meyer et al., 2001; Alloy et al., 2006), in samples of individuals diagnosed with bipolar disorder (e.g., Meyer et al., 2001), major depressive disorder (e.g., Kasch et al., 2002), and in analogue student samples (e.g., Dodd et al., 2010). However, there has been a tendency for research to focus solely on the nature of the BIS/BAS systems and not on the associations with other cognitive processes (e.g., Beevers & Meyer, 2002).

The Depression Avoidance account posits that mania is the result of a dysfunctional attempt to avoid depressive mood states and cognitions (Neale, 1988; Bentall et al., 2006; Thomas et al., 2007), and shares some common ground with Response Styles Theory where the engagement in distraction responses to negative moods has been associated with increased hypomania vulnerability (Thomas & Bentall 2002; Thomas et al., 2007). The Depression Avoidance literature suggests that bipolar disorder is associated with an underlying negative self-schema reflecting low-self worth which is masked by outward appearances of elevated self-esteem (Winters & Neale, 1985), with bipolar patients and at-risk individuals found to have particular sensitivities towards self-negative information (Bentall & Thompson, 1990; French et al., 1996; Lyon et al., 1999). The Depression

Avoidance theory has also been supported by studies demonstrating that individuals diagnosed with bipolar disorder and at-risk individuals can possess both low and fluctuating self-esteem (Jones et al., 2006b; Knowles et al., 2007; Van der Gucht et al., 2009). However, the Depression Avoidance theory is limited by low empirical support and it is unclear as to how these negative self-schemas are associated with mood lability, in particular how the sensitivity to self-negative information contributes to subsequent mood swings. Although, there has been an attempt to research the underlying source of the depression avoidance hypothesis through the use of both implicit and explicit measures of self-esteem (e.g., Winters & Neale, 1985; Knowles et al., 2007).

The Response Styles Theory suggests that the manner in which individuals cognitively respond to affective states determines the future course of mood states (Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1993), with ruminative and brooding responses to negative mood states associated with increased depressive states (Treynor et al., 2003). A developing literature has indicated that responding to positive mood states in a positively focused ruminative manner may be associated with ascents in mood and with the vulnerability to bipolar disorder (Feldman et al., 2008; Johnson et al., 2008a). The Response Styles literature has a very established evidence base from research conducted in unipolar depression, as well as in subclinical depression (dysphoria). However, the nature of ruminative thought processes and response styles in bipolar disorder is less well understood, particularly how negative and positive forms of rumination relate to other cognitive processes and contribute to mood lability. The rumination research in bipolar disorder has been largely cross-sectional (e.g., Van der Gucht et al., 2009; Thomas et al., 2007), with generally few studies conducted across patient and student samples.

The Beckian Cognitive models suggest that both bipolar and unipolar disorders are associated with underlying negative self-schemas and maladaptive attitudes about the self (Jones et al., 2009), with mixed evidence as to whether the same types of beliefs underlie bipolar disorder and unipolar depression (Jones et al., 2005a; Lex et al., 2008). The Beck models assume that latent self-schemas underlie bipolar disorder, which can be positive or negative in valence. Research in this area is primarily based upon the use of the DAS scale to measure the prevalence of dysfunctional attitudes, which may be problematic due to concerns over whether individuals, particularly in patient samples, have the necessarily awareness of their own attitudes and are truthfully reporting the extent to which they endorse these attitudes (Mansell & Scott, 2006). Cognitive therapies based upon Beck's work suggest that modifying underlying dysfunctional schemas and attitudes about the self is associated with improved illness outcomes in bipolar samples (e.g., Lam et al., 2003).

Schematic models are prominent features of the two multi-level models of emotion presented in this chapter. Jones' (2001) adaptation of the SPAARS model (Power & Dalgleish, 1997) implicates the schematic appraisal of internal physiological states in the exacerbation of bipolar symptoms. The ICS framework similarly implicates physiological input in triggering schematic appraisals leading to one of two forms of processing styles to arise. ICS proposes that propositional forms of thought dominate depression, where attention is focused upon the analysis of self-discrepancies similar to ruminative modes of thought. During mania, processing is focused upon more abstract and generic levels of meaning relating to implicational schematic models of the self, leading to less propositional thought and higher rates of change in the generation of schemas.

Both Jones' (2001) model and the Interacting Cognitive Subsystems framework (Barnard & Teasdale, 1991) have received low levels of empirical support. The presence of overly-positive appraisals has been established in samples of patients with bipolar disorder and at-risk individuals, with such appraisals considered to contribute to symptom exacerbation (Jones et al., 2006a). A measure of negative appraisals has been developed to assess how self-negative cognitions may contribute to the downward regulation of mood states (Jones & Day, 2008); however this measure has only been used in a student sample. Ankers and Jones (2009) reported that the endorsement of positive self-appraisals and greater sleep variability distinguish group membership between low and high risk individuals for bipolar disorder. Additional research is required to further explore the associations between these self-appraisals and their association with mood, behaviour and sleep patterns in at-risk individuals and patients with bipolar disorders. The Interacting Cognitive Subsystems framework has received a small amount of evidential support (Lomax et al., 2009). However, a major issue is whether ICS as a theory is truly falsifiable through empirical testing (Barnard and Teasdale, 1991, p.3, state that "*the ICS model is not, in itself, an exact theory that can be proved true or false*"). Whilst the ICS account may assist in generating hypotheses relating to potential cognitive-emotional interactions in the affective disorders (e.g., Delduca et al., 2009), there is the concern that ICS as a theory is not testable and may only unnecessarily complicate the understanding of cognition and emotion without a falsifiable research base.

In sum, the psychological processes underlying bipolar disorder remain poorly understood. The theories presented in this review have received differing degrees of empirical support. This lack of scientific understanding about the basic psychology of bipolar disorder is concerning. Improving the understanding of the (potentially) dysfunctional nature of these processes would assist in the development of effectively targeted, evidence-based psychotherapeutic interventions.

Table 1.2.1 Summary table of the major psychological theoretical frameworks for Bipolar Disorder

	Central tenet of theory	Strengths & Limitations
Behavioural Activation	A behavioural activation system, sensitive to signals of reward, becomes dysregulated in at-risk and bipolar individuals. Low BAS activity associated with depression, higher BAS activity associated with hypo/mania.	Explains the vulnerability to bipolar disorder from a diathesis-stress perspective (e.g., interaction between BAS sensitivity and life events). Evidence is largely based upon self-reported BAS sensitivity.
Depression Avoidance	Mania is the result of a dysfunctional attempt to avoid depression and depressive cognitions about the self. A negative self-schema is considered to underlie mania.	Supporting evidence for theory available from a variety of studies. Theory somewhat controversial due to suggestions that mania is a "defence mechanism".
Response Styles Theory	Differences in responses to clinical mood states determine the future exacerbations of moods.	Theory is compatible with other cognitive theories. Few studies have been conducted in bipolar spectrum samples.
Beck Cognitive Models	Maladaptive beliefs about the self underlie the cognitive vulnerability to depression and mania. Dysfunctional attitudes regarding goal-achievement, dependency and autonomy have been implicated in Bipolar Disorder.	Evidence is reliant upon the DAS scale, which assumes the transparent and truthful reporting of attitudes. Research has used different versions of the DAS scale across a number of bipolar samples.
Appraisals of Internal State (SPAARS & Jones, 2001)	The schematic appraisal of changes in internal state in a self-negative or self-positive manner contributes to attempts to regulate moods and behaviour patterns, leading to manic or depressive states.	Accounts for more complex cognitive-emotional interactions, and integrates physiological and cognitive processes in describing the vulnerability to bipolar disorder. Low empirical support.
Interacting Cognitive Subsystems (ICS)	Different forms of processing underlie manic and depressive states, with implicational and schematic processing during mania, and more propositional and ruminative processing during depression.	Provides an account for the complex cognitive-affective interactions noted in bipolar disorder. ICS is considered to be more a conceptual framework rather than a falsifiable theory.

Section 1.3

The Specificity of Autobiographical Memory in the Affective Disorders: Psychological Mechanisms, Theory, and Potential Applications to Bipolar Disorder

1.3.0 *Abstract*

A lack of specificity in the recall of autobiographical memories is considered to be a marker of the cognitive vulnerability to affective disorders. Whilst this overgeneral memory phenomenon has most frequently been studied in major depressive disorder, few studies have explored the role of autobiographical memory recall in bipolar affective disorders, despite research indicating that similar latent cognitive vulnerabilities may be shared by the two conditions. The present review will provide an updated discussion of the autobiographical memory research literature relating to the mood disorders, including a review of the mechanisms implicated in overgenerality, with a focus upon how these mechanisms may function in bipolar disorder.

1.3.1 *The Autobiographical Memory System*

Autobiographical memories are recollections of personally experienced events which are hierarchically structured within the human memory system. Conway and Pleydell-Pearce (2000) proposed a self-memory model where autobiographical memory is structured according to three levels of representation, reflecting lifetime periods, general events and event-specific knowledge (ESK) which form an autobiographical knowledge base (see Figure 1.3.1). The representations within the self-memory system are differentiated according to the specificity of detail in their descriptions of events. Lifetime periods refer to broad periods of time which capture general temporal and thematic knowledge of a distinct time period (e.g., “When I was studying at university”). General events are more specific and heterogeneous descriptions which can incorporate both single and repeating events, and can also encompass series of events linked by common themes (e.g., “When I went on holiday to…”). Event-specific knowledge is the most specifically detailed and vivid memory representation which includes detailed accounts of events incorporating sensory information unique to that event. The ability to recall event-specific knowledge contributes to the identification of specific events stored in the memory system (Conway & Pleydell-Pearce, 2000), and also assists in the identification of memories for real versus imagined events (Johnson, Foley, Suengas & Raye, 1988; Conway, Collins, Gathercole & Anderson, 1996).

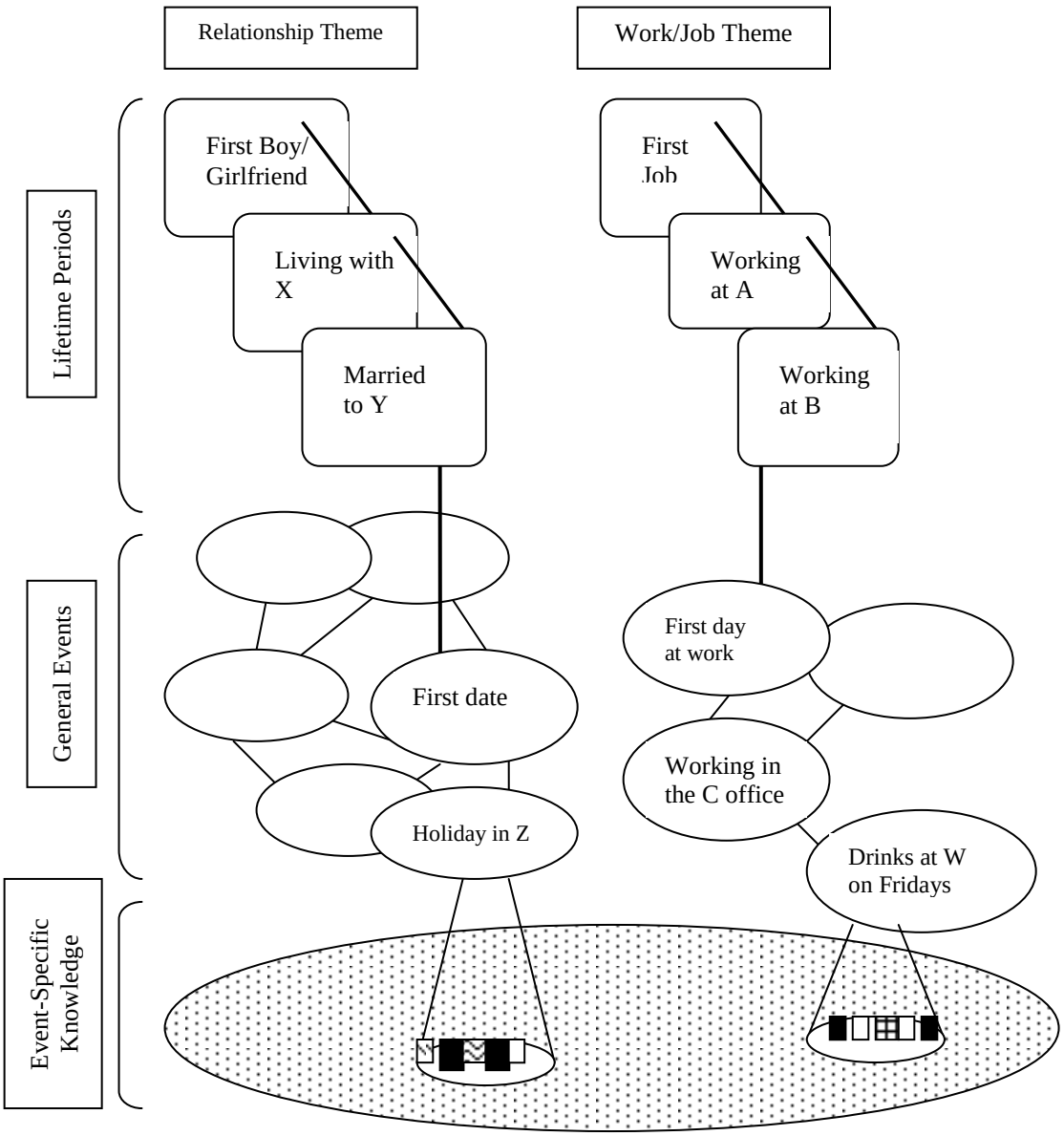


Figure 1.3.1. The autobiographical memory system as outlined by Conway & Pleydell-Pearce (2000).

1.3.2 *Autobiographical Memory Recall*

Memory recall within Conway and Pleydell-Pearce's (2000) system can occur generatively, a top-down staged search with retrieval directed from general to specific memory representations, or directly, an automatic bottom-up recall process where event-specific knowledge is activated following a cue.

A series of studies have observed that individuals with mood disorder diagnoses, and individuals with histories of suicidal behaviours and other mental health conditions, have particular difficulties in accessing and recalling the specific autobiographical memory representations (Williams et al., 2007), in a phenomenon known as "overgeneral memory" (Conway & Pleydell-Pearce, 2000; Williams, 1996). One explanation for this overgeneral memory bias is that individuals diagnosed with mental health conditions have

dysfunctional recall strategies for autobiographical memories, where the memory recall process fails to progress past general levels of representation within the memory system. This "truncated search" (Williams et al., 2007) is considered to arise from generative processing, where, following a memory cue, processing in the autobiographical memory system generates more elaborative representations until a specific representation is activated and recalled. However, this search is stopped at a higher generic level than the specific representations, resulting in the recall of generally detailed descriptions of autobiographical memories. The current section will review the evidence base for the overgeneral memory phenomenon in the affective disorders, and will consider the different psychological mechanisms and contrasting theories which have been proposed to explain this overgeneral recall of autobiographical memories.

1.3.3 *Overgeneral Autobiographical Memory Specificity*

The recall of autobiographical memories in an overgeneral level of detail was first demonstrated by Williams and Broadbent (1986). When tasked with recalling specific memories for positive and negative cue words, individuals with recent suicide attempts were slower to recall memories for positive than negative cues, and also recalled more general memories for positive cues compared to controls (Williams & Broadbent, 1986). This finding was replicated by Williams and Dritschel (1988), who noted that recovered individuals with lifetime histories of attempted suicide were more specific in the recall of positive memories compared to recent suicide attempters, suggesting that the inability to recall specific positive memories confers a risk of suicide in vulnerable individuals.

Whilst these studies had established the prevalence of overgeneral memory in suicidal patients, a later study using the cued memory paradigm developed by Williams and Broadbent (1986) (the "Autobiographical Memory Test", the "AMT") observed that patients with major depressive disorder were slower to recall memories for positive than negative cues, and recalled more general memories for positive cues (Williams & Scott, 1988). A number of studies have since observed that individuals diagnosed with major depressive disorder recall positive and negative memories in general levels of detail (Goddard, Dritschel & Burton, 1996, 2001; Barnhofer, de Jong-Meyer, Kleinpaß & Nikesch, 2002; Burnside, Startup, Byatt, Rollinson & Hill, 2004; Kuyken, Howell & Dalgleish, 2006; Raes et al., 2006b; Vrielnyck, Deplus & Philipot, 2007). A number of studies have also suggested that there exists a bias in the overgeneral recall of emotionally positive memories in depressed patients (Moore, Watts & Williams, 1988; Brittlebank, Scott, Williams, & Ferrier, 1993; Puffet, Jehin-Marchot, Timsit-Berthier & Timsit, 1991; Nandrino, Pezard, Posté, Réveillère & Beaune, 2002), and in adolescents in remission from

depression (Park et al., 2002). In contrast, Mackinger and colleagues (2000) reported a reduced recall specificity for negative memories in women with histories of major depression (Mackinger, Pachinger, Leibetseder & Fartacek, 2000). At least one study has failed to observe an overgeneral memory recall bias in depressed patients (Kaney, Bowen-Jones & Bentall, 1999).

A study by Leibetseder and colleagues (2006) sought to address concerns regarding the comorbid nature of suicidality and depression in a study comparing memory specificity in depressed patients with and without histories of suicide attempts, patients with histories of suicidal behaviour without diagnosed affective disorders, and a control group of healthy adults. Patients with recent suicide attempts without a diagnosis of an affective disorder demonstrated similarly reduced memory specificity as the depressed patients, with and without prior suicidal attempts (Leibetseder, Rohrer, Mackinger & Fartacek, 2006). Leibetseder's findings suggest that a reduced specificity of memory is a shared vulnerability factor between suicidality and major depression, and may interact with an additional leading to increased suicidality, such as feelings of hopelessness (Leibetseder et al., 2006). However, one study noted that depressed adolescents who reported high levels of depression and hopelessness were specific in their recall of negative autobiographical memories (Swales, Williams & Wood, 2001). Although the this study did not find an association between overgenerality and hopelessness, the recall of specific negative autobiographical memories relating to traumatic experiences appeared to exacerbate hopelessness in clinically depressed adolescents, many of whom reported past suicidality and self-harm behaviours.

Overgeneral memory recall does not appear to be a feature of all mood disorders, with no evidence of an overgeneral memory bias in individuals with seasonal affective disorder (Dalgeish, Spinks, Yiend & Kuyken, 2001). Seasonal affective disorder is characterised by biological etiological factors, namely seasonal changes in light cycles, and may be less influenced by the psychological vulnerability factors associated with non-seasonal forms of major depressive disorder. Preliminary research has suggested that bipolar disorders are associated with reduced memory specificities (Mansell & Lam, 2004). However, overgenerality does not appear to be a feature of all anxiety disorders (Wessel, Meeren, Peeters, Arntz & Merckelbach, 2001; Williams et al., 2007), except for post-traumatic stress disorder (Sutherland & Bryant, 2008) and trauma-related conditions (See section 1.3.4).

1.3.4 *The Psychological Mechanisms Underlying Overgeneral Autobiographical Memory*

The Affect Regulation & Early Trauma Hypothesis

The affect regulation hypothesis suggests that overgeneral memory specificity develops following the experience of negative childhood life events, from which individuals learn to avoid remembering events in specific detail to prevent the re-experience of negative emotions associated with these memories (Williams, 1996). The avoidance of re-experiencing these negative emotions reinforces the overgeneral recall of negative memories.

Experimental studies have investigated the affect regulation hypothesis in samples of individuals with histories of trauma, where the experience of past traumatic life events is anticipated to be associated with reduced memory specificity, particularly for negative memories. Overgeneral memory specificities are prevalent in maltreated children (Valentino, Toth & Cicchetti, 2009), and in adolescents with histories of emotional, physical and sexual abuse (de Decker, Hermans, Raes & Eelen, 2003). Overgeneral memory specificities have also been observed in adults with histories of childhood sexual abuse (Kuyken & Brewin, 1995; Burnside et al., 2004), histories of physical abuse (Dalgleish et al., 2003), post-traumatic stress disorder (PTSD) (Sutherland & Bryant, 2008), in war veterans with PTSD (McNally, Litz, Prassas, Shin & Weathers, 1994; McNally, Lasko, Macklin & Pitman, 1995), and in patients with acute stress disorder (Harvey, Bryant & Dang, 1998).

The number of specific autobiographical memories recalled by adults with major depressive disorder has also been negatively associated with histories of trauma, with more overgeneral memories recalled in individuals with histories of physical abuse (Hermans et al., 2004). A separate study observed that an earlier age of onset of childhood sexual abuse is associated with greater severities of overgeneral memory in patients with recurrent suicidal behaviours (Crane & Duggan, 2009). It would appear that the severity and the earlier onset of trauma may influence the severity of overgeneral memory. Greater severities of overgeneral memory have also been associated with longer durations of childhood abuse and earlier ages of onset of abuse in adults with post-traumatic stress disorder (Burnside et al., 2004). The association between histories of trauma and overgeneral memory has also been observed in student samples, where individuals identified with low specificities of autobiographical memory also report histories of emotional abuse (Raes, Hermans, Williams & Eelen, 2005b), although a subsequent student study failed to replicate this association (Stokes, Dritschel & Bekerian, 2008).

Although a number of studies have cited support for the affect regulation hypothesis, as previously discussed, a somewhat recent review has suggested that the evidence base is more actually mixed as many studies have failed to observe associations between histories of trauma with overgenerality in autobiographical memory (Moore & Zoellner, 2007). For example, Wessel and colleagues (2001) observed that a diagnosis of major depressive disorder, rather than a history of trauma, predicted the severity of overgeneral autobiographical memory in a sample of depressed and anxious patients, however the participants only reported mild to moderate scores on a self-report measure of trauma (Wessel et al., 2001).

In the opposite direction of the affect regulation hypothesis, one study has observed that higher levels of childhood traumatisation are predictive of more specific recall of negative memories in a sample of depressed outpatients (Peeters, Wessel, Merckelbach & Boon-Vermeeren, 2002), whilst a separate study has reported more severe overgeneral memory in depressed adolescents without histories of trauma than depressed adolescents with trauma (Kuyken et al., 2006). The association between histories of trauma and overgeneral autobiographical memory has also failed to emerge in adults with bipolar disorder (Mowlds et al., 2010). The mixed evidence base for the experience of traumatic events in childhood being a causal factor of the overgeneral recall of memories in later life may suggest that the experience of significant childhood traumas is just one of many mechanisms implicated in a lack of specificity in autobiographical memory.

In relation to this, Hauer and colleagues (2008) have provided evidence to suggest that the overgeneral bias may be dependent on whether memories are recalled generatively or directly in individuals with histories of trauma. Hauer and colleagues (2008) presented a sample of adults with histories of childhood sexual abuse with two AMT tasks in order to promote generative and direct memory recall. A standardised AMT task, using emotionally valenced cue words (e.g., “happy”, was presented to elicit the generative retrieval of memories via the top-down process of identifying a specific memory in Event-Specific Knowledge (ESK) from the activation of memory representations for lifetime periods to more general events (Conway & Pleydell-Pearce, 2000). A second AMT task presented participants with more concrete and highly imageable cue words (e.g., “funeral”) than the standardised AMT in order to prime the immediate activation of the sensory-perceptual information located in the specific memory representations (ESK), therefore bypassing generative memory searches (Hauer, Wessel, Geraerts, Merckelbach & Dalgleish, 2008). Both AMT procedures still required participants to recall a specific memory for each cue within a sixty second time limit, the only difference between AMT tasks was in the imageability of the cue words. Whilst participants with histories of childhood sexual abuse

produced more overgeneral memories than non-abused controls during generative recall, during direct recall no group differences were found (Hauer et al., 2008). In addition, the association between childhood sexual abuse and overgeneral memory on the standardised AMT task was found to be independent of past and current depression. Hauer and colleagues' (2008) study supports the argument that individuals with past histories of trauma regulate their affective states through aborting generative memory recall processes at the intermediate general stages of the memory system. The direct route to memory recall may be outside of conscious executive control, meaning that individuals are unable to abort retrieval, resulting in the automatic specific recall of unpleasant and traumatic memories, as suggested by Peeters and colleagues' (2002) study.

The Rumination Hypothesis

Convergent evidence has implicated the engagement in negative forms of rumination in reducing the specificity of autobiographical memory recall (Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998; Watkins, Teasdale & Williams, 2000; Park, Goodyer & Teasdale, 2004). The rumination hypothesis suggests that the overgeneral recall of memories results from the individual's engagement in persistent ruminative and analytical verbal thought processes which prevent the elaborative recall of specific representations of autobiographical memories (Williams, 2006; Williams et al., 2007). In relation to this, Williams (1996) introduced the concept of "*mnemonic interlock*", and suggested that a network of general memory representations becomes established following repeated failures to access the specific memory representations. This network of general representations becomes elaborated through repeated retrieval attempts, and is maintained by ruminative thought processes and also encourages further rumination. Future attempts to activate specific memory representations fail due to the abundance of intermediate memory descriptions.

Empirical support for the rumination hypothesis has been provided by a series of studies, with the induction of non-ruminative thought processes associated with reductions in overgeneral memory compared to the induction of rumination in dysphoric participants (Watkins et al., 2000). Watkins and Teasdale (2001) further investigated whether the analytical or self-focused components of rumination are associated with overgeneral recall biases. In their study, depressed patients were allocated to receive one of four experimental manipulations to induce either a high or low self-focused thinking style, which was either high or low in analytical thought, with memory specificity tested pre and post-manipulation. The degree of self-focused thought processes was found to influence the severity of the participant's current despondent mood state but not their specificity of

memory recall, whilst the inverse relationship was observed for the degree of analytical thought process. The severity of overgenerality of memory during recall, but not the severity of despondent mood, was associated with the degree of analytical thought, with analytical thought processes associated with elevations in overgeneral memory recall (Watkins & Teasdale, 2001). The authors suggested that the overgeneral memory bias in depression may be associated with a dysfunctional attempt to understand past and/or current problems, providing a possible explanation for the presence of overgeneral memory in patients outside of depressive episodes. Interestingly, the induction of an experiential self-focus in depressed patients has also been reported to reduce overgeneral memory specificity compared to analytical self-focus (Watkins & Teasdale, 2004).

Subsequent studies have observed that rumination is associated with both exacerbations in depressed mood and increases in overgeneral memory recall particularly for emotionally negative memories (Park et al., 2004). The induction of abstract, analytical, and ruminative modes of thought in patients in recovery from depression is also associated with significant reductions in the recall of specific autobiographical memories (Crane, Barnhofer, Visser, Nightingale & Williams, 2007). The induction of rumination in currently dysphoric students also contributes to the generation of negatively biased memories (Lyubomirsky et al., 1998). Rumination in currently depressed patients has also been associated with poorer problem solving skills in addition to reduced autobiographical memory specificities, with low memory specificity found to mediate the relationship between rumination and problem solving capabilities (Raes et al., 2005a). Raes and colleagues (2006d) have presented further data to suggest that a bidirectional relationship may exist between memory specificity and rumination, where the overgeneral recall of memories may also influence ruminative thought processes. In a sample of students with high and low trait levels of rumination, the experimental induction of an overgeneral memory recall style led to high trait ruminators producing more rumination relevant sentences on a sentence scrambling task (Raes, Hermans, Williams, Geypen & Eelen, 2006d). The memory retrieval manipulation had no effect upon performance on the sentence scrambling task in individuals with low trait levels of rumination.

Finally, the experimental induction of a non-ruminative cognitive style in an analogue student sample led to reductions in the recall of overgeneral memories on a sentence completion autobiographical memory measure, in comparison to students who were induced into an abstract and ruminative-like thinking style (Raes, Watkins, Williams & Hermans, 2008b). The overgeneral recall of memories on this sentence completion task has also been associated with increased depressed mood and rumination within a non-clinical student sample (Raes, Hermans, Williams & Eelen, 2007).

Whilst studies have investigated the association between negative forms of rumination and reduced autobiographical memory specificity, Sutherland and Bryant (2007) compared the effect of positive and negative rumination upon memory specificity. Induced negative rumination led to the recall of more overgeneral memories in dysphoric individuals compared to distraction and positive rumination, negative rumination was not associated with the recall of overgeneral memories in non-depressed individuals (Sutherland & Bryant, 2007).

In sum, research has implicated negative ruminative thought processes in the overgeneral recall of autobiographical memories, with support from studies which induce ruminative thinking styles (e.g., Watkins et al., 2000) and studies which measure self-reported trait rumination (e.g., Raes et al., 2005a), across both clinically depressed (e.g., Crane et al., 2007) and non-clinical student samples (e.g., Raes et al., 2008b). Whilst the induction of positive rumination has been associated with increases in positive mood states in both depressed and non-depressed students, only increases in overgeneral memory recall were associated with negative rumination inductions (Sutherland & Bryant, 2007). The induction procedure used by Sutherland and Bryant (2007) may not have sufficiently induced positive ruminative thought processes to produce effects on memory specificity, only increases in mood. Future studies could consider using a recently developed self-report measure of positive rumination, the "Responses to Positive Affect" scale (Feldman et al., 2008), to more accurately assess the engagement in positive self-thought processes.

Executive Processes

The recall of autobiographical memories in the self-memory system is thought to be moderated by supervisory central executive processes (Conway & Pleydell-Pearce, 2000). Reductions in the capacities of central executive processes are considered to be implicated in the overgeneral memory bias, through interference with the more effortful generative recall of memories, meaning that event-specific representations in the memory system fail to be activated (Williams, 2006). A number of studies have reported associations between a reduced specificity of autobiographical memory with reduced working memory capacity and reduced executive processes (Dalgleish et al., 2007; Neshat-Doost, Dalgleish & Golden, 2008; Ros, Latorre & Serrano, 2010).

Dalgleish and colleagues (2007) reported a series of studies that demonstrated that a reduced specificity of autobiographical memory was associated with poor performances across a number of measures of executive processes, including verbal fluency tasks, which remained independent of the effect of current depressive mood states. Current depressed mood states were also associated with reduced executive processes across samples of

healthy controls, participants with subclinical levels of depressive symptoms, and in participants with clinically diagnosed eating disorders (Dalgleish et al., 2007).

One suggestion is that the association between reduced executive processes and overgeneral memory may be the result of a failure to inhibit distracting or irrelevant information which interferes with the generative memory recall process (Dalgleish et al., 2007; Williams et al., 2007). Indeed, the severity of overgeneral autobiographical memory has been associated with lower scores on a self-report measure of inhibitory control in non-clinically depressed children (Raes, Verstraeten, Bijttebier, Vasey & Dalgleish, 2010). The relationship between depressed mood and overgeneral memory was also partially mediated by reduced inhibitory control in the same study. In sum, the reduction of executive processing capacities is considered to interfere with the generative recall of specific autobiographical memories, possibility due to the inability to inhibit distracting information during recall (e.g., Dalgleish et al., 2007), meaning that there are insufficient processing capacities for specific memory representations to be activated.

The Non-Trauma Affect Regulation Hypothesis

Individuals may learn to avoid recalling autobiographical memories in specific detail as a means of regulating their emotional state, but not as a result of traumatic experiences (Hermans, Defranc, Raes, Williams & Eelen, 2005; Raes, Hermans, Williams & Eelen, 2006c; Hermans et al., 2007). The overgeneral recall of autobiographical memories may be adaptive in the short term, in terms of regulating mood and in avoiding negative mood states (Hermans et al., 2005), and may become reinforced as the individual continues to avoid negative emotional states, developing into an enduring tendency to be overgeneral in memory recall. Indeed, the overgeneral recall of autobiographical memories has been associated with avoidant coping styles in non-depressed students, including social avoidance and thought suppression strategies (Hermans et al., 2005).

The overgeneral recall of autobiographical memories also appears to be a means of coping with future unpleasant events, with students with low memory specificities reporting less distress following the experience of an unexpected negative event compared to high-specific students (Raes, Hermans, de Decker, Eelen & Williams, 2003; Hermans et al., 2007). A second study by replicated this finding and observed that both high and low-specific students did not differ in their emotional reactions to a positive event (Raes et al., 2006c), suggesting that habitual overgenerality may serve a protective function from negative events and cognitions at least in the short term.

Interestingly, Raes and colleagues (2006c) have suggested that there exists a dichotomy between individuals who are low-specific in that they recall fewer specific

memories, and individuals who are low-specific in that they recall more general memories. In their second study, participants induced to retrieve more overgeneral memories experienced more distress and intrusive thoughts following a negative laboratory event, in comparison to participants who received a specific memory recall induction (Raes et al., 2006c). Raes and colleagues (2006c) suggested that the avoidance of recalling specific memories through the recall of more general memories is associated with affect regulation as the individual avoids priming emotions associated with event-specific memory representations. Whilst avoiding the recall of specific memories (i.e., recalling fewer specific memories) for unpleasant events may be beneficial in that the emotions associated with event-specific information are not primed, the overgeneral recall of memories appears to be associated with greater distress following a negative experience. Overgenerality as an affect regulatory strategy may only assist in priming ruminative propositional thoughts about the self through the activation of the general memory networks as suggested by William's (1996) mnemonic interlock concept, meaning that individuals are more likely to interpret recent experiences in a self-negative manner.

The CaRFAX Model of Autobiographical Memory Recall

Williams (2006) proposed the CaRFAX model of autobiographical memory in recognition of the established associations between overgeneral memory recall with negative rumination and reduced executive processing capacities, as well as the affect regulatory strategy of recalling unpleasant memories in overgeneral levels of detail. CaRFAX integrates capture and ruminative thought processes, functional avoidance (the affect regulatory hypotheses), and executive capacity and control processes into one framework (see Figure 1.3.2).

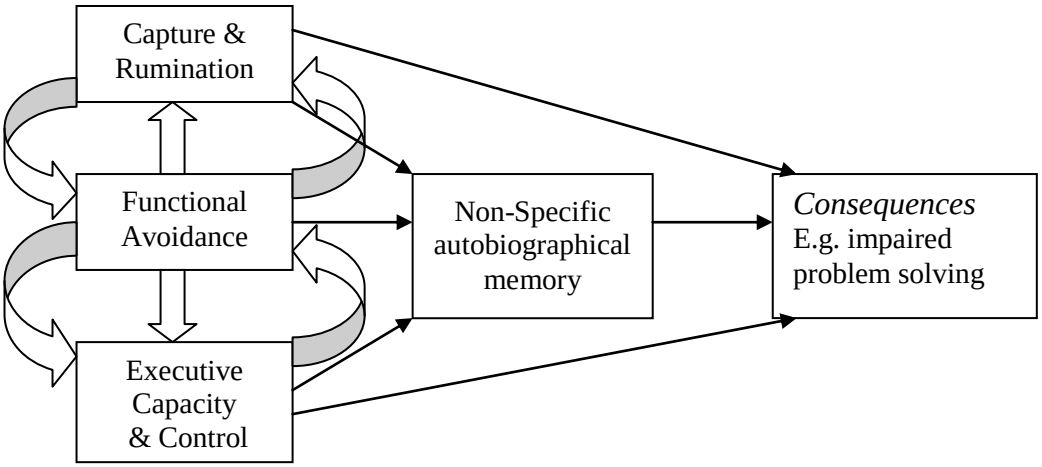


Figure 1.3.2 The CaRFAX model of autobiographical memory (Williams 2006)

Capture and rumination refers the processes involved in the identification and recall of memories, including the conceptual overlap between a presented memory cue to the current concerns of the individual (Williams, 2006). This conceptual overlap is considered to trigger ruminative thought processes and is also thought to activate higher-order mental representations, including dysfunctional attitudes and self-schemas (Williams, 2006). Two studies conducted in samples of depressed patients and patients with borderline personality disorder observed a reduced specificity of autobiographical memory recall in response to cue words that matched underlying schemas and attitudes (Spinhoven, Bockting, Kremers, Schene & Williams, 2007). Greater conceptual overlap between memory cues and self-conceptual information, relating to perceptions of past, current and future selves, has also been associated with reduced memory specificity in depressed individuals but not in never-depressed controls (Crane, Barnhofer & Williams, 2007). The association between overgeneral memory and schema activation as suggested by these studies suggests that the activation of self-schemas may be related to the activation of the over-elaborated general memory representations which develop through mnemonic interlock (Williams, 1996). Greater degrees of conceptual overlap between cue words and schematic content may lead to the activation of the propositional information contained within the general memory representations, leading to rumination and the truncation of memory recall prior to the event-specific knowledge representations in autobiographical memory.

Functional avoidance, an "affective gating mechanism" (Williams, 2006, p. 563), refers to attempts to avoid the remembrance of unpleasant memories through the abortion of the memory recall process prior to the activation of the specific memory representations. Williams (2006) emphasised the motivational need of the individual to avoid recalling memories in specific detail, and suggested that reduced executive processing capacities may reduce the ability of the individual to keep unpleasant memories out of consciousness.

Executive processes are considered to be implicated in the generative recall of autobiographical memories, with the reduction of executive processing capacities thought to assist in the truncation of the memory recall process at the generic intermediate representations within the self-memory system. Whilst research has demonstrated that the association between reduced memory specificity and executive processing capacities are independent of depressed mood states (Dalgleish et al., 2007), the experience of depression and the engagement in ruminative thought processes are also considered to reduce executive processes through the propositional analytic thought (Watkins & Brown, 2002; Philippot & Brutoux, 2008).

Despite the efforts of Williams to produce a more cohesive model of autobiographical memory, research has continued to focus upon the individual

contributions of the CaRFAX processes to memory specificity, rather than investigating the associations between these processes and their combined influence upon memory recall. In addition, the CaRFAX model is primarily based upon studies conducted within clinically depressed and dysphoric analogue samples. It is unclear how these processes are associated with overgeneral memory in other conditions. The functional avoidance strand of CaRFAX, in particular, has received less empirical support compared to the effects of negative rumination and reduced executive processing capacity upon memory specificity.

Summary

In sum, research has suggested that there are a number of different mechanisms through which overgenerality in the recall of autobiographical memories may arise. These include the engagement in rumination (Lyubomirsky et al., 1998), and reductions in executive processing capacities (Dalgleish et al., 2007). Whilst overgeneral memory recall may arise in the attempt to regulate mood states (Hermans et al., 2007), and to avoid recalling past traumatic experiences (Hermans et al., 2004). Although numerous studies have demonstrated the presence of overgeneral memory recall in depressed samples, overgenerality does not appear to be a simple function of depressed mood (Mackinger et al., 2000), more a function of these maladaptive cognitive processes. In addition, research conducted with patients diagnosed with Seasonal Affective Disorder, an organic form of depression which is not associated with overgenerality, has implied that overgeneral autobiographical memory is largely a cognitive phenomenon (Dalgleish et al., 2001).

A number of studies have demonstrated that both naturally occurring and experimentally induced negative ruminative thought processes are associated with reduced memory specificities (e.g., Watkins et al., 2000; Raes et al., 2008b). However, these studies have been limited to clinically depressed or non-clinical dysphoric samples, and only one study has investigated how positive forms of rumination may be associated with memory specificity (Sutherland & Bryant, 2007). The memory specificity and rumination literature has been well supported by studies which have used established self-report measures of rumination (e.g., the Ruminative Responses Scale: Nolen-Hoeksema & Morrow, 1991) as well as experimental studies investigating the induction of ruminative thinking styles in comparison to distraction and concrete-forms of thinking processes (e.g., Lyubomirsky et al., 1998; Watkins & Teasdale, 2001).

A range of studies have been conducted in relation to the affect regulation hypothesis, including studies conducted in clinical and non-clinical samples, and across various mental health conditions. There are two somewhat different components to the affect regulation hypothesis, relating to the overgeneral recall of autobiographical

memories as a means to avoid recalling memories of past traumas, and overgenerality as a more general means for regulating emotions. Whilst some studies have associated the experience of trauma with overgenerality in autobiographical memory, conditions such as post-traumatic stress disorder (PTSD) are notably associated with intrusive memories and vivid flashbacks of past traumas (APA, 2000). Peeters and colleagues (2002) also noted that the experience of more severe childhood traumas was associated with the recall of specific negative memories in adult patients with diagnosed with depression (Peeters et al., 2002). One explanation for the increased specificity of memory recall in trauma, suicidality and depression, is that memory recall is primarily of the direct form, not generative recall where the memory recall process may be aborted prior to the activation of specific memory representations (Hauer et al., 2008). The repeated rehearsal of past traumas may assist in the development and maintenance of direct associative links between cues and specific memory representations, leading to the more automatic re-experiencing of unpleasant events and their associated emotional states. However, there is some concern regarding the assessment of traumatic experiences through the use of self-report questionnaires of trauma (Raes et al., 2005b). Future studies could use structured clinical interviews to more accurately assess the qualitative nature of traumatic experiences in non-clinical samples. However, the extent to which traumatic experiences lead to more specific memory recall due to the rehearsal of these experiences is unclear simply due to a lack of research. Whilst the non-trauma based affect regulation hypothesis has been supported by experimental studies, these studies have been conducted within student samples (Raes et al., 2003; Raes et al., 2006c). It remains unclear as to how clinically depressed individuals regulate their emotional states through memory recall, and whether overgenerality in depressed patients protects the individual from experiencing negative emotional states associated with negative experiences.

In sum, whilst research has implicated the experience of early traumas, the engagement in ruminative and abstract-verbal modes of thought, and reductions in executive processing capacity with reduced memory specificity, these processes are not necessarily mutually exclusive (e.g., the CaRFAX model). Although there appear to be a number of different pathways to reduced memory specificity, there remains a general lack of understanding and research investigating the interactions between these processes and their subsequent effects upon memory specificity.

1.3.5 *The Impact of Overgeneral Autobiographical Memory Recall upon Functioning and Illness Outcomes*

The overgeneral recall of autobiographical memories can have a significant impact upon illness outcomes in patient populations. A number of studies support the notion that overgeneral memory may act as a marker of the vulnerability to relapse and may also be predictive of the future course of depression (Sumner, Griffith & Mineka, 2010).

For example, the overgeneral recall of positive autobiographical memories has been reported to be predictive of poorer responses to antidepressant medication at both three and seven month follow-ups in depressed patients (Brittlebank et al., 1993). Similar studies in depressed patient samples have suggested that the specific recall of negative but not positive autobiographical memories are associated with reduced depression severities at three month (Peeters et al., 2002) and seven month follow-ups (Raes et al., 2006a). The overgeneral recall of positive and negative memories in depressed patients has also been associated with a higher probability of still meeting criteria for being clinically depressed at a 4 week follow-up (Hermans et al., 2008). Interestingly, Raes and colleagues (2006a) observed that the association between reduced memory specificity and increased depression severity at a seven month follow-up in depressed patients was rendered non-significant once rumination was incorporated as a mediator. Rumination may not be directly associated with poorer illness outcomes in depressed patients, but may assist in preventing the specific recall of memories which in turn is associated with poorer illness outcomes. However, one study reported that depression severities at a six month follow-up was predicted by the intrusion and avoidance of stressful memories in depressed patients rather than by overgenerality (Brewin, Reynolds & Tata, 1999).

In patients with recurrent forms of depression, overgeneral autobiographical memory specificity appears to remain stable despite continued treatment by antidepressant medication, suggesting that overgeneral memory may be a function of the number of previous depressive episodes experienced (Nandrino et al., 2002). Interestingly, the severity of overgeneral memory also appears to be predictive of outcomes following electro-convulsive therapy (ECT) in depressed patients, with overgeneral patients reporting greater increases in depression severities following ECT than specific patients (Raes et al., 2008a). These studies would appear to support the notion that physiological treatments do not address the underlying cognitive processes implicated in overgeneral memory.

Modification of Overgenerality in Autobiographical Memory Recall

There is some evidence to suggest that cognitive-behavioural therapies can assist in improving autobiographical memory specificity. McBride and colleagues (2007) reported

improvements in the recall specificity of extended memories, memories for events lasting more than one day, in a group of depressed patients who had received a 16 week course of CBT compared to depressed patients receiving pharmacotherapy. However, improvements in the recall of specific memories, and reductions in the quantity of overgeneral memories recalled were noted in both groups at the end of therapy (McBride, Segal, Kennedy & Gemar, 2007). One study has failed to observe significant changes in memory specificity following group cognitive therapy in euthymic patients with histories of recurrent depression (Spinhoven et al., 2006). Whilst CBT appears to have had an effect upon improving the recall specificity for extended memories (McBride et al., 2007), more focused CBT interventions may be required to address the dysfunctional autobiographical memory recall.

Mindfulness-based cognitive therapy (MBCT) has also been demonstrated to reduce overgeneral memory in patients with major depressive disorder (Williams, Teasdale, Segal & Soulsby, 2000). MBCT incorporates exercises to train patients to focus more on momentary experiences rather than engaging in ruminative thinking or thought processes that take attention away from their present situation (Ma & Teasdale, 2004). In a sample of individuals who had recovered from major depressive disorder, participants who were assigned to an eight week MBCT intervention had significant reductions in overgeneral memory compared to those who received ongoing treatment as usual (Williams et al., 2000). Promoting mindful thought processes may assist in improving the specificity of overgeneral memory recall via improving cognitive flexibility and executive processing capacity (Williams et al., 2000). Research in a non-depressed sample reported that individuals who completed an MBCT intervention had improved memory specificities and improved their performance on measures of cognitive flexibility and the inhibition of automatic responses to stimuli (Heeren, Van Broeck & Philippot, 2009).

Memory Specificity Training (MeST), a psychological intervention focused upon improving the specificity of autobiographical memory recall, has also provided support for the notion that overgeneral memory is modifiable (Raes, Williams & Hermans, 2009). MeST is a one-to-one psychotherapy delivered over the course of four weeks in one hour sessions with a clinical psychologist. MeST incorporates psychoeducation regarding memory functioning and its impairments in relation to depression, in addition to activities that aim to promote specific memory recall, for example through focusing the client upon the retrieval of sensory and peripheral details of memories (for a thorough description of the MeST procedure, please see Raes et al., 2009).

A recent pilot study reported improvements in memory specificity in a sample of ten patients with major depressive disorder following a four week MeST intervention, with

these improvements being independent of changes in depressive symptoms (Raes et al., 2009). Improvements in problem solving, feelings of hopelessness, and ruminative thinking patterns were also observed at post-treatment. The authors also noted that some participants reported improved awareness of the detail in their environment (Raes et al., 2009), which may indicate that improved memory recall through MeST training may be associated with improvements in mindfulness.

Whilst two studies have reported improvements in memory specificity in depressed patients receiving CBT (Williams et al., 2000; McBride et al., 2007), the application of Memory Specificity Training (MEST) reported improvements in overgeneral memory which were independent of current mood states (Raes et al., 2009). The lack of a significant change in memory specificity following group cognitive therapy in Spinhoven and colleagues' study (2006) may be due to the group CBT format and the absence of techniques focused upon improving memory specificity. Although these are only preliminary studies, there is some encouraging evidence to suggest that the application of CBT may assist in improving the recall specificity of autobiographical memories.

There is limited evidence to suggest that pharmacological therapies can assist in alleviating overgeneral memory (McBride et al., 2007). Whilst pharmacological treatments may assist in stabilising mood patterns, only cognitive-behavioural techniques appear to assist in modifying underlying information processes implicated in reduced memory specificity, and the cognitive restructuring of dysfunctional cognitions and self-schemas.

Overgeneral Memory & Problem Solving

In addition to impacting upon illness outcomes, the overgeneral recall of autobiographical memories has also been associated with deficits in psychosocial problem-solving capabilities (Goddard et al., 1996; Raes et al., 2005a; Williams et al., 2006). The problem solving hypothesis suggests that the overgeneral retrieval of autobiographical memories prevents the access and subsequent application of previously successful problem-solving strategies stored in the memory system to current problems (Williams, 1996).

The ability to successfully resolve problematic situations encountered in the environment has been suggested to be a fundamental component of maintaining positive well-being (Bell & D'Zurilla, 2009). Indeed, poor problem solving skills, in terms of the generation of less effective solutions, are associated with increased depressive symptom severities in patients with major depressive disorder (Marx, Williams & Claridge, 1992; Garland, Harrington, House & Scott, 2000). In extreme cases, deficits in problem-solving and in the specific recall of autobiographical memories have been reported in individuals

with histories of attempted suicide (Evans, Williams, O'Loughlin & Howells, 1992; Sidley, Whitaker, Calam & Wells, 1997; Arie, Apter, Orbach, Yefet & Zalzman, 2008).

In a non-clinical student sample, Williams and colleagues (2006) reported that the induction of a specific memory recall style was associated with the production of more effective solutions to problems on the Means-End Problem Solving task (MEPS: Williams et al., 2006). The MEPS is a problem-solving task which requires participants to generate solutions to a range of hypothetical problematic situations, with problem-solving performance usually assessed by the number of solution steps participants generate in relation to these scenarios (Platt & Spivak, 1975). A second study conducted by the same researchers observed that the induction of a specific memory recall strategy, through the presentation of highly imageable cue words, was associated with the production of more effective solutions and a greater number of relevant solution means on the MEPS (Williams et al., 2006). It would appear that the generation of effective solutions on the problem solving task is modifiable through the increased availability of autobiographical memories for retrieval.

Within clinical samples, the overgeneral recall of autobiographical memories by patients with major depressive disorder has been associated with poorer performances on measures of problem solving, with depressed patients found to generate fewer effective solution steps and less effective solutions to problems (Goddard et al., 1996; Raes et al., 2005a). The association between deficits in social problem solving and reduced memory specificity has also emerged in samples of dysphoric students (Goddard, Dritschel & Burton, 1997).

Summary

In sum, the overgeneral recall of autobiographical memories appears to present a considerable impact upon an individual's well-being. The tendency to recall autobiographical memories in overgeneral levels of detail has been associated with prospective increases in depressive symptoms (Raes et al., 2006a; Sumner et al., 2010), with lower likelihoods of recovering from depressive episodes (Hermans et al., 2008), and is predictive of poorer responses to treatment by medication and by electro-convulsive therapy (Brittlebank et al., 1993; Raes et al., 2008a). A lack of specificity in the recall of autobiographical memory has also been associated with impairments in the effective resolution of psychosocial problems (Goddard et al., 1997; Williams et al., 2006). The association between reduced memory specificity and impaired problem solving capabilities suggests that overgeneral individuals are unable to recall previously successful problem

solving strategies which they are then unable to apply to their current and future problems, potentially leading to future exacerbations of depressed states.

Whilst there is some encouraging evidence to suggest that psychotherapy may be effective in reducing the severity of overgeneral autobiographical memory, these studies are largely small-scale and preliminary in nature. The development of Memory Specificity Training (MeST) shows promise (Raes et al., 2009), although further evaluation is required in relation to the effectiveness of MeST for prospective illness outcomes. However, the majority of studies investigating the effect of psychotherapy upon overgenerality have been conducted within depressed patient samples, so it is unclear how such therapies may assist in improving the specificity of autobiographical memory recall in other psychopathological disorders. Although it has been argued that overgeneral autobiographical memory recall may function as a transdiagnostic process (Harvey, Watkins, Mansell & Shafran, 2004), which would suggest that these therapeutic interventions could be applicable to and effective for use with other mental health conditions, such as anxiety, schizophrenia, and bipolar disorder.

1.3.6 *Overgeneral Autobiographical Memory in Bipolar Disorder*

As is evident from the previously reviewed studies, there is an abundance of research conducted within samples of depressed patients and dysphoric individuals. There is also an emerging literature investigating the nature of autobiographical memory recall in individuals with diagnoses of bipolar disorder, in the attempt to explore whether an overgeneral memory bias is present in bipolar individuals.

Scott and colleagues (2000) first observed that individuals in remission from bipolar disorder recalled more overgeneral autobiographical memories than non-bipolar controls, across both positive and negative cues. The bipolar participants also generated fewer relevant solutions and less effective solutions on the Means-End Problem Solving task, in line with previous observations in depressed samples (Goddard et al., 1996; Raes et al., 2005a), and reported more extreme dysfunctional attitudes than controls (Scott et al., 2000). However, as Scott and colleagues (2000) did not include a comparison group of patients with major depressive disorder, it was unclear as to whether overgenerality acts as a similar cognitive vulnerability process for both bipolar disorder and major depressive disorder.

A subsequent study addressed this limitation and reported that individuals in remission from bipolar disorder generated more overgeneral memories in response to negative cue words in comparison to remitted unipolar patients (Mansell & Lam, 2004). The bipolar participants also reported the more frequent recollection of negative memories

in everyday life, and the experience of more previous depressed episodes than the depressed patients. The extent of overgeneral memory may be a function of the number of prior episodes of depression experienced, where the recurrence of clinically significant depressed states reinforces overgenerality, possibly by reinforcing negative self-schemas. Alternatively, the overgeneral recall and the more frequent rehearsal of negative memories may have been caused by rumination, particularly as research has suggested that negative ruminative thought processes are prevalent even during remission from bipolar disorder (Thomas et al., 2007; Van der Gucht et al., 2009). Mansell and Lam (2004) also noted that 95% of the specific autobiographical memories involved the recall of a mental image, consistent with hypothesised role of sensory-perceptual information in the identification and recall of specific memories (Conway & Pleydell-Pearce, 2000).

A later study by Tzemou and Birchwood (2007) reported no significant differences in memory specificity or problem-solving capabilities between currently hospitalised bipolar and unipolar patients, although both patient groups recalled fewer specific memories and generated fewer solutions to problems than non-depressed controls. However, the bipolar patients reported more specific autobiographical memories for positive cues and improved problem-solving at a 12 week follow-up compared to depressed patients. Both bipolar and unipolar participants reported the experience of intrusive memories, whilst the authors noted that those individuals who reported fewer intrusive memories also reported more extreme overgeneral memory specificity (Tzemou & Birchwood, 2007). This association would support the hypothesised affect regulatory role of overgeneral memory, whereby the avoidance of recalling memories in specific levels of detail prevents the recall of unpleasant emotions associated with such memories. Both the unipolar and bipolar patients performed similarly on the AMT and problem-solving tasks, suggesting that similar patterns of deficits in these cognitive processes are shared by these conditions.

A recent study reported that currently manic bipolar patients generated fewer specific memories in response to negative cue words compared to non-bipolar controls (Van der Gucht et al., 2009). The same study also reported similar mean numbers of specific negative memories recalled by currently depressed and remitted bipolar patients, but found no significant correlations between manic and depressive symptoms with memory specificity (Van der Gucht et al., 2009). The lack of significant relationships between current symptoms and memory specificity could be consistent with the notion that it is the maladaptive cognitive processes and not current moods or symptoms which are associated with overgenerality.

Interestingly, a case study of a patient with rapid cycling bipolar disorder, who experienced cycling in moods from depression to mania on a daily basis, reported that depressed days were associated with the recall of more general and less pleasant autobiographical memories, whilst manic days were associated with the recall of more specific memories (Lam & Mansell, 2008). Memory recall was also faster on manic days, but was slower and appeared to be more effortful on depressed days.

In a study investigating the affect regulation hypothesis, Mowlds and colleagues (2010) failed to observe an association between the severity of childhood trauma and the overgeneral recall of autobiographical memories in adult patients with bipolar disorder. The study did find that the severity of childhood trauma was associated with the severity of inter-episode depressive mood states (Mowlds et al., 2010). However, the study assessed the severity of traumatic experiences via self-report questionnaire measures, which has previously been criticised for ignoring the more subjective aspects of experienced traumas (Raes et al., 2005b). Whilst Mowlds and colleagues' study (2010) has focused upon the role of traumatic life events in relation to overgeneral memory, there is still a paucity of research into the role of traumatic and non-traumatic life events in the specificity of autobiographical memory recall in bipolar individuals. It is feasible that the experience of childhood traumas may be implicated in the development of overgeneral memory specificities in bipolar adults, particularly as research has associated the experience of life events with symptom exacerbation in bipolar individuals (Johnson, 2005a; Johnson et al., 2008b). Overgeneral autobiographical memory in bipolar disorder may not just be a function of the experience of traumatic childhood events, but more of an interaction between childhood trauma and life events experienced in adulthood.

At present, only one study has taken a behavioural high-risk approach when investigating whether an overgeneral autobiographical memory bias contributes to the vulnerability to bipolar disorder. Delduca and colleagues (2010) reported that individuals at an elevated risk for hypomania generated more specific negative autobiographical memories than low-risk individuals. High-risk participants were also faster to recall specific negative memories than individuals at a low-risk for mania (Delduca, Jones & Barnard, 2010). Whilst Delduca and colleagues present their findings in relation to the Interacting Cognitive Subsystems framework (Barnard & Teasdale, 1991), where specific memory recall is considered to arise due to experiential forms of processing associated with mania, the specific recall of negative memories in hypomanic individuals may also lend support to the manic defence/depression avoidance hypothesis. The increased availability of negative autobiographical memories in the hypomanic participants in Delduca and colleagues' (2010) study, possibly relating to underlying negative self-

schemas, may prompt exacerbations in (hypomanic) mood states in a dysfunctional attempt to cope with self-negative cognitions.

The notion of a negative self-concept in relation to autobiographical memory in bipolar disorder has also been described in a qualitative analysis of autobiographical memories from a previous study (Mansell & Lam, 2004; Mansell & Hodson, 2009). Mansell and Hodson (2009) identified several themes from recalled memories relating to a negative self-concept, as well as to feelings of isolation and victimisation. Positive memories were associated with themes relating to perceptions of the self from the perspective of other individuals, including memories of positive feedback and interactions with other individuals. Mansell and Hodson (2009) did not find evidence to support the notion of a positive self-concept which is internally devised and independent from outside influence. Rather, their analyses suggested that bipolar individual's memories related very much to a pervasive negative self-concept and need for positive feedback from other individuals (Mansell & Hodson, 2009). One interpretation of this finding may again relate to the manic-defence/depression avoidance hypothesis, whereby the existence of a pervasive negative self-concept could be rooted within the autobiographical memory knowledge base. Individuals with bipolar disorder may attempt to avoid self-negative information in the form of autobiographical memories by aborting recall at an intermediate level in the memory system, to avoid recalling memories associated with negative emotions and unpleasant information about the self.

However, a limitation with Mansell and Hodson's (2009) study is that their analyses were conducted upon data collected in an earlier study where individuals in remission from bipolar disorder reported more overgeneral negative memories than remitted depressed patients, and had experienced more previous episodes of depression (Mansell & Lam, 2004). The observations that bipolar disorder is associated with extreme negative self-concepts may reflect the frequency of depressed episodes experienced by the bipolar patients in that particular study.

A separate line of research has explored the role of imagery in relation to goals associated with autobiographical memories. Conway and colleagues (2004) have suggested that goals are implicit processes derived from the available self-knowledge in autobiographical memory. In relation to psychopathology, it has been suggested that imagery may contain information relating to avoidance goals (Conway, Meares & Standart, 2004), with high prevalences of intrusive images in memories relating to avoidance and approach goals noted within a transdiagnostic clinical sample (Reid, 2009). As such, mental imagery pertaining to goals is considered to reflect the ongoing concerns

of the individual, and may serve to direct future goal-related behaviours in order to address current concerns.

Whilst it has been suggested that autobiographical memory, mental imagery and goals are inter-related, little research has been conducted into the role of these factors in relation to the experience of bipolar disorder, which is surprising given that bipolar individuals are particularly sensitive to goal-directed behaviours and cognitions (Johnson, 2005b).

Gregory and colleagues (2010) conducted a study which investigated the prevalence of intrusive memories and mental imagery relating to goals in past hypomanic, depressive and euthymic episodes. Using a semi-structured interview, a sample of currently euthymic bipolar individuals reported that previously experienced euthymic states were associated with intrusive memories of the past, often relating to past negative experiences, which were rated as being less distressing and intrusive compared to negative memories which intruded previous depressed episodes. Hypomanic episodes were associated with images related to positive future events, with such images rated as being experienced as particularly vivid, enjoyable, and real, whilst intrusive images relating to past negative experiences were less frequently reported as occurring during previous hypomanias. Interestingly, both positive and negative mental imagery relating to the future were rated as being high in their realism and were goal-related in nature (Gregory, Brewin, Mansell & Donaldson, 2010). A summary table (Table 1.3.3) detailing the published research investigating autobiographical memory specificity in bipolar disorder is presented on the following page.

Table 1.3.1. A table of studies investigating autobiographical memory specificity in samples of bipolar patients and at-risk individuals.

	Sample	Design	Findings
Scott et al. (2000)	41 euthymic BD, 20 HC	Cross-sectional AMT & MEPS	Overgeneral AM: BD > HC, BD = poorer MEPS performance than HC
Mansell & Lam (2004)	19 remitted BD, 16 remitted UD	AMT	BD recalled more negative OG AMs than UD, Specific AMs associated with mental images
Tzemou & Birchwood (2007)	29 episodic BD, 21 UD, 20 HC	AMT & MEPS (inc. 12 week follow-up)	BD and UD performed similarly on OG AM and MEPS effectiveness, but both worse than HC.
Lam & Mansell (2008)	1 rapid cycling BD patient	Case study, non-standardised AMT	Depressed mood associated unpleasant & OG AMs, Mania associated with pleasant and specific AM recall
Mansell & Hodson (2009)	(same as Mansell & Lam, 2004)	IPA	IPA suggested that AM in BD features a pervasive negative self-concept
Van der Gucht et al. (2009)	41 HC, 30 depressed BD, 34 hypo/manic BD, 43 euthymic BD	AMT (+ many other psychological tests)	Currently hypo/manic BD patients recall more OG negative AMs than other participants.
Delduca et al. (2010)	14 high-risk & 14 low-risk students (HPS scores)	AMT	High-risk students faster to recall more specific negative AMs than low-risk students
Gregory et al. (2010)	29 euthymic BD	AM Interview	Euthymia and depression associated with neg intrusive AMs and imagery, hypomania associated with pleasant future images
Mowlds et al. (2010)	52 BD	AMT	Low AM specificity in BD, but no association between childhood trauma and AM

Key: AM = Autobiographical Memory, AMT = the Autobiographical Memory Test, BD = Bipolar Disorder (patients), HC = healthy controls, HPS = Hypomanic Personality Scale, IPA = Interpretative Phenomenological Analysis, MEPS = Means-End Problem Solving task, OG = Overgeneral (autobiographical memories), UD = Unipolar Depression.

1.3.7 *Conclusions*

It is clear from this review that the overgeneral recall bias for autobiographical memories is implicated in the affective disorders, functions as a cognitive vulnerability factor for depression, and is associated with poorer illness outcomes in depressed patients. There is some research to suggest that the overgenerality is modifiable through therapy (e.g., Williams et al., 2000; McBride et al., 2007; Raes et al., 2007), suggesting that these poor outcomes in patient samples may be avoidable through effectively designed and targeted therapeutic interventions. There also appear to be a number of different pathways to overgenerality in autobiographical memory, which may or may not be inter-related, such as the engagement in ruminative and verbal thought processes (e.g., Crane et al, 2007), reduced executive processing capacities (e.g., Dalgleish et al, 2007), and the attempt to regulate current mood states through overgenerality (e.g., Hermans et al., 2005; 2007), often following the experience of traumatic life events (e.g., Hauer et al., 2008).

Whilst studies have suggested that the overgeneral recall of autobiographical memories may be as much of a feature of bipolar disorder as unipolar depression (e.g., Scott et al., 2000; Mansell & Lam, 2004), few studies have been conducted in bipolar samples. There are also some methodological limitations with these studies, which present some challenges to understanding the role of autobiographical memory in bipolar disorder. For example, patients in different stages of illness have been sampled across studies, ranging from remitted and euthymic patients (Scott et al., 2000; Mansell & Lam, 2004), to acutely unwell patients (Tzemou & Birchwood, 2007; Lam & Mansell, 2008). Tzemou and Birchwood's (2007) use of a sample of patients currently experiencing various bipolar episodes may have ignored some subtle differences in autobiographical memory, particularly as Gregory and colleagues (2010) have suggested that different memory processes occur across different bipolar mood states. There are also some issues regarding inter-study differences in the assessment of autobiographical memory. For example, Mansell and Lam (2004) asked their participants to qualify their identified autobiographical memories across a number of features prior to the full recall of these memories, which may have unintentionally primed the recall of additional information which may not have been recalled under normal conditions. Some studies have also used non-standardised assessments of memory recall, such as semi-structured interviews (Gregory et al., 2010). Whilst other studies have adopted cue words used in previous research conducted within depressed and suicidal samples, which may not adequately prime memories of positive experiences associated with bipolar disorder (Delduca et al., 2010). Although, Mansell and Lam (2004) have used a number of bipolar-relevant cues in their study which would appear to more adequately probe bipolar-relevant experiences.

It remains unclear how the psychological mechanisms associated with overgenerality are implicated in overgeneral memory in individuals with bipolar affective disorders. Although the study by Van der Gucht and colleagues (2009) measured rumination and memory specificity in bipolar participants, they did not investigate the associations between these variables. Mowlds and colleagues (2010) reported an investigation into the affect regulation hypothesis in adult bipolar patients but failed to observe an association between the severity of childhood trauma and memory specificity. Tzemou and Birchwood's (2007) noted that those individuals who didn't experience intrusive memories were more overgeneral in their autobiographical memory recall, across both unipolar and bipolar patients, suggesting that these participants were avoiding potentially stressful memories through overgenerality. However, the experience of trauma in Tzemou and Birchwood's study was largely confined to adulthood, suggesting that more recently experienced life events are associated with overgenerality in bipolar disorder. The hypothesis that adult traumatic experiences are associated with reduced memory specificities in bipolar patients would be consistent with the lack of an association between childhood traumas and adulthood overgenerality reported by Mowlds et al. (2010).

No study has yet investigated whether the relationship between executive processing capacities and overgenerality is applicable to bipolar disorder. There is mixed evidence as to whether individuals currently in remission from bipolar symptoms continue to experience dysfunctions in executive function, with studies suggesting that executive dysfunction are only associated with depressed states (Maalouf et al., 2010), with other studies suggesting that bipolar individuals in remission from symptoms experience ongoing executive dysfunction (Ferrier, Stanton & Scott, 1999; Mur et al., 2007). In sum, there has been a limited attempt to understand the psychological processes associated with the specificity of autobiographical memory recall in bipolar spectrum individuals.

Whilst non-clinical studies have suggested that the overgeneral memory bias may function as a cognitive risk factor for depression (Gibbs & Rude, 2004), only one study has explored memory specificity in relation to the vulnerability to bipolar disorder (Delduca et al., 2010). At present, it is not clear whether similar biases in autobiographical memory recall are shared by individuals on the bipolar spectrum, inclusive of at-risk individuals and patients diagnosed with bipolar disorder. It is also unclear how the mechanisms implicated in the overgeneral autobiographical memory bias may be associated with the vulnerability to bipolar disorder. Further research is required to establish whether bipolar disorder and the risk for bipolar disorder are associated with overgenerality, particularly for negative memories, and how the psychological mechanisms implicated in overgeneral memory recall in unipolar forms of depression contribute to memory specificity in bipolar disorder.

Section 1.4

The Current Thesis: Theory, Research Aims & Hypotheses

This section will provide an outline of the work presented in the thesis, including a theoretical background based upon the previous literature reviews, a description of the research aims and hypotheses, and an overview of the studies reported in subsequent sections.

1.4.1 Autobiographical Memory Recall in Bipolar Disorder

There is now a growing empirical literature which has investigated the nature of autobiographical memory recall in individuals diagnosed with bipolar disorder, although these studies remain few in number in comparison to the literature in major depressive disorder. An emergent pattern from these studies is that individuals with bipolar disorder appear to possess an overgeneral recall bias for autobiographical memories, particularly during remission from symptoms (e.g., Scott et al., 2000; Mansell & Lam, 2004). Although one study has suggested that individuals in remission from bipolar disorder are more overgeneral in their recall of negative autobiographical memories, when compared to remitted unipolar patients (Mansell & Lam, 2004). However, further investigation is warranted into autobiographical memory recall in bipolar disorder in order to determine whether this overgeneral bias for emotionally negative memories is not simply a function of the methodological issues highlighted in previous studies (see Section 1.3).

The availability of overgeneral negative autobiographical memories for recall by bipolar individuals may reflect the highly accessible nature of negative self-schematic models (e.g., Mansell & Lam, 2004; Mansell & Hodson, 2009), where both general memories and schematic models feature propositional information about the self in relation to past experiences. The availability of negative self-propositional information in the form of autobiographical memories may be prompted by the activation of negative self-schemas, and may also reinforce such schematic models in a negative feedback loop, which is maintained by and encourages ruminative thought, leading to overgenerality in autobiographical memory through mnemonic interlock (Williams, 1996, 2006). Even in remission, bipolar disorder has been associated with the engagement in negative rumination (Thomas et al., 2007; Van der Gucht et al., 2009), the overgeneral recall of autobiographical memories (Scott et al., 2000; Mansell & Lam, 2004), as well as with the endorsement of negative dysfunctional attitudes relating to self-schemas (Scott et al., 2000). Whilst bipolar individuals recall negative memories in more general levels of detail, they also report the more frequent recollection of these memories in day-to-day life,

suggesting that self-negative information in the form of memories remains readily accessible even during euthymic states (Mansell & Lam, 2004). Although bipolar disorder is characterised by extreme mood swings, incorporating both elevated and depressed mood states, there appears to be empirical and theoretical support for the argument that bipolar disorder is associated with an overgeneral recall bias for negative autobiographical memories, possibly reflecting readily available self-negative information, similar in nature to the bias reported in unipolar depression. It is currently unclear, based upon the theoretical models of bipolar disorder and the previous autobiographical memory whether bipolar individuals may have an overgeneral bias for positive memories.

From the perspective of the bipolar disorder continuum, there is a lack of clarity regarding the role of autobiographical memory recall specificity as a potential risk factor for bipolar disorder, and how memory recall may be associated with other cognitive processes in conferring a vulnerability to bipolar spectrum disorders. For example, the engagement in negative forms of ruminative thinking styles and the inability to generate effective solutions to psychosocial problems have individually, and in combination, been associated with the vulnerability to unipolar depression (Nolen-Hoeksema, 1991; Lyubomirsky & Nolen-Hoeksema, 1995; Raes et al., 2005a). In terms of autobiographical memory recall, negative rumination is considered to restrict the recall of specific representations of autobiographical memories through “mnemonic interlock” (Williams, 1996), with the inability to fully recall memories considered to restrict the application of previously successful problem-solving strategies to current and future problems (Raes et al., 2005a; Williams, 2006; Williams et al., 2006). Whilst there is the argument that similar processes may be implicated in the vulnerability to bipolar disorder and major depressive disorder (Scott et al., 2000), due to the shared experiences of depression in the two conditions, it is unclear how cognitive processes such as rumination, memory recall and problem-solving are together associated with the vulnerability to hypomania and future bipolar disorder.

Although negative ruminative thought processes appear to be implicated in overgeneral memory recall, the way in which ruminative responses to positive emotional states and experiences affects memory specificity remains unclear. One possibility is that the engagement in positive rumination contributes to a positive form of “mnemonic interlock” whereby the memory recall process results in the over-elaboration of general positive memories, encouraging further positive ruminative thought and the maintenance of positive affect in at-risk and bipolar individuals. Positive mnemonic interlock may lead to a focus during memory recall upon analysing propositional information about the self in relation to past experiences. Alternatively, positive forms of rumination may assist in the

specific recall of memories. The Interacting Cognitive Subsystems (Barnard & Teasdale, 1991) framework suggests that thought processes during activated hypo/manic states are concentrated on the implicational code, whereby information from across the memory stores located at the cognitive subsystems is abstracted into the implicational code in an experiential mode of processing (Barnard & Teasdale, 1991; Delduca et al., 2010). The increased availability of information from the sensory subsystem memory stores is thought to assist in the generation of specifically detailed memories through the increased availability of event-specific knowledge (Delduca et al., 2010), which is characterised by sensory-perceptual information unique to a specific event (Conway & Pleydell-Pearce, 2000). In support of this, Talarico and colleagues (2009) have reported that positive affect appears to enhance the recall of peripheral details for autobiographical memories in a non-clinical sample, whilst negative affect was more exclusively associated with the recall of central memory details (Talarico, Bernsten & Rubin, 2009). Talarico and colleagues' study may be consistent with the notion that experiential forms of processing associated with positive emotional states assist in the recall of more detailed memory representations, possibly through the activation and abstraction of information located in the subsystem memory stores proposed by ICS (Barnard & Teasdale, 1991).

1.4.2 Research Aims

Rationale

The research presented within this thesis is motivated by several factors. Primarily, the studies presented in the current thesis are motivated by a lack of research into the psychological processes associated with bipolar disorder, particularly a lack of understanding regarding the specificity of autobiographical memory recall in bipolar individuals and the role of memory specificity as a vulnerability factor for bipolar spectrum disorders. Although a small number of studies have investigated memory specificity in bipolar samples, there are a number of methodological issues with these studies (See Section 1.3). In addition, only one study has investigated whether the vulnerability to hypomania and future bipolar disorder is associated with an overgeneral memory recall bias, with mixed success (Delduca et al., 2010).

Theoretically, there are arguments that individuals with bipolar disorder and those at-risk may report similar patterns of memory specificity, in line with a continuum conceptualisation of bipolar disorder across patients and vulnerable individuals. The current thesis aimed to investigate the specificity of autobiographical memory in bipolar individuals, by addressing methodological issues identified with previous studies, and also aimed to investigate the cognitive processes associated with overgenerality to determine

whether similar cognitive vulnerability factors associated with depression are associated with the risk for bipolar disorder. There is the potential for the work presented in the current thesis to contribute to the refinement of psychological therapies for bipolar disorder by improving the scientific understanding of the processes implicated in memory recall. As the overgeneral recall appears to be a vulnerability factor for affective disorders (e.g., Gibbs & Rude, 2004), and that preliminary studies have suggested that cognitive-behavioural interventions can assist in improving memory specificity and illness outcomes in patients diagnosed with mood disorders (McBride et al., 2007; Raes et al., 2009; Williams et al., 2000), the investigation of autobiographical memory specificity for bipolar disorder may ultimately assist in refining cognitive and memory-focused therapies for individuals diagnosed with bipolar disorders. A number of broad research aims were outlined as part of the current thesis, with more specific hypothesis devised for each individual study.

Research Aim 1

Investigate the associations between positive and negative cognitive style measures implicated in mood disorders

The first research aim of the thesis was to investigate the associations between positive and negative forms of rumination and cognitive styles, in particular the conceptual overlap across cognitive style measures associated with bipolar disorder (Study One) and how such measures are associated with prospective mood symptoms in an analogue sample (Study Two). Previous research has suggested that the vulnerability to hypomania and bipolar disorder may be associated with the engagement of both positive and negative forms of rumination, and the endorsement of both positive and negative forms of self-appraisal. However, it was unclear from these previous studies whether self-appraisals or rumination make the greater contribution to the vulnerability to bipolar affective disorders.

Study One investigated the associations between measures of positive and negative cognitive style measures in relation to the vulnerability to hypomania and the recent experience of depressive symptoms. It was hypothesised that both hypomania and depression would be associated with negative forms of cognitive styles, i.e. thought processes that encourage increased negative affectivity and depressive symptoms, whilst positively oriented cognitive styles were anticipated to be more exclusively associated with hypomania vulnerability, not current depressive symptoms. In terms of the conceptual overlap of the cognitive style measures, an exploratory principal components analysis (PCA) was conducted to assess the extent to which the cognitive style measures captured similar emotion regulation responses to both positive and negative experiences. Study Two

investigated how both the cognitive style measures and the components derived from the PCA were associated with bipolar mood symptoms at a six month follow-up of participants from Study 1. It was hypothesised that the positive cognitive style measures would be associated with prospective subclinical hypo/manic symptoms, with the negative cognitive style measures being more associated with prospective depressive symptoms. It was also anticipated that prospective depressive symptoms may be associated with a lack of positively valenced thought processes, consistent with previous observations in depressed samples (Johnson et al., 2008a).

Research Aim 2

Investigate the cognitive vulnerability to hypomania in relation to autobiographical memory specificity, problem-solving capabilities, and positive and negative rumination

The second research aim was to investigate the associations between autobiographical memory specificity, positive and negative rumination, and problem-solving in relation to the vulnerability to hypomania within an analogue student population. Previous research has identified negative rumination, deficits in psychosocial problem-solving, and a reduced specificity of autobiographical memory as separate yet inter-related vulnerability factors for depression (e.g., Raes et al., 2005a). However, the way in which these cognitive processes may contribute to the vulnerability to hypomania, and bipolar disorders, is currently poorly understood. There is also a dearth of research into the contribution of psychosocial problem-solving towards hypomania vulnerability in at-risk individuals.

In order to investigate between-group differences in psychosocial problem-solving between students at a low and a high risk for hypomania, a means-end problem-solving task was developed for use with British students (the UMEPS: "University Means-End Problem-Solving task"). The UMEPS featured problematic situations that British undergraduates were likely to encounter whilst studying at a British university, such as problems relating to issues regarding student finance, degree coursework, and worries over graduate career prospects. Previous research has relied upon the "Means-End Problem Solving" task to measure problem-solving in patient samples (Platt & Spivack, 1975); however, subsequent studies have had to omit or adapt the items from the original MEPS task for use with student samples (Lyubomirsky & Nolen-Hoeksema, 1995). The UMEPS items were developed in Study Three, with performance on the UMEPS compared between students currently reporting high and low severities of depressive symptoms to confirm whether subclinical depression is associated with deficits in problem-solving. Study Four investigated the associations between problem-solving as measured by the UMEPS with

appraisals of defeat and entrapment associated with depression and suicidality in a second validation of the UMEPS in a separate sample. Study Five adopted a selection of the UMEPS items and investigated group differences in problem-solving, ruminative thought processes and memory specificity between students at a low and a high risk for hypomania. Study Five also adopted a sentence completion measure of autobiographical memory (Raes et al., 2007) to allow comparisons with previous other studies which have used the traditional cued memory paradigm, namely, the Autobographical Memory Test (AMT; Williams & Broadbent, 1986). The sentence completion task is considered to be a more sensitive measure of trait-based tendencies to recall general memories in non-clinical samples compared to the AMT (Raes et al., 2007).

Study Three hypothesised that effective problem-solving as measured by the UMEPS would be negatively associated with the severity of depressive symptoms and positively associated with resourcefulness behaviours relating to effective problem-solving. Study Four hypothesised that self-appraisals of defeat and entrapment would be associated with reduced effectiveness of problem-solving within an analogue sample. This hypothesis is consistent with the notion that those individuals who are unable to effectively problem solve their way out of defeating and entrapping situations would have more extreme feelings of defeat and entrapment, increased depression and greater suicide risk. Study Five hypothesised that individuals at a high risk for hypomania would report poorer means-end problem-solving, greater severities of overgeneral memory recall, and elevated tendencies to engage in ruminative responses to positive and negative moods compared to low-risk individuals. This hypothesis is consistent with previous observations made in samples of bipolar patients (e.g., Scott et al., 2000; Tzemou & Birchwood, 2007), and is consistent with a continuum conceptualisation of bipolar disorder, where patients and at-risk individuals are located on one spectrum of increasing severity (from individuals at a low risk for bipolar disorder to those diagnosed with severe bipolar disorders) (Depue et al., 1981; Eckblad & Chapman, 1986).

Research Aim 3

Investigate the relationship between the autobiographical memory specificity and the planning and pursuit of goals in relation to hypomania vulnerability

The third research aim was to conduct a preliminary investigation into the relationship between memories for past goal successes and failures with the pursuit of current and future goals, in relation to the vulnerability to hypomania within a non-clinical sample. Autobiographical memories are considered to form a self-knowledge base from which a working self-concept is derived, with goals being implicit processes derived from the

content of the autobiographical memory knowledge base (Conway & Pleydell-Pearce, 2000). Individuals on the bipolar disorder spectrum, inclusive of at-risk analogue individuals and bipolar patients, have particular sensitivities towards goals and the engagement in goal-directed behaviours (Johnson, 2005; Carver & Johnson, 2009; Johnson, Eisner & Carver, 2009), with goal attainment associated with increases in manic symptom severities in bipolar patients (Johnson et al., 2000). Previous studies have also suggested that individuals with bipolar disorder report the presence of mental imagery in their cognitions and autobiographical memories (Mansell & Lam, 2004), which can be high in their perceived realism and are often goal-related (Gregory et al., 2010). However, the study by Gregory and colleagues' (2010) did not specifically investigate the relationship between the memory for goal-related events and the planning and pursuit of future goals, and no previous study has explicitly investigated the relationship between goals and autobiographical memory specificity within a bipolar or at-risk sample using a standardised memory test.

Study Six aimed to specifically investigate the relationship between goal-pursuit and goal-related memory processes within a non-clinical sample, considering that both vulnerable individuals and individuals with bipolar disorder appear to possess particular sensitivities towards goals and have tendencies to engage in goal-directed behaviours (APA, 2000; Lam et al., 2004; Johnson, Ruggero & Carver, 2005). Furthermore, goals have been conceptualised as processes which are derived from autobiographical memory (e.g., Conway & Pleydell-Pearce, 2000). Hence, there is a sound theoretical rationale for examining goals in relation to goal pursuit and goal-related memories. It was hypothesised that the vulnerability to hypomania would be associated with extreme goal pursuit, and increased reward sensitivities through heightened behavioural activation, in line with previous observations (e.g., Jones et al., 2007; Carver & Johnson, 2009; Johnson et al., 2009). Whilst previous research has suggested that individuals at a vulnerability to hypomania are more specific in their recall of negative autobiographical memories (Delduca et al., 2010), this previous study did not specifically investigate the goal-related content of recalled memories. However, goals in autobiographical memories can be represented in mental imagery, part of the sensory-perceptual information associated with specific memories, or can be more verbal and propositional in content, similar to general representations of memories (Conway, Meares & Standard, 2004). In relation to goal-related memory, it is unclear whether extreme goal-pursuit and hypomania vulnerability would be associated with the more specific or general recall of past goal-related events, therefore the specificity of goal-related memory recall was explored in Study Six.

Research Aim 4

Investigate the specificity of autobiographical memory in individuals at a low, moderate and a high risk for hypomania

The fourth research aim was to investigate the way in which the specificity of autobiographical memory recall is associated with the vulnerability to hypomania using Williams & Broadbent's (1986) Autobiographical Memory Test. The only previous investigation into autobiographical memory specificity in at-risk individuals by Delduca and colleagues (2010) reported that high-risk individuals recalled more specific memories in response to negative cues on the AMT compared to low-risk individuals. This study has been criticised for the use of negatively biased cue words which may have prompted direct forms of memory recall in the high-risk group for negative memories (see Section 1.3), a criticism acknowledged by the authors themselves (Delduca et al., 2010).

Study Seven (Section 5.2) investigated memory specificity in groups of individuals at a low, moderate or high risk for hypomania, using the Autobiographical Memory Test (Williams & Broadbent, 1986). To overcome potential problems with cue word valences, Study Seven subjected a range of positive and negative cues used in previous AMT studies to a valency-rating pre-test. It was hypothesised that the increased risk for hypomania would be associated with an increased severity of overgenerality (ranging from low, moderate to high-risk individuals). Due to the concerns regarding the cue words used in Delduca and colleagues' (2010) study, Study Seven hypothesised that individuals at a high risk for hypomania and future bipolar disorders would report an overgeneral memory bias similar in nature to those reported in samples of bipolar patients. Whilst the previous investigation into memory specificity and hypomania vulnerability suggested that at-risk individuals recall more specific negative memories (Delduca et al., 2010), providing tentative support for the depression avoidance hypothesis, it was not clear whether memory specificity was related to depression avoidance processes or due to methodological issues in that study.

Research Aim 5

Investigate the specificity of autobiographical memory in remitted bipolar individuals and matched non-bipolar controls: is there evidence for an overgeneral recall bias for negative autobiographical memories?

The fifth research aim was to replicate previous investigations into autobiographical memory recall in individuals in remission from bipolar disorder using the AMT (Study Eight). Previous studies have suggested that bipolar disorder may be characterised by an

overgeneral recall bias for negative autobiographical memories (e.g., Mansell & Lam, 2004; Van der Gucht et al., 2009). However, these previous studies contain a number of methodological flaws, including the completion of memory rating tasks prior to the recall of autobiographical memories which may have primed the specific recall of memories (Mansell & Lam, 2004). In addition, previous studies have sampled bipolar patients across different phases of illness, including currently remitted and currently episodic patients, which may complicate the interpretation of these findings (see Section 1.3).

Study Eight replicated the AMT procedure used in Study Seven within a sample of individuals diagnosed with bipolar disorder currently in remission from symptoms, to avoid potential effects of current mood states upon AMT performance, and a non-bipolar control group who were matched for age and gender with participants in the bipolar group. It was hypothesised that individuals with bipolar disorder would recall more overgeneral negative memories than the non-bipolar control group consistent with research suggesting that similar patterns of cognitive vulnerability are shared by bipolar disorder and unipolar depression (Scott et al., 2000; Mansell & Lam, 2004), and consistent with the notion that bipolar disorder is associated with a latent negative self-schema (Winters & Neale, 1985; Neale, 1988; Mansell & Hodson, 2009). To overcome methodological issues highlighted in previous studies, Study Eight used a series of bipolar-relevant positive and negative cues in the AMT (as used in Study Seven, see Section 5.4 for details), and also presented participants with a memory rating task after the completion of the AMT recall procedure.

1.4.3 Overview of Studies

A series of studies which investigate the research aims outlined above are presented within this thesis. Study One (Section 2.1) investigated the cross-sectional associations between a number of positive and negative cognitive questionnaire measures which have been associated with bipolar disorder and bipolar vulnerability, including positive and negative rumination and self-appraisal styles. Study One, a web-based study in a sample of non-clinical participants, conducted a principal components analysis upon scores on the cognitive style measures to assess whether similar affect regulatory processes may underlie these measures. Study One acted as a screening stage for a subsequent study investigating the specificity of autobiographical memory in individuals at a low, moderate and high risk for bipolar disorder (Study Seven). Study Two (Section 2.2) describes a six month follow-up of participants who had completed Study One, and investigated the associations between the cognitive style measures and the components produced in the original study with prospective bipolar mood symptoms. Subsequent studies in this thesis have investigated the associations between the cognitive styles explored in these two studies in

relation to the specificity of autobiographical memory recall in both at-risk and bipolar individuals.

Study Three (Section 3.1) describes the development of a task designed to assess the effectiveness of problem solving strategies in British undergraduate students. Further validation of the problem solving task is described in Study Four (Section 3.2), which investigated the effectiveness of problem solving capabilities in relation to the experience of feelings of defeat and entrapment within a separate analogue sample. Study Five (Section 3.3) applied the problem solving task to investigate the between-group differences in positive and negative ruminative thought processes, autobiographical memory specificity, and the effectiveness of psychosocial problem solving, within groups of participants at a high or a low risk for hypomania and bipolar disorder.

Study Six (Section 4) investigated whether the specificity of autobiographical memory recall is associated with the specificity and affective polarity of the pursuit of goals in relation to the vulnerability to hypomania. Study Six conducted a preliminary investigation within an analogue sample to investigate the associations between the specificity of autobiographical memory recall for past failures and successes in relation to attitudes regarding the need to achieve goals, sensitivities to goals and rewards, as well as the imageability of future events.

Study Seven (Section 5.2) investigated autobiographical memory specificity in groups of students at a low, moderate, and a high risk for hypomania and bipolar disorder. Participants completed a face-to-face version of the standardised AMT procedure (Williams & Broadbent, 1986), which included six positive memory cue words (e.g., “happy”, “excited”, “successful”) and six negative cues (e.g., “hate”, “pessimistic”, “failure”). Study Eight (Sections 5.3), replicated the AMT procedure reported in Study Seven within a sample of individuals in remission from bipolar disorder and a group of age and gender matched non-bipolar controls. The study was conducted within a remitted bipolar group to ensure that performance on the memory recall tasks was not unduly influenced by extreme bipolar mood symptoms.

Studies One to Seven received institutional ethical approval from the School of Psychological Sciences Research Ethics Committee. Study Eight received ethical approval from the NHS Greater Manchester South Research Ethics Committee.

1.4.4 The Alternative Format & Publications

The thesis is presented in the Alternative Format as afforded by the University of Manchester in order to facilitate the dissemination of the work in this thesis through peer review in academic journals. For all studies, the designs, procedures, data collection and analysis, and the writing up of work for submission to journals was conducted by the author, under the supervision of Dr Gooding and Professor Jones. A number of manuscripts based upon the studies presented in this thesis have been submitted for peer review by academic journals, or are currently in preparation for submission (see below).

Section	Study	Title & Target Journal
2.1	One	Dempsey, R. C., Gooding, P. A., & Jones. S. H. (2011). Positive and negative cognitive style correlates of the vulnerability to hypomania. *Journal of Clinical Psychology*, 67(7), 673-690.
3.1	Three	Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-a*). The development of the University Means-End Problem Solving task as a measure of problem solving capabilities in British students. *Cognitive Therapy & Research.*
3.2	Four	Dempsey, R. C., Gooding, P. A., & Jones, S. H. (*submitted-b*). The differential associations between defeat and entrapment with psychosocial problem-solving. Further validation of the University Means-End Problem Solving Task. *Behaviour Research and Therapy*.
3.3	Five	Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-c*). Investigating the cognitive vulnerability to hypomania: Associations between autobiographical memory specificity, positive and negative rumination, and problem-solving capabilities in high and low risk individuals. *(Target journal TBC)*
4.0	Six	Dempsey, R. C., Jones, S. H., & Gooding P. A. (*submitted-d*). A preliminary investigation into the relationship between goal-related memory recall and dysfunctional goal planning and pursuit in individuals vulnerable to hypomania. *Cognitive Therapy & Research.*
5.2	Seven	Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-e*). Autobiographical memory specificity in individuals vulnerable to hypomania. *Memory*.
5.4	Eight	Dempsey, R. C., Gooding, P. A., & Jones, S. H. (*submitted-f*). The availability and specificity of autobiographical memory in individuals in remission from bipolar disorder. *Journal of Abnormal Psychology*.

Section 1.5

The Current Thesis: Methodology

1.5.1 Methodological Approaches

This section details the reasoning underlying the methodological approaches utilised in this thesis, and describes the specific measures used across the various studies presented in subsequent sections.

Assessing the specificity of Autobiographical Memory Recall

The dominant experimental paradigm used to investigate the specificity of autobiographical memory recall is the cued memory task devised by Williams and Broadbent (1986), the "Autobiographical Memory Test" (AMT). The AMT presents participants with a series of cue words and requires participants to recall specific autobiographical memories within a specified time limit (between 30-60 seconds). Responses on the AMT are recorded for later transcription and are coded as to whether responses refer to specific or general events, with general events differentiated according to whether they refer to extended events (e.g., "*When I spent a week on holiday in…*"), repeating events or categories of events (e.g., "*When I went to watch the football…*"), or semantic information about the self (e.g., "*I was always good at school…*"). The response latency, the time taken for participants to recall a memory, can also be taken as a measurement of the availability of memories for recall (e.g., Delduca et al., 2010).

However, it has been argued that the AMT may not be sufficiently sensitive to detect subclinical tendencies to recall autobiographical memories in general levels of detail, particularly in student samples (Raes et al., 2007). Indeed, previous studies have identified that low frequencies of general memories are recalled on the AMT task in student populations, and it has been suggested that non-clinical participants with trait-based tendencies to be overgeneral in memory recall are more specific in their memory recall on the AMT task due to the repetition of task instructions and use of practice trials (Raes et al., 2007). To counter this, Raes and colleagues (2007) devised a sentence completion task as a more sensitive measure of overgenerality in autobiographical memory in student samples (the Sentence Completion for Events from the Past Test: SCEPT). In this task, participants are asked to complete a number of sentence stems in reference to a past event (e.g., "Last year I…"), with less emphasis placed upon recalling a specific memory. Indeed, Raes and colleagues (2007) noted that a greater number of overgeneral responses were made on the SCEPT in comparison to the standardised AMT in a sample of non-depressed students (see Appendix for SCEPT items).

In the current thesis, Study Five, an internet-based study, adopted the SCEPT to investigate the group differences in memory specificity, problem solving, and positive and negative forms of rumination in students at low and high risks for hypomania. Study Six used an adapted version of the SCEPT to assess the specificity of goal-related memories for previous successes and failures (the SCEPT-WL, see Appendix for items), and also presents data using a validated modification of the SCEPT to assess the planning and imageability of future events (The Sentence Completion for Events in the Future Test: SCEFT, Anderson & Dewhurst, 2009). Considering these limitations, Study Seven adopted the AMT to assess memory specificity in a face-to-face study, to allow comparisons in findings with a previous AMT study conducted in groups of students identified as being at high and low risks for hypomania (Delduca et al., 2010). The standardised AMT procedure from Study Seven was used to assess autobiographical memory specificity in a bipolar sample to allow comparisons with previous AMT studies conducted within clinical samples (Study Eight). The General Discussion (Section 6) will consider the effectiveness of the AMT and SCEPT tasks as measures of autobiographical memory specificity.

The use of self-report questionnaire measures

A number of validated self-report questionnaire measures have been adopted across the studies presented within this thesis. Detailed psychometric information about each of these measures is presented within the chapters (copies of these measures are included in the Appendix). The questionnaire measures used in the thesis fall into a number of categories, including measures of hypomania vulnerability (the Hypomanic Personality Scale, HPS, Eckblad & Chapman, 1986), current bipolar mood symptoms (the Internal States Scale, ISS, Bauer et al., 1991), current depressive symptoms (the Centre for Epidemiological Studies Depression scale, CES-D: Radloff, 1977), and measures of current emotional states (the Positive and Negative Affect Schedule, Watson, Clark & Tellegen, 1988).

In addition, the Ruminative Responses Scale (RRS: Nolen-Hoeksema & Morrow, 1991) and the Responses to Positive Affect scale (RPA: Feldman, Joormann & Johnson, 2008) were used to assess the effect of negative and positive forms of ruminative cognitive styles in relation to the specificity of autobiographical memory. Additional cognitive style measures used in the thesis included the Hypomanic Interpretations Questionnaire (HIQ: Jones, Mansell & Waller, 2006), and the Interpretations of Depression Questionnaire (IDQ: Jones & Day, 2008), which assess tendencies to make dysfunctional self-appraisals. The Problem Solving Scale, a measure of resourcefulness behaviours during problem-solving (PSS, Center for Cognitive Therapy), was used to assist in the validation of the UMEPS problem-solving task (Study Three). The Defeat and Entrapment scales (Gilbert & Allen,

1988), and the Beck Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974) were used in Study Four, in a second validation of the problem solving task. Study Six (Section 4) used the Behavioural Inhibition and Activation Scales (BIS/BAS: Carver & White, 1994) to assess the sensitivity to goals, rewards and punishment, based upon the behavioural activation theory. Study Seven also used a relatively new measure designed to asses the pursuit of extremely unlikely goals, the Willingly Approached Set of Statistically Unlikely Pursuits scale (WASSUP: Johnson & Carver, 2006).

Novel measures

A visual analogue rating scale of the experience of positive and negative life events was used in Study Two (see Appendix). Study Three details the development of a novel measure of means-end problem solving designed for use with British student samples (The University Means-End Problem Solving task, UMEPS). Previous problem-solving studies conducted in student samples have used the Means-End Problem Solving task (MEPS: Platt & Spivack, 1975), which was developed to assess problem-solving in patient samples. Previous studies have had to adapt the MEPS to create situations of relevance to students (Lyubomirsky & Nolen-Hoeksema, 1995), whilst there has been a previously unsuccessful attempt by American researchers to develop a “college” student version of the MEPS (Blankstein et al., 1992). The UMEPS was developed to assess problem-solving in British student samples using problematic situations which are likely to be encountered whilst studying at university. Study Three details the development and validation of the UMEPS as a problem-solving measure. Study Four describes a further validation of the UMEPS in relation to the appraisals of defeat and entrapment implicated in the experience of depression and suicide. Study Five describes an investigation into the role of problem-solving using the UMEPS task, positive and negative rumination, and autobiographical memory, in conferring the vulnerability to bipolar disorder in at-risk individuals.

Assessing the vulnerability to hypomania and future bipolar disorders

Six studies presented in this thesis have investigated cognitive processes in individuals considered to have a trait-based vulnerability to experiencing hypomania and developing future bipolar disorders. The studies in this thesis have used the Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986) to assess the vulnerability to bipolar disorder in student-based samples.

The HPS is a 48-item questionnaire designed to assess the prevalence of hypomanic personality traits which are characteristic of clinical hypomanic mood states (Eckblad & Chapman, 1986). The HPS has been widely used as a screening measure to identify

individuals who are at an elevated risk for hypomania and bipolar disorder, allowing for the exploration of subclinical processes and risk factors associated with clinical presentations of bipolar disorder (Eckblad & Chapman, 1986). Individuals who score highly on the HPS, who self-endorse possessing hypomanic personality characteristics, have been demonstrated to be at a greater risk of experiencing hypomanic episodes and future bipolar disorders, as well as a range of related mental health conditions including psychosis, substance abuse disorders and major depressive disorder (Eckblad & Chapman, 1986; Kwapil et al., 2000). In addition, high HPS scorers are more likely to have experienced past hypomanic and manic episodes, and have diagnosed bipolar disorders than low-HPS scorers (Meyer & Hautzinger, 2003). Elevated HPS scores have also been associated with an increased risk of experiencing future mood episodes and with a shorter time to the onset of a mood episode in individuals diagnosed with bipolar I disorder (Kam, Bolbecker, O'Donnell, Hetrick, & Brenner, *in press*), supporting the notion that hypomanic personality traits are associated with an increased risk for bipolar symptoms and relapse (Eckblad & Chapman, 1986).

Non-clinical individuals who endorse high numbers of hypomanic personality traits also appear to share many of the same characteristics associated with the experience of clinical hypomanic mood states in bipolar samples. Indeed, individuals who possess hypomanic personality traits are typically creative, energetic, gregarious, and goal-directed, and are able to function successfully whilst juggling numerous social commitments, often requiring few hours of sleep to do so (Eckblad & Chapman, 1986). Individuals with elevated levels of hypomanic personality traits also report elevated levels of current bipolar mood symptoms (Udachina & Mansell, 2007), more frequent past experiences of hypomanic mood states (Eckblad & Chapman, 1986), as well as increased tendencies to engage in substance and alcohol abuse (Krumm-Merabet & Meyer, 2005), and more variable sleep and activity patterns than individuals who endorse low levels of hypomanic personality traits (Ankers & Jones, 2009; Meyer & Maier, 2006). Whilst these personality traits are considered to represent subclinical trait-based forms of hypomanic symptoms, high HPS scorers are also at an elevated risk of developing clinically significant bipolar symptoms over the long term (Blechert & Meyer, 2005; Kwapil et al., 2000).

Whilst the cross-sectional validity of the HPS as a risk measure for bipolar disorder has been demonstrated across a variety of studies, there is less supporting evidence for the prospective validity of the HPS in relation to the development of clinically significant bipolar symptoms. Although other risk measures for bipolar disorder exist, such as the General Behaviour Inventory (GBI: Depue et al., 1981), the HPS was utilised as a risk measure in the current thesis to allow comparisons with the previous investigation into

autobiographical memory processes in an at-risk student sample (Delduca et al., 2010), as well as previous investigations into the cognitive processes associated with bipolar disorder vulnerability (e.g., Johnson & Jones, 2009). The HPS has also been more widely used to assess the cognitive vulnerability to bipolar disorder across a range of student samples compared to the GBI. The GBI was also deemed unsuitable for use for the present research due to the increased number of items presented to participants compared to the HPS, as well as the GBI's presentation of more complexly worded items which may contribute to heightened attrition from the internet-based studies presented in this thesis. In contrast to the HPS, which requires participants to rate whether simple traits are representative of their own personality, the GBI requires participants to rate the past experience of clinical symptoms and directly asks questions potentially upsetting questions (e.g., "*Have there been times of several days or more when you were so sad that it was quite painful or you felt that you couldn't stand it?*"). The HPS was deemed to be a more appropriate measure of a personality trait based vulnerability to bipolar disorder than the GBI which is more focused upon past unipolar and bipolar disorder symptom experiences.

Analogue studies

The use of student samples within the studies in the current thesis is justified for a number of reasons. As this thesis aims to explore the vulnerability to bipolar disorder in relation to autobiographical memory specificity, non-clinical student samples were used to identify individuals at different levels of risk according to scores on validated self-report measures. At present, only one study has used an at-risk design in the investigation of autobiographical memory in individuals vulnerable to bipolar disorders (Delduca et al., 2010). Whilst student samples are an available source of potential participants, previous studies have identified high prevalences of hypomanic symptoms and bipolar-relevant experiences in student samples (Depue & Iacono, 1989; Udachina & Mansell, 2007).

There are some limitations in the use of student samples, which consist of relatively homogenous groups of individuals who may have similar experiences in relation to educational achievements, IQ, and socio-economic status. The results of studies conducted in student samples can be limited in their generalisability to the wider general population, particularly given the higher proportion of female to male students who participate in psychological research and the younger age range of the typical undergraduate sample. However, the recruitment of students allows for the collection of meaningfully sized data-sets which permits adequately powered statistical analyses, and allows for the investigation of potential risk factors for bipolar disorders in at-risk individuals, which may assist in furthering the understanding of the vulnerability to and development of bipolar disorder.

Section 2.1

Study One

Positive and Negative Cognitive Style Correlates of the Vulnerability to Hypomania

Robert C. Dempsey

Patricia A. Gooding

&

Steven H. Jones

A manuscript based on this section has been published in the Journal of Clinical Psychology

2.1.1 Abstract

Specific forms of rumination and self-appraisals have been implicated in the development of bipolar symptomatology. This study investigated the associations between measures of positive and negative forms of appraisals and rumination with vulnerability to hypomania, and also investigated the conceptual overlap between these measures in terms of their responses to emotional experiences. Hypomania vulnerability was associated with positive cognitive style measures, whilst current depressive symptoms were explained by scores on measures of negative cognitive styles in an analogue sample of 353 participants. A principal components analysis conducted upon the rumination and appraisal measures yielded three components representing positive and negative cognitive styles, and a normalising of symptoms component. The implications of these results are discussed.

2.1.2 Introduction

Rumination has traditionally been defined as a negative cognitive style characterised by persistent thoughts focused on the causes and consequences of recent negative experiences, moods and symptoms (Nolen-Hoeksema, 1991). Rumination has commonly been viewed as arising in response to the experience of negative emotional states and symptoms of depression (Lyubomirsky & Tkach, 2003); although a number of different conceptualisations of rumination currently exist (Smith & Alloy, 2009). However, recent research has started to investigate the role of positive rumination in the vulnerability to bipolar disorder (Feldman et al., 2008; Johnson et al., 2008a).

The manner in which individuals respond to the experience of positive mood states has been suggested to confer a vulnerability to hypomania (Johnson et al., 2005b), similar in nature to the vulnerability for depression associated with negative rumination (Nolen-Hoeksema, 1991). Indeed, research has indicated that an elevated risk for hypomania is associated with intense ruminative and emotional reactions toward positive stimuli (Carver & Johnson, 2009). The manner in which an individual responds to the recent experience of positive emotions is considered to contribute to subsequent changes in mood, particularly through positive ruminative thinking which contributes to ascents of mood into manic states (Feldman et al., 2008; Johnson, 2005b).

Johnson and colleagues have developed and validated a self-report measure to assess how positive rumination contributes to the development of bipolar symptoms (the Responses to Positive Affect scale, RPA: Feldman et al., 2008). The RPA was constructed as a counterpart to Nolen-Hoeksema's Ruminative Responses Scale (RRS) (Nolen-Hoeksema & Morrow, 1991), and contains three factors measuring three distinct positive ruminative cognitive styles. These factors include attempts to intensify the experience of

recent positive mood states ("Emotion-Focused" positive rumination); responses that focus upon the self and goal-attainment ("Self-Focused" positive rumination); and strategies that attempt to reduce the intensity of positive emotional states ("Dampening") (Feldman et al., 2008). Positive rumination appears to be uniquely associated with bipolar disorder, where students diagnosed with bipolar disorder report tendencies to engage in both positive and negative rumination, whilst students with major depressive disorder only reporting tendencies to engage in negative rumination (Johnson et al., 2008a).

Research has also indicated that both bipolar disorder and hypomanic personality traits, a known vulnerability factor for bipolar disorder (Eckblad & Chapman, 1986) are closely associated with negative rumination (Thomas & Bentall, 2002; Knowles et al., 2005; Thomas et al., 2007; Van der Gucht et al., 2009). Thomas et al. (2007) observed higher self-reported negative rumination in remitted compared to depressed and manic bipolar patients, whilst Van der Gucht and colleagues (2009) noted higher rumination scores in currently depressed compared to currently manic and euthymic bipolar patients. However, the prevalence of negative ruminative thinking patterns during remission may be due to the experience of ongoing subsyndromal mood symptoms, particularly as research has suggested that bipolar individuals may experience ongoing low levels of depressive symptoms (Post et al., 2010) which may be sufficient to drive negative ruminative thinking patterns. Although it has been suggested that a negative cognitive style may act as a vulnerability factor in bipolar individuals, which when activated leads to a cycle of negative thoughts about the self, rumination and depression (Van der Gucht et al., 2009).

Whilst ruminative cognitive styles appear to be a feature of bipolar disorder and hypomania vulnerability, recent theoretical models have implicated the appraisal of hypomania and depression related experiences, and of changes in internal physiological states, in the development of symptoms (Jones, 2001; Mansell, Morrison, Reid, Lowens & Tai, 2007). These models suggest that it is the manner in which changes in internal state are interpreted is associated with the exacerbation of bipolar symptoms. Both models permit an influence of positive and negative appraisals in the transition to symptoms, which contribute to ascents and descents in mood through changes in behaviour and cognition. Individuals with bipolar disorder and those at-risk report tendencies to endorse positive self-appraisals experiences associated with hypomanic mood states (Jones & Day, 2008; Jones et al., 2006). Although individuals with hypomanic personalities also endorse negative self-appraisals, only positive self-appraisals make a unique contribution to hypomania vulnerability (Jones & Day, 2008). The endorsement of positive self-appraisals by bipolar individuals also distinguishes group membership between bipolar patients and

controls (Jones et al., 2006). Positive self-appraisals would appear to be important in the development of hypo/manic symptoms.

Despite research indicating that individuals with bipolar disorder and those at risk engage in positive and negative ruminative cognitive styles, and endorse positive and negative self-appraisals, no study has yet investigated the cross-sectional associations between these appraisals and ruminative cognitive styles. It is also unclear how much of a conceptual overlap exists between appraisal and ruminative cognitive styles. Many of the commonly used measures of rumination and self-appraisal appear to capture similar response styles to emotional experiences. These include strategies that attempt to reduce current emotional states, as measured by the Reflective rumination (RRS) and Dampening of positive affect (RPA) scales, and the normalising appraisal scales of hypomanic and depressive experiences (Interpretations of Depression Questionnaire, IDQ: Jones & Day, 2008; Hypomania Interpretations Questionnaire HIQ: Jones, et al., 2006). There are also some similarities across the rumination and appraisal measures which describe response styles that increase the intensity of current moods, including the self and symptom-focused rumination scales of the RPA and RRS, and the positive and negative self-appraisal measures of the HIQ and IDQ. Despite this potential overlap, it remains unclear whether dysfunctional appraisal styles or ruminative cognitive styles make the greater contribution to the vulnerability to hypomania in at-risk individuals.

The current study investigated the associations between positive and negative cognitive styles as measured by self-report measures of rumination (the RPA and RRS), and positive and negative self-appraisals (the HIQ and IDQ), in relation to the experience of depressive symptoms and hypomania vulnerability. The measures included in the current study were chosen due to their structural similarity, as the RPA measure was designed to complement the RRS, and the IDQ was designed to complement the HIQ. The current study focused upon the associations between the cognitive style measures with the CES-D depressive symptom and HPS trait measures to explore how positive and negative cognitive styles are associated with the vulnerability to hypomania, whilst also taking potential confounds with depression into account. The study focused upon possible confounds with depression, rather than with hypo/manic symptoms, as the HPS is considered to capture behavioural traits pertaining to hypomanic mood symptoms and measures a vulnerability to experience future hypomanic states (Eckblad & Chapman, 1986). Measures of current bipolar symptoms (the Internal States Scale: Bauer et al., 1991) and the recent experience of hypomania and depression-relevant events (the “Experience” subscales of the HIQ and IDQ) were included to account for potential effects of these variables upon scores on the cognitive style measures.

First, it was predicted that the self-reported hypomania vulnerability, as measured by the HPS (Eckblad & Chapman, 1986), would be positively associated with measures of both positive and negative appraisal and ruminative cognitive styles, reflecting the bipolarity of affect associated with both hypomanic personality and clinical presentations of bipolar disorder (Hofmann & Meyer, 2006). Second, it was predicted that the negative cognitive style measures, but not measures of positive cognitive styles, would be associated with self-reported depression symptoms, reflecting the absence of positive cognitive styles in depressed states (Johnson et al., 2008a). Whilst it has been suggested that there exist different forms of positive cognitive style correlates of the vulnerability to hypomania (Johnson & Jones, 2009), due to the absence of a self-report measure of current depressive symptoms, this previous study could not suggest how these distinct positive cognitive styles may relate to the experience of depressive symptoms, a key feature of bipolar disorder. A final aim was to explore the extent of the overlap in the responses to mood states described by the rumination and appraisal self-report measures through a principal components analysis.

2.1.3 Method

Participants

353 participants from the University of Manchester took part in the study (Mean age = 22.62 years, S.D. = 6.38; 277 Females, 76 Males; 339 students, 14 University staff). Whilst those participants who were members of staff were of an older age (M_{age} = 28.93 years, S.D. = 5.76) than the student participants (M_{age} = 21.60, S.D. = 5.15; $t(315) = -5.35$, $p < .001$), t-tests indicated that there were no significant differences between the staff and student participants for scores on the HPS, or the mood and symptom measures (CES-D and ISS) (all t values < 1.5, p values > .17).

Hypomania Vulnerability Measure

Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986)

The HPS is a 48 item true-false self-report measure which assesses the presence of hypomanic personality traits. Although the HPS would appear to capture relatively stable personality traits similar in nature to the clinical experience of hypomania, items on the HPS measure the lability of mood, energy and behavior associated with bipolar disorder (e.g., “I seem to be a person whose mood goes up and down easily”). High scores on the HPS have been observed to be predictive of concurrent and future bipolar symptoms (Blechert & Meyer, 2005; Eckblad & Chapman, 1986; Kwapil et al., 2000; Meyer &

Hautzinger, 2003). The HPS has good test-retest reliability (r = .81) and good internal consistency (α = .87; Eckblad & Chapman, 1986).

Symptom Measures

The Center for Epidemiological Studies Depression Scale (CES-D: Radloff, 1977)

The CES-D scale is a 20 item measure of current depressive symptoms which has been widely used in non-clinical samples (e.g., Johnson et al., 2008a; Jones & Day, 2008). Items on the CES-D describe a variety of depressive symptoms (e.g., "I felt that I could not shake off the blues even with help from my family or friends"), which are rated on a scale from 0 ("Rarely") to 3 ("Most of the time") indicating the experience of each symptom in the past week. Research has suggested that a score of 16 and above on the CES-D is indicative of clinical depression (Radloff, 1991). The CES-D has demonstrated good reliability (Cronbach's α = .79-.87, Radloff, 1991).

Internal States Scale (ISS: Bauer et al., 1991)

The ISS is a 15-item self-report measure designed to assess current manic and depressive bipolar symptoms (example items: "today I feel depressed", "today I feel impulsive"). Participants rate the extent to which they have felt each symptom in the past 24 hours on a 0-100 analogue scale (0 = "Not at all/Rarely" to 100 "Very much so/Much of the time"). The ISS has four subscales: a Well-Being scale measuring general emotional well-being with low scores indicating depressed mood (ISS-WB), an Activation scale measuring manic symptoms (ISS-A), a Depression scale measuring depressive symptoms (ISS-D), and Perceived Conflict, measuring conflict within the self and others (ISS-PC). Participants also complete a single item measure of their current state on the day ("Today I feel", Depressed = -50 to Manic = +50). Scores on the ISS have been found to be associated with clinician ratings of bipolar symptoms (Bauer et al., 1991). Acceptable levels of reliability have been previously demonstrated for the ISS subscales (Cronbach's α = .73-.82; Jones & Day, 2008).

Cognitive Style Measures

Hypomania Interpretations Questionnaire (HIQ: Jones et al., 2006)

The HIQ is a 10 item measure which assesses tendencies to make overly positive self-appraisals for hypomanic experiences. The HIQ consists of a list of hypomania relevant situations (e.g., If I felt impulsive, I would probably think it was because…"), each of which is followed by two explanations, a positive self-appraisal (e.g., "…I could make rapid decisions and good choices."), and a normalising appraisal (e.g., "…there are lots of

external demands.”). Participants rate the extent to which each appraisal explains the aforementioned experience on a scale from one (“Not at all”) to four (“A great deal”), with higher scores indicating the greater endorsement of hypomanic (HIQ-H) and normalising appraisals (HIQ-N). Participants also indicate (yes/no) whether they have experienced each situation in the past three months (HIQ-Experience scale). The HIQ subscales have demonstrated acceptable reliability (α = .70-.83, Jones et al., 2006; Jones & Day, 2008).

Interpretations of Depression Questionnaire (IDQ: Jones & Day, 2008)

The IDQ is a recently developed self-report measure designed to assess the tendency to make depressive and negative self-appraisals. Participants are presented with ten depression relevant situations and rate a normalising appraisal (IDQ-N) and a negative self-appraisal (IDQ-D) for each situation. Similar to the HIQ, participants rate the extent to which the normalising and negative appraisals explain each situation (from “Not at all” to “A great deal”), with higher scores indicating a greater endorsement of that appraisal style. Participants also indicate whether they have experienced that situation in the past three months (yes/no) (IDQ-Experience). The IDQ has demonstrated high reliability (α = .90-.91: Jones & Day, 2008).

Responses to Positive Affect Scale (RPA: Feldman et al., 2008)

The RPA is a 17 item self-report questionnaire which measures ruminative responses to the experience of positive emotional states. Each item describes a possible response to a positive mood state (e.g., “When you are feeling happy, how often do you savor this moment”). The RPA consists of three factors measuring positive rumination on mood and bodily experiences (“Emotion-Focus” positive rumination), rumination on the self and the attainment of goals (“Self-Focus”), and thought processes that attempt to reduce the intensity of positive emotions (“Dampening”). Higher scores on the RPA indicate greater propensities to ruminate in response to positive affect. The three subscales of the RPA have demonstrated adequate reliability (RPA-E α = .76, RPA-S α = .73, RPA-D α = .79; Feldman et al., 2008)

Ruminative Responses Scale (RRS: Nolen-Hoeksema & Morrow, 1991)

The RRS is a 22 item measure of the tendency to engage in ruminative thinking styles following the experience of negative affective states (Nolen-Hoeksema & Morrow, 1991). Each item describes a potential response to the experience of a negative emotional state (e.g., “Think about how alone you feel”). Responses are rated on a four point scale, ranging from one (“Never respond in this way”) to four (“Always respond in this way”),

with high scores indicating a ruminative cognitive style. The RRS has been widely used in a variety of clinical (Johnson et al., 2008a; Roelofs, Huibers, Peeters, Antz & van Os, 2008) and non-clinical samples (Feldman et al., 2008; Olson & Kwon, 2008).

A factor analysis of the RRS has identified a three factor structure representing rumination upon current depressive symptoms ("Depression Related Rumination"), maladaptive brooding upon discrepancies between the self and unachieved goals ("Brooding"), and a more adaptive cognitive style which attempts to alleviate depressive symptoms through cognitive problem solving (termed "Reflection") (Treynor et al., 2003). The subscales of the RRS have demonstrated adequate reliability (Brooding $\alpha = .71$, Depression $\alpha = .84$, Reflection $\alpha = .90$; Johnson et al., 2008).

Procedure

Participants were directed to the study's website via advertisements displayed on poster notice boards in various locations in the University of Manchester campus, as well as advertisements placed on University research volunteering intranet websites. The first page of the study's website presented electronic versions of the participant information sheet and consent form. Following informed consent, participants completed a short demographics questionnaire and the remaining self-report measures in a random order. The participants either received course credits or were entered into a prize draw for shopping vouchers in return for participating in the study. The study received institutional ethical approval from the University of Manchester.

Data Analysis

Normality of data was checked via review of histograms, calculation of skewness and kurtosis statistics for each measure, and by checking for outliers through the calculation of z-scores (note that Kolmogorov-Smirnoff tests can be unreliable with large datasets and were not conducted for the current study, Field, 2005). Bivariate correlations were conducted to investigate the associations between scores on the cognitive style measures with self-reported hypomanic personality traits and current mood symptoms. Hierarchical linear regression analyses were conducted to investigate the associations between the cognitive style measures with hypomania vulnerability and depression controlling for current bipolar mood symptoms. A principal components analysis (PCA) was conducted to investigate potential item redundancy across the cognitive style measures. Associations between the cognitive style components produced by the PCA with hypomania vulnerability and depression were analysed using bivariate correlations and hierarchical regression analyses controlling for current mood symptoms.

2.1.4 Results

Review of histograms with normality curves and the calculation of z-scores indicated that the data across the questionnaire scales did not significantly differ from normality. Kurtosis and skewness statistics were not substantially larger than zero and were well within the acceptable limits (Curran, West, & Finch, 1996; Tabachnick & Fidell, 2001). There was no evidence of significant outliers across the measures, with 99.8% of z-scores less than 3.29 (Field, 2005). Descriptive statistics and Cronbach's α for scores on the self-report measures are presented in Table 2.1.1.

Table 2.1.1. Means and standard deviations for scores on the questionnaire measures.

	Mean	S.D.	Range	α
Center for Epidemiological Studies Depression Scale	18.89	11.27	0-56	.91
Hypomanic Personality Scale	17.13	9.12	1-45	.89
Internal States Scale (ISS)				
ISS Activation	123.37	89.87	0-382	.75
ISS Depression	47.51	50.84	0-200	.81
ISS Perceived Conflict	126.25	95.47	0-390	.77
ISS Well-Being	139.15	65.54	0-299	.79
Hypomania Interpretations Questionnaire (HIQ)				
HIQ - Hypomanic Appraisals	21.39	5.73	10-40	.83
HIQ - Normalising Appraisals	25.36	4.83	12-39	.73
Interpretations of Depression Questionnaire (IDQ)				
IDQ-Normalising Appraisals	26.81	5.95	10-40	.88
IDQ-Depressogenic Appraisals	16.33	5.92	10-40	.89
Responses to Positive Affect (RPA)				
RPA Dampening	15.83	5.23	8-32	.85
RPA Emotion Focused	13.83	3.00	5-20	.72
RPA Self Focused	9.93	2.78	4-16	.76
Ruminative Responses Scale (RRS)				
RRS Brooding	11.62	3.49	5-20	.79
RRS Reflection	11.50	3.55	5-20	.78
RRS Depression-Focused	28.91	7.62	12-48	.90

As shown in Table 2.1.1 above, mean HPS scores were similar to those reported in previous studies (Johnson & Jones, 2009; Dodd et al., 2010), although mean CES-D scores were higher than those reported by a previous study conducted in a similar sample (Jones & Day, 2008). Mean scores on the ISS symptom, the self-appraisal and rumination measures in the current study were consistent with the mean scores reported in previous studies conducted within non-clinical samples (Jones & Day, 2008; Mansell et al., 2008; Johnson & Jones, 2009; Dodd et al., 2010).

Correlational Analysis

A series of bivariate correlations were conducted to investigate the associations between scores on the cognitive style measures with self-reported hypomanic personality traits and current affective symptoms (see Table 2.1.2).

Scores on the Hypomanic Personality Scale were positively correlated with the rumination and appraisal cognitive style measures, but were not correlated with the normalising appraisal measures (HIQ-N and IDQ-N). Scores on the CES-D were positively correlated with negative rumination (Brooding, Reflection and Depression-Related Rumination), RPA Dampening, negative self-appraisals (IDQ-D) and with appraisals that normalise hypomanic experiences (HIQ-N). CES-D scores were also negatively correlated with the Self-Focused positive rumination scale. The CES-D was not correlated with the depression normalizing appraisals (IDQ-N) or hypomanic appraisals measures (HIQ-H).

Table 2.1.2. Correlations between scores on self report symptom, self-appraisal, activation and cognitive style measures.

	HPS	ISS A	ISS D	ISS PC	ISS WB	HIQ H	HIQ N	IDQ D	IDQ N	RPA D	RPA E	RPA S	RRS B	RRS R	RRS D
CESD	*.272****	*.181****	*.636****	*.480****	*-.491****	*-.076*	*.129**	*.009*	*.564****	*.393****	*.006*	*-.124**	*.472****	*.184****	*.598****
HPS		*.501****	*.259****	*.317****	*.094*	*.494****	*-.027*	*-.033*	*.258****	*.178****	*.306****	*.278****	*.217****	*.320****	*.265****
ISS A			*.352****	*.449****	*.251****	*.321****	*-.002*	*-.034*	*.167***	*.192****	*.222****	*.219****	*.204****	*.185****	*.185****
ISS D				*.657****	*-.398****	*-.035*	*.008*	*-.112**	*.440****	*.333****	*-.050*	*-.133**	*.388****	*.167***	*.431****
ISS PC					*-.225****	*.033*	*.083*	*-.084*	*.330****	*.299****	*.055*	*-.026*	*.316****	*.156***	*.326****
ISS WB						.337***	-.111*	-.033	*-.310****	-.237***	.200***	.348***	-.186***	.062	-.291***
HIQ H							-.070	.152**	*.121**	-.106*	.339***	.362***	.061	.264***	.055
HIQ N								.475***	*.442****	.203***	.127*	.036	.197***	.131*	.263***
IDQ D									*.024*	-.065	.245***	.142**	.197***	.219***	.218***
IDQ N										*.425****	*-.050*	*-.065*	*.593****	*.261****	*.628****
RPA D											.122*	.023	.462***	.150**	.425***
RPA E												.558***	.134*	.216***	.154**
RPA S													.106*	.239***	.063
RRS B														.493***	.738***
RRS R															.489***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Spearman's correlations are in italics, other correlations are Pearson.

Key: CESD = Centre for Epidemiological Studies Depression Scale, HPS = Hypomanic Personality Scale, ISS = Internal States Scale (A = Activation, D = Depression, PC = Perceived Conflict, WB = Well-being) , HIQ = Hypomania Interpretations Questionnaire (N = Normalising Appraisals, H = Hypomanic Appraisals), IDQ = Interpretations of Depression Questionnaire (D = Depressogenic Appraisals, N = Normalising Appraisals), RPA = Responses to Positive Affect scale (D = Dampening, E = Emotion-focused, S = Self-focused positive rumination), RRS = Ruminative Responses Scale (B = Brooding, R = Reflection, D = Depression-focused rumination).

Regression analyses

Regression analyses were conducted to determine which of the cognitive style measures contributed the greatest variance to scores on the measures of the vulnerability to hypomania (HPS) and depressive symptomatology (CES-D).

For the HPS regression analysis, scores on the ISS subscales (A, D, WB and PC) and CES-D scores were entered into the first block of the regression to control for effects of current mood symptoms. Scores on the "Experience" subscales of the HIQ and IDQ were included to control for the recent experience of hypomania and depression relevant events. Each of the cognitive style measures which were significantly correlated with HPS scores were entered into the second block of the regression (HIQ-H, IDQ-D, RPA-D, RPA-E, RPA-S, RRS-B, RRS-R, RRS-D). As shown in Table 2.1.3, next page, the model was significant ($F_{(10, 329)} = 34.264$, $p < .001$) and explained 51% of the variance in HPS scores, and was not unduly influenced by multicolinearity between predictor variables (Variance Inflation Factors < 1.8, Tolerances > 0.5). Scores on the Hypomanic Appraisals scale, the Reflection subscale of the Ruminative Responses Scale, and the Self-Focused positive rumination subscale of the RPA were significant contributors to variance in HPS scores. In sum, the endorsement of hypomanic self-appraisals, the engagement in reflective rumination in response to negative affect and self-focused positive rumination were associated with HPS scores.

Table 2.1.3 Regression analysis investigating the contribution of the cognitive style measures to scores on the Hypomanic Personality Scale.

	Standardised Beta
Step 1	
Internal States Scale	
Activation	.18***
Depression	.00
Perceived Conflict	.06
Well-being	-.01
Centre for Epidemiological Studies Depression scale	.23***
Hypomania Interpretations (HIQ) – Experience Scale	.27***
Interpretations of Depression (IDQ) – Experience Scale	-.06
Step 2	
Hypomania Interpretations - Hypomanic Appraisals (HIQ-H)	.32***
Ruminative Responses Scale - Reflective Rumination (RRS-R)	.90*
Reponses to Positive Affect - Self-focused Rumination (RPA-S)	.94*
Step 1 R^2	.402***
Step 2 ΔR^2	.108***
d.f.	10, 329
F	34.264***

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

To explore which variables contributed to CES-D scores, a similar hierarchical regression analysis was conducted. Scores on the ISS subscales, HPS scores, and the recent experiences of depression and hypomania-relevant events (IDQ-E and HIQ-E) were entered into the first block. Variables with significant correlations with the CES-D were then entered into the second block of the regression equation (HIQ-N, IDQ-D, RPA-D, RPA-S, RRS-B, RRS-R, and RRS-D). As shown in Table 2.1.4 below, the regression model was significant ($F_{(9, 330)} = 57.933$, $p < .001$) and explained 61.2% of the variance in CES-D scores, and was not unduly influenced by multicolinearity (VIFs < 1.9, Tolerances > 0.5). Scores on the RRS Depressive Rumination scale, IDQ Depressive appraisals scale, and the Self-Focused Positive Rumination scale were significant contributors to variance in CES-D scores. Tendencies to engage in rumination upon depressive symptoms and to endorse negative self-appraisals were positively associated with CES-D scores, whilst the engagement in self-focused positive rumination was negatively associated with CES-D.

Table 2.1.4 Regression analysis investigating the contribution of the cognitive style measures to scores on the depressive symptom measure (CES-D).

	Standardised Beta
Step 1	
Internal States Scale (ISS)	
Activation	.00
Perceived Conflict	.19***
Well-being	-.24***
Hypomanic Personality Scale (HPS)	.14**
Hypomania Interpretations (HIQ) – Experience Scale	-.10*
Interpretations of Depression (IDQ) – Experience Scale	.27***
Step 2	
Ruminative Responses Scale - Depressive Rumination (RRS-D)	.25***
Interpretations of Depression - Depressive Appraisals (IDQ-D)	.11*
Responses to Positive Affect - Self-focused Rumination (RPA-S)	-.87*
Step 1 R^2	.54***
Step 2 ΔR^2	.08***
d.f.	9, 330
F	57.93***

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

Principal Components Analysis

A principal components analysis was conducted on the rumination (RRS and RPA) and appraisal measures (IDQ and HIQ) to investigate the conceptual overlap between the cognitive style measures. Using a direct oblimin rotation, a three component solution was suggested by review of the scree plot and by a parallel analysis (O'Connor, 2000a). The Kaiser-Meyer-Olkin measure confirmed that the sample was adequate for principal components analysis (KMO = .861), whilst Bartlett's test of sphericity was significant (χ^2 (2775) = 12130.082, $p < .001$) indicating that the correlations between variables were sufficiently large. Items were removed from the initial solution if they loaded on more than one component to a similar magnitude, or if they failed to adequately load on one component (i.e. load less than .30).

Table 2.1.5. Item loadings following the Principal Components Analysis conducted on the rumination and self-appraisal measures.

	Factor loadings		
	1	**2**	**3**
IDQD_6 If I felt down on myself I would probably think it was because I am a bad person, even towards myself.	.696		
IDQD_5 If I had upsetting or bad thoughts going through my mind I would probably think it was because I am a worthless person to have these types of thoughts.	.684		
RRS18_D Think about all your shortcomings, failings, faults and mistakes.	.682		
IDQD_9 If I have periods of time when I felt a persistent sense of gloom I would probably think it was because I am a failure and a burden to others.	.679		
RRS22_D Think about how angry you are with yourself.	.674		
IDQD_7 If I felt that the future was bleak and things were unlikely to improve I would probably think it was because I am a negative pessimistic person.	.667		
RRS16_B Think “why can’t I handle things better?”	.663		
IDQD_10 If I felt that nothing was working out for me I would probably think it was because I struggle to get anything right in my life.	.643		
RRS6_D Think about how passive and unmotivated you feel.	.631		
RRS19_D Think about how you don’t feel up to doing anything.	.630		
IDQD_2 If I experience guilty feelings even though I may not have done anything particularly wrong I would probably think it was because I am a bad person and deserve to be punished.	.622		
IDQD_8 If there were times when I struggled to control an urge to cry or found myself crying without really understanding why I would probably think it was because I am a weak, pathetic, person.	.616		
RRS10_B Think “why do I always react this way?”	.607		
RRS15_B Think “why do I have problems other people don’t have?”	.598		
RRS14_D Think “I won’t be able to concentrate if I keep feeling this way”.	.572		
RPA14_D When you are feeling happy, how often do you think "I don't deserve this"?	.570		
IDQD_1 If I felt I couldn’t enjoy life as easily as other people, I would probably think it was because I don’t get pleasure from anything anymore.	.566		

	Factor loadings		
	1	**2**	**3**
RPA10_D When you are feeling happy, how often do you remind yourself that these feelings won't last?	.566		
RRS8_D Think about how you don’t seem to feel anything anymore.	.560		
RRS17_D Think about how sad you feel.	.554		
RRS2_D Think “I won’t be able to do my job if I don’t snap out of this”.	.551		
RPA15_D When you are feeling happy, how often do you think "My streak of luck is going to end soon"?	.548		
RRS1_D Think about how alone you feel.	.542		
IDQD_3 If I have exploded at others and afterwards felt bad about myself I would probably think it was because I am a nasty person**.**	.538		
RPA9_D When you are feeling happy, how often do you think about things that could go wrong?	.529		
RRS4_D Think about how hard it is to concentrate.	.529		
IDQD_4 If I felt cut off from other people I would probably think it was because I am an insensitive person.	.496		
RRS13_B Think about a recent situation wishing it had gone better.	.493		
RRS3_D Think about your feelings of fatigue and achiness.	.485		
RRS9_D Think “why can’t I get going?”	.484		
RRS5_B Think “what am I doing to deserve this?”	.483		
RPA11_D When you are feeling happy, how often do you think “People will think I am bragging”?	.480		
RPA17_D When you are feeling happy, how often do you think about the things that have not gone well for you?	.431		
RPA12_D When you are feeling happy, how often do you think about how hard it is to concentrate?	.392		
RPA6_D When you are feeling happy, how often do you think "It is too good to be true”?	.383		
RRS11_R Go away by yourself and think about why you feel this way.	.363		
IDQN_6 If I felt down on myself I would probably think it was because current problems are leading me to be rather hard on myself.		.727	
IDQN_4 If I felt cut off from other people I would probably think it was because things are difficult at the moment and I have little energy for other things.		.694	
IDQN_9 If I have periods of time when I felt a persistent sense of gloom I would probably think it was because things are going wrong for me just at present.		.653	

	Factor loadings		
	1	**2**	**3**
IDQN_5 If I had upsetting or bad thoughts going through my mind I would probably think it was because I am rather low at present but when things improve the thoughts will go.		.638	
IDQN_8 If there were times when I struggled to control an urge to cry or found myself crying without really understanding why I would probably think it was because my difficulties have affected me just at the moment.		.632	
IDQN_3 If I have exploded at others and afterwards felt bad about myself I would probably think it was because I am under a lot of pressure at the moment.		.620	
IDQN_2 If I experience guilty feelings even though I may not have done anything particularly wrong I would probably think it was because I am being hard on myself because I under strain at the moment.		.602	
IDQN_7 I felt that the future was bleak and things were unlikely to improve I would probably think it was because situations look bleak, but will change as things improve.		.599	
IDQN_10 If I felt that nothing was working out for me I would probably think it was because too many obstacles are being put in my way at present.		.599	
IDQN_1 If I felt I couldn't enjoy life as easily as other people, I would probably think it was because current pressures are distracting me from my interests.		.576	
HIQ_N1 If I thought my thoughts were going too fast I would probably think it was because there are too many competing tasks for me at present.		.470	
HIQ_N9 If I found my thinking was very quick and clear, I would probably think it was because there are few distractions at present.		.435	
HIQ_N4 If I was feeling 'sped up' inside, I would probably think it was because I am under pressure from work or social demands.		.408	
HIQ_N5 If I felt physically restless and kept moving from one activity to the next, I would probably think it was because there is too much pressure and I need a break.		.390	
HIQ_N3 If my thoughts were coming so thick and fast that other people couldn't keep up, I would probably think it was because there are too many demands on my time.		.387	
HIQ_N7 If I felt in high spirits and full of energy, I would probably think it was because things happen to be going well for me at present.		.381	
HIQ_N2 If I was on the go so much that other people couldn't keep up with me, I would probably think it was because: I am overdoing it and will soon need a rest.		.380	

	Factor loadings		
	1	**2**	**3**
HIQ_N6 If I felt impulsive, I would probably think it was because there are lots of external demands.		.333	
HIQ_N10 If I found that tastes, smells or things I touched seemed more vivid, I would probably think it was because it is just a phase and will pass.		.313	
HIQ_H7 If I felt in high spirits and full of energy, I would probably think it was because I am a talented person with lots to offer.			.718
HIQ_H9 If I found my thinking was very quick and clear, I would probably think I am clever and talented.			.685
HIQ_H1 If I thought my thoughts were going too fast I would probably think it was because I am intelligent and full of good ideas.			.639
HIQ_H3 If my thoughts were coming so thick and fast that other people couldn't keep up, I am full of good ideas and others are too slow.			.612
RPA13_S When you are feeling happy, how often do you think "I am achieving everything"?			.578
RPA16_S When you are feeling happy, how often do you think about how proud you are of yourself?			.571
HIQ_H6 If I felt impulsive, I would probably think it was because: I could make rapid decisions and good choices?			.555
HIQ_H8 If I woke up earlier than normal and felt full of energy, I would probably think it was because I am a happy, positive and energetic person.			.538
RPA8_E When you are feeling happy, how often do you think about how strong you feel?			.536
RPA5_S When you are feeling happy, how often do you think "I am living up to my potential"?			.530
HIQ_H4 If I was feeling 'sped up' inside, I would probably think it was because I am in good spirits and can take on challenges.			.520
HIQ_H5 If I felt physically restless and kept moving from one activity to the next, I would probably think it was because I am full of energy and raring to go.			.510
HIQ_H2 If I was on the go so much that other people couldn't keep up with me, I would probably think it was because I have more stamina than other people.			.510
RPA4_E When you are feeling happy, how often do you think about how you feel up for doing everything?			.438
RPA1_E When you are feeling happy, how often do you notice how you feel full of energy?			.421

	Factor loadings		
	1	**2**	**3**
HIQ_H10 If I found that tastes, smells or things I touched seemed more vivid, I would probably think it was because I am more sensitive and 'tuned in' than other people.			.420
RRS12_R Write down what you are thinking and analyze it			.340
RPA3_S When you are feeling happy, how often do you think "I am getting everything done"?			.330
RPA2_E When you are feeling happy, how often do you savour this moment?			.327
RPA7_E When you are feeling happy, how often do you think about how happy you feel?			.326

Key: HIQ = Hypomania Interpretations Questionnaire (N = Normalising Appraisals, H = Hypomanic Appraisals), IDQ = Interpretations of Depression Questionnaire (D = Depressogenic Appraisals, N = Normalising Appraisals), RPA = Responses to Positive Affect scale (D = Dampening, E = Emotion-focused, S = Self-focused positive rumination), RRS = Ruminative Responses Scale (B = Brooding, R = Reflection, D = Depression-focused rumination).

The final solution accounted for 32.6% of the total variance, with the three components having eigenvalues of 12.40, 6.97 and 5.06. As shown in Table 2.1.5, the first component (termed "Negative Cognitive Style") incorporated items from the IDQ Depressive appraisals measure, items from the RPA Dampening scale, and items from the Brooding and Depression Related rumination scales of the RRS, with one item from the RRS Reflection subscale. All items positively loaded onto this component. The second component included positively loading items from the normalising appraisals scales from the HIQ and IDQ (component termed "Normalising of Symptoms"). The third component (termed "Positive Cognitive Style") included positively loading items from the hypomanic appraisals subscale of the HIQ, items from the RPA Emotion Focused and RPA Self Focused rumination, and one item from the RRS Reflection subscale.

A series of correlations were conducted to investigate the associations between the new emergent component from the principal components analysis and scores on the symptom measures (the ISS subscales, HPS, and CES-D) (see Table 2.1.6).

Table 2.1.6. Bivariate correlations between symptom measures and the three cognitive style components produced in the Principal Components Analysis (PCA)

	Cognitive Style Component		
	Negative Cognitive Style	Normalising of Symptoms	Positive Cognitive Style
CES-Depression Scale	.638**	.062	-.091
Hypomanic Personality Scale	.254**	-.029	.542**
ISS Activation	.180**	-.022	.348**
ISS Depression	.492**	-.056	-.093
ISS Perceived Conflict	.416**	-.004	.074
ISS Well Being	-.329**	-.075	.391**
Negative Cognitive Style	1.000	.170**	.071
Normalising of Symptoms		1.000	.139*
Positive Cognitive Style			1.000

* $p < .05$, ** $p < .01$. CES-D = Center for Epidemiological Studies Depression Scale; ISS = Internal States Scale.

No significant correlations were noted between the Negative and Positive Cognitive Style components, however, the Normalising of Symptoms component was weakly positively correlated with both the Negative and Positive Cognitive Style components. The Negative Cognitive Style component was also highly positively associated with measures of depressive symptoms (the CES-D, ISS-D, and ISS-PC), modestly positively correlated with HPS and ISS-A scores, and negatively correlated with ISSWB scores. The Positive Cognitive Style component was positively correlated with scores on the HPS, ISS-A and ISS-WB, but no significant correlations were found between Positive Cognitive Style and any of the measures of depressive symptoms.

To explore whether the three components made unique contributions to the variance in scores on the Hypomanic Personality Scale, a hierarchical multiple regression analysis was conducted, controlling for current affective symptoms (see Table 2.1.7 below). Scores on the ISS subscales (D, WB, A, PC) and scores on the HIQ and IDQ Experience scales were entered into the first block of the regression, with the three components entered into the second step. The regression model was significant ($F_{(10, 329)} = 35.639$, $p < .001$) and explained 52.0% of variance in HPS scores. Scores on the Positive Cognitive style component were positively associated with unique variance in HPS scores, whilst the Normalizing of Symptoms component was negatively associated with HPS

scores. The Negative Cognitive style component made no independent contribution to HPS scores.

A second regression analysis was conducted to investigate whether the components contributed to variance in CES-D scores (see Table 2.1.7). Scores on the ISS subscales (A, PC, WB), the IDQ and HIQ Experience subscales were entered into the first step of the regression analysis with the three components entered into the second step. The model was significant ($F_{(9, 330)} = 57.765$, $p < .001$) and explained 61.2% of variance in CES-D scores. Scores on the Negative Cognitive Style component were positively associated with unique variance in CES-D scores, whilst scores on the Positive Cognitive Style component were negatively associated with unique variance in CES-D scores. The Normalising of Symptoms component made no significant contribution to variance in CES-D scores.

Table 2.1.7 Results of the regression analyses for the associations between the cognitive style components with hypomania vulnerability and depressive symptoms

	HPS	CES-D
	Standardised Beta	Standardised Beta
Step 1		
Internal States Scale		
Activation	.17**	.01
Depression	-.09	
Perceived Conflict	.04	.24***
Well-being	-.02	-.23***
Hypomanic Personality Scale (HPS)		.17***
Centre for Epidemiological Studies Depression (CES-D)	.21**	
Hypomania Interpretations (HIQ) – Experience Scale	.29***	-.10*
Interpretations of Depression (IDQ) – Experience Scale	-.04	.29***
Step 2		
Negative Cognitive Style component	.04	.33***
Positive Cognitive Style component	.40***	-.11*
Normalising of Symptoms component	-.13*	-.03
Step 1 R^2	.40***	.542***
Step 2 ΔR^2 *Change*	.12***	.070***
d.f.	10, 329	9, 330
F	35.639***	57.765***

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

2.1.5 Discussion

Previous research has suggested that the vulnerability to hypomania is associated with positive and negative forms of rumination (Johnson et al., 2008a), and with positive and negative self-appraisals (Jones & Day, 2008). However, it was unclear from previous studies whether rumination or self-appraisals contribute differentially to hypomania vulnerability, and whether these measures capture similar responses to emotional states.

The vulnerability to hypomania was positively correlated with self-report measures of positive and negative cognitive styles, supporting our first prediction. However, only scores on the hypomanic self-appraisal, reflective negative rumination, and self-focused positive rumination measures were significant contributors to variance in hypomania vulnerability using regression analysis. The reflection subscale of the Ruminative Responses Scale, in addition to positively contributing to hypomania vulnerability, was also positively associated with measures of negative rumination. On closer inspection, the reflective rumination, hypomanic self-appraisal and the self-focused positive rumination scales all capture similar responses to emotional states that attempt to improve current mood states. Improvements in mood could be achieved through the alleviation of negative affect during reflective thinking, or via an increased focus upon the self as reflected by the hypomanic appraisal and self-focused positive rumination measures. The contribution of reflective negative rumination to the self-reported vulnerability to hypomania was an unanticipated finding. Reflective rumination, thought to comprise cognitive problem-solving responses to negative moods (Treynor et al., 2003), may represent the first stage of emotion regulation from a negative mood up to a positive mood state. Positive forms of rumination may emerge following successful reflective problem-solving leading to positive self-appraisals and ascents in mood in bipolar-vulnerable individuals.

In contrast to a previous study (Johnson & Jones, 2009), dampening did not contribute unique variance to the vulnerability to hypomania. Dampening of positive affect has previously been associated with current and past histories of depressive symptoms (Eisner, Johnson & Carver, 2009; Feldman et al., 2008), and with hypomania vulnerability (Feldman et al., 2008), but no associations have been reported between dampening and current or past histories of manic symptoms (Johnson et al., 2008a). Dampening in the current study was more strongly correlated with current depressive symptoms than with hypomania vulnerability and manic symptoms. As the current study's sample reported mean CES-D scores greater than Radloff's (1991) suggested cut-off of 16 for clinically significant depressive symptoms, participants in the current study may have more readily engaged in negative forms of rumination rather than dampening as a means of down-regulating mood, due to current depressive symptoms.

Indeed, the severity of current depressive symptoms was observed to be associated with negative cognitive response styles that attempt to reduce positive and increase negative emotional states, supporting our second prediction. Current depression symptoms were either uncorrelated or negatively correlated with the positive rumination and appraisal measures, supporting our prediction and previous observations (Johnson et al., 2008a). Rumination upon depressive symptoms, negative self-appraisals, and a lack of self-focused positive rumination, each made significant contributions to the variance in self-reported severity of depression. A lack of self-focused rumination in response to positive mood states in depressed individuals is consistent with previous observations (Johnson et al., 2008a). Self-focused positive rumination captures cognitive responses thought to be implicated in the intensification of positive affect (Feldman et al., 2008), and it has been argued that depressed individuals are unable, or unwilling, to focus upon and elaborate positive aspects of the self (Feldman et al., 2008; Joormann & Siemer, 2004), meaning that positive moods are only sustained for short periods of time. Self-focused positive rumination in depressed individuals may only serve to further highlight the discrepancy between their current and desired selves, worsening depressive feelings and maintaining negative ruminative thought processes (Joormann & Siemer, 2004).

It is interesting to note that current depression symptom severities and hypomania vulnerability were strongly associated with the self and symptom focused rumination subscales from the positive and negative rumination measures respectively. This indicates that response styles which focus upon the self and one's current state make significant contributions to vulnerability to hypomania and current depressive symptom severities. Whilst a lack of self-focused positive rumination made a significant contribution to current depression, a lack of self and symptom focused depressive rumination did not emerge as a significant contributor to variance in hypomania vulnerability. This supports the argument that whilst hypomania vulnerability can be associated with negative rumination, it is the engagement in positive cognitive response styles that confers a vulnerability to hypomania.

For our third aim, a principal components analysis was used to explore the overlap and item redundancy across the ruminative and appraisal cognitive style measures. A three-component solution was produced, including a negative cognitive style component, a positive cognitive style component and a normalising of symptoms component. The negative cognitive style component captured strategies that attempt to amplify negative emotional states and reduce positive emotional states, including items from the negative self-appraisal, symptom-focused negative rumination and dampening measures. The positive cognitive style component captured strategies which focus upon and amplify positive affective states, and included items from the positive self-appraisal, self and

emotion-focused positive rumination measures. Although the measures included in the positive and negative cognitive style components are designed to capture different forms of positive and negative cognitions, the principal components analysis suggested these measures may simply be reduced to cognitive response styles that attempt to increase or decrease mood states, in addition to a normalising of symptoms component. This normalisation component included items from the hypomania and depression normalising appraisal measures, suggesting that the normalisation of experiences may reflect a different type of response style than the two other emotional processing components. This may reflect a generic reappraisal process where the individual makes a more conscious effort to rationalise emotional experiences. Alternatively, the two emotional processing strategies indicated by the principal components analysis may reflect a simpler process of engaging in a positive or negative thinking style in response to current affective states. A similar normalising component emerged in a previous study, which was composed of the normalising items from the hypomanic appraisals measure (Johnson & Jones, 2009).

In relation to the overlap between self-appraisals and ruminative thought processes, tendencies to make positive self-appraisals and to engage in positive rumination were associated with the vulnerability to hypomania. Although scores on the hypomanic self-appraisal scale were found to make the greater contribution to variance in scores on the hypomania vulnerability measure compared to positive rumination. Whilst such an assertion would require testing, positive forms of rumination may occur prior to the endorsement of positive self-appraisals, with these overly positive self-appraisals becoming endorsed through repetitive self-thought. However, it is unclear whether a similar relationship between ruminative self-thought and negative self-appraisal may exist in relation to depression vulnerability, as the current study did not include a trait-based measure of the vulnerability to depression. One possible implication of these findings is that training individuals to better regulate their cognitive responses to mood states may assist in reducing the endorsement of extreme appraisals of the self, which assists with the more effective regulation of subsequent behavioural reactions to mood states.

In sum, the current study suggests that the vulnerability to hypomania is primarily associated with a positively orientated cognitive style, consistent with previous observations in bipolar and at-risk samples (Carver & Johnson, 2009; Johnson et al., 2008a). In addition, regression analyses conducted upon the components identified by the principal components analysis indicated that the vulnerability to hypomania was inversely associated with the endorsement of normalising appraisals, supporting previous observations (Jones et al., 2006; Jones & Day, 2008; Johnson & Jones, 2009). Rather than reappraising a hypomanic or depression relevant event, hypomanic individuals may instead

endorse a positive or negative self-appraisal or respond by focusing their thinking in a positive or negative ruminative manner. This may prompt the engagement in behaviours and cognitive styles which further exacerbate current mood and symptoms. Research has suggested that reappraising the personal meanings associated with recently experienced events can assist in controlling subsequent behavioural responses to events (Gross & John, 2003). A lack of the endorsement of normalising appraisals may contribute to subsequent inflations in mood and behaviour in hypomania. This would be consistent with prior observations that hypomania is associated with poor self-regulation, such as the tendency for hypomanic individuals to actively pursue unrealistically achievable goals in the attempt to maintain positive emotional states (Johnson, 2005b; Johnson & Carver, 2006).

There are a number of limitations to consider with the current study. A number of items from the reflective rumination subscale failed to load on one component or loaded on more than one to a similar magnitude in the principal components analysis. The lack of significant loadings for some of the reflective items may indicate that the RRS Reflection subscale was not purposefully constructed as a measure of reflective thinking in response to negative emotional experiences and only emerged in a previous factor analysis (Treynor et al., 2003). The study was also conducted in a predominantly female and high-functioning sample of individuals from a higher education institute in the UK, and it is not clear what proportion of participants had previously contacted mental health services and/or had been diagnosed with a mental health condition as this data was not collected. Future research will be required to investigate these findings within a bipolar population.

The current study is also cross-sectional in design and relies upon the self reporting of moods and cognitive styles, albeit using established and validated psychometric measures. However, it is still unclear how positive forms of rumination are associated with prospective mood symptoms. Whilst the current study controlled for the effect of current activated mood states upon cognitive styles in the regression analyses, the study did not incorporate a measure of more enduring manic symptomatology comparable to the CES-D scale, which measures depressive symptom severity over the previous week. Although individuals who report HPS high scores are considered to be vulnerable to experiencing both current and future hypomanic symptoms (Eckblad & Chapman, 1986), future studies are required to investigate how positive rumination is related to prospective mood and symptoms. Future research may wish to incorporate more objective and less self-report reliant indices of rumination, in tandem with prospective designs, to ascertain how ruminative cognitive styles contribute to the development of bipolar symptoms over time.

2.1.6 Conclusions

In conclusion, the current study has suggested that the vulnerability to hypomania is primarily characterised by positive cognitive styles, which appear to be more implicated in conferring a vulnerability to hypomania than negative cognitive styles. Whilst hypomanic personality traits were also positively associated with measures of negative cognitive styles, only positive cognitive measures emerged as significant contributors to the self-reported risk for hypomania. Future research should take into account the sensitivity of individuals at a high vulnerability for hypomania to both positive and negative emotional experiences. In particular, researchers should consider how the propensity to engage in specific forms of cognitive styles in response to emotional experiences may contribute to the development of manic and depressive symptoms following environmental stressors.

Section 2.2

Study Two

The prospective associations between positive and negative cognitive styles and the severity of bipolar mood symptoms at six months in an analogue sample

Robert C. Dempsey

Patricia A. Gooding

&

Steven H. Jones

2.2.1 Abstract

A previous study (Section 2.1) had identified that similar emotion regulatory processes appeared to be captured by a set of commonly used cognitive style measures, including processes implicated in increasing and decreasing mood states, and a normalising appraisal process for the experience of bipolar symptoms. However, it was unclear how these cognitive styles may be associated in long term changes in bipolar symptoms. The current study comprised a six month follow-up of the participants from the previous study and assessed mood symptoms, hypomania vulnerability and the experience of life events between time points.

Scores on the negative cognitive style component at Time 1 were associated with elevated scores across the Time 2 manic and depressive symptom and hypomania vulnerability measures, as well as with lower well-being scores. Scores on the positive cognitive style component were associated with increased hypomania vulnerability and well-being, but were negatively correlated with depressive symptoms at the six month follow-up. Whilst the experience of positive life events were not associated with scores on the symptom or vulnerability measures, the experience of negative life events were associated with elevated scores across all the symptom and vulnerability measures, including reduced well-being, and was the only variable which was associated with increases in self-reported hypomania vulnerability at follow-up. These results lend tentative support to the manic defence hypothesis, whereby increases in hypomania vulnerability and subclinical symptoms are considered to stem from attempts to cope with and avoid depressogenic cognitions and experiences.

2.2.2 Introduction

A previous study (Study One, Dempsey et al., 2011) conducted a principal components analysis (PCA) upon a number of self-report measures of positive and negative rumination and self-appraisal to investigate whether these measures may capture similar affect regulatory processes.

The PCA produced a three component solution reflecting three distinct components, the first reflected a negative cognitive style component consisting of brooding and depressive symptom focused negative rumination, negative self-appraisal and dampening responses to positive emotions. The second component represented a normalising of depressive and hypomanic symptoms process, which appeared to be similar to reappraisal (Gross & John, 2003). The third component represented a positively oriented cognitive style incorporating self and emotion-focused positive ruminative thought processes, and positive self-appraisals. Cross-sectional positive correlations were observed

between the negative cognitive style component with self-reported hypomanic personality traits, and subclinical depressive and manic symptoms, whilst the negative cognitive style component was negatively associated with self-reported well-being scores. The normalising of symptoms component was not associated with any of the self-report personality or symptom measures. However, the positive cognitive style component was positively associated with hypomanic personality traits, well-being, current hypomanic symptoms, and with scores on the normalising component. Although the negative cognitive style component was positively associated with current depressive and manic symptoms, and the positive cognitive style component was positively associated with manic symptoms and increased well-being, it was not clear how these cognitive styles may be associated with prospective symptom severities and the vulnerability to hypomania at a longer term follow-up.

The current study consisted of a six month follow-up of participants from the original study (Dempsey et al., 2011). The main aim of the study was to investigate the prospective associations between the cognitive style measures from Study One with the self-reported severity of bipolar mood symptomatology at a six month follow-up.

Previous research has suggested that the vulnerability to hypomania is predominantly associated with a number of positively orientated cognitive styles (Dempsey et al., 2011), including tendencies to react intensely to positive stimuli and engage in affect regulatory strategies that attempt to increase and maintain positive mood states (Carver & Johnson, 2009; Johnson & Jones, 2009). Although it has also been suggested that hypomania vulnerability is associated with the engagement in negative cognitive styles, particularly negative rumination (Thomas & Bentall, 2002), and with thought processes which attempt to dampen positive emotional states (Feldman et al., 2008; Johnson & Jones, 2009).

Taking into consideration Dempsey and colleagues' (2011) study, which had indicated that HPS scores were cross-sectionally associated with the positive cognitive style measures and that depressive symptoms were primarily associated with the negative cognitive style measures; one possibility is that these associations will remain for prospective symptoms. Indeed, positive ruminative thought processes are considered to be associated with exacerbations in manic symptoms (Feldman et al., 2008; Johnson et al., 2008a), and negative rumination with the maintenance of depressed states and with the vulnerability to depression (Nolen-Hoeksema, 1991; Nolen-Hoeksema et al., 1993; Smith & Alloy, 2009). However, theories such as the manic defence hypothesis (Neale, 1988), and its supporting research, suggest that hypo/mania can be associated with sensitivities to negative information about the self (Bentall & Thompson, 1990), including labile self-

esteem (Winters & Neale, 1985) and the engagement in negative rumination (Thomas & Bentall, 2002; Van der Gucht et al., 2009; Dempsey et al., 2011), which may be indicative of a latent negative self-concept (Neale, 1988). Attempts to avoid self-negative cognitions through the use of distraction and risky behaviours may lead to increases in positive affect (Thomas et al., 2007).

However, prospective hypo/manic symptoms may be associated with a combination of both positive and negative cognitive styles, reflecting the bipolarity of mood and cognitive processes noted across the bipolar spectrum. Whilst in relation to depression, prospective depressive symptoms may be more associated with the engagement in negative cognitive styles and a lack of positively orientated cognitive styles as suggested by previous research (Joormann & Siemer, 2004; Johnson et al., 2008a). In relation to this, our first hypothesis was that the engagement in negative cognitive styles would be associated with prospective increases in depressive symptomatology, and to a lesser extent increases in manic symptomatology, whilst positive cognitive styles would be predominantly associated with increases in hypo/manic, but not depressive, symptoms. This hypothesis is consistent with the observations made in Study One where positively oriented cognitive styles were associated with increased hypomanic symptoms (ISS Activation) and well-being scores, but negative cognitive styles were positively associated with depressive symptoms and to a lesser extent with hypomanic symptoms.

Study Two also investigated the contribution of negative and positive life events to the vulnerability to hypomania and the experience of prospective mood symptoms. Previous research has implicated the experience of life events in the exacerbation of mood symptoms (Johnson, 2005a; Johnson et al., 2008a), with the experience of negative life events associated with prospective changes in depressive but not manic symptoms in patients with Bipolar I Disorder (Johnson et al., 2008a). In relation to at-risk individuals, the experience of stressful life events may act as a trigger for increases in mood symptoms, particularly in the manner in which individuals respond to positive and negative life events. Previous research has suggested that individuals with hypomanic personality traits and bipolar disorder may interpret experiences in both self-positive and self-negative manners (Jones et al., 2006; Jones & Day, 2008; Dempsey et al., 2011), and also engage in both positive and negative ruminative response styles to experiences (Johnson et al., 2008a; Dempsey et al., 2011). Because individuals on the bipolar spectrum may respond to experiences in both self-positive and self-negative manners, it is currently unclear how at-risk individuals respond to the experience of positive and negative life events, and what effect this may have upon their prospective mood symptoms.

Although it has been have suggested that the experience of life events can trigger exacerbations in manic and depressive symptoms in patients with bipolar disorder (Johnson, 2005a), it is not currently clear how the experience of life events influences mania vulnerability in at-risk individuals, and whether the experience of more positive and/or negative events is associated with exacerbations in mania vulnerability. It is possible that the experience of negative life events in hypomanic individuals may prompt descents in mood leading to depressed states, or may prompt attempts to increase positive mood states and avoid depressive feelings through the engagement in goal-related or risky activities (Thomas & Bentall, 2002; Thomas et al., 2007). Alternatively, the experience of positive life events may be associated with ascents in mood and symptoms; as such life events may trigger positive thoughts about the self, through positive rumination, leading to endorsement of more grandiose self-beliefs and ascent behaviours. The current study represented an exploratory investigation into the prospective associations between positive and negative cognitive styles with mood symptoms at a six month follow-up.

2.2.3 Method

Participants

A total of 127 participants (104 female, 23 male; Mean Age = 24.30 years, S.D. = 8.04) from the sample of 353 participants in Study One (Dempsey et al., 2011) completed the follow-up self-report measures (a 36% conversion from Time 1 to Time 2).

Materials

Time 1 Measures

Full details of the baseline questionnaire measures and the results of the Principal Components Analysis conducted upon these measures are described in Study One (Section 2.1).

Time 2 Measures

Hypomanic Personality Scale (HPS)

The HPS is a 48 item true-false questionnaire designed to assess the presence of personality traits associated with hypomanic symptoms, such as mood lability and grandiosity (Eckblad & Chapman, 1986). Individuals who report elevated scores on the HPS have been observed to be at a higher risk of experiencing more severe bipolar symptoms (Blechert & Meyer, 2005), and more likely to experience hypomanic episodes, psychotic symptoms, and abuse substances than low HPS scorers at long-term follow-up (Eckblad & Chapman, 1986). The HPS has demonstrated good test-retest reliability (r =

.81; Eckblad & Chapman, 1986) and high levels of internal consistency (Cronbach's α = .87-.89; Eckblad & Chapman, 1986; Dempsey et al., 2011).

Internal States Scale (ISS)

The ISS is a 16 item measure designed to assess current bipolar symptomatology (Bauer et al., 1991). Each of the items on the ISS refers to the experience of bipolar symptoms relating to depression (ISS-D), hypo/mania (ISS-Activation), perceived interpersonal conflict (ISS-PC) and well-being (ISS-WB). Participants rate the intensity of each bipolar symptom over the past 24 hours on 100mm rating scales which are anchored at the extremes by "Not at all/Rarely" to "Very much so/Much of the time" (Example items include: "Today my mood is changeable", "Today I feel "sped up" inside"). Scores on the ISS are associated with clinician-made ratings of bipolar symptom severities (Bauer et al., 1991), with high levels of internal consistency for the ISS subscales reported in previous studies (αs = .70-.83, Jones & Day, 2008; Dempsey et al., 2011).

Event-rating scale (ERS: Novel scale)

To assess the experience and appraisal of positive and negative life events in the six month period between time points, a novel self-report measure was devised. Although other life event appraisal measures exist, such measures are more focused upon the appraisal of solitary stressful life events (e.g., the Appraisal of Life Events Scale; Ferguson, Matthews & Cox, 1999). A novel measure was devised in order to allow the measurement of the cumulative experience and appraisal of both positive and negative life events over a six month period. The event rating scale requires participants to rate the frequency of positive and negative life events experienced over the previous six months, rate how emotionally positive or negative these events were, rate their emotional state for when they look back over the events of the prior six months, and provide a rating of their optimism or pessimism for the next six months of their life. Participants made their ratings according to 100mm scales, with higher ratings indicating the experience of greater numbers of positive and negative events, and with greater optimism and more positive appraisals of these events (see Appendix).

Procedure

Participants from a previous online study (Dempsey et al., 2011) had consented to being contacted about future research and were invited via email to take part in the current study. The email message contained a link to the study's website where electronic versions of the information sheet and consent form were presented. Following informed consent,

participants completed the HPS, ISS, and the Event-Rating Scale. Those participants who completed the follow-up study were entered into a prize draw for vouchers as an incentive. The study received institutional ethical approval from the University of Manchester.

Data Analysis

Data normality was investigated through the use of Kolmogorov-Smirnoff tests, calculation of z-scores, and review of histograms. Associations between the Time 1 cognitive style measures and the Time 2 symptom and vulnerability measures were first investigated by correlational analysis, with hierarchical regression analyses conducted to establish whether these associations remain when controlling for baseline mood symptoms. As preliminary data analyses failed to find evidence of significant interactions between the baseline vulnerability and cognitive style measures and scores on the event appraisal measures in relation to prospective symptoms, the analysis focused upon the associations between baseline cognitive styles and the severity of mood symptoms at a six month follow-up.

2.2.4 Results

Review of histograms, z-scores, and the results of Kolmogorov-Smirnoff indicated that the data distributions did not significantly differ from normality. An independent samples t-test was first conducted to determine whether significant differences in age existed between those participants from Time 1 who completed and did not complete Time 2. Participants who did not complete Time 2 were younger in age (Mean age = 21.73 years, S.D. = 4.90) compared to participants who completed Time 2 (M = 24.29 years, S.D. = 8.05) ($t(353) = -3.81$, $p < .001$, $r = .20$). No significant differences in gender ratios between completers and non-completers were noted (Pearson's $X^2 = .787$, $p = .375$). In addition, no significant differences between completers and non-completers were noted for Time 1 scores on the HPS ($t(370) = 1.70$, $p = .09$), the CES-D ($t(352) = -1.08$, $p = .28$), or on the Depression ($t(352) = -.49$, $p = .66$), Activation ($t(352) = -.56$, $p = .57$) and Perceived Conflict ($t(352) = -.51$, $p = .61$) subscales of the Internal States Scale. However, those participants who completed Time 2 reported significantly lower Time 1 scores on the Well-Being subscale of the Internal States Scale (M = 126.14, S.D. = 60.44) compared to non-completers (M = 145.66, S.D. = 66.98) ($t(352) = 2.67$, $p < .01$, $r = .14$). Mean scores on the Time 2 measures are presented in Table 2.2.1 below.

Table 2.2.1 Means and standard deviations for the Time 2 self-report measures

	Mean	S.D.	Ranges
Internal States Scale (ISS)			
Activation	121.54	97.29	0-500
Depression	46.92	47.74	0-195
Perceived Conflict	110.83	83.45	0-360
Well-Being	146.66	66.28	0-300
Hypomanic Personality Scale (HPS)	15.70	8.95	1-40
HPS Change Score	-.27	4.80	-14 to 13

Note: HPS Change scores = Time 2 HPS score – Time 1 HPS score

Mean scores on the ISS subscales, as shown in Table 2.2.1, are consistent with mean scores reported in previous non-clinical studies (Mansell et al., 2008; Dodd et al., 2010). Whilst mean HPS scores appeared lower than the mean reported in Study One (M_{HPS} = 17.13) this difference was at a non-significant trend level (p = .09). The mean HPS score reported in Table 2.2.1 is consistent with HPS means reported by previous studies conducted in similar British student samples (Knowles et al., 2005; Mansell et al., 2008; Jones & Day, 2008). A series of bivariate correlations were next conducted to investigate the associations between the Time 1 cognitive style measures and the Time 2 symptom measures (see Table 2.2.2).

Table 2.2.2. Bivariate correlations between scores on the Time 1 cognitive style self-report measures and Time 2 symptom and vulnerability measures.

Time 2 Measures	HPS	ISS A	ISS D	ISS PC	ISS WB	HPS Change
Time 1 Measures						
HPS	.850***	.325**	.041	.146	.038	-.184*
HIQ Hypomanic	.419***	.149	-.124	.016	.131	-.006
HIQ Normalising	-.004	.056	.029	.052	-.069	.061
IDQ Normalising	.046	.024	-.157	-.115	.029	.041
IDQ Depressogenic	.170	.163	.299**	.296**	-.252**	.097
ISS Activation	.347***	.316***	.151	.141	-.062	-.141
ISS Depression	.057	.122	.361***	.260**	-.258**	-.036
ISS Conflict	.206*	.206*	.307***	.329***	-.170	-.133
ISS Well-Being	.088	.059	-.202*	-.058	.242**	-.132
RPA Dampening	.140	.150	.126	.062	-.158	.059
RPA Emotion	.166	-.024	-.193*	-.205*	.222*	-.054
RPA Self	.171	-.014	-.189*	-.146	.231**	-.125
RRS Brooding	.247**	.232**	.311***	.245**	-.255**	.095
RRS Reflection	.377***	.186*	.061	.062	-.022	.095
RRS Depression	.326***	.270**	.283**	.235**	-.282**	.121
Pos Life Events	.063	-.048	-.163	-.070	.115	-.082
Neg Life Events	.281**	.191*	.410***	.314***	-.226*	.224*
Negative PCA	.273**	.223*	.316***	.246**	-.306***	.131
Normalising PCA	.012	.008	-.099	-.066	-.010	.074
Positive PCA	.377***	.069	-.213*	-.114	.248**	-.072

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Key: HPS = Hypomanic Personality Scale (HPS Change = Time 2 HPS – Time 1 HPS), HIQ = Hypomania Interpretations Questionnaire, IDQ = Interpretations of Depression Questionnaire, ISS = Internal States Scale, RPA = Responses to Positive Affect Scale, RRS = Ruminative Responses Scale, PCA = Components from the Principal Components Analysis produced in Study 1.

Cross-sectional correlations between the Time 1 measures were reported in Section 2.1. In relation to the associations between the Time 1 and Time 2 measures, as displayed in Table 2.2.2 above, scores on the hypomanic appraisals measure were positively associated with follow-up HPS scores. Depressive appraisals (IDQ-D) were positively

associated with scores on the ISS Depression and Perceived Conflict subscales, and negatively with ISS Well-Being at six months. Scores on the positive rumination scale (the RPA) were negatively associated with ISS Depression (Emotion and Self-focused), ISS Perceived Conflict (Emotion focused rumination only), and positively with ISS Well Being scores (Self and Emotion focused rumination). In terms of negative forms of rumination, positive associations were noted between all three negative rumination subscales with Time 2 HPS scores and ISS Activation scores, whilst positive correlations with ISS Depression and Perceived Conflict were noted for the Brooding and Depression-related rumination subscales. Negative associations were also noted between ISS Well Being with Brooding and Depression-related rumination scores.

Scores on the Positive Life Events scale of the Event Rating Scale, higher scores on which reflect the experience of greater numbers of positive life events between Time 1 and Time 2, were not associated with any of the symptom or vulnerability measures. However, scores on the Negative Life Events scale were positively associated with scores on the HPS, all of the ISS symptom subscales except Well-Being which was negatively associated with Negative Life Events, and positively with HPS Change scores, which reflect changes in HPS scores from Time 1 to Time 2 (a more positive HPS change score reflects increases in HPS scores at Time 2 compared to Time 1). Interestingly, none of the cognitive style measures were associated with HPS Change scores.

In relation to the cognitive style components produced in the previous study, scores on the negative cognitive style component were positively associated with Time 2 HPS, as well as with scores on the ISS subscales (A, D and PC), although a negative correlation was noted with scores on the ISS Well Being measure. Scores on the positive style component were positively associated with HPS and ISS Well Being, but negatively with ISS Depression scores.

A series of hierarchical multiple regression analyses were conducted to assess which of the cognitive style measures taken at Time 1 explained the most variance in scores on the Time 2 symptom and vulnerability measures. To control for possible effects of baseline symptoms, those subscales of the Internal States Scale which significantly correlated with the dependent variable were entered into the first block of the regression equation. The cognitive style measures which were significantly correlated with the dependent variable were entered into the second step of the regression using stepwise regression (see Table 2.2.3 below).

Table 2.2.3. Results of the regression analyses investigating the associations between the Time 1 cognitive style measures and the Time 2 symptom and life event measures

Dependent variable	Step		β	SE β	Total R^2	ΔR^2
T2 HPS	1	T1 ISS A	.194*	.008		
		T1 ISS PC	.057	.009	.123	
	2	HIQ-H	.334***	.138	.258	.135***
	3	Neg Life Events	.252**	.027	.329	.072***
	4	RRS Reflection	.231**	.213	.377	.048**
T2 ISS A	1	T1 ISS A	.277**	.106		
		T1 ISS PC	-.010	.109	.104	
	2	RRS Depression	.219*	1.234	.145	.041*
T2 ISS D	1	T1 ISS Activation	.095	.057		
		T1 ISS PC	.111	.052		
		T1 ISS WB	-.092	.076	.126	
	2	Neg Life Events	.308***	.156	.202	.101***
	3	RRS Brooding	.184*	1.159	.256	.028*
	4	RPA Emotion	-.174*	1.361	.284	.028*
T2 ISS PC	1	T1 ISS PC	.284**	.099		
		T1 ISS D	-.024	.192	.112	
	2	Neg Life Events	.241**	.282	.168	.056**
	3	RPA Emotion	-.187*	2.496	.201	.033*
T2 ISS WB	1	T1 ISS D	-.082	.138		
		T1 ISS WB	.114	.106	.088	
	2	RRS Depression	-.217*	.860	.119	.031*
	3	RPA Emotion	.184*	2.040	.151	.032*
HPS Change	1	Neg Life Events	.224*	.017	.050	.050*

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. T1 = Time 1 measure, T2 = Time 2 measure. HIQ-H = Hypomania Interpretations Questionnaire – Hypomanic Appraisals Scale, HPS = Hypomanic Personality Scale, ISS = Internal States Scale (A = Activation, D = Depression, PC = Perceived Conflict, WB = Well-being), RPA = Responses to Positive Affect scale, RRS = Ruminative Responses Scale.

Scores on the HIQ-H, Negative Life Events and RRS Reflective Rumination Scales were found to make significant positive contributions to variance in Time 2 HPS scores. Scores on the ISS Activation measure were associated with Time 1 Activation symptoms and scores on the Depression-focused Rumination subscale of the RRS. Whilst none of the baseline ISS subscales were associated with Time 2 ISS-Depression, Negative Life Events and Brooding made significant positive contributions to ISS-D variance at Time 2, in addition to a lack of RPA Emotion focused positive rumination. Time 2 ISS Perceived

Conflict scores were associated with Time 1 PC scores, in addition to positive associations between Time 2 PC and the experience of Negative Life Events and a lack of Emotion-focused positive rumination (RPA-E). Depression focused negative rumination and Emotion-focused positive rumination were negatively and positively associated with Time 2 ISS Well-being scores respectively. Interestingly, only scores on the Negative Life Events measure made a significant positive contribution to variance in HPS Change scores.

To investigate the proportion of variance in the Time 2 symptom measures explained by the cognitive style components and life event measures, a series of regression analyses were conducted. To control for any effect of baseline symptoms, those subscales on the Time 1 ISS which were correlated with the dependent variable were entered into the first block of the regression equation. The cognitive style components and life event measures which were significantly correlated with the dependent variable were entered into the second block (see Table 2.2.4 below).

Table 2.2.4 Regression analyses investigating the associations between the Time 1 cognitive style components and scores on the life events measure with scores on the Time 2 symptom and vulnerability measures

	Time 2 Measures					
Time 1 Measures	HPS Standardised B	ISS A	ISS D	ISS PC	ISS WB	HPS Change
Step 1						
ISS A	.197*	.293**				
ISS D			.174	.011	-.036	
ISS PC	.001	-.030	.063	.227*		
ISS WB					.024	
Step 2						
Negative PCA	.190*	.165	.147	.098	-.253*	
Positive PCA	.363**				.205*	
Negative Life Events	.269**	.134	.317***	.237**	-.128	.224*
Step 1 R^2	.123***	.104**	.126***	.112**	.088	.050
Step 2 ΔR^2	.210***	.045*	.118***	.063*	.084	
df	*(5, 121)*	*(4, 122)*	*(4, 122)*	*(4, 122)*	*(5, 121)*	*(1, 125)*
F	12.09***	5.33**	10.61***	6.49***	5.04***	6.57*

*$p < .05$, **$p < .01$, ***$p < .001$. HPS = Hypomanic Personality Scale, ISS = Internal States Scale (A = Activation, D = Depression, WB = Well-being, PC = Perceived Conflict), PCA = Principal Components Analysis Component

Current manic symptoms (ISS A), negative life events, and scores on the negative and positive cognitive style components were all significant contributors to variance in Time 2 HPS scores, whilst only baseline scores on the ISS A at contributed to variance in Time 2 ISS A scores. In relation to current depressive symptoms, only the reporting of negative life events made a significant contribution to variance in ISS D scores. Scores on the negative life events measure also made a significant positive contribution to variance in ISS Perceived Conflict scores at Time 2, in addition to baseline ISS PC scores. For Time 2 ISS Well-being, scores on the negative cognitive style component made a significant negative contribution to variance in Time 2 ISS WB, whilst the positive cognitive style component made a significant positive contribution. None of the cognitive style components made any contribution to HPS Change scores, only the reporting of negative life events explained variance in the change of HPS scores from Time 1 to Time 2.

2.2.5 Discussion

Previous research has implicated the engagement in positive and negative cognitive thought processes in the vulnerability to affective disorders, in the maintenance of positive and negative emotional states, and in the development of bipolar symptoms (Johnson et al., 2008b). Whilst a previous study had suggested that similar affect regulatory processes may underlie commonly used measures of positive and negative forms of rumination and self-appraisal, it was unclear which of these processes were associated with prospective symptoms (Dempsey et al., 2011). The current study investigated the prospective associations between positive and negative forms of cognitive styles with the self-reported severity of bipolar mood symptoms and vulnerability at a six month follow-up.

Prospective hypomanic and depressive symptoms were associated with negative life events appraisals, with negative forms of rumination (brooding and depression-related rumination) and with a lack of emotion-focused positive rumination. These results were broadly in line with our predictions, except that neither the individual positive cognitive style measures nor the positive component from Time 1 were associated with prospective hypomanic symptoms. Although, it was noted that the positive PCA component and emotion-focused positive rumination measures were associated with higher scores on the ISS Well-Being measure at Time 2, consistent with the notion that positively focused cognitive styles can be associated with increased and healthy levels of positive affect.

Hypomania vulnerability scores at Time 2 were positively associated with tendencies to make positive self-appraisals, more negative appraisals of life events and with reflective forms of rumination, although only appraisals of negative life events measure made a significant contribution to increases in hypomania vulnerability from

Time 1 to Time 2. The associations between the Time 1 measures and Time 2 scores on the hypomania vulnerability measure are similar to the cross-sectional associations reported in Study One, where HPS scores were associated with positive self-appraisals, reflective rumination and self-focused positive rumination. The absence of significant correlations between positive life events appraisals and prospective symptoms may be due to the life events scale not accounting for the experience of goal-attainment events, which may have explained greater proportions in variance of prospective hypomanic symptoms.

Contrary to predictions, the positive cognitive style measures were not associated with prospective scores on the hypomania vulnerability or symptom measures. Although, emotion and self-focused positive rumination were found to be associated with increased well-being, and were negatively correlated with depressive symptoms and perceived conflict, positive rumination was not associated with prospective hypo/manic symptoms. However, in contrast, Time 1 scores on the hypomanic symptoms measure were positively associated with prospective hypomanic symptoms. Prospective subclinical hypomanic symptoms were associated with the brooding, reflection and depression-focused components of negative rumination, as well as with the reporting of negative life events.

Whilst it has been suggested that manic symptoms may be associated with ruminative responses to positive mood states (Johnson, 2005b; Feldman et al., 2008), the findings suggest that prospective hypo/manic and depressive symptoms are associated with negative cognitive styles, in contrast to research reporting cross-sectional associations between positive rumination and hypomanic symptoms (Dempsey et al., 2011; Feldman et al., 2008). Although, a lack of positive rumination was associated with prospective depressive symptoms in the current study, in accord with previous cross-sectional observations (Feldman et al., 2008), and a lack of negative rumination was associated with greater well-being. Positive rumination may only contribute to short-term increases in manic symptoms and positive mood states, and may be more effortful to enact than negative ruminative cognitive styles, particularly in at-risk and clinical samples. Alternatively, the lack of associations between positive rumination with hypo/manic symptoms may be due to the non-clinical nature of the sample, who may be less likely to engage in positive rumination or to respond as intensely to recent positive and goal-attainment events compared to bipolar samples. However, there was a trend for lower HPS scores to be reported by those participants who completed the follow-up measures. The lack of associations between the positive cognitive style measures with prospective symptoms may be in part due to the attrition of participants who report elevated hypomanic personality traits who may be more likely to engage in positive ruminative thought processes, and experience more intense mood symptoms, than low HPS scorers.

In relation to the appraisals of life events, only negative life event appraisals were associated with increased bipolar symptoms and increased hypomania vulnerability at follow-up, no associations were observed with the appraisals of positive life events. Whilst the simplistic rating scale measure of life event appraisals used in the current study may not have adequately measured the qualitative experience of positive life events; it may be that the appraisal of negative life events has a more enduring and powerful effect upon prospective bipolar symptoms in at-risk individuals. The appraisal of the experience of negative life events may prompt attempts to comprehend the reasons for the event's occurrence, through negative rumination, which could unintentionally result in prolonged depressive states in ruminating individuals. Alternatively, at-risk individuals for hypomania and bipolar disorder may be more likely to engage in initial ruminative attempts to understand the causation of negative experiences followed by attempts to avoid negative feelings associated with rumination through pleasant distraction or the engagement in risky activities, which may lead to subsequent ascents in mood and increased subclinical manic symptoms. In comparison, the experience of positive life events may only have a small impact upon mood symptoms within non-clinical individuals

There are a number of limitations to consider with the study. A major limitation of is that the rating scale of life events may not have accounted for the influence of events relating to goal-attainment, which may have explained prospective hypomanic symptoms. Although appraisals of negative life events made a significant contribution to variance in HPS change scores, negative life event appraisals only explained a small proportion of variance. Greater proportions of variance may be explained through the use of a more sensitive measure of negative life events, which may more accurately measure schema-activating life events relating to failures for example. Future studies may consider using validated measures such as the Life Events Scale for Students, a measure of the experience of events likely to be encountered by student participants (Clements & Turpin, 1996), or using a more qualitative measure of life events to assess the extent to which life events associated with goals or negative dysfunctional attitudes contribute to prospective symptom exacerbation. There may also have been confounds between the appraisal-based nature of the ERS with scores on the ISS mood measures, whereby higher ratings for the experience of life events on the ERS may have simply reflected the current experience of intense mood symptoms given the correlations reported between the ERS scales and ISS measure. In light of these limitations, future research should consider using validated assessments of life events and event appraisals rather than the ERS, such as the Appraisals of Life Events scale (Ferguson et al., 1999). The current study also only included a measure of transient bipolar symptoms (the "Internal States Scale"), which measures the

experience of symptoms over the past 24 hours, which may not have adequately assessed more enduring mood symptoms associated with bipolar disorder.

It was also noted that only a third of participants from Study One completed the follow-up study. Those participants who completed Time 2 reported lower scores on the ISS Well-Being scale and were older than the non-completing participants, and there was a trend for lower HPS scores reported at Time 2 compared to Time 1. These results suggest that there may have been an attrition of higher HPS scorers at the six month follow-up, which may provide a partial explanation for the lack of associations between positive rumination and prospective mood symptoms given that high HPS scorers are more likely to engage in positive ruminative thought processes (Feldman et al., 2008). The low-completion rate for the follow-up may have been influenced by the internet-based nature of the study, which relied upon participants having regular email access in order to complete the Time 2 measures. Also, as data collection for the current study was conducted during the spring semester (March to July), student participants may have been too preoccupied with university coursework deadlines and examinations to participate in the study. As was the case in Study One, which sampled the same participants as Study Two, the sample was largely female and it is unclear whether the participants had previously experienced some form of mental illness. Future studies should attempt to recruit more equal numbers of males and females to avoid potential gender biases in findings, and also consider including measures to screen out participants with histories of mental health problems.

2.2.6 Conclusions

The current study has suggested that negative cognitive response styles are associated with heightened prospective mood symptoms. Whilst positive rumination appeared to be associated with greater self-reported well-being at follow-up and less severe depressive symptoms, no associations were noted between positive rumination and manic symptomatology contrary to predictions and previous observations. More negative life event appraisals were associated with the increased vulnerability to hypomania and were positively associated with prospective bipolar symptoms. Whilst the study may be limited by a high rate of attrition and the use of a student sample, it would appear that the experience and appraisal of negative life events may impact the experience of future subclinical mood symptoms, although the precise mechanism underlying these associations is unclear. Although caution is advised in the interpretation of these findings, there is a clear need for more research investigating how positive and negative cognitive styles contribute to the vulnerability to affective disorders and the experience of bipolar symptoms over time.

Section 3.1

Study Three

The Development of the University Means-End Problem Solving Task as a Measure of Problem Solving Capabilities in British Undergraduate Students

Robert C. Dempsey

Steven H. Jones

&

Patricia A. Gooding

3.1.1 Abstract

The assessment of solution generation processes during psychosocial problem-solving has typically been assessed by the Means-End Problem-Solving Task (MEPS: Platt & Spivack, 1975), although there are concerns that some of the MEPS items are outdated and unsuitable for use with non-clinical student samples. The current study describes the development of the University Means-End Problem Solving task (UMEPS), an adapted version of the MEPS featuring problematic situations suitable for use with British student samples. Eighty British students rated a series of problematic situations for their realism, described the steps they would take to resolve each situation, and rated the effectiveness of their solutions. Participants also completed self-report measures of depression and the use of resourcefulness behaviours during problem-solving. The severity of current depressive symptoms was associated with reduced resourcefulness, and with the generation of fewer effective and less specifically detailed solutions. Observer-made ratings of solution efficacy were positively associated with the generation of relevant solutions and with greater resourcefulness. The generation of fewer relevant solutions also predicted the increased severity of depressive symptoms, and also distinguished group membership between students experiencing high and low levels of subclinical depressive symptoms. Although further validation is required, the UMEPS appears to be a promising measure of problem-solving.

3.1.2 Introduction

Deficits in psychosocial problem-solving capabilities are prevalent in a variety of mental health conditions, including major depressive disorder (Garland et al., 2000), bipolar disorder (Scott et al., 2000), and suicidality (Pollock & Williams, 2004). Deficits in problem solving also appear to be a cognitive vulnerability factor for depression (Nezu, 1987), in addition to the overgeneral recall of autobiographical memories (Gibbs & Rude, 2004), and ruminative responses to depressed mood states (Nolen-Hoeksema, 1991).

The ability to effectively resolve problems appears to be an important factor in maintaining positive well-being. Many cognitive-behavioural therapies for depression and other psychiatric disorders incorporate some form of problem-solving skills training (Nezu & Perri, 1989; Lam et al., 2000; Malouff, Thorsteinsson & Schutte, 2007). Meta-analyses of problem solving therapy (PST), a cognitive-behavioural intervention specifically designed to promote problem-solving capabilities in patient populations, have indicated that PST is effective in treating both mental and physical health complaints (Malouff et al., 2007), particularly in reducing the severity of depressive symptoms (Bell & D'Zurilla, 2009). These meta-analyses indicate that training in problem-solving appears to be

fundamental to promoting an individual's wellbeing, as well as in reducing the risk of future relapse, and suggests problem-solving is modifiable through psychological therapy.

Investigations into problem-solving effectiveness have typically used the Means-End Problem Solving (MEPS) task (Platt & Spivack, 1975) as an assessment of individual differences in solution generation, across both clinical and non-clinical samples (Platt & Spivack, 1975; Kao, Dristchel & Astell, 2006; Williams et al., 2006; Tzemou & Birchwood, 2007). The MEPS consists of a series of hypothetical problematic situations and requires participants to describe the steps, or "means", that they would take in order to resolve the described problem, usually according to a final outcome provided by the researcher. Performance on the MEPS can be assessed in a variety of ways, including measuring the number of effective steps the participant has described in order to resolve the problem, as well as observer-made ratings of the effectiveness and the level of specificity described in the solution (Platt & Spivack, 1975; Marx et al., 1992).

Previous research has indicated that individuals diagnosed with major depressive disorder generate less effective solutions on the MEPS compared to anxious individuals and non-clinical controls (Marx et al., 1992). Less effective problem-solving on the MEPS has also been associated with increased depressive symptom severities in individuals who have recently attempted suicide (Sidley et al., 1997). Interestingly, performance on the MEPS in clinically depressed samples appears to remain stable over time. No significant changes in the number of relevant solutions and observer-rated effectiveness ratings on MEPS were noted in a sample of depressed individuals at a six month follow-up, despite improvements in problem-solving confidence appraisals and improved depressive symptom severities (Garland et al., 2000). The lack of changes in performance on the MEPS suggests that solution generation may reflect a more trait-based process, whilst self-perceptions of problem-solving abilities reflect more transient, state-based processes relating to the experience of current depressive symptoms. Although, one study conducted within a non-clinical student sample noted that appraisals of low problem-solving confidence are associated with increased depressive symptoms at a six month follow-up, and also that appraisals of low problem-solving confidence can in themselves be a symptom of depression (Dixon, Heppner, Burnett, Anderson & Wood, 1993). The use of self-report questionnaire measures of problem-solving may be limited to assessing an individual's appraisal of their own problem-solving ability, and may not measure the solution generation process when individuals are faced with psychosocial problems. In relation to this, there is a currently a lack of a measure of means-end problem solving which is specifically suited for investigating problem-solving in student samples. The

purpose of the current study was to develop and validate a measure of means-end problem-solving suited for use with student samples.

There has been one previous attempt to develop a student version of the means-end task featuring problematic situations of relevance to student samples (the "College Means-End Problem Solving" procedure, CMEPS; Blankstein, Flett & Johnston, 1992). The CMEPS featured problematic situations generated by a large sample of Canadian university students, including problems of an interpersonal nature (e.g., arguments with roommates or boy/girlfriends), an intrapersonal nature (e.g., losing essay materials), or an emotional nature (e.g., experiences of depressed feelings). The final set of eighteen CMEPS items were subsequently administered to a depressed group and a non-depressed group of students in order to investigate whether depressed students would report less effective problem-solving than their non-depressed peers. However, Blankstein and colleagues (1992) failed to observe significant differences in problem solving skills between the two groups according to performances on the CMEPS task, but did observe that the depressed group made more pessimistic appraisals of their own performances on the problem solving task (Blankstein et al., 1992). Despite attempting to devise the CMEPS as a valid measure of the problematic scenarios faced by university students, the CMEPS failed to differentiate between students currently reporting high and low levels of depressive symptoms in terms of their generation of solutions to hypothetical problems.

Unsurprisingly, subsequent studies have continued to use and adapt items from the original Means-End problem solving item set when investigating problem solving in student samples (Lyubomirsky & Nolen-Hoeksema, 1995). Previous studies have also had to omit inappropriate items such as "killing a former SS trooper", "stealing a diamond", and "getting revenge", from the original MEPS item set when assessing problem-solving in student samples (Nezu & Ronan, 1988; Lyubomirsky & Nolen-Hoeksema, 1995). At present, there is an absence of a means-end problem solving task designed for specific usage with samples of university students which is sufficiently sensitive to differentiate individual differences in solution generation during problem-solving between students currently experiencing high and low severities of depressed moods.

The primary aim of the current study was to develop and validate a version of the means-end problem solving task which incorporates descriptions of problematic situations which are suitable for use with British student samples (The University Means-End Problem Solving task, "UMEPS"). The development of a measure of problem-solving for specific use with student samples would assist in the exploration of the cognitive vulnerability to psychopathological disorders, by featuring problematic situations that may be encountered in the student environment. The UMEPS was designed to incorporate

situations that British students are likely to face, particularly given recent changes to university education in the United Kingdom, such as the introduction and rise in tuition fee costs, the increased financial pressures on students relating to the student loan system and graduate debt, and the increased competition for graduate jobs.

Self-report measures of depressive symptoms and resourcefulness problem-solving behaviours, as measured by the Problem Solving Scale (Centre for Cognitive Therapy, 1988), were included to assess the validity the UMEPS task as a measure of problem-solving. It was hypothesised that greater resourcefulness would be associated with more effective performance on the UMEPS, in terms of the number of solution means generated for each problematic situation, and the effectiveness and specificity of these solutions. It was hypothesised that effective problem solving on the UMEPS would be negatively correlated with the severity of current depressive symptoms, as measured by the Center for Epidemiological Studies' Depression Scale (CES-D) (Radloff, 1977), in line with previous observations (Marx et al., 1992; Goddard et al., 1996; Raes et al., 2005). In contrast to the student means-end problem-solving task developed by Blankstein and colleagues (1992), it was anticipated that more effective problem-solving, as measured by the UMEPS task, would differentiate between students reporting high versus low severities of depressive symptoms.

3.1.3 Method

Participants

A total of 81 students (Mean age = 21.01 years, S.D = 4.90; 74 females, 7 males) from the University of Manchester took part in the study in exchange for course credit or voluntarily took part for no incentive (67 participants received course credits, 14 participated for no incentive).

Materials

The Center for Epidemiological Studies Depression Scale (CES-D: Radloff, 1977)

The CES-D scale is a measure of depressive symptoms which has been used in a variety of clinical samples (Knubben et al., 2007; Calam, Jones, Sanders, Dempsey & Sadhnani, *submitted*), and non-clinical student samples (Radloff 1977, 1991; Johnson et al., 2008a), including samples of British students (Jones & Day, 2008; Dempsey et al., 2011). The CES-D is a 20-item self-report scale which describes a variety of depressive symptoms (e.g., "I felt that I could not shake off the blues even with help from my family or friends"; "I thought my life had been a failure"). Each of these symptoms is rated for their occurrence in the previous week on a scale from 0 ("Rarely") to 3 ("Most of the time"). A

score of 16 and above on the CES-D has been suggested to be indicative of clinical levels of depression (Radloff, 1991). The CES-D has demonstrated good internal validity in student samples (Cronbach's α = .79-.91; Radloff, 1991; Dempsey et al., 2011).

The Problem Solving Scale (PSS: Center for Cognitive Therapy, 1988)

The PSS is a 15-item self-report measure derived from the Self Control Schedule (Rosenbaum, 1980), which in turn is a 36-item measure of the tendency to use self-control strategies in the attempt to overcome problematic situations, with high scores indicating effective self-management skills. Fifteen items from the Self Control Schedule were used to construct the PSS as a measure of problem-solving capabilities as a component of learned resourcefulness (Moorey, Hughes, Knynenberg & Michael, 2000). Each item on the PSS describes a self-control behaviour which individuals may apply when encountering a behavioural problem (e.g., "When I find that I have difficulties in concentrating on my reading, I look for ways to increase my concentration"; "Facing the need to make a decision I usually find out all the possible alternatives instead of deciding quickly and spontaneously"). Participants rate how characteristic of themselves each behaviour is on a six-point scale, ranging from +3 ("Very characteristic of me") to -3 ("Very uncharacteristic of me"), with a total score produced by summing responses across all items (total scores range from -45 to +45). Higher total scores on the PSS reflect more effective problem-solving capabilities, greater self-reliance, and higher levels of learned resourcefulness. Lower scores on the PSS are predictive of poorer illness outcomes in clinically depressed patients (Scott, Harrington, House & Ferrier, 1996), and are predictive of poorer outcomes following cognitive-behavioural therapy in clinically depressed patients (Moorey, Holting, Hughes, Knynenberg & Michael, 2001). Higher scores on the PSS have also been associated with greater autonomy, as measured by the Dysfunctional Attitudes Scale, and with reduced severities of depressive symptoms (Scott et al., 1996). The PSS has demonstrated adequate internal validity (Cronbach's α = 0.81; Moorey et al., 2000).

The University Means-End Problem Solving Task (UMEPS)

A set of 22 problematic situations tailored for British students were devised by the first author (*R.D.*) from reviewing newspaper articles produced for the student community in Greater Manchester, and based upon the item descriptions included in the college student version of the means-end problem solving task (Blankstein et al., 1992). These items included situations describing student worries regarding future graduate careers, worries over repaying debts accrued from student loans and worries regarding ongoing financial

issues, as well as descriptions of more generic educational experiences, such as, interpersonal problems resulting from collaborative group work for degree courses. Each situation consisted of a single paragraph describing the problematic scenario. An example item is presented below (see Appendix for a full list of the UMEPS items).

Problem: Worry about how to pay back student loan

Like many students you took out a student loan to help pay your tuition fees, rent and living costs. You have just checked your bank and student loan statements and realise that your overall debt is much larger than what you anticipated. You are also concerned that you don't have a job lined up for when you graduate. As you look at your statements you wonder how you will repay your debts. We end the story with you overcoming your worries regarding the repayment of your debt.

Procedure

Participants were recruited via advertisements displayed on an online research volunteering website hosted by the University of Manchester. These advertisements directed participants to an electronic version of the participant information sheet and consent form. Following informed consent, participants were randomly assigned to one of three groups. Due to the large number of problematic situations generated for the UMEPS, which totalled 22 situations, each group presented participants with seven UMEPS situations. In addition, the results of an early pilot study produced weaker realism ratings for Item 8 ("Stranded after a night out"). Following the pilot study, Item 8 was rewritten and presented in each group of the current study so that each of the three groups of participants was presented with 8 problematic situations from the UMEPS.

For each UMEPS item, participants read a description of a problematic situation, and were then asked to provide a rating for how realistic that situation was from their experience of university education (on a five point scale from "Very Unrealistic" to "Very Realistic"). Participants were also asked to describe the solution that they would use to overcome that problem, state the outcome of using that solution, and provide a rating of the likelihood of their stated solution solving that particular problem (on a five-point scale from "Very Unlikely" to "Very Likely"). This procedure was then repeated for each of the UMEPS items. Participants were then presented with electronic versions of the PSS and CES-D scales, and an optional open-ended feedback form regarding the appropriateness of the UMEPS problems in relation to their experiences at university. The study was conducted in accordance with ethical guidelines following institutional ethical approval from the University of Manchester.

Data Analysis

A number of performance indices for the UMEPS were calculated to assess the effectiveness of the participant's problem solving skills. Responses on the problem solving task were first coded by the first author (R.D.). An independent rater received training using the UMEPS coding manual (available from the corresponding author), and conducted an inter-rater reliability check by coding a random sample of 25% of the responses on the problem solving task.

First, each response on the problem solving task was coded for the number of relevant solution means or steps described for each problem. This is a count of the number of steps described in the solution, with each mean or step referring to a potentially effective step that assists in achieving the desired outcome (Bray, Barrowclough & Lobban, 2007). A count of irrelevant solution means, where the participant describes a solution mean which has no relevance to the problem, was also made. Example irrelevant solution steps included references to panicking or "becoming depressed" when encountering a problem. Each solution was also rated for its effectiveness, based upon the coding scheme for means-end problem solving tasks used in previous studies (Marx et al., 1992; Scott et al., 2000). In the current study observers rated the efficacy of solutions according to a five point scale (from "Very effective" to "Very ineffective"). The solution was rated as "very effective" if it presented a clear focus on solving the problem, described a number of solution steps and had a very high likelihood of resolving the problem (Bray et al., 2007). A rating of "very ineffective" was allocated to solutions which failed to attempt to resolve the stated problem, or had high probabilities of exacerbating the problem or creating new problems. Each solution was also coded for specificity, in terms of the level of detail described in each solution, based upon the coding scheme used by Bray et al. (2007). Each solution was rated for specificity on a five point scale, with a rating of 5 ("Very specific") being allocated to solutions which provided very clear and detailed solutions with additional detail regarding the solution steps whilst containing no ambiguous information. A rating of 1 ("Very unspecific") was given to solutions which were vague and described solutions in minimal detail.

Bivariate correlational analyses were conducted to investigate the associations between depressive symptoms and problem-solving performance on the UMEPS task, with those significant associations tested with regression analysis whilst controlling for scores on the Problem Solving Scale (PSS) and age and gender ratios where necessary. A logistic regression analysis was conducted in order to establish whether the UMEPS task is able to differentiate between students currently reporting low and high severities of current depressive symptoms, and allow comparisons with the CMEPS task which had previously

failed to differentiate between students reporting low and high severities of depression in terms of problem-solving effectiveness (Blankstein et al., 1992).

3.1.4 Results

One participant was removed from the dataset prior to data analysis after failing to make a response on more than half of the UMEPS items. Statistical analyses were conducted on the remaining 80 participants. Scores on the UMEPS problem solving task and the self-report questionnaire measures (PSS, CES-D) were checked for normality using Kolmogorov-Smirnov tests and from review of histograms. The relevant solution means data was transformed using a square root transformation to correct for mild positive skew. Analyses of variance were also conducted to investigate whether there were differences between the study groups in terms of the performance on the UMEPS task. No significant differences were noted across groups for the relevant solution means ($F_{(2, 77)} = 1.319$, $p = .273$), irrelevant solution means ($F_{(2, 77)} = .467$, $p = .629$), solution specificity ($F_{(2, 77)} = 1.406$, $p = .251$), or for either observer-made ($F_{(2, 77)} = .992$, $p = .376$) or participant-made solution effectiveness ratings ($F_{(2, 77)} = 2.213$, $p = .127$), indicating that the three study groups were presented with items from the UMEPS task that were equivalent in their difficulty and scores on the UMEPS task.

Means and standard deviations for scores on the CES-D and PSS scales, and for the performance indices on the UMEPS task, are presented in Table 3.1.1 below. Cohen's Kappa values are presented in Table 3.1.1 for the categorical measures on the UMEPS task (Observer-rated solution efficacy and solution specificity data), whilst Intraclass correlation coefficients are presented for the continuous measures (the relevant and irrelevant solution means data).

As shown in Table 3.1.1, below, whilst the mean CES-D scores in the current study (M = 14.66, scores ranged from 0 to 49) were below Radloff's (1991) recommended cut-off that scores above 16 on the CES-D are indicative of clinical depression, a large proportion of the sample reported CES-D scores greater than 16 (33 participants, 41% of the sample). Mean CES-D scores were also similar to those reported in a previous study (Jones & Day, 2008). Mean scores on the Problem Solving Scale (PSS; mean = 11.85) were greater than those reported in a sample of patients referred for cognitive therapy (Moorey et al., 2000, Mean = 4.89, S.D. = 15.95), indicating that the current primarily student sample possessed more effective resourcefulness behaviours. The mean numbers of relevant and irrelevant solutions generated on the UMEPS problem-solving task, as well as the mean effectiveness ratings, were also consistent with mean scores reported on a means-end problem solving task in a previous study (Blankstein et al., 1992).

Table 3.1.1 Means, standard deviations, internal validity (Cronbach's alpha) and inter-rater reliability (Cohen's κ) statistics for scores on the self-report measures and performance indices on the University Means-End Problem-Solving task (UMEPS).

	Mean	S.D.	α	Inter-rater reliability
Center for Epidemiological Studies Depression scale (CES-D)	14.66	9.44	.89	
Problem Solving Scale (PSS)	11.85	13.12	.77	
University Means-End Problem Solving Task (UMEPS)				
No. of Relevant Means			.80	.91[b]
- non-transformed scores	2.21	1.02		
- transformed scores	1.47	.33		
No. of Irrelevant Means	.84	1.04	.31	.87[b]
Solution Specificity	2.21	.70	.77	.86[a]
Observer-rated solution efficacy	3.47	.44	.78	.78[a]
Participant-rated solution efficacy	3.85	.49	.65	

Note: [a] = Cohen's Kappa, [b] = Intraclass Correlation Coefficient.

Inter-rater Reliability

High levels of agreement between the first rater (R.D.) and the second independent rater were noted for the UMEPS problem-solving performance measures (Cohen's Kappas ranged from .78-.86, Intraclass Correlation Coefficients ranged from .87-.91). In terms of reliabilities in scores for each of the problem-solving measures, good levels of reliabilities were noted for the relevant solution means, solution specificity and the effectiveness measures (Alphas ranged from .65-.80). A low alpha value was noted for the irrelevant means data (α = .31), which reflects the very low frequency of irrelevant means coded across the sample compared to relevant solution means (a total of 73 irrelevant means were coded compared to 1326 relevant means across the whole sample). Table 3.1.2, below, presents the realism ratings for the UMEPS items, these ratings are based upon the participant-made ratings on a scale of one ("Very Unrealistic") to five ("Very Realistic") for each problematic scenario.

Table 3.1.2. Realism ratings for the items from the University Means-End Problem-Solving Task (UMEPS) (means and standard deviations)

UMEPS Problem	Realism Rating	
	M	SD
19. Worry over job hunting	4.63	.50
5. Problems with course mates	4.58	.58
15. Stress over deadlines	4.58	.65
16. Exam revision	4.44	.71
12. Worry about finances	4.34	.55
18. Argument with housemates	4.28	.68
11. Worry about how to pay back student loan	4.21	.98
3. Trouble with job supervisor	4.21	.62
13. Alcohol abuse	4.00	1.20
2. Want to have a relationship	3.93	.70
22. Losing self-confidence	3.92	.86
1. Break up with boyfriend/girlfriend	3.88	1.15
14. Social isolation	3.79	1.24
21. Abdominal pain	3.72	.75
20. Sleeping problems	3.63	.92
6. Lost essay materials	3.62	1.05
17. Excitement at start of new university year	3.58	.97
7. Friend is avoiding you	3.54	.78
10. Depressed feelings	3.45	1.18
8. Stranded after a night out	3.27	1.05
9. Poor relationship with parents	3.25	1.23
4. Gambling	2.92	1.50
Overall Mean Realism	3.90	0.90

Bivariate correlational analyses were next conducted to assess how performance on the remaining UMEPS items was associated with resourcefulness behaviours, as measured by the Problem Solving Scale, and with depressive symptoms, as measured by the CES-D scale (see Table 3.1.3 below).

Table 3.1.3. Correlations between resourcefulness, depression and problem-solving.

	PSS	Relevant means	Irrelevant means	Solution efficacy (observer rated)	Solution efficacy (participant rated)	Solution specificity
CES-D	-.238*	-.252*	-.170	-.096	.073	-.191*
PSS		.246*	-.052	.238*	.058	.259*
No. of Relevant Solution means			.156	.742**	.014	.875**
No. of Irrelevant Solution means				.097	.023	.163
Solution efficacy (observer rated)					.259*	.806**
Solution efficacy (participant rated)						.173

Note: * $p < 0.05$, ** $p < 0.001$. CES-D = Centre for Epidemiological Studies Depression Scale. PSS = Problem Solving Scale

As shown in Table 3.1.3, scores on the CES-D scale were negatively correlated with scores on the Problem Solving Scale (PSS), and also with the number of effective solution means generated on the UMEPS and the specificity of UMEPS solutions. The pattern of correlations supported the hypothesis that increased depressed mood is associated with poorer problem solving capabilities, whereby fewer relevant and less specific solution means are generated for problems. Scores on the Problem Solving Scale, a measure of resourcefulness behaviours, were positively associated with the generation of more relevant solution means, with more specifically detailed solutions, and with more

effective solutions as rated by an observer, supporting the prediction that resourcefulness behaviours would be associated with improved problem solving abilities as measured by the UMEPS. A moderate positive correlation was also observed between observer-made ratings and participant- made ratings of solution effectiveness. The specificity of the described solutions was strongly positively correlated with both the mean number of solution means described and with the observer-rated solution effectiveness.

Significant bivariate correlations were also noted between participant ages and the mean number of relevant solutions generated on the UMEPS (r = .374, p < .001), the observer-rated effectiveness of solutions (r = .334, p < .001), and the specificity of solutions (r = .279, p < .001), indicating that the older participant ages were associated with more effective problem solving capabilities. No significant differences on the UMEPS performance measures or on the CES-D and PSS scales were found between male and female participants.

A hierarchical multiple regression analysis was conducted to investigate which of the measures from the problem solving task explained the largest quantity of variance in scores for the self-reported severity of current depressive symptoms on the CES-D scale. Participant ages and scores on the Problem Solving Scale were entered into the first block of the regression equation to control for potential effects upon depression scores. The number of relevant solution means (transformed scores), number of irrelevant solution means, specificity of solutions and effectiveness of solutions were entered as predictors into the second block. The magnitude of the some of the inter-predictor correlations and initial analyses confirmed the presence of multicolinearity between the predictor variables taken from the problem solving task, in relation to the relevant and irrelevant means, solution specificity and solution effectiveness measures (VIFs = 2.2 – 5.2, Tolerances = .20 - .45). The presence of multicolinearity in the initial regression analyses may have been a result of the coding scheme used to score the responses on the problem solving task, where more effective and more specifically detailed solutions were also more likely to describe more individually relevant solution means. The regression analysis was repeated omitting the solution specificity and solution efficacy predictors from the second stage of the regression (see Table 3.1.4 below).

Table 3.1.4. Results of the hierarchical multiple regression analysis for the prediction of depression scores from the mean number of solutions generated on the University Means-End Problem-Solving Task (UMEPS).

	R^2 change	Standardized Beta	*t*
Step 1	.06		
Constant			3.54**
Age		.03	.03
Problem Solving Scale (PSS)		-.24	-2.15*
Step 2	.11		
Constant			4.15**
Age		.89	.76
Problem Solving Scale (PSS)		-.19	-1.73
Relevant Solution Means		-.25	-2.01*

* $p < 0.05$, ** $p < 0.01$

The regression model was significant ($F_{3, 76} = 3.045$, $p < 0.05$), with the number of relevant means the only significant contributor to variance in CES-D scores when controlling for age and scores on the Problem Solving Scale (VIFs = 1.05-1.19, Tolerances = .84-.96). The regression model accounted for 17% of the total variance in CES-D scores. Separate regression analyses were also conducted to explore the contributions of solution specificities and effectiveness to variance in CES-D scores, whilst controlling for PSS scores and age. Neither analysis produced significant regression models.

Next, a binary logistic regression was conducted to determine whether the number of solution means generated on the UMEPS task could correctly classify membership of participants to groups of high or low depressed participants. Participants were first allocated to high or low depressed groups according to whether they scored within the top or bottom quartile of scores on the CES-D scale. Participant ages and scores on the PSS were entered into the first block of the regression, with the mean number of relevant solution means generated on the problem solving task entered into the second block. The groups were coded 1 for the high CES-D scorers and 0 for the low scoring group. The regression model was significant ($\chi^2 = 9.977$, d.f. = 3, $p < .05$) and correctly classified 70% of participants (12/19 High CES-D scorers, 17/22 low CES-D scorers). As shown in Table 3.1.5 after controlling for effects of age and scores on the Problem Solving Scale, the number of relevant solution means generated on the UMEPS made a significant contribution to the regression model. The Exp. (β) statistic for the number of relevant

means indicates that as the number of relevant solution means generated on the UMEPS task increased, the odds of being classified in the high-depressed group decreased.

Table 3.1.5. Results of the binary logistic regression for the prediction of depressed or non-depressed group membership from the number of relevant solution means generated on the University Means-End Problem Solving Task (UMEPS)

	β	S.E.	Wald	Exp(β)	*p*
Block 0					
Constant	-.19	.31	.38	.83	.83
Block 1					
Age	.02	.11	.51	.976	.82
Problem Solving Scale (PSS)	-.04	.03	1.92	.96	.17
Block 2					
Relevant Means	-4.01	1.86	4.65	.18	.03

3.1.5 Discussion

The current study described the development of a problem solving task for use with British students (the University Means-End Problem Solving task: UMEPS), and investigated how performance on this measure was associated with depressive symptomatology and resourcefulness behaviours in a sample of British students. Previously, means-end problem solving capabilities have been assessed using items from the original Means-End Problem Solving Procedure (MEPS) which was originally developed for use with clinical samples (Platt & Spivack, 1975). Because of this, subsequent studies have had to adapt items from the MEPS to assess problem solving capabilities in student samples (Lyubomirsky & Nolen-Hoeksema, 1995). There has been a previous attempt to devise a university (college) student version of the MEPS by researchers in North America (Blankstein et al., 1992). However, this American version of the means-end problem solving procedure failed to distinguish between groups of depressed and non-depressed college students in relation to their problem-solving capabilities.

The primary aim of the current study was to assess the validity of the problem solving situations devised for the UMEPS task in relation to the severity of self-reported depressive symptoms and resourcefulness behaviours in a sample of British studies. The severity of current depressive symptoms was associated with the generation of fewer effective solutions means on the UMEPS task, and also with the generation of less specific

and less detailed solution means, supporting previous observations between reduced problem solving efficacy and increased depressive symptom severities (Goddard et al., 1996, 2001; Raes et al., 2005). Scores on the Problem Solving Scale (PSS: Centre for Cognitive Therapy, 1988), a self-report measure of learned resourcefulness behaviours associated with more effective problem-solving, were associated with the generation of a greater number of relevant solution means, the generation of more effective solutions as rated by an observer, more specifically detailed solutions, and with reduced severities of depressive symptoms. Mean PSS scores in the current study (mean = 11.85) were greater than those reported in a sample of patients referred for cognitive therapy (Moorey et al., 2000, Mean = 4.89, S.D. = 15.95), indicating that the current sample possessed more effective resourcefulness behaviours.

The generation of fewer relevant solution means on the UMEPS was also associated with the increased severity of depressive symptoms consistent with observations made in samples of depressed outpatients on the original MEPS task (Garland et al., 2000), although the correlation between relevant solutions and depression was weaker in the current study than reported by Garland and colleagues (2000). Also in contrast to previous studies conducted in clinical samples (Sidley et al., 1997), there was no correlation between solution effectiveness on the UMEPS and depression. The generation of relevant solutions on the UMEPS also predicted the membership of participants to high or low depressed groups in the regression analyses, in contrast to the student means-end problem solving task developed by Blankstein and colleagues (1992). Although Blankstein et al (1992) did note that depressed students made more pessimistic appraisals of their own problem-solving than individuals with low levels of depression. However, the current study has demonstrated that a means-end problem solving task targeted at university students can distinguish between individuals experiencing high and low levels of subclinical depression.

Generally, items on the UMEPS were rated by participants as being realistic to their experiences of university education in the UK. The weaker realism ratings for some items may reflect that these items are not explicitly related to university experiences from a purely educational perspective, such as the “gambling” and the “stranded on a night out” situations. However, participant feedback regarding the UMEPS situations was generally positive, and many commented on the appropriateness of the problems in relation to the participant’s own experiences at university (e.g., “*I feel all the situations were very realistic of university life*”, “*I thought the problems were quite realistic and likely to happen at university*”). Whilst not all of the UMEPS items were relevant to the participant’s own experiences, a number of participants commented that they were aware

of other students who had experienced similar situations. For example, one participant commented: "*The scenarios I was faced with (in the task) are very real and I found that I've been in most of them. Some were not characteristic of me, but I know of others who have found themselves in such situations*".

There are a number of limitations to highlight with the current study. Whilst the sample in the current was largely female, consistent with the gender ratios of previous studies conducted at the same institution (e.g., Jones & Day, 2008; Dodd et al., 2010); no significant differences in scores on the CES-D, PSS or the UMEPS problem-solving measures were noted between male and female participants. The results of the study should be treated with caution in terms of its generalisability, as the largely female student sample is not fully representative of the wider general population. Whilst previous research has failed to find significant gender differences on the Means-End Problem-Solving task (Sidley et al., 1997), given that the UMEPS task is still a new measure, further research is required to assess whether gender differences may arise on the UMEPS and to assess the generalisability of the UMEPS items across genders. Also, there was no correction for multiple testing in the current study and there is a risk of Type 1 errors. In relation to opportunistic nature of the student sample recruited for the study, the associations between UMEPS performance and the severity of depressive symptoms may become more pronounced in more severely depressed groups. Whilst the participants were not screened for past histories of depression, a large proportion (41%) of the students sampled in this study reported CES-D scores greater than Radloff's (1991) recommended cut-off of 16 for clinically significant levels of current depressive symptoms. Future studies may consider screening out students for histories of depression or for current depressive symptoms by using clinical self-report measures or diagnostic interviews, and then comparing problem-solving capabilities between individuals currently experiencing high and low levels of depressive symptoms. The association between depressive symptom severities and reduced problem solving capabilities may also be explained by a third variable, such as rumination or the overgeneral recall of autobiographical memories. Further research is required to assess whether this association between depression and poorer performance on the UMEPS could be explained by one of these factors.

Despite the reliance on a self-report measure of depression in the current study, the severity of current depressive symptoms were associated with poorer performances on the means-end problem solving task, specifically in the generation of fewer effective solution means. To provide a more stringent assessment of depression, future studies may also wish to consider incorporating a prospective design to investigate how performance on the UMEPS task is associated with the development of depressive symptoms over time, in

addition to other cognitive vulnerability factors, particularly as there remains a lack of clarity over the precise causal relationship between problem-solving and the development of depressive symptoms.

3.1.6 Conclusions

In conclusion, the UMEPS shows promise as a measure of problem-solving for use with British student samples and has been demonstrated to distinguish between individuals with high versus low levels of current depressive symptoms in relation to their capability to successfully resolve problems. However, further validation of the problematic situations described in the UMEPS is required, particularly across student samples located in different universities across the UK. There is the potential for future studies to continue to develop and adapt the UMEPS items for specific research aims and hypotheses, aside from the aims described in the current study.

Section 3.2

Study Four

The differential associations between defeat and entrapment with psychosocial problem-solving. Further validation of the University Means-End Problem Solving Task

Robert C. Dempsey

Patricia A. Gooding

&

Steven H. Jones

3.2.1 Abstract

Appraisals of defeat and entrapment have been implicated in depression and suicidality. Whilst previous research has reported that depressed and suicidal individuals have deficits in problem-solving, no study has specifically investigated whether perceptions of defeat and entrapment are associated with ineffective problem-solving as measured by a process-focused problem-solving task. The current study investigated means-end problem-solving in relation to defeat and entrapment within an analogue student population. 146 participants completed self-report measures of depression, hopelessness, defeat and entrapment, and generated solutions to a series of problematic situations on a means-end problem-solving task designed for usage with British students. Depression was correlated with the generation of irrelevant solutions to problems and with pessimistic appraisals of solution efficacy. However, mediation analyses indicated that defeat and entrapment appear to possess differential associations with problem-solving. Entrapment fully mediated the relationship between depression and the generation of irrelevant solutions to problems, whilst defeat mediated the relationship between depression and appraisals of solution efficacy. The current research supports the notion that defeat and entrapment represent two different processes, rather than a single construct representing perceptions of failure without available means of escape, and suggests potential clinical avenues for promoting effective problem-solving behaviours.

3.2.2 Introduction

Theoretical frameworks of suicide have implicated appraisals of being defeated and entrapped by current circumstances as being associated with increased depression severities and suicidality (Johnson, Gooding & Tarrier, 2008c; Taylor et al., 2010a; Taylor, Wood, Gooding & Tarrier, 2010b). Defeat refers to negative self-perceptions relating to low social rank and failed struggles, whilst entrapment refers to feelings of being trapped by internal and external events (Gilbert & Allan, 1998). Although a number of psychosocial factors have been associated with suicidality, including hopelessness, the availability of social support and the severity of depressive symptoms, appraisals of defeat and entrapment appear to confer a greater risk of suicidality than the aforementioned environmental and psychosocial factors (Taylor, Gooding, Wood & Tarrier, *in press*).

Although the defeat and entrapment questionnaires were originally devised to measure separate constructs (Gilbert & Allan, 1998), it has recently been suggested that these scales may actually measure a unitary factor which encompasses perceptions of loss and failure without available means for escaping from the current situation (Johnson et al., 2008c; Taylor et al., 2009). Within non-clinical student samples, this combined factor-

analytically driven defeat and entrapment construct has been demonstrated to mediate the relationship between self-appraisals of social support and problem-solving capabilities with suicidality (Taylor et al., 2010b). Furthermore, research conducted in individuals diagnosed with schizophrenia spectrum disorders has observed that a combination of defeat and entrapment mediate the relationship between the severity of positive psychotic symptoms and suicidality, even when current depressive symptoms and feelings of hopelessness are accounted for (Taylor et al., 2010a). As such, feelings of defeat and entrapment are considered to confer a risk of suicide in vulnerable individuals, rather than just the severity of depressive symptoms or feelings of hopelessness.

One avenue of research which has not been fully explored in relation to defeat and entrapment is the role of psychosocial problem-solving. The ability to effectively overcome and resolve psychosocial problems may assist in reducing perceptions of defeat and entrapment by providing individuals with a viable mechanism for escape from their current situation. The reduced effectiveness of problem-solving has previously been observed in a range of clinical and non-clinical samples, ranging from dysphoric students (Dempsey et al., *submitted-a*), samples of clinically depressed patients (Marx et al., 1992; Garland et al., 2000), and samples of suicidal individuals (Evans et al., 1992; Pollock & Williams, 2004). Whilst defeat and entrapment have been reported to mediate the role of appraisals of social support and problem solving upon suicidality in a non-clinical student population (Taylor et al., 2010b), no published research has assessed the association between problem-solving capabilities using a more objective process-focused measure of problem-solving in relation to defeat and entrapment. Although numerous self-report questionnaire measures of problem-solving capabilities are available, such measures are limited to assessing an individual's appraisals of their own problem-solving capabilities and not of their ability to generate effective solutions to problematic situations.

The current study had two aims. The first aim was to investigate the association between appraisals of defeat and entrapment with the capability to effectively resolve psychosocial problems on a means-end measure of problem-solving. The second aim of the study was to further validate a measure of means-end problem solving designed for use with British student samples (the UMEPS task). The original Means-End Problem-Solving Task was devised in the 1970s for use with patient samples (Platt & Spivack, 1975) and has since been used in numerous studies (e.g., Evans et al., 1992; Garland et al., 2000; Marx et al., 1992). However, there are fears that some of the original MEPS items are not suitable for use with student samples. Indeed, previous studies have had to adapt items from the MEPS when assessing means-end problem-solving in non-clinical samples and have omitted items such as "stealing a diamond", "killing a former SS trooper", and

“getting revenge” from the original MEPS item set (Lyubomirsky & Nolen-Hoeksema, 1995; Nezu & Ronan, 1988). There has also been one previous attempt to devise a student version of the MEPS in North America (The “College MEPS”, CMEPS; Blankstein et al., 1992). However, this task failed to differentiate between groups of students reporting high and low levels of depressive symptoms in terms of their problem-solving capabilities, but the authors did report that depressed students were more pessimistic in their appraisals of their own performances on the CMEPS (Blankstein et al., 1992). In contrast to this, the UMEPS task has been demonstrated to differentiate between individuals currently reporting high and low severities of depressive symptoms in terms of their ability to generate relevant solution steps to psychosocial problems (Dempsey et al., *submitted-a*).

In relation to the current study, it was anticipated that defeat and entrapment in general would be associated with poorer performances on the UMEPS task, in terms of the generation of fewer relevant solution means, more irrelevant solution steps and the generation of less effective and specifically detailed solutions. However, as defeat is considered to capture a perception of failure and low social rank, and entrapment is considered to capture appraisals of being trapped by current events and a desire to escape from these events (Gilbert & Allan, 1998), defeat and entrapment may be differentially associated with problem-solving. Defeat would appear to encapsulate a pessimistic appraisal of the individual’s status and abilities, which may interfere with solution generation during problem-solving. Defeated individuals may perceive that their low social rank and failures mean that they are unlikely to ever effectively resolve the current situation thereby preventing the engagement in problem-solving behaviours. In contrast, entrapment refers more to an escape motivation and may reflect a more active, if ill-advised, attempt to problem-solve out of a current problematic situation, and may be more associated with poor and ineffective problem-solving behaviours compared to defeat.

The current study presented participants with a series of problematic scenarios from the UMEPS, and measured the associations with self-appraisals of defeat and entrapment, current depressive symptoms, and feelings of hopelessness which are similar in concept to the negative self-appraisals as captured by defeat and entrapment (Johnson et al., 2008; Taylor et al., 2010b). Due to some disagreement in the literature as to whether defeat and entrapment as measured by Gilbert and Allen’s self-report measures represent separate factors (Gilbert & Allan, 1998), or a single construct (Taylor et al., 2009), performance on the problem-solving task was analysed with defeat and entrapment as both separate and combined constructs.

3.2.3 Method

Participants

An opportunistic sample of 146 participants from the University of Manchester took part in the study (M_{age} = 20.79 years, S.D. = 4.87; 122 female, 24 male; 130 undergraduate students, 13 postgraduates, 3 not stated).

Measures

Defeat Scale

The defeat scale is a 16 item self-report measure designed to assess self-perceptions of failed struggles and low social rank associated with depression (Gilbert & Allan, 1998). Respondents rate their experiences of defeat over the previous seven days using a five point scale ("Never" to "Always/All the time"), with higher scores reflecting greater feelings of defeat. Example items include: "*I feel that I have lost my standing in the world*", and "*I feel that I am one of life's lo*sers". The defeat scale has demonstrated high levels of internal consistency across both student (α = .83 - .85) and clinical samples (α = .86 - .94) (Gilbert & Allan, 1998; Taylor et al., 2009; Taylor et al., 2010a; Taylor et al., 2010b).

Entrapment Scale

This a 16 item questionnaire scale which assesses perceptions of feeling trapped by internal factors and external events, and the desire to escape such situations (Gilbert & Allan, 1998). Example items include: "*I would like to escape from my thoughts and feelings*" and "*I feel trapped by other people*". Participants rate the extent to which they are currently experiencing each item on a five point scale (from "Not at all like me" to "Extremely like me"), with higher scores reflecting more extreme perceptions of entrapment. The entrapment scale has demonstrated excellent internal validity across studies conducted in students (α = .93 - .95) and clinical populations (α = .86 - .95) (Gilbert & Allan, 1998; Taylor et al., 2009; Taylor et al., 2010b).

Beck Hopelessness Scale (BHS)

This is a 20 item true-false measure which assesses the prevalence of perceptions of hopelessness over the past seven days (Beck, Weissman, Lester & Trexler, 1974). Higher scores reflect more extreme perceptions of hopelessness. Example items include: "*All I can see ahead of me is unpleasantness rather than pleasantnes*s", and "*The future seems vague and uncertain to me*". The BHS has demonstrated high levels of internal validity (α = .93), and good test-retest reliability over 3 weeks (r = .85) (Holden & Fekken, 1988).

The Center for Epidemiological Studies Depression Scale (CES-D)

The CES-D is a 20 item measure designed to assess the severity of current depressive symptoms in non-clinical populations (Radloff, 1977), and has previously been used within British student samples (Dempsey et al., 2011). Participants are required to rate the occurrence of twenty depressive symptoms over the previous seven days on a four point scale (0 = "Rarely/0 days", to 3 "Most of the time/5-7 days"). Higher scores on the CES-D reflect greater severities of depressive symptoms, with scores greater than 16 considered to reflect clinically significant depression (Radloff, 1991). The CES-D has demonstrated high levels of internal validity (α = .79-.91) (Radloff, 1991; Dempsey et al., 2011).

The University Means-End Problem Solving Task (UMEPS)

The UMEPS is a means-end problem solving task designed to assess the effectiveness of problem solving capabilities in British students (Dempsey et al., *submitted-a*). The UMEPS is based upon the Means-End Problem Solving task which was originally developed for use in patient samples (Platt & Spivack, 1975). The UMEPS task features problematic situations which are likely to be encountered by students at British universities, including problems relating to university education (e.g., exam revision, managing coursework deadlines), graduate careers and job opportunities (e.g., worries over job prospects and competition for jobs), student finance (e.g., repaying student loans), in addition to interpersonal (e.g., managing peer group work, resolving arguments between flatmates) and emotional problems (e.g., resolving depressed feelings and homesickness).

Performance on the UMEPS has been observed to distinguish between students reporting elevated and low severities of current depressive symptoms, with depressed students found to generate fewer relevant solutions to problematic situations (Dempsey et al., *submitted-a*).

Procedure

Participants were recruited from adverts displayed on an online research volunteering website hosted by the University of Manchester, which directed participants to the study's website where electronic versions of the information sheet and consent form were displayed. Following informed consent, participants were randomly assigned to one of four groups. Due to the large number of items originally developed for the UMEPS task, each group was presented with different six situations taken from the UMEPS task. For each UMEPS item, participants read a description of the problem and were asked to describe the steps they would take in order to resolve the problem. Participants were also asked to rate how realistic they felt each item was in relation to their experiences at university (on a five

point scale from “Very Realistic” to “Very Unrealistic”), and appraise the likelihood of their solution fully resolving the problem (on a five point scale from “Very Likely” to “Very Unlikely”). Participants also provided a rating of how effortful they felt their solution would be to apply (on a five point scale from “Very little effort” to “Extremely effortful”). This procedure was repeated for each UMEPS item.

After completing the UMEPS solution generation task, participants were presented with electronic versions of the self-report questionnaire measures (Defeat, Entrapment, the Beck Hopelessness Scale, and the CES-D depression scale). Participants were also provided with an optional open-ended feedback form on the final page of the study’s website.

Data Analysis

The solutions generated on the problem-solving task were coded for the number of relevant and irrelevant solution means, referring to effective and ineffective steps described in the solutions respectively. The described solutions were also rated for their effectiveness and specificity of detail according to five point likert scales, with higher ratings indicating more effective and more specifically detailed solutions (see appendix for coding scheme). The first author (R.D.) coded the UMEPS performance measures (solution means, specificity and effectiveness). Three undergraduate student volunteers from the University of Manchester received formal training in using the coding manual and conducted an inter-rater reliability check, and together coded 25% of the data.

Scores on the self-report measures and problem-solving performance measures were screened for normality from review of histograms and checking for outliers via calculation of z-scores. Two participants were identified as extreme outliers on the relevant solution means and solution specificity measures on the UMEPS problem-solving task (zs > 3.5) and were removed from the data set. Data analyses were conducted on the remaining 144 participants. Scores on the CES-D scale and the solution specificity and effectiveness measures of the UMEPS task did not substantially deviate from normality. Square root transformations were conducted to correct for positively skewed data on the Defeat and Entrapment scales, and on the means for the number of relevant and irrelevant solution steps generated on the UMEPS task. Positive skew for scores on the Beck Hopelessness Scale was corrected using a logarithmic transformation.

Bivariate correlational analyses were conducted to investigate the associations between the self-report measures of defeat, entrapment, depression and hopelessness with performance measures on the UMEPS task. To assess whether a combined defeat/entrapment construct was a better predictor of problem-solving capabilities than

separate defeat and entrapment variables, a factor analysis using Maximum Likelihood extraction was conducted upon scores on the Defeat and Entrapment scales. Follow-up partial correlations were conducted to ascertain whether the associations between the appraisal and problem-solving measures remained when including scores on the CES-D depression scale. Mediation models indicated by the partial correlational analyses were tested using bootstrapping procedures.

3.2.4 Results

Means and standard deviations for scores on the self-report measure and the UMEPS task are presented in Table 3.2.1. High levels of agreement existed between the first author and the three independent raters for the UMEPS task measures (Cohen's Kappas = .86 for rater one, .81 for rater two, and .85 for rater three). In addition, high levels of reliability were observed for the defeat, entrapment, hopelessness and depression self-report measures (Cronbach's α).

Table 3.2.1. Means and standard deviations for scores on the self-report questionnaire measures and the University Means-End Problem-Solving Task (UMEPS)

	Untransformed data	Transformed data	
	Mean (S.D.)	Mean (S.D.)	α
Self-report measures			
Defeat	16.64 (11.43)	3.82 (1.44)	.95
Entrapment	14.32 (13.27)	3.24 (1.95)	.95
BHS Hopelessness	5.94 (4.16)	.67 (.31)	.86
CES-D Depression	16.44 (10.36)		.92
University Means-End Problem Solving Task (UMEPS)			
Relevant means	2.36 (1.07)	1.50 (.33)	
Irrelevant means	.08 (.15)	.14 (.24)	
Solution Effectiveness (observer-rated)	3.16 (.64)		
Solution Specificity	2.60 (.77)		
Solution Effectiveness (participant-rated)	3.89 (.40)		
Solution Effort	3.27 (.49)		

Note: BHS = Beck Hopelessness Scale, CES-D = Center for Epidemiological Studies Depression Scale

Mean scores on the hopelessness, defeat and entrapment measures were equivalent to those reported by a study conducted in a similar student sample (Taylor et 2010b), whilst the mean self-reported CES-D depression scores were between those reported by previous studies (Jones & Day, 2008; Dempsey et al., 2011). Mean scores on the UMEPS problem-solving task measures (relevant and irrelevant solutions, specificity and effectiveness) were consistent with scores reported in previous means-end problem-solving studies (Blankstein et al., 1992; Dempsey et al., *submitted-a*). Analyses of variance confirmed that there were no differences between the study groups for the UMEPS task measures, including the relevant solution means ($F_{(3,\ 139)}$ = .052, p = .984), irrelevant solution means ($F_{(3,\ 139)}$ = 1.324, p = .269), solution specificity ($F_{(3,\ 139)}$ = .505, p = .679), solution effort ratings ($F_{(3,\ 139)}$ = 1.830, p = .145), or for either the observer-made ($F_{(3,\ 139)}$ = .291, p = .832) or participant-made solution effectiveness ratings ($F_{(3,\ 139)}$ = .955, p = .416).

Table 3.2.2, below, details the inter-rater reliability statistics for the coding of the UMEPS problem solving task with intra-class correlations presented for the continuous UMEPS measures (the relevant and irrelevant solution mean counts) and Cohen's Kappa values for the categorical measures (the solution specificity and the observer-made ratings of solution effectiveness).

Table 3.2.2. Inter-rater reliability statistics for the University Means-End Problem-Solving Task measures (UMEPS) (intraclass correlations and Kappa values).

UMEPS task measure	Statistics	Rater 1	Rater 2	Rater 3
Number of Relevant means	Intra-class correlation	0.90	0.92	0.75
Number of Irrelevant means	Intra-class correlation	1.00	0.87	0.99
Solution Effectiveness (observer-rated)	Cohen's Kappa	0.78	0.71	0.87
Solution Specificity	Cohen's Kappa	0.70	0.86	0.79

Note: The inter-rater reliability statistics reported in Table 3.2.2 are comparisons between the researcher (R.D.) and each rater separately (e.g., for relevant means .90 is the agreement between the researcher and Rater 1, .92 is the agreement between the researcher and Rater 2, .75 is the agreement between the researcher and Rater 3)

As shown in Table 3.2.2, there were high levels of agreement between the first author's coding and the coding from each of the independent raters. The perfect agreement between the first author and Rater 1 for the "Number of Irrelevant means" reflects that

there were few instances of irrelevant solutions means in the coding check conducted by Rater 1. The following table (3.2.3, below) details the participant-made realism ratings for the problematic situations used in the UMEPS task (N.B. Realism ratings range from 1 (“Very Unrealistic”) to 5 (“Very Realistic”); Effort ratings from 1 (“Very Little Effort”) to 5 (“Extremely Effortful”).

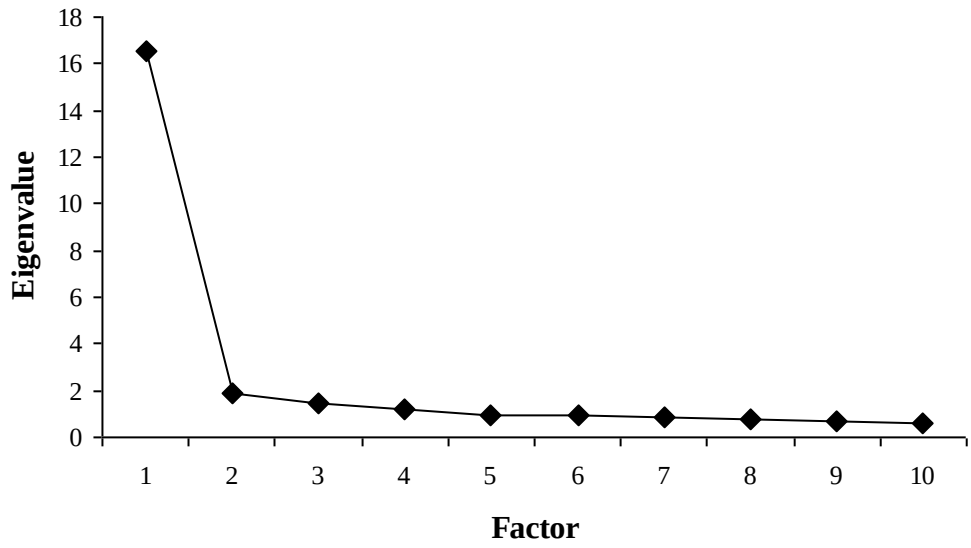
Table 3.2.3. Participant ratings for mean solution effort and realism ratings for items on the University Means-End Problem-Solving task (UMEPS) (sorted by realism ratings)

Item Description	Realism Rating *Mean (S.D.)*	Effort Rating *Mean (S.D.)*
15. Stress over deadlines	4.43 (.65)	3.51 (1.02)
24. Dislikes degree subject	4.22 (.82)	3.51 (.93)
12. Worry about finances	4.18 (1.06)	3.41 (.98)
2. Want to have a relationship	4.08 (.92)	3.70 (.74)
16. Exam Revision	4.08 (1.04)	4.13 (.97)
14. Social Isolation	4.00 (1.05)	2.90 (.90)
19. Worry over job hunting	4.00 (.96)	3.64 (.93)
11. Worry about how to pay back student loan	3.97 (1.09)	3.44 (.90)
10. Depressed feelings	3.97 (.90)	3.20 (1.10)
23. Homesickness	3.97 (.90)	3.09 (.96)
13. Alcohol abuse	3.92 (1.09)	2.56 (1.05)
5. Problems with course-mates	3.88 (.81)	3.34 (.94)
21. Abdominal pain	3.86 (.67)	2.78 (.95)
18. Argument with housemates	3.86 (1.13)	3.14 (.93)
7. Friend is avoiding you	3.73 (1.02)	2.86 (.75)
22. Losing self-confidence	3.69 (1.01)	3.08 (1.00)
17. Start of new university year	3.65 (.88)	2.41 (.98)
9. Poor relationship with parents	3.62 (1.16)	3.05 (1.20)
3. Trouble with job supervisor	3.56 (.99)	3.38 (.91)
20. Sleeping poorly	3.47 (1.16)	3.17 (.90)
6. Lost essay materials	3.42 (1.18)	4.25 (.91)
1. Break up with boyfriend/girlfriend	3.33 (1.28)	3.46 (1.10)
4. Gambling	3.24 (1.21)	3.34 (1.07)
8. Stranded after a night out	2.89 (1.12)	3.00 (1.15)
Overall Mean Realism	3.79 (1.00)	3.27 (.97)

Factor Analysis

A factor analysis using Maximum Likelihood extraction and direct oblimin rotation was conducted on participant scores on the Defeat and Entrapment scales to investigate whether scores on these measures represent a single factor as suggested by previous research (Taylor et al., 2009). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = .918) and Bartlett's test (χ^2 (496) =3832.46, $p < .001$) indicated that the sample size and the correlations between variables were sufficient for factor analysis. The initial factor analysis produced four factors with eigenvalues greater than 1 (16.53, 1.99, 1.46, and 1.184). The decision about the number of factors to extract was based upon review of the scree plot (see Figure 3.2.1 below) which suggested one clear factor, whilst a parallel analysis (O'Connor, 2000a, 2000b) suggested two factors with eigenvalues greater than the mean and 95th percentiles.

Figure 3.2.1. Scree plot of the eigenvalues from the factor analysis



However, the two factor solution suggested by the parallel analysis was deemed to be a poor fit of the data, as all the items from the defeat and entrapment were more strongly loaded onto the first single-factor solution compared to their loadings on the second factor. Once extracted, the single factor solution had an eigenvalue of 16.54 and accounted for 51.67% of the variance in items (see Table 3.2.4 below for item loadings on this single factor).

Table 3.2.4. Factor loadings for items from the Defeat (D) and Entrapment (E) scales for the single factor solution (continues on next page).

Item		Loading
E6	I feel I'm in a deep hole I can't get out of	.826
D14	I feel down and out	.822
E4	I feel trapped inside myself	.818
E7	I am in a situation I feel trapped in	.816
D7	I feel powerless	.805
E13	I can see no way out of my current situation	.804
D10	I feel that I have sunk to the bottom of the ladder	.779
E11	I feel powerless to change things	.777
D12	I feel that I am one of life's losers	.773
D13	I feel that I have given up	.757
D15	I feel I have lost important battles in life	.754
E5	I would like to get away from who I am and start again	.747
D11	I feel completely knocked out of action	.739
D3	I feel defeated by life	.738
D1	I feel that I have not made it in life	.734
E3	I would like to escape from my thoughts and feelings	.732
D5	I feel that I have lost my standing in the world	.729
D16	I feel that there is no fight left in me	.724
E8	I have a strong desire to escape from things in my life	.716
E1	I want to get away from myself	.703
D8	I feel that my confidence has been knocked out of me	.700
E14	I would like to get away from other more powerful people in my life	.680
E2	I feel powerless to change myself	.664
E12	I feel trapped by my obligations	.664
D6	I feel that life has treated me like a punch bag	.663
E16	I feel trapped by other people	.656
E10	I often have the feeling that I would just like to run away	.652

D2r	I feel that I am a successful person	.605
E15	I have a strong desire to get away and stay away from where I am now	.595
D4r	I feel that I am basically a winner	.484
D9r	I feel able to deal with whatever life throws at me	.422
E9	I am in a relationship I can't get out of	.280

D = Defeat scale, E = Entrapment Scale.

Correlational Analyses

A series of correlational analyses were conducted to investigate the relationships between performance on the UMEPS task with the symptom and appraisal measures (see Table 3.2.5). Bivariate correlations indicated that scores on the CES-D depression scale, Beck Hopelessness and Defeat and Entrapment scales were all highly positively correlated. In terms of the associations between the UMEPS problem-solving performance measures and the self-report measures, the generation of irrelevant solution means was positively associated with current depressive symptoms, with appraisals of entrapment and with the factor-analytically derived single construct of defeat/entrapment. No significant correlations between hopelessness and the generation of relevant or irrelevant solutions on the problem-solving task were found. Depression, hopelessness, defeat, entrapment, and the combined single defeat/entrapment factor were all negatively associated with the participants' own appraisals of their solution's effectiveness, with higher scores on these measures associated with more pessimistic appraisals.

Table 3.2.5. Bivariate correlations between scores on the self-report measures and problem-solving performance on the University Means-End Problem-Solving Task (UMEPS).

					University Means-End Problem-Solving Task (UMEPS)					
	Defeat	Entrapment	D/E	BHS	Relevant Solutions	Irrelevant Solutions	Solution Efficacy	Solution Specificity	Solution Likelihood	Solution Effort
CES-D	.825***	.773***	.836***	.560***	-.086	.179*	-.046	-.031	-.280***	-.050
Defeat		.840***	.929***	.711***	-.093	.095	-.048	-.028	-.327***	-.063
Entrapment			.919***	.651***	-.081	.229**	-.042	.021	-.295***	-.003
Defeat/Entrapment				.685***	-.107	.168*	-.070	-.024	-.299***	-.033
BHS					-.075	.048	-.023	-.039	-.238**	-.033

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

Note: BHS = Beck Hopelessness Scale, CES-D = Center for Epidemiological Studies Depression Scale, D/E = Single Defeat/Entrapment factor produced by factor analysis, Solution Likelihood = participant's own rating of the likelihood that their solution will resolve the problem, Solution Efficacy = observer-made rating of the solution's effectiveness.

170

Partial Correlations

Partial correlations were conducted to ascertain whether the associations between the defeat, entrapment and hopelessness measures and UMEPS performance measures, as detailed in Table 3.2.5, remained significant after controlling for depression.

The mean number of irrelevant solution means generated on the UMEPS remained positively correlated with entrapment (partial r = .146, p < .05). However, the correlation between entrapment and participants' appraisals of their solution effectiveness (the "likelihood" of their solution resolving the problem) was rendered non-significant once CES-D scores were accounted for (partial r = -.128, p = .06), as was the correlation between hopelessness and participant's ratings of their own solution effectiveness (partial r = -.106, p = .10). Defeat remained significantly correlated with appraisals of solution efficacy when controlling for CES-D (partial r = -.177, p < .05). When accounting for scores on the CES-D, correlations between the factor-analytically produced combined Defeat/Entrapment construct and the generation of irrelevant solutions (partial r = .020, p = .406) and participant's appraisals of their solution effectiveness (likelihood) (partial r = -.122, p = .072) were not significant.

In sum, when controlling for current depressive symptoms, entrapment remained positively associated with the generation of more irrelevant solutions on the UMEPS problem-solving task. However, only perceptions of defeat, but neither entrapment nor hopelessness, remained associated with participants' more pessimistic appraisals of the likelihood of their solutions resolving the problems encountered on the UMEPS task. Associations between participant's appraisals of solution effectiveness and irrelevant solution means with the combined defeat/entrapment construct were not significant when accounting for current depressive symptoms, suggesting that defeat and entrapment are differentially associated with problem-solving appraisals and solution generation.

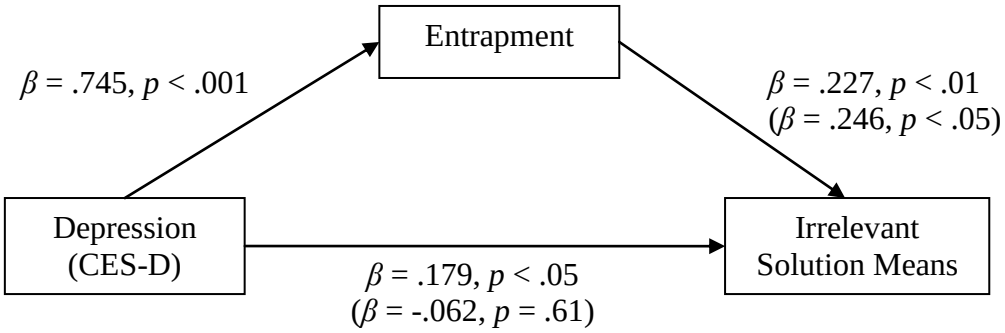
Mediation Analyses

Bootstrapping analyses were conducted using the SPSS Macro provided by Preacher & Hayes (2004) to assess whether defeat and entrapment mediate the relationship between depressive symptoms and solution effectiveness appraisals and the generation of irrelevant solutions respectively, as had been suggested by the partial correlations. Bootstrapping is a non-parametric method which allows for the indirect effect of the independent variable on the dependent variable via the mediator to be tested for statistical significance. Bootstrapping is preferred over the use of the Sobel test and Baron and Kenny's (1986) method of mediation analysis as it avoids potential Type 1 errors through multiple regression analyses and does not assume that the sampling distribution of the indirect

effect (*ab*, the product of path *a* from the independent variable to the mediator and path *b* from the mediator to dependent variable) is normally distributed. Both mediation models were tested via bootstrapping using 5000 random samples, as recommended by Hayes (2009), to generate confidence intervals for the indirect effects.

As the 95% confident intervals for the mediation of the effect of depressive symptoms upon the generation of irrelevant solutions via entrapment did not bridge zero (95% CI = .001, .014), it was concluded that the indirect effect was significantly different from zero at $p < .05$ (see Figure 3.2.2 below for the mediation diagram for entrapment with the beta and alpha values for each path). Multicolinearity between the predictor variables in the final regression analysis remained within acceptable levels (Tolerance > .4, VIFs < 2.3).

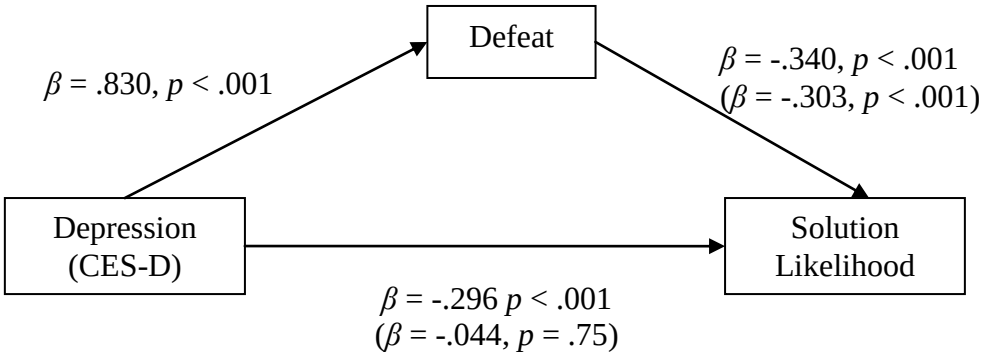
Figure 3.2.2. Mediation of the association between depression and the generation of irrelevant solution means by appraisals of entrapment



(standardised Betas and alpha values presented for each path, values in parentheses are for path *ab* with both entrapment and depression regressed onto irrelevant solution means)

For the mediation of the relationship between depression and participant's appraisals of the likelihood of their own solutions resolving problems by defeat, a similar bootstrapping analysis was conducted, using 5000 random samples to generate confidence intervals. As the 95% confident intervals for the mediation of the effect of depressive symptoms upon the solution effectiveness appraisals via defeat did not bridge zero (95% CI = -.02, -.001), it was concluded that the indirect effect was significantly different from zero at $p < .05$ (see Figure 3.2.3 for the mediation model and path statistics). Although defeat and CES-D scores were previously observed to be highly correlated ($r = .825$), levels of collinearity between defeat and CES-D in the regression analyses were within acceptable limits (Tolerances > .3, VIFs < 3.5).

Figure 3.2.3. Mediation of the association between depression and participant-made pessimistic appraisals of solution effectiveness by appraisals of defeat



(standardised Betas and alpha values presented for each path, values in parentheses are for path *ab* with both defeat and depression regressed onto irrelevant solution means)

3.2.5 Discussion

The current study investigated the associations between appraisals of defeat and entrapment with performance on a process-focused measure of means-end problem-solving designed for usage with British student samples (the UMEPS; Dempsey et al., *submitted-a*). Whilst previous research has suggested that defeat and entrapment in combination mediate the relationship between self-appraisals of problem-solving capabilities and suicidality in non-clinical samples (Taylor et al., 2010b), no previous study had assessed problem-solving using a means-end problem-solving task (Platt & Spivack, 1975; Dempsey et al., submitted-a).

The current study observed that both defeat and entrapment were associated with the generation of irrelevant solution steps to hypothetical psychosocial problems and with participants' pessimistic appraisals of the likelihood that their solutions would resolve the stated problem. However, partial correlations and mediation analyses suggested that defeat and entrapment were differentially associated with problem-solving capabilities, with defeat found to mediate the relationship between current depressive symptoms and the appraisal of solution efficacy, and entrapment mediating the relationship between depression and the generation of irrelevant solution means. Although hopelessness was associated with pessimistic appraisals of solution effectiveness, this association was not significant when accounting for current depressive symptoms. In contrast to previous research suggesting that a combined defeat/entrapment construct mediates the relationship between self-appraisals of problem-solving capabilities and suicidality (Taylor et al., 2010b), the current study suggests that defeat and entrapment may possess differential associations with problem-solving capabilities according to performance on a process-

focused measure of psychosocial problem-solving. These results suggest that it is the appraisals of defeat and entrapment, not just the experience of depressive symptoms, which are associated with greater pessimism regarding problem-solving in relation to defeat, and the generation of irrelevant solutions to problems in relation to entrapment.

In contrast to the previous study using the UMEPS task (Dempsey et al., *submitted-a*), current depressive symptoms were not negatively correlated with the generation of relevant solutions but were instead positively correlated with the generation of irrelevant solution means. The previous study had reported a similar magnitude of correlation between depression and irrelevant solutions, albeit at a non-significant trend level. Whilst both studies recruited samples from the same population, with similar mean ages and gender ratios, the lack of a significant correlation between relevant means and depression in the current study may be due to an unmeasured factor, such as suicidality or resourcefulness in problem-solving as measured in the previous study (Dempsey et al., *submitted-a*). Indeed, previous research has noted that suicidal individuals generate more irrelevant solutions on the means-end problem-solving task than non-suicidal controls (Schotte & Clum, 1987; Evans et al., 1992). It may be possible that the current sample were experiencing greater suicidal ideation than the previous study's sample (Dempsey et al., *submitted-a*), with the more depressed and suicidal individuals more likely to generate more irrelevant solution steps to the UMEPS problems than to generate fewer relevant solution means. Interestingly, the defeat and entrapment measures, which are highly associated with suicidality, were only associated with the generation of irrelevant solutions on the UMEPS. In addition, the mean CES-D score in the current study was greater than Radloff's (1991) suggested cut-off for clinically significant depressive symptoms, which may be indicative of elevated suicidality in the current sample. However, this remains speculative as neither study incorporated a measure of suicidality. Future research should consider the inclusion of a suicidal ideation measure in order to account for potential effects of suicidality upon problem-solving, even in investigations of cognitive processes implicated in subclinical depression.

In line with a previous study (Taylor et al., 2009), the present study observed that defeat and entrapment appeared to represent a similar unitary construct through a factor analysis of scores on the Defeat and Entrapment scales. Scores on this combined Defeat/Entrapment measure were associated with the generation of irrelevant solution means and more pessimistic participant appraisals of solution effectiveness. Although previous research has suggested that defeat and entrapment may constitute the same construct (Taylor et al., 2009), a combined defeat/entrapment factor produced by factor analysis in the current study did not remain significantly associated with poor problem-

solving when accounting for current depressive symptoms. Taylor et al. (2010b) noted that a combined defeat/entrapment construct mediated the relationship between problem-solving appraisals, as measured by the Confidence subscale of the Problem-Solving Inventory (Heppner, & Petersen, 1982), and suicidality in a non-clinical sample. The current study suggests that defeat, but not entrapment, is associated with greater pessimism in the solutions individuals actually generate for problems, whereas Taylor and colleagues' (2010b) study suggests that defeat/entrapment as unitary construct is more associated with a lack of confidence about problem-solving in general prior to solution generation. There is a clear need for future work to investigate the solution generation process in defeated and entrapped individuals, as well as in at-risk and currently suicidal individuals.

The differential properties of defeat and entrapment as suggested by the current study would appear to be in accord with a social problem-solving theory advocated by D'Zurilla and colleagues (D'Zurilla & Goldfried 1971; Bell & D'Zurilla, 2009). This model has two dimensions: problem-solving *orientation*, referring to an individual's awareness of the problem, their motivation and appraisal of their own ability to effectively resolve problems; and problem-solving *style*, referring to cognitive and behavioural strategies individuals adopt to understand the nature of problems and develop means to resolve such problems (Bell & D'Zurilla, 2009). In relation to this model, defeat would appear to relate to a negative problem-solving orientation, relating to a lack of motivation and/or pessimism regarding the individual's ability to resolve the problem. Entrapment, on the other hand, would appear to be associated with a poor or ineffective problem-solving style, whereby entrapped individuals have the motivation to escape and resolve the problem but implement poor strategies to do so. Interestingly, previous research using a self-report measure of problem-solving based upon this theory has suggested that suicidal inpatients report negative problem orientations and avoidant problem-solving styles (D'Zurilla, Chang, Nottingham, & Faccini, 1998). There may also be a considerable discord between an individual's perception of their own problem-solving capability and their actual ability to resolve problems in situ. Whilst a previous study had suggested that defeat and entrapment mediate the relationship between self-appraisals of problem-solving abilities and suicidality (Taylor et al., 2010b), defeated individuals may simply have greater pessimism about whether their solutions will resolve problems, as suggested by the current study, and may be less likely to fully engage in solution generation. The targeting of motivational interventions with individuals high in defeat may assist in improving problem-solving orientations and the engagement in solution generation.

There are a number of limitations to consider with this study. The current research is limited by its analogue sample and cross-sectional correlational design, meaning it is

difficult to specify the precise causal relationship between defeat, entrapment and problem-solving over time. In addition, a self-report measure of suicide was omitted from the study due to ethical concerns regarding the web-based and non-clinical nature of the sample, particularly in the ability of the researchers to offer support to vulnerable and potentially suicidal individuals. Whilst similar gender ratios were recruited for the current study as compared with previous research (e.g., Taylor et al., 2010b), the sample was predominantly female and it is unclear whether the findings were significantly gender-biased. Also, the participants were not screened for their past clinical histories, meaning that some participants with past histories of clinical depression may have been recruited into the current study which may have biased the results. The current study also requires replication within a clinical suicidal sample to assess the effectiveness of patients' problem-solving behaviours on a means-end measure, and test whether the differential properties of defeat and entrapment in relation to problem-solving are present as suggested in the current study. There is also an issue of bidirectionality in the mediation models, with evidence suggesting that defeat and entrapment may precede depression and also that depression may precede appraisals of defeat and entrapment (see Taylor et al., *in press,* for a review). Future studies could also develop specific problematic situations relating to defeating and entrapping situations experienced by suicidal individuals as previously suggested (Johnson et al., 2008c). However, there is a general a need for research to focus upon both problem-solving appraisal and solution generation processes, in addition to evaluating problem-solving using both objective and subjective measures, rather than solely relying on subjective self-appraisal measures of problem-solving.

3.2.6 Conclusions

In sum, the current study has indicated that defeat and entrapment appear to have differential properties in relation to psychosocial problem-solving. Defeat appeared to represent an appraisal process relating to an individual's pessimism of their ability to produce effective solutions to problems, whilst entrapment was associated with poorer problem-solving behaviours, relating to the generation of irrelevant and unfocused solutions to psychosocial problems. This pattern of results supports the notion that defeat and entrapment represent two qualitatively different appraisal processes, and suggest that it is feelings of defeat and entrapment, rather than sole the presence of depressive symptoms, which are associated with impairments in problem-solving. Although, there remains the possibility that targeting problem-solving focused therapies with motivational components will reduce appraisals of defeat and entrapment, improve problem-solving orientations and solution generation behaviours, and assist in alleviating psychopathological symptoms.

Section 3.3

Study Five

Investigating the cognitive vulnerability to hypomania: Autobiographical memory specificity, positive and negative rumination, and psychosocial problem-solving

Robert C. Dempsey

Steven H. Jones

&

Patricia A. Gooding

3.3.1 Abstract

Rumination, overgeneral autobiographical memory and poor psychosocial problem-solving are inter-related cognitive vulnerability factors for depression. Although preliminary research has suggested that individuals diagnosed with bipolar disorder possess similar biases in these processes, it is not clear whether these processes contribute to the vulnerability to bipolar disorders in at-risk individuals. The current study investigated whether hypomania vulnerability is associated with biases in memory specificity, rumination, and problem-solving in high versus low-risk individuals. An analogue sample of 222 participants were screened into high (n = 30) or low-risk (n = 32) groups and completed measures of autobiographical memory specificity, problem-solving, and self-report measures of mood, and positive and negative rumination. High-risk participants reported elevated tendencies to engage in positive and negative rumination, less effective problem-solving and greater overgenerality in memory recall. However, once current mood symptoms were accounted for, only tendencies to engage in emotion focused positive rumination, depression focused negative rumination, and the recall of general negative memories differentiated the high and low-risk groups. These results suggest that whilst mechanisms underlying the vulnerability to hypomania share some similarities with those mechanisms underlying the depression vulnerability, in relation to negative rumination and recall of overgeneral negative memories, hypomania vulnerability is characterised by the engagement in positive rumination but not poor problem-solving capabilities.

3.3.2 Introduction

Similar cognitive processes have been implicated in the vulnerability to bipolar disorder and unipolar forms of depression (Scott et al., 2000; Scott & Pope, 2003). These processes include negative rumination, poor psychosocial problem-solving, and the overgeneral recall of autobiographical memories (e.g., Nezu, 1987; Nolen-Hoeksema, 1991; Gibbs & Rude, 2004). The current study investigated whether individuals at a high risk for hypomania and future bipolar disorders report similar patterns of cognitive vulnerability in these processes.

Negative rumination is a repetitive thought process where the individual focuses upon the causes and consequences of recent negative experiences (Nolen-Hoeksema, 1991), and is associated with the maintenance of depressed moods (Nolen-Hoeksema, Morrow & Fredrickson, 1993), and with the vulnerability to depression (Nolen-Hoeksema, 1991; Smith & Alloy, 2009). Individuals diagnosed with bipolar disorder also report tendencies to engage in negative rumination (Van der Gucht et al., 2009), even during remission from symptoms (Thomas et al., 2007), suggesting that negative ruminative

thinking patterns may confer a risk of future relapse. Individuals vulnerable to hypomania and future bipolar disorders also readily engage in rumination, distraction and the engagement in risky behaviours in response to negative moods, suggesting that hypomania may result from dysfunctional attempts to cope with negative emotional states (Thomas & Bentall, 2002; Knowles et al., 2005).

Recent research has also indicated that tendencies to engage in ruminative thinking patterns in response to positive experiences and mood states are associated with bipolar disorder and hypomania vulnerability (Feldman, et al., 2008; Johnson et al., 2008a; Dempsey et al., 2011). Responses to positive affect appear to be crucial to emotion regulation, whereby emotion-focused and self-focused positive rumination assist in elevating and maintaining positive moods, and strategies that attempt to dampen positive moods assist with the down-regulation of mood (Feldman et al., 2008; Johnson et al., 2008a). One possibility is that both at-risk individuals and those with bipolar disorder have poor emotion regulation strategies and may readily engage in ruminative responses in response to both positive and negative experiences, contributing to mood lability (Dempsey et al., 2011). Indeed, research has indicated that whilst negative rumination appears to be a feature of both bipolar disorder and major depressive disorder, only positive rumination is associated with bipolar disorder (Johnson et al., 2008a), suggesting that individuals on the bipolar disorder spectrum have a particular sensitivity to engage in rumination in response to both positive and negative experiences.

At present, no research has investigated whether the vulnerability to hypomania is associated with deficits in psychosocial problem-solving. The ability to effectively resolve problems appears promote mental and physical well-being (Malouff et al., 2007; Bell & D'Zurilla, 2009), with poor problem-solving capabilities reported in samples of dysphoric students (Dempsey et al., *submitted-a*), clinically depressed patients (Watkins & Baracaia, 2002; Raes et al., 2005a), suicidal individuals (Evans et al., 1992; Marx et al., 1992), and individuals diagnosed with bipolar disorder (Scott et al., 2000; Tzemou & Birchwood, 2007).

Individuals currently in remission from bipolar disorder tend to generate fewer solutions to psychosocial problems on the Means-End Problem Solving Task (Platt & Spivack, 1975) compared to non-bipolar controls (Scott et al., 2000), but appear to possess similar problem-solving deficits as reported in patients with unipolar depression (Tzemou & Birchwood, 2007). However, it is currently unclear whether individuals with vulnerabilities to hypomania report similar deficits in problem-solving as reported in bipolar disorder and major depressive disorder. If individuals at an elevated risk for hypomania represent a vulnerable population for bipolar disorder, similar deficits in

problem solving as found in bipolar samples may be anticipated. Although, hypomania vulnerability can be associated with increased reward sensitivity and goal-striving (Jones et al., 2007; Carver & Johnson, 2009), which may suggest that high-risk individuals are more likely to engage in behaviours to achieve rewards associated with successful problem-solving. Interestingly, research has suggested that high-risk individuals for hypomania do not necessarily perform better at goal-related activities, such as academic work, but still have overly optimistic beliefs about their own abilities (Meyer & Krumm-Merabet, 2003). At-risk individuals may be less likely to engage in problem-solving and perform more poorly on solution generation measures of problem-solving. Whether problem-solving is a vulnerability factor for hypomania is not currently clear.

The lack of specific detail in the recall of autobiographical memories has been demonstrated in individuals diagnosed with major depressive disorder (Williams et al., 2007). This "overgeneral" recall bias is a consequence of the termination of retrieval processes prior to the activation of specific memory representations, leading to the recall of generic memory descriptions low in specific detail (Williams, 2006; Williams et al., 2007). Research has indicated that individuals diagnosed with bipolar disorder appear to possess an overgeneral recall bias for negative autobiographical memories (Mansell & Lam, 2004; Van der Gucht et al., 2009), similar to the patterns of overgenerality associated with major depression (Tzemou & Birchwood, 2007). In at-risk samples, one study has reported that the higher risk for hypomania is associated with the recall of specific negative memories (Delduca et al., 2010). This finding contrasts previous observations made in bipolar samples (e.g., Scott et al., 2000; Mansell & Lam, 2004), and suggests that the ready availability of self-negative information via memory recall may prompt dysfunctional response styles and ruminative thinking patterns leading to exacerbations in mood and symptoms (Thomas et al., 2007). However, a major concern with Delduca and colleagues' (2010) study is their use of negatively biased cue words, meaning that the specific recall of negative memories may have been prompted by the use of highly imageable negative cues (e.g., "angry", "hurt") compared to less imageable positive cues (e.g., "safe", "surprised"). There is a clear need for further research to investigate whether the individuals at a higher risk of hypomania and future bipolar disorder report similar patterns of overgenerality in memory recall.

The current study

The primary aim of Study Five was to assess whether the vulnerability to hypomania, as measured by the Hypomanic Personality Scale (Eckblad & Chapman, 1986), is associated with similar patterns of ruminative thought, deficits in problem-solving, and a reduced

specificity of autobiographical memory recall as demonstrated in bipolar disorder and in relation to the vulnerability to depression.

The Sentence Completion for Events from the Past task (SCEPT) was adopted to assess the specificity of autobiographical memory recall (Raes et al., 2007). The sentence completion task was used to avoid potential effects of cue word valence upon memory recall, following concerns in a previous study (Delduca et al., 2010). The SCEPT presents participants with a series of non-valenced sentence stems probing memories for past events (e.g. "*Last year I…*"), which participants complete in relation to a different memory. The SCEPT is considered to be a more sensitive measure of overgeneral memory in non-clinical samples compared to the Autobiographical Memory Test (AMT) (Williams & Broadbent, 1986), as low frequencies of general memories have been highlighted in previous AMT studies conducted within student samples (Raes et al., 2007). Raes and colleagues (2007) suggest that the AMT may not be sufficiently sensitive to detect trait-based overgeneral memory in non-clinical samples due to the repetition of specificity instructions and the completion of practice trials.

The current study used the University Means-End Problem Solving Task (UMEPS; Dempsey et al., *submitted-a*) to assess between-group differences in means-end problem-solving. Performance on the UMEPS has been reported to distinguish between groups of students reporting low and high severities of depressive symptoms, with students who report more severe depressive symptoms found to generate fewer relevant solutions to problems (Dempsey et al., *submitted-a*). Self-report measures of positive and negative rumination were also included to assess group differences in rumination (the "Responses to Positive Affect" scale; Feldman et al., 2008; the Ruminative Responses Scale, Nolen-Hoeksema & Morrow, 1991). Participants also completed the CES-D depression scale (Radloff, 1977) and the Internal States Scale (Bauer et al., 1991) to assess current mood symptoms.

It was predicted that individuals at a high risk for hypomania would recall more overgeneral autobiographical memories for negative events, demonstrate less effective problem-solving capabilities and be more likely to engage in ruminative responses to emotional experiences compared to low-risk individuals. It was anticipated that individuals at a higher risk for hypomania would perform in a similar manner on these cognitive tasks as has been evidenced in bipolar samples (e.g., Scott et al., 2000); Johnson et al., 2008a), with more severe deficits noted in the high-risk compared to the low-risk group.

3.3.3 Method

Participants

A total of 222 participants from the community of the University of Manchester completed the web-based screening stage of the study, which included the Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986). From this, 114 individuals were invited to participate in the main phase of the study after scoring either one standard deviation above or below the mean HPS score. A total of 62 participants completed the second stage of the study (See Table 3.3.1 below for demographic information). T-tests indicated that there were no significant differences in the ages or HPS scores of those participants who were invited to take part and who did complete part two of the study (M_{age} = 20.33 years, S.D. = 2.49; M_{HPS} = 27.83, S.D. = 4.19) and those who did not participate in the second stage as part of the high-risk group (M_{age} = 20.20 years, S.D. = 2.40; M_{HPS} = 27.97, S.D. = 4.35) (Age, $t(59) = 1.648$, $p = .110$, n.s.; HPS score, $t(59) = .911$, $p = .366$, n.s.). Similarly, no significant differences were noted in age or HPS scores for those participants who were invited to the second stage and who did complete (M_{age} = 21.31 years, S.D. = 5.22 ; M_{HPS} 6.38, S.D. = 2.50) and did not complete the study as part of the low risk group (M_{age} = 21.93 years, S.D. = 6.69; M_{HPS} = 5.82, S.D. = 2.09) (Age, $t(59) = -.040$, $p = .969$, n.s.; HPS score, $t(59) = -1.093$, $p = .279$, n.s.). There were also no differences in gender ratios for those participants who were invited to participate in the second stage of the study as part of the high-risk group between those who did and not complete part two (Pearson's $X^2 = 1.667$, $p = .197$). Similarly no significant differences in gender ratios were noted for those participants invited to participate as part of the low-risk group, between those who did and did not complete the study (Pearson's $X^2 = 1.652$, $p = .199$). Participants completed the study either voluntarily for no incentive (n = 24) or received course credit (n = 38).

Table 3.3.1 Demographic characteristics for the sample, and by high and low risk groups

	Total	*High-risk group*	*Low-risk group*
Gender	9 male, 53 female	4 male, 26 female	5 male, 27 female
Mean age (S.D.)	20.84 (4.13)	20.33 (2.49)	21.31 (5.22)
HPS Range Scores		24-36	1-10

Note: HPS = Hypomanic Personality Scale.

Materials

The Center for Epidemiological Studies Depression Scale (CES-D)

The CES-D is a 20 item self-report questionnaire measure designed to assess the severity of depressive symptoms within non-clinical populations (Radloff, 1977). Participants rate the occurrence of twenty depressive symptoms over the previous seven days (from 0 = "Rarely", to 3 = "Most of the time"). Example items include: "I had crying spells", "I felt depressed", and "I thought my life had been a failure". Scores on the CES-D range from 0-60, with scores of 16 or above indicative of clinically significant levels of depression (Radloff, 1991). The CES-D has demonstrated good internal validity (Cronbach's α = .79-.89) (Radloff, 1991; Jones & Day, 2008).

The Hypomanic Personality Scale (HPS)

The HPS is a 48 item self-report measure designed to assess the presence of hypomanic personality traits (Eckblad & Chapman, 1986). Participants rate whether statements pertaining to hypomania-like traits are true or false in relation to their own personality (e.g., "I frequently find that my thoughts are racing"). High scorers on the HPS report elevated levels of bipolar symptomatology, when measured both concurrently and prospectively (Eckblad & Chapman, 1986; Meyer & Hautzinger, 2003; Blechert & Meyer, 2005), and are more likely to meet diagnostic criteria for bipolar disorder at long-term follow-up (Kwapil et al., 2000). The HPS has demonstrated good re-test reliability (r = .81, Eckblad & Chapman, 1986) and good internal validity (α = .87-.89) (Eckblad & Chapman, 1986; Jones & Day, 2008; Dempsey et al., 2011).

The Internal States Scale (ISS)

The ISS is a 16 item self-report questionnaire which measures depressive and manic symptoms (Bauer et al., 1991). Participants rate the experience of 15 symptoms over the previous 24 hours on 100mm visual analogue scales (anchored by 0 = "Not at all"/"Rarely" to 100 = "Very much so"/"Much of the time"), and also rate their current mood state on a separate 100mm scale ("Today I feel": "Depressed/Down" = -50, to "Manic/High = +50). Items on the ISS comprise separate subscales measuring manic symptoms (ISS Activation), depressive symptoms (ISS Depression), interpersonal conflict (ISS Perceived Conflict), and general emotional well-being (ISS Well-being). Scores on the ISS correlate with clinician-made ratings of symptoms (Bauer et al., 1991). The ISS has demonstrated adequate internal validity (α = .73-.82) (Jones & Day, 2008).

The Responses to Positive Affect Scale (RPA)

The RPA is a 17 item measure designed to assess positive forms of rumination (Feldman et al., 2008). Items on the RPA refer to various possible responses to positive emotions (e.g., "When you are feeling happy, how often do you…*think about how happy you feel*", "…*think about how proud you are of yourself*"). Items on the RPA constitute three subscales including rumination upon mood and physical experiences (RPA Emotion-focused positive rumination), rumination upon the self and personally relevant goals (RPA Self-focused rumination), and responses which attempt to reduce the intensity of positive mood states (RPA Dampening). Participants rate each item according to whether they "almost never", "sometimes", "often" or "almost always" respond to a positive mood state in that manner (on a scale from 1 to 4), with higher scores reflecting greater propensities to engage in positive forms of rumination. The RPA and its subscales have demonstrated adequate internal validity (α = .72-.85) (Feldman et al., 2008; Dempsey et al., 2011).

The Ruminative Responses Scale (RRS)

The RRS is a 22 item self-report measure of the engagement in ruminative responses to the negative emotions and experiences (Nolen-Hoeksema & Morrow, 1991). Each item on the RRS describes a response to a negative emotional state (e.g., "Think about your feelings of fatigue and achiness", "Write down what you are thinking and analyse it"). Items on the RRS form three factor-analytically derived subscales, which include rumination upon depressive symptoms (RRS Depression-related Rumination), repetitive thought processes analysing the discrepancies between the current self and unachieved goals (RRS Brooding), and more adaptive attempts to improve mood states through cognitive problem solving (RRS Reflection) (Treynor et al., 2003). The subscales of the RRS have demonstrated adequate to excellent internal validity (Brooding α = .71-.79; Depression α = .84; Reflection α = .78-.90) (Johnson et al., 2008a; Dempsey et al., 2011).

Sentence Completion for Events from the Past Test (SCEPT)

The SCEPT is a sentence completion task designed to measure the specificity of autobiographical memory recall in non-clinical groups (Raes et al., 2007). The SCEPT consists of a series of 11 sentence stems which probe memories for past experiences (e.g., "Last year I…", "I will never forget…"). Participants are asked to provide a continuation to each sentence, and are instructed to complete each sentence with reference to a different memory or event. Sentence completions are coded according to whether they refer to specific or general memories, with specific memories defined as events which took place at a particular time and place that had durations of less than one day. Tendencies to make

overgeneral responses on the SCEPT have been positively associated with self-reported depression severities and visual analogue scale ratings of rumination (Raes et al., 2007).

The University Means-End Problem-Solving Task (UMEPS)

The UMEPS is a means-end problem solving task designed for use in British student samples (Dempsey et al., *submitted-a*). Each item on the UMEPS describes a problematic scenario which may be encountered whilst studying at a British university. These problems include situations directly relating to educational activities (e.g., difficulties in managing collaborative group work with peers, managing coursework), financial concerns (e.g., the repayment of student debt), graduate career prospects (e.g., worries over job hunting), as well as emotional (e.g., social isolation), and interpersonal problems (e.g., arguments with housemates). Problem-solving capabilities as assessed by the UMEPS can be measured according to the number of relevant and irrelevant solution means or steps generated for each problem, as well as coding for the effectiveness and specificity of solutions. Five items measuring different domains of problem-solving were included in the current study based upon the realism ratings measured in the previous two studies and participant feedback ("Depressed feelings", "Problems with course-mates", "Worry about how to pay back student loan", "Arguments with housemates", and "Stress", see Appendix for the UMEPS items).

Procedure

Participants were recruited from advertisements placed on research volunteering websites hosted by the University of Manchester. These advertisements directed participants to the study's website, where the information sheet and consent form were displayed. Once participants consented to taking part in the study they completed a short demographics questionnaire and the Hypomanic Personality Scale. Those participants who scored within the regions of one standard deviation above or below the mean HPS score were later invited via email to participate in the second stage of the study. Previous studies have screened participants into high and low-risk groups based on HPS scores one standard deviation above and below the group HPS mean (e.g., Johnson, Ballister & Joiner, 2005; Taylor & Mansell, 2008).

Participants in the second stage completed the ISS, to assess current bipolar mood symptoms, before completing the 11 sentence stems from the SCEPT task (Raes et al., 2007), followed by the five problematic situations from the UMEPS which were presented in a randomised order. Upon completion of these tasks, participants completed online versions of the CES-D and rumination questionnaires (the RPA and RRS). The final page

of the study's website presented a short debrief about the study and an optional feedback form. The study received institutional ethical approval from the University of Manchester.

Data Coding

Reponses made on the SCEPT task were coded according to whether completed sentences referred to positive or negative events, and whether participants made reference to a specific or general event based upon the coding scheme devised by Williams and Broadbent (1986). Responses were coded as positive or negative if they made explicit references to emotional states, or implicitly described positive or negative events. Responses were coded as specific if they referred to an event that occurred at a particular time and a place with a duration of less than a day. General sentence completions included references to events which took place over a period greater than one day (see Table 3.3.2). A response was coded as an omission if the participant failed to complete the sentence or made an unintelligible response.

Table 3.3.2 Example responses from the Sentence Completion for Event from the Past Test (SCEPT) measure of autobiographical memory specificity.

	Autobiographical Memory Valence	
Memory Specificity	Positive	Negative
Specific	I still recall how... happy I felt when I passed my driving test.	I can still picture how… my cat looked when he returned after being missing for about a week. He looked so thin and hungry.
General	I still remember how… fun our family holidays were when I was young.	At the time when I… wasn't in a relationship I felt very lonely.

Responses on the UMEPS task were coded for the number of relevant solutions and irrelevant solution means generated for the problem solving situations. A relevant solution mean refers to a unique potentially effective solution step that has a good probability of resolving the problem at hand, whilst an irrelevant solution mean refers to a potentially ineffective solution step which has a good probability of exacerbating rather than solving

the current problem. Participants' solutions on the UMEPS were coded by the first author (R.D.) for their effectiveness (on a five point scale, 1 = "very ineffective", 5 = "very effective"), relating to the probability that the solution will resolve the stated problem, and their specificity, relating to the level of detail described in the solution (from 1 = "very unspecific" to 5 "very specific") (see Appendix for full coding manual). An independent rater coded a random sample of 25% of the items on the UMEPS and SCEPT tasks (see Table 3.3.3 in the Results section for inter-rater reliability statistics).

Data Analysis

Scores on the hypomania vulnerability measure were compared using t-tests to confirm whether the screening stage had produced two distinct groups according to HPS scores, with multivariate analysis of variance (MANOVA) being used to compare between-group differences in baseline mood symptoms and rumination. Responses on the SCEPT memory specificity measure were compared between-groups using a mixed design analysis of variance (ANOVA), whilst univariate ANOVAs were conducted for between-group differences on the UMEPS problem-solving task. An exploratory binary logistic regression analysis was conducted to investigate which of the cognitive vulnerability processes (rumination, problem-solving and memory specificity) were predictors of group membership for the low and high-risk groups, after accounting for current bipolar mood symptoms.

3.3.4 Results

Inter-rater reliability

An independent rater conducted a coding check on 25% of the data from the autobiographical memory (SCEPT) and problem-solving tasks (UMEPS) (See Table 3.3.3, below). As shown in Table 3.3.3, there were high levels of agreement between the raters across the memory and problem-solving measures (intraclass correlation coefficients are presented for continuous variables and Cohen's Kappa values are presented for categorical data).

Table 3.3.3. Inter-rater reliability statistics for scores on the Sentence Completion Task for Events from the Past Test (SCEPT) and the University Means-End Problem-Solving Task (UMEPS) (Intraclass correlation coefficients and Cohen's Kappa values)

	Inter-rater Reliability
Sentence Completion for Events from the Past Test (SCEPT)	
Positive Specific Memories	.94 [b]
Positive General Memories	.89 [b]
Negative Specific Memories	.93 [b]
Negative General Memories	.91 [b]
University Means-End Problem-Solving Task (UMEPS)	
Relevant Solution Means	.96 [b]
Irrelevant Solution Means	.92 [b]
Solution Specificity	.93 [a]
Solution Effectiveness	.79 [a]

Note: [a] = Cohen's Kappa, [b] = Intraclass Correlation Coefficient.

Comparison of the low and high-risk groups on the vulnerability and mood measures

The results of an independent samples t-test reported significant differences in mean HPS scores between the high (M_{HPS} = 27.83, S.D. = 4.19) and low-risk groups (M_{HPS} = 6.38, S.D. = 2.5) ($t(61) = -25.067$, $p < .001$) confirming that the screening stage of the study produced two distinct groups of HPS scorers. The mean HPS scores of the groups were consistent with those reported for the high and low risk groups recruited by Delduca and colleagues (2010). The high and low risk groups did not differ with respect to participant age ($t(60) = .932$, $p = .355$) or gender ratios (Pearson's $X^2 = .066$, $p = .798$). Means and standard deviations for scores on the symptom measures (the CES-D and ISS scales), and reliability statistics (Cronbach's α) are presented in Table 3.3.4.

Table 3.3.4. Means, standard deviations, reliability statistics, and between-group differences for scores on the mood symptoms measures

		HPS Group				
	α	Low	High	Total	*F*	η^2
CES-D Depression	.91	12.97 (9.53)	22.37 (10.30)	17.59 (10.92)	14.75***	.20
ISS Activation	.85	96.23 (82.56)	179.37 (113.54)	137.11 (106.75)	11.72**	.16
ISS Depression	.86	30.06 (38.33)	52.73 (50.13)	41.21 (45.61)	4.35*	.07
ISS Perceived Conflict	.81	90.42 (82.31)	164.23 (94.96)	126.72 (95.55)	11.40***	.16
ISS Well-being	.76	149.94 (58.26)	143.77 (52.94)	146.90 (55.33)	.19	.00

Note: CES-D = Centre for Epidemiological Studies Depression scale, HPS = Hypomanic Personality Scale, ISS = Internal States Scale. Standard deviations in parenthesis, * $p < .05$, ** $p < .01$, *** $p < .001$

A MANOVA was conducted to investigate between-group differences in scores on the symptom measures. The MANOVA was significant overall ($F_{(5, 56)} = 4.83$, $p < .01$), with the high-risk group reporting significantly higher mean scores on the CES-D depression, ISS Activation, Depression and Perceived Conflict scales, with no significant between-group differences on the Well-being subscale of the ISS. The mean scores on the ISS subscales for the HPS groups were also consistent with scores reported by Delduca and colleagues (2010).

Rumination

Means and standard deviations for scores on the positive (RPA) and negative rumination (RRS) measures are presented in Table 3.3.5.

Table 3.3.5. Means, standard deviations (in parenthesis), alpha reliabilities, and between-group differences in self-reported positive and negative rumination.

		HPS Group				
	α	Low	High	Total	*F*	η^2
Responses to Positive Affect Scale (RPA)						
Dampening	.80	12.66 (4.16)	15.07 (4.50)	13.82 (4.44)	4.86*	.08
Emotion-focused	.83	11.88 (2.49)	14.43 (3.55)	13.11 (3.29)	10.92**	.15
Self-focused	.67	8.34 (1.84)	10.00 (2.70)	9.15 (2.43)	8.03**	.12
Ruminative Responses Scale (RRS)						
Brooding	.83	9.81 (3.70)	11.97 (3.45)	10.85 (3.89)	5.62*	.09
Reflection	.87	10.12 (2.92)	12.80 (4.36)	11.42 (3.89)	8.16**	.12
Depression-related	.84	24.59 (5.82)	31.17 (5.48)	27.77 (6.52)	20.88***	.26

Note: HPS = Hypomanic Personality Scale, d.f. = 6, 53. * $p < .05$, ** $p < .01$, *** $p < .001$

A MANOVA was conducted to investigate between-group differences in rumination. The MANOVA was significant overall ($F_{(6,\ 53)} = 5.67$, $p < .001$), with univariate ANOVAs indicating that the high-risk group reported more extreme scores across the positive and negative rumination measures (see Table 3.3.4 above).

Autobiographical Memory Specificity

Means and standard deviations for sentence completions on the SCEPT task are presented in Table 3.3.6. Whilst the low-risk group appeared to make similar mean numbers of sentence completions for specific and general memories, the high-risk group appeared to make substantially more completions referring to general than specific memories.

Table 3.3.6. Mean autobiographical memory specificity scores, separated according to memory valence, for the high and low risk groups (standard deviations in parentheses).

	Low HPS Group	*High HPS Group*	Total
All memories			
Specific	5.25 (1.83)	3.87 (2.19)	4.58 (2.12)
General	5.59 (1.78)	7.00 (2.08)	6.27 (2.04)
Omissions	.16 (.37)	.13 (.43)	.15 (.40)
Positive memories			
Total	8.09 (1.57)	7.23 (1.70)	7.68 (1.68)
Specific	3.84 (1.71)	2.77 (1.61)	3.33 (1.73)
General	4.25 (1.55)	4.46 (1.94)	4.35 (1.74)
Negative memories			
Total	2.75 (1.55)	3.63 (1.71)	3.18 (1.62)
Specific	1.41 (1.46)	1.10 (1.13)	1.26 (1.31)
General	1.34 (.86)	2.53 (1.59)	1.92 (1.39)

N.B. HPS = Hypomanic Personality Scale.

A 2 x 2 x 2 mixed design analysis of variance was conducted to investigate between-group differences in memory specificity on the SCEPT task, with memory valence (positive vs. negative) and memory specificity (specific vs. general) treated as within-subject factors and HPS risk group (low vs. high) treated as a between-subjects factor.

A significant main effect of memory valence was found ($F_{(1, 60)} = 122.14$, $p < .001$) which indicated that participants were more likely to complete sentences referring to positive memories than negative memories irrespective of memory specificity. This main effect was qualified by a significant interaction effect between memory valence and group ($F_{(1, 60)} = 4.64$, $p < .05$), with greater numbers of positive sentence completions made by the low-risk group compared to the high-risk group, whilst greater numbers of negative sentence completions were made by the high risk group compared to the low risk group.

A significant main effect of memory specificity was also observed ($F_{(1, 60)} = 12.15$, $p < .01$), with a higher mean number of sentence completions made in reference to general memories than for specific memories. This main effect was further qualified by a significant interaction between memory specificity and group ($F_{(1, 60)} = 7.82$, $p < .01$), with greater numbers of specific memories recalled on the sentence completion task by the low-

risk group than the high group, whilst the high-risk group recalled greater numbers of general memories than the low-risk group. No significant effect was noted for the interaction between memory valence and memory specificity (p = .38), and the three-way interaction between valence, specificity and group was also not significant (p = .81).

Follow-up univariate ANOVAs were conducted to further explore between-group differences in memory specificity, which indicated that the high-risk group recalled fewer specific positive memories compared to the low-risk group ($F_{(1, 61)} = 6.51$, $p < .01$). The high-risk group also recalled more negative general memories than the low-risk group ($F_{(1, 61)} = 13.60$, $p < .001$), but no significant between-group differences were noted for the number of general positive memories or negative specific memories recalled on the SCEPT task (Fs < 1). A Mann-Whitney test indicated that there were no significant between-group differences for the mean number of omissions made on the SCEPT memory task (U = 455.50, Z = -.594, p = .55).

Problem-Solving

Means and standard deviations for scores on the UMEPS problem-solving measures are presented in Table 3.3.7 below.

Table 3.3.7. Performance on the University Means-End Problem-Solving Task (UMEPS: means, standard deviations, and Cohen's d effect size) across the low and high-risk groups

	Group				
	Low HPS	High HPS	Total	*F*	Cohen's *d*
University Means-End Problem-Solving Task (UMEPS)					
Relevant Means	3.06 (1.32)	2.43 (1.08)	2.76 (1.24)	4.19*	.52
Irrelevant Means	.49 (.45)	.59 (.37)	.54 (.41)	.85	.24
Solution Specificity	3.50 (.77)	3.29 (.73)	3.40 (.75)	1.29	.28
Solution Effectiveness	3.42 (.53)	3.07 (.69)	3.25 (.63)	5.21*	.57

Note: Standard deviations in brackets, * $p < .05$, ** $p < .01$, HPS = Hypomanic Personality Scale.

Univariate analyses of variance indicated that there were significant between-group differences for the number of relevant means generated on the UMEPS problem-solving task, with the low-risk group generating greater numbers of relevant solutions compared to

the high-risk group. There was also a significant between-group difference for the mean solution effectiveness (observer-made) ratings, with the low-risk group generating more effective solutions than the high-risk group.

Which cognitive vulnerability factors predict hypomania vulnerability group membership?
An exploratory logistic regression analysis was conducted to investigate which combination of the cognitive vulnerability factors (rumination, problem-solving and memory specificity) predicted group membership for the high and low-risk groups. Scores on the CES-D and the Activation subscale of the Internal States Scale were entered into the first block of the regression model to control for between-group differences in mood symptoms, whilst HPS group (low or high) was entered as the dependent variable. ISS Depression scores were not entered due to their strong correlation with CES-D scores (r = .744, p > .001) to avoid elevated colinearity amongst predictor variables, with the cognitive vulnerability variables were entered into the second block using backwards entry.

The logistic regression was significant overall (χ^2 = 46.709, d.f. = 6, p < .001), and accounted for between 52.9% (Cox & Snell R Square statistic) and 70.6% (Nagelkerke R Square statistic) of variance in group status. The model correctly predicted group membership for 87.1% of participants. Higher scores on the self-focused positive rumination scale, depressive symptom-focused rumination and the more frequent recall of negative general memories were all independent contributors to the regression model once concurrent depressive (CESD) and hypo/manic (ISS-A) scores were accounted for (see Table 3.3.8, below). The effectiveness of solutions generated on the UMEPS task was not a significant predictor of HPS group membership (p = .082).

Table 3.3.8 Results of the logistic regression analysis for the prediction of group membership to the high and low risk groups.

	β	S.E.	95% Confidence Intervals (CIs) for Exp(β)		
			Lower CI	Exp(β)	Upper CI
Block 0					
Constant	-.07	.25		.94	
Block 1					
Constant	-2.37	.68		.94	
CES-D	.08*	.03	1.019	1.081	1.148
ISS Activation	.01*	.00	1.001	1.007	1.014
Block 2					
Constant	-11.27**	4.07		.00	
CES-D	.02	.05	.93	1.02	1.13
ISS Activation	.01	.00	1.00	1.01	1.02
RPA Self-focused	.76**	.26	1.28	2.13	3.54
RRS Depression Related	.17*	.08	1.01	1.19	1.40
Negative general memories	1.04*	.43	1.23	2.83	6.51
UMEPS effectiveness	-1.22	.70	.08	.30	1.17

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. CES-D = Center for Epidemiological Studies Depression Scale, ISS = Internal States Scale, RPA = Responses to Positive Affect scale, RRS = Ruminative Responses Scale. UMEPS = University Means-End Problem-Solving Task

3.3.5 Discussion

Study Five investigated whether the vulnerability to hypomania is associated with similar patterns of overgeneral autobiographical memory specificity, ruminative thought processes, and the reduced efficacy of psychosocial problem-solving as previously identified in relation to the vulnerability to depression.

Individuals at a high-risk for hypomania reported the increased engagement in positive and negative ruminative cognitive styles compared to low-risk individuals, supporting previous observations made in both at-risk samples (Dempsey et al., 2011), and in individuals diagnosed with bipolar disorder (Johnson et al., 2008a). High-risk

individuals also generated fewer relevant solution means and less effective solutions to problematic situations compared to low-risk individuals, consistent with previous observations that individuals in remission from bipolar disorder generate fewer relevant solutions on the MEPS task than non-bipolar controls (Scott et al., 2000). However, the logistic regression analysis indicated that once current bipolar mood symptoms are accounted for, performance on the UMEPS problem-solving task does not differentiate between individuals at a high and a low-risk for hypomania, contrary to our predictions.

In relation to memory recall, a higher risk for hypomania was associated with the recall of fewer specific memories and greater numbers of general negative memories on the SCEPT sentence completion measure of autobiographical memory, in contrast to previous research (Delduca et al., 2010) but supporting our predictions. It was also noted that participants across groups made more frequent sentence completions referring to general than specific events, supporting Raes and colleagues' (2007) argument that the SCEPT is a more sensitive measure of overgeneral memory in non-clinical student samples than the cued AMT paradigm.

When the cognitive variables were entered into a logistic regression analysis to investigate which combination of the vulnerability processes predicted group membership for high and low-risk individuals, only tendencies to engage in self-focused positive rumination, depression-focused negative rumination, and the recall of general negative memories differentiated group membership independent of current bipolar mood symptoms. Whilst the high and low risk groups appeared to differ in their problem-solving abilities, once current mood symptoms were accounted for these between-group differences were not significant. Deficits in psychosocial problem-solving would not appear to be uniquely associated with a trait-based vulnerability to hypomania, but are largely associated with the experience of current mood symptoms. Indeed, a similar study noted that means-end problem-solving did not differentiate group membership between individuals diagnosed with bipolar disorder and healthy controls (Scott et al., 2000). Rather, the presence of more extreme dysfunctional attitudes relating to perfectionism and the more overgeneral recall of autobiographical memories were significant predictors of membership for the bipolar group. Although deficits in psychosocial problem-solving appear to be a vulnerability factor for depression (Dempsey et al., *submitted-a*), based upon the results of the current study and Scott and colleagues' (2000) work, it would appear that problem-solving deficits may not be uniquely associated with bipolar disorders and may be accounted for by the experience of current depressive symptoms in bipolar spectrum individuals.

Interestingly, previous research has reported that the vulnerability to hypomania is associated with the self-reported use of distraction and the engagement in risky and potentially dangerous activities, rather than problem-solving, as responses to negative mood states (Thomas & Bentall, 2002). Individuals vulnerable to hypomania may be less likely to engage in problem-solving following negative experiences and instead engage in higher-risk activities to avoid negative emotions through short-term boosts in positive mood states, rather than use problem solving as an effective means of coping with negative experiences. As individuals at a higher risk for hypomania are also at a heightened vulnerability for future depression, with high prevalences of diagnosed depressive disorders noted in a long-term follow-up of high-scorers on the Hypomanic Personality Scale (Eckblad & Chapman, 1986; Kwapil et al., 2000), poor psychosocial problem-solving may only be predictive of future depressive but not hypomanic symptoms in high-risk individuals.

There are several limitations to consider with the current study. The study predominantly relied upon self-report questionnaire measures to assess the engagement in ruminative thought processes, memory specificity and problem solving capabilities. Future studies may consider inducing positive and negative forms of rumination in low and high risk individuals, and then assessing between-group differences in memory recall specificity and problem-solving to investigate the causal relationships between rumination and memory specificity and problem-solving. Although poorer psychosocial problem-solving was not uniquely associated with hypomania vulnerability in the current study, it is still unclear whether individuals currently experiencing hypomanic states report similar deficits in problem-solving as reported in currently depressed individuals. Whilst one study has suggested that there are no significant differences in problem-solving capabilities between currently hospitalised bipolar and unipolar individuals, both patient groups generated fewer relevant solutions on the MEPS compared to healthy controls (Tzemou & Birchwood, 2007). However, the bipolar sample in their study consisted of individuals who had been hospitalised for manic and for depressive episodes, which may indicate that the experience of extreme mood episodes is associated with deficits in solution generation during means-end problem-solving. In terms of the current study, the sample was predominantly female and no assessment of the participants' past clinical histories was included, meaning that the sample may be unrepresentative of the processes implicated in hypomania vulnerability in males and may have consisted of some individuals who have previously experienced clinically significant mood symptoms.

Although the current study was mostly self-report in nature, the study did attempt to overcome problems with the use of the cued Autobiographical Memory Test in non-

clinical samples by using the SCEPT sentence completion task (Raes et al., 2007). A major strength of the SCEPT procedure is that participants are not as aware of the nature of the task in relation to the specificity of autobiographical memory recall compared to the AMT, whereas the AMT presents participants with practice trials and repeated task instructions. Also, the SCEPT task does not require participants to recall memories in response to cue words, meaning that there is no requirement to counterbalance cues for their imageability or emotional valence. The use of the cued AMT procedure can be problematic, as previous research has reported that high-risk individuals for hypomania were more specific in their recall of negative autobiographical memories (Delduca et al., 2010), but had appeared to use negatively biased cue words, in direct contrast to the current study's results from the sentence completion task. Finally, our analyses indicated that there was no evidence of selective attrition of participants from the screening stage to the main phase of the study based upon participant ages, gender ratios or HPS scores.

3.3.6 Conclusions

Study Five has indicated that the vulnerability to hypomania, and future bipolar disorders, is associated with similar patterns of autobiographical memory specificity, rumination, and problem-solving capabilities as has previously been associated with the vulnerability to unipolar forms of depression. Individuals at a higher risk for hypomania reported tendencies to engage in both positive and negative forms of rumination, were more overgeneral in their autobiographical memory recall, and recalled fewer specific positive memories and more general negative memories than low-risk participants. Whilst high-risk individuals appeared to demonstrate poorer psychosocial problem-solving than low-risk individuals in terms of generating fewer relevant solution steps to problems, these between-group differences did not remain independent of current bipolar mood symptoms. There is some convergent evidence to suggest that deficits in psychosocial problem-solving may not be uniquely associated with hypomania vulnerability or bipolar disorder, however, poor problem-solving capabilities may be associated with the experience of depressive symptoms associated with bipolar spectrum disorders.

Section 4

Study Six

A Preliminary Investigation into the Relationships between Dysfunctional Goal Striving and Goal-related Memory Recall Processes in the Vulnerability to Hypomania

Robert C. Dempsey

Steven H. Jones

&

Patricia A. Gooding

4.1.1 Abstract

The vulnerability to hypomania is associated with goal-directed behaviour, increased reward responsivity and extreme goal-pursuit. Although theories of autobiographical memory suggest goals are implicit processes derived from memories, no study has yet investigated the associations between memory specificity and goal-pursuit with the vulnerability for hypomania. A non-clinical sample of 165 participants completed assessments of goal-related memory, future event generation, and questionnaires of hypomania vulnerability, reward sensitivity and goal planning. Regression analysis indicated that the vulnerability to hypomania was independently associated with heightened goal sensitivity, goal-planning for extreme goals with potential public rewards, tendencies to generate semantic information about the self for goal-related memories and the imagination of future repeating successful events. The results suggest that the vulnerability to hypomania is associated with tendencies to think about generalised information about the self in relation to past goal-related successes, which may contribute to self-focused positive rumination and high expectations of future successes leading to exacerbations in mood and increased goal-directed activity in bipolar-vulnerable individuals.

4.1.2 Introduction

The vulnerability to hypomania and the experience of clinical hypomanic and manic episodes are associated with the engagement in goal-related activities and the heightened sensitivity to potential goal-related rewards (APA, 2000). Numerous studies have investigated the relationships between goal-pursuit and vulnerability to hypomania, vulnerability to relapse in bipolar disorder, and prospective bipolar symptoms, but few studies have explored how an individual's memory for past goal-related events may be associated with future goal-planning and pursuit, and the vulnerability to hypomania. Thus the goal of the current study was to investigate the associations between the vulnerability to hypomania with goal-related memory processes and goal-pursuit.

Research has demonstrated that goal-sensitivity and goal-attainment in individuals with bipolar disorder can have an important influence upon future illness courses, particularly in the development of manic symptoms (Lam & Wong, 1997; Johnson et al., 2000; Johnson, 2005b; Lam & Wong, 2005; Johnson et al., 2008b). Individuals diagnosed with bipolar disorder, and those vulnerable for future bipolar disorders, react intensely to the accomplishment of goals, with increases in positive affect, confidence, elevated expectancies of future successes, and higher goal-setting observed following recent goal-related successes (Johnson, 2005b; Johnson et al., 2005). These intense reactions to goal-

attainment contribute to the further exacerbation of positive affect and manic symptoms in vulnerable individuals, with increased goal-striving activity identified as a common prodrome for mania (Lam & Wong, 1997; 2005). Indeed, the recent experience of goal-attainment life events has been associated with increases in manic symptoms in individuals diagnosed with bipolar disorder (Johnson et al., 2000; Johnson et al., 2008b), and with the subsequent experience of hypomanic episodes in students diagnosed with cyclothymia and bipolar II disorder (Nusslock, Abramson, Harmon-Jones, Alloy & Hogan, 2007). Furthermore, personality traits relating to achievement striving have been associated with prospective increases in manic symptoms at a six month follow-up in individuals diagnosed with bipolar I disorder (Lozano & Johnson, 2001).

Individuals with diagnoses of bipolar I disorder also endorse strong beliefs regarding the need to accomplish goals even during euthymic states (Lam et al., 2004). Interestingly, these goal-striving attitudes appear to be resilient to mood changes, one study observed that individuals with bipolar disorder report similar elevated levels of goal-attainment beliefs pre and post a positive mood induction compared to individuals in remission from unipolar depression and healthy controls (Wright et al., 2005). The endorsement of strong beliefs regarding the need to accomplish goals in individuals with bipolar disorder appears to remain prevalent during mild increases in positive mood states, which may further contribute to mood and symptom exacerbation following an initial success through increased goal-directed behaviour.

Goal-striving has also been associated with vulnerability to future hypomania and bipolar disorders. The Hypomanic Personality Scale (HPS) (Eckblad & Chapman, 1986) has been frequently used to investigate goal-sensitivity and pursuit in individuals at a high risk for experiencing future hypomania and bipolar disorders. Hypomanic personality traits are considered to be similar to the clinical presentations of hypomanic mood episodes (Eckblad & Chapman, 1986), with high scorers on the HPS experiencing more frequent episodes of hypomania and depression over a ten year follow-up compared to low HPS scorers (Kwapil et al., 2000). A number of studies have reported associations between hypomanic personality and heightened incentive motivation as indexed by the behavioural activation system (Jones et al., 2007; Jones & Day, 2008; Carver & Johnson, 2009), a motivational system responsive to rewards and incentives measured by the BIS/BAS questionnaire (Carver & White, 1994), suggesting that vulnerability to hypomania and the setting of high goals may be related to the over-activation of an incentive system (Johnson & Carver, 2006).

Hypomanic personality traits have also been associated with tendencies to engage in approach behaviours to goals (Jones et al., 2007), with increased expectancies of success

and higher goal-setting following reward (Johnson et al, 2005). Individuals with hypomanic personalities also pursue goals of an extreme, potentially grandiose, and statistically unlikely nature, including the attainment of popular celebrity fame and significant financial wealth (Johnson & Carver, 2006; Carver & Johnson, 2009). Subsequent research has also suggested that hypomania vulnerability is more associated with reward and achievement related emotions (e.g., joy and pride) than prosocial emotions (e.g., compassion), and more with setting extrinsic extreme personal goals (e.g., political influence) than intrinsic goals which may be less publicly rewarding (e.g., relationships with family and friends), even when current manic and depressive symptoms are accounted for (Gruber & Johnson, 2009). Individuals at risk for hypomania and future bipolar disorders may not simply pursue extreme goals, but are particularly attuned to the potential rewards associated with these goals, particularly where goals have a perceived high value and public reward.

One possible cognitive process which may explain excessive goal-pursuit by individuals on the bipolar disorder spectrum is autobiographical memory. Goals have been described as implicit processes which are grounded in the self-knowledge base formed by autobiographical memories (Conway & Pleydell-Pearce, 2000). The autobiographical memory system contains three levels of memory representation which are differentiated by their associated degree of specificity. These representations include: lifetime periods relating to general thematic and temporal knowledge (including time periods of several months or years, e.g., "working at office *x*"); general events including extended single events (including durations of days or weeks, e.g., "when I went on holiday to…") and thematically associated repeating events (e.g., "going shopping"); and specific events associated with sensory-perceptual detail unique to that event (e.g., "when I attended my university graduation ceremony") (Conway & Pleydell-Pearce, 2000).

Conway and Pleydell-Pearce (2000) also suggest that due to the implicit and non-conscious nature of goals in memory, specific memory representations do not directly represent goals but instead represent goal outcomes and plans to achieve these goals. The recall of specifically detailed memories may assist in the enactment of specific behavioural plans to accomplish goals, and suggest that goals derived from specific memories are realistically achievable in nature, whilst general memories may represent non-specific behavioural plans to achieve unlikely goals. Indeed, the recall of specific memories has been associated with more effective problem-solving behaviours (Williams et al., 2006), which may provide tentative support for the proposal that specific memories containing behavioural plans assist in successfully completing set goals, in this example through successful problem-solving. The availability of autobiographical memories describing past

goal-related activities may play an important role in the pursuit of current and future goals, although how goal-memory processes are implicated in the vulnerability to hypomania and bipolar disorders is unclear.

There has, however, been little investigation into the association between goals and autobiographical memory in bipolar disorder, although a number of studies have suggested that individuals with bipolar disorder and those at-risk for hypomania possess dysfunctional memory recall strategies. For example, individuals with bipolar disorder diagnoses have shown a tendency to generate general descriptions for negative autobiographical memories, but retain the ability to recall emotionally positive memories in specific detail compared to individuals in remission from unipolar depression (Mansell & Lam, 2004). Other studies have suggested that individuals with bipolar disorder have low specificities for both positive and negative memories compared to non-bipolar controls (Scott et al., 2000). Whilst a separate study reported similar levels of overgenerality in groups of individuals currently experiencing bipolar and unipolar mood episodes (Tzemou & Birchwood, 2007).

There is some disagreement as to whether individuals at-risk for hypomania and future bipolar disorders report similar patterns of overgeneral memory as found in bipolar samples. One study reported that high-risk individuals are more specific in their recall of negative memories (Delduca et al., 2010), whilst two recent studies suggest that high-risk individuals report similar over-general biases for negative memories as found in bipolar samples (Dempsey et al., *submitted-c*), and more extreme overgenerality across both positive and negative memories (Dempsey et al., *submitted-e*). However, neither of these studies specifically focused upon goal-related memory recall, it remains somewhat unclear as to how the specificity of memories may influence future goal-pursuit in people at-risk for hypomania and future bipolar disorders.

At present, only one study has taken an explicit goal-related memory focus in relation to bipolar disorder, using a semi-structured memory interview in a sample of euthymic bipolar individuals (Gregory et al., 2010). Participants in Gregory and colleagues' study reported that both previous depressed and hypomanic mood episodes were associated with mental images relating to future goal events. Although depressive episodes were associated with images of future events relating to death and suicide, hypomanic episodes were associated with a range of positive goal-related images, such as success in managing projects (Gregory et al., 2010). However, the reliance upon participant's memories for their own previous recall of memories during past bipolar mood episodes may not be reliable, particularly where individuals have experienced significant mood disturbances and functional impairment.

The current study aimed to conduct a preliminary investigation into goal-related memory recall and goal-striving in individuals vulnerable for hypomania and future bipolar disorders, and specifically investigate whether the vulnerability to hypomania is associated with the recall of more general or specifically detailed autobiographical memories for past goal-related events. Whilst previous research has suggested that individuals vulnerable to hypomania have dysfunctional autobiographical memory recall processes, no research has yet investigated the association between autobiographical memory and goal-pursuit in individuals with hypomanic personality traits. The current study assessed the specificity of autobiographical memories for past goal-related memories, as well as the imageability of future events using sentence completion measures of autobiographical memory, to investigate whether the pursuit of extreme goals is associated with the specificity of future event imagination.

Recently validated sentence-completion measures were used in the current study to assess the specificity of goal-related memory recall and future event-imagination (Raes et al., 2007; Anderson & Dewhurst, 2009). Whilst research has suggested that individuals remember past events in similar levels of detail as they imagine future events in "mental time travel" (D'Argembeau & Van der Linden, 2006), the current study investigated whether the specificity of goal-related memory for past events were associated with similar biases in future event imagination. Sentence completion tasks were used following Raes and colleagues' (2007) arguments that the cued-memory Autobiographical Memory Test (AMT) (Williams & Broadbent, 1986) may not be sufficiently sensitive to detect overgeneral memory within non-clinical samples (Raes et al., 2007). Sentence completion assessments avoid the repetition of instructions requiring participants to recall specific memory events and avoid the use of valenced cue words to prime memory recall. Validated self-report questionnaire measures were also used in the current study to assess hypomania vulnerability, current mood symptoms, goal-sensitivity and goal-pursuit.

It was anticipated that the vulnerability to hypomania would be associated with the setting of extreme goals and increased reward sensitivity, consistent with previous observations (e.g., Johnson & Carver, 2006; Jones et al., 2007). The secondary prediction was that hypomania vulnerability would primarily be associated with the recall of general goal-attainment memories compared to the recall of specific memories. The recall of specific memories for past goal-related events was also anticipated to be associated with less extreme goal setting. Specific memory representations constitute more accurately detailed accounts of previous events compared to general memories which may be greater in their realism to the original event, feature specific plans for the accomplishment of realistic goals, and may represent less overly-positive and self-focused beliefs about goal-

attainment. Generally detailed memories feature less specific sensory-perceptual detail, and may be more propositional and verbal in nature (e.g., "I am more able to achieve high goals than ordinary individuals"), which may reinforce positive self-perceptions and beliefs that more extreme goals can be attained.

4.1.3 Method

Participants

An opportunistic sample of 165 participants was recruited from the University of Manchester (Mean age = 21.79 years, S.D. = 5.05), including 132 females (Mean age = 21.49 years, S.D. = 4.82) and 33 males (Mean age = 23.64, S.D. = 5.68). The sample consisted of 119 undergraduate students, 38 postgraduates, 2 staff, whilst seven participants did not provide a status (Please note that a "continuum" of participants was recruited in order to allow factor analyses to be conducted, these analyses are not reported).

Materials

The Behavioural Inhibition & Activation Scales (BIS/BAS: Carver & White, 1994; Holzwarth & Meyer, 2006)

The BIS/BAS scale is a self-report measure designed to assess the sensitivity of the behavioural activation and inhibition systems which are sensitive to signals of reward and non-reward/punishment respectively, and have in turn been associated with bipolar symptomatology (Carver & White, 1994). The extended 28-item version of the BIS/BAS scales was used in the current study, which features the Dysregulation of BAS subscale (Holzwarth & Meyer, 2006), in addition to subscales measuring behavioural inhibition (BIS), and three subscales measuring different forms of behavioural activation (Drive, Reward Responsiveness, and Fun Seeking). Elevated BAS sensitivity, as indicated by higher scores on the BAS measures, have been associated with more intense manic symptomatology (Meyer et al., 1999), whilst low BAS and greater BIS sensitivities have been associated with depressive symptoms (Meyer et al., 2007). Recent research has also suggested that the dysregulation of the BAS system is associated with bipolar symptoms in individuals diagnosed with bipolar disorder and those vulnerable to bipolar disorders (Urošević et al., 2008). The BIS/BAS scales have demonstrated good internal consistencies (α = .71-.79, Jones & Day, 2008) as has the dysregulation of BAS subscale (α = .84, Holzwarth & Meyer, 2006) (See Table 3.1.2 for Cronbach's α statistics for the current study).

The Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986)

The HPS is a 48-item true-false self-report questionnaire measure of the endorsement of hypomanic personality traits associated with vulnerability to hypomania and future bipolar disorders (Eckblad & Chapman, 1986). Each item refers to a trait associated with the experience of hypomanic mood states, with participants being required rate whether each trait is true of their own personality (e.g. "I am considered to be kind of a "hyper" person", "I seem to be a person whose mood goes up and down easily", "I have often felt happy and irritable at the same time"). Individuals who report high HPS scores are more likely to be currently experiencing bipolar mood symptoms, are more likely to have experienced previous hypomanic and manic episodes (Meyer & Hautzinger, 2003), and other mental health related symptoms, such as psychosis, at longer-term follow-up than low HPS scorers (Kwapil et al., 2000). The HPS has previously demonstrated good test-retest reliability ($r = .81$) (Eckblad & Chapman, 1986), and high levels of internal consistency ($\alpha = .87$-$.89$) (Eckblad & Chapman, 1986; Dempsey et al., 2011).

The Internal States Scale (ISS: Bauer et al., 1991)

The ISS is a 16 item measure of current bipolar mood symptoms. Participants are required to rate the extent to which they have experienced fifteen symptoms over the past twenty-four hours on a series of 100mm visual analogue scale (from "0 Not at all/Rarely" to 100 "Very much so/Most of the time"). The ISS consists of four subscales measuring hypo/manic symptoms (ISS-Activation, example item: "My thoughts are going fast"), depressive symptoms (ISS-Depression, example item: "It seems like nothing will ever work out for me"), interpersonal conflict (ISS-Perceived Conflict, example item: "I feel argumentative"), and well-being (ISS-Well Being, example item: "I actually feel great inside"). High scores on the ISS subscales are indicative of the experience of more intense bipolar symptoms, and self-reported ISS scores have been associated with clinician-made ratings of bipolar symptoms (Bauer et al., 1991). The ISS subscales have demonstrated good reliability (ISS-WB $\alpha = .79$-$.82$, ISS-A $\alpha = .73$-$.75$, ISS-D $\alpha = .73$-$.81$, ISS-PC $\alpha = .77$-$.80$; Dempsey et al., 2011; Jones & Day, 2008).

The Willingly Approached Set of Statistically Unlikely Pursuits scale (WASSUP: Johnson & Carver, 2006)

The WASSUP is a 30-item self-report measure of the pursuit of personal goals of an extreme and highly unlikely nature (Johnson & Carver, 2006). The WASSUP has seven factor-analytically derived subscales relating to different forms of extreme goal setting, including goals relating to Popular Fame (e.g., "you will be famous", "you will appear

regularly on TV"), Wealth (e.g., "you will have 20 million pounds or more"), World Impact (e.g., "you will create world peace"), Creative Accomplishments (e.g., "you will create a great work of art, music, or poetry"), Political Influence (e.g., "you will be important in political circles"), having Idealised Relationships with Friends (e.g., "whenever you have a problem, your friends will drop what they are doing to support you"), and Idealised Relationships with Family (e.g., "you will have the closest family relationships imaginable") (Johnson & Carver, 2006). Participants are required to rate the likelihood of whether they will pursue such high goals, with higher WASSUP scores reflecting the more extreme endorsement of these goals (from 1 – "No chance I will set this goal for myself" to 5 "Definitely will set this goal for myself"). The WASSUP was originally developed for use with North American participants and the wording of a subset of items required some modification for use with British English participants (i.e., references to dollars changed to pounds, becoming president of your country changed to leader).

Hypomanic personality traits have been associated with the pursuit of goals relating to popular fame, political influence, and wealth (Fulford et al., 2008; Carver & Johnson, 2009; Gruber & Johnson, 2009). Students with lifetime histories of bipolar disorder, as assessed by clinical interviewing, also report higher scores on the popular fame and wealth subscales (Johnson, Eisner & Carver, 2009). The WASSUP scales have demonstrate good internal consistencies (α = .72-.88, Fulford et al., 2008; Carver & Johnson, 2009).

Sentence Completion for Events from the Past Test – Win/Loss Version (SCEPT-WL: Novel Measure)

The original SCEPT sentence completion assessment of autobiographical memory specificity (Raes et al., 2007) was adapted for use in the current study to assess goal-related memory specificity. The SCEPT-WL consists of a series of eight sentence stems based upon those devised by Raes and colleagues (2007) (e.g., "Last year I...") which have been adapted to include references to goal-related memories (i.e., a "win" or a "loss", e.g. "The time I felt particularly successful...", "When I failed...") (see Appendix).

Sentence completions are coded for their level of memory specificity, with completions coded as: *specific*, referring to an event that lasted less than a day and that occurred at a particular time and a place (e.g., "getting my exam results"); *extended*, referring to a specific event with a duration greater than a day (e.g., "revising for my exams this week"); *categoric*, referring to a category of events or repeating events (e.g., "going shopping"); *semantic associate*, referring to generic information about the self (e.g., "I'm good at driving"); or *omission* for missed or incomplete sentences. Tendencies to

make over-general responses on the SCEPT have been associated with self-reported rumination scores (Raes et al., 2007), and with the experimental induction of abstract, evaluative ruminative-like cognitive styles (Raes et al., 2008b).

Sentence Completion for Events in the Future Test (SCEFT: Anderson & Dewhurst, 2009)

The SCEFT is an adapted version of the SCEPT designed to assess the specificity of future event imagination (Anderson & Dewhurst, 2009). Participants are required to complete 11 sentence stems with reference to a future event (e.g., ‘‘When I look forward to…’’), with responses on the SCEFT coded in the same manner as for the SCEPT. Previous research using the SCEFT has indicated that non-clinical student participants appear to be less specific in their imagination of future events compared to their recall of past events (Anderson & Dewhurst, 2009).

Procedure

Participants were directed to the study’s website via advertisements placed on the University of Manchester’s research volunteering intranet site and on the School of Psychological Science’s electronic experimental participation system. The first page of the website presented electronic versions of the study’s information sheet and consent form. Following informed consent, participants read instructions for the sentence completion tasks. Participants completed the sentence completion tasks prior to the questionnaire measures, the latter of which were presented in a randomised order on the study’s website. The study received ethical approval from the School of Psychological Sciences Research Ethics Committee at the University of Manchester.

Data Analysis

Responses on the sentence completion tasks were coded for their specificity by the first author (see Table 4.1.1 for examples), with a random sample of 25% of the sentence completions analysed by an independent coder who received training in the use of the coding scheme. High levels of agreement were noted between raters for the memory specificity codings (Cohen’s $\kappa = .87$). Responses on the sentence completion measures and scores on the self-report questionnaire measures were assessed for normality, with no substantial deviations from normality observed. Bivariate correlational analyses were conducted to investigate the associations between the goal-related memory and future event imagination tasks, with the hypomania vulnerability and goal-pursuit questionnaires (BIS/BAS and WASSUP scales). An exploratory hierarchical regression analysis was conducted to assess which of these variables contributed the most variance to the self-

reported vulnerability to hypomania, as measured by the HPS, whilst controlling for current hypo/manic and depressive symptoms. The survey software was programmed to prompt participants to complete any missing sentence completion or questionnaire items before responses were saved, therefore no data was missing for the 165 participants.

Table 4.1.1. Example responses on the sentence completion tasks.

	SCEPT		SCEFT
	Win	Loss	
Specific	The time I felt particularly successful… was during my postgraduate degree ceremony	When I failed… my driving test	Next week I… will play a tennis game with my brother
Extended	My greatest achievement was… getting to Everest base camp and travelling around India for three months	I was let down when… my closest friend got in to a new relationship and I never heard from her very often	In the future… I plan to go travelling around Asia
Categoric	I had achieved… many dance awards when I was dancing	When I failed… any of the tests in secondary school I felt disappointed	Next year… I would hope to visit Germany a number of times
Semantic Associate	The time I felt particularly successful... encourages me to work hard to get that feeling again	It was disappointing when... I don't do as well as I think I should	In the future I can clearly see how . . . unhappy I might be unless I overcome some of my many hang-ups

Note: SCEPT = Sentence Completion for Events from the Past Test (SCEPT), SCEFT = Sentence Completion for Events in the Future Test.

4.1.4 Results

Means and standard deviations for scores on the self-report measures of hypomania vulnerability (HPS), current bipolar mood symptoms (ISS), reward sensitivity (BIS/BAS, DYS), and extreme goal-striving (WASSUP) are presented in Table 4.1.2.

Table 4.1.2 Means, standard deviations and internal reliability statistics (Cronbach alphas) for scores on the symptom, vulnerability and goal measures

	Mean	*S.D.*	Ranges	α
Symptom & Vulnerability Measures				
Hypomanic Personality Scale (HPS)	17.99	8.67	1-43	.88
Internal States Scale (ISS)				
ISS Activation	112.78	93.54	0-440	.74
ISS Depression	47.78	52.193	0-200	.67
ISS Perceived Conflict	122.95	100.73	0-500	.78
ISS Well-Being	137.87	70.76	0-300	.76
Goal Measures				
Behavioural Activation (BAS) & Inhibition Scales (BIS)				
BAS Drive	10.87	2.54	4-16	.81
BAS Fun Seeking	11.90	2.10	6-16	.59
BAS Reward Responsivity	17.16	2.04	10-20	.62
Behavioural Inhibition Scale	22.15	4.09	10-28	.74
Dysregulation of BAS	11.95	2.65	5-16	.80
Willingly Approached Set of Statistically Unlikely Pursuits Scale (WASSUP)				
WASSUP Total	64.30	16.28	32-123	.84
WASSUP Popular Fame	10.48	4.27	7-29	.83
WASSUP Family Relationships	16.14	5.15	5-25	.80
WASSUP World Impact	3.30	1.90	2-10	.83
WASSUP Political Influence	2.73	1.45	2-10	.76
WASSUP Friend Relationships	12.21	4.27	5-23	.73
WASSUP Wealth	6.83	3.13	4-17	.70
WASSUP Creative Accomplishments	12.61	3.64	5-25	.59

Mean Hypomanic Personality Scale scores in the current study were equivalent to those reported in previous studies sampling British students (Jones et al., 2007; Johnson & Jones, 2009; Dodd et al., 2010; Dempsey et al., 2011), as were scores on the behavioural activation and inhibition measures (Jones & Day, 2008; Dodd et al., 2010), and the Internal States Scale subscales (Mansell et al., 2008; Dodd et al., 2010; Dempsey et al., 2011), although mean scores on the Activation subscale were slightly lower than previously reported (e.g., Jones & Day, 2008), but were comparable with mean Activation scores reported earlier in this thesis (Dempsey et al., 2011; Dempsey et al., Study Two) (Please note that previous studies do not report mean WASSUP subscale scores).

Correlations

Pearson's correlations were conducted to investigate the associations between hypomania vulnerability (HPS), goal-planning (WASSUP) with memory specificity for past goal-related events (SCEPT-WL) and the imageability of future events (SCEFT) (See Table 4.1.3). In relation to our first prediction, that heightened hypomania vulnerability would be positively associated with increased reward sensitivity and extreme goal-planning, scores on the HPS were positively associated with the WASSUP scales and the BAS subscales, whilst HPS scores were negatively associated with BIS, consistent with the first prediction. In terms of the second prediction, that hypomania vulnerability would be associated with the recall of generally detailed goal-related memories, the recall of specific events relating to past goal-successes (SCEPT-Win) was negatively associated with HPS scores and with extrinsic extreme goals measured by the WASSUP (World Impact, Political Influence and Creative Accomplishments). However, extreme goals relating to Family Relationships were positively associated with specific memories for past goal accomplishments.

Tendencies to generate semantic associations, relating to generalised information about the self for past goal-related successes, were positively associated with HPS scores, the extrinsic goal-striving subscales of the WASSUP (PF, WI, PI and CA), BAS Drive, but negatively with BIS. BAS Fun Seeking and Reward Responsivity were both positively associated with the generation of categoric memories for past goal-related successes. HPS scores were also positively associated with tendencies to image future repeating events on the SCEFT task. Responses on the SCEPT-Loss, relating to memories for past goal-related failures, were generally uncorrelated with HPS scores and the goal-measures, except specific goal-failure memories which were associated with WASSUP Family Relationships (r = .141, p < .05) and Creative Accomplishment (r = -.188, p < .01). However, scores on the BAS reward responsivity measure were positively associated with extended memories for memories relating to past goal failures and positively with extended future events.

Table 4.1.3 Means and Standard Deviations for responses on the sentence completion measures for the goal related memory (SCEPT) and future event imagination tasks (SCEFT), and correlations between the goal-striving questionnaire measures (WASSUP, BAS, DYS, BIS) with hypomania vulnerability (HPS), past goal-related memory recall (SCEPT-WL) and future event imagination (SCEFT).

	Mean (S.D.)	HPS	WASSUP							BAS			DYS	BIS
			PF	FaR	WI	PI	FrR	W	CA	D	FS	RR		
HPS			**.413**[c]	**.203**[b]	**.314**[c]	**.324**[c]	**.234**[b]	**.348**[c]	**.481**[c]	**.459**[c]	**.389**[c]	**.272**[c]	**.194**[b]	**-.168**[a]
SCEPT Win														
Specific	1.82 (1.10)	**-.156**[a]	-.096	**.183**[b]	**-.175**[a]	**-.190**[b]	.078	-.060	**-.148**[a]	-.123	-.102	-.036	.049	.123
Extended	.81 (.81)	-.101	.054	-.121	-.085	-.091	**-.177**[a]	-.006	-.028	-.045	-.055	-.077	-.067	.045
Categoric	.36 (.62)	.033	-.084	.020	.006	-.123	.103	-.047	.026	.112	**.142**[a]	**.185**[b]	-.122	.042
Semantic Associate	.52 (.71)	**.322**[c]	**.159**[a]	-.057	**.277**[c]	**.373**[c]	-.047	.128	**.185**[b]	**.162**[a]	.077	.054	.070	**-.150**[a]
SCEPT Loss														
Specific	2.22 (1.09)	-.114	-.121	**.141**[a]	-.088	-.016	.040	-.048	**-.188**[b]	-.049	-.107	-.030	.019	.058
Extended	.66 (.79)	.024	.126	.007	.031	-.016	-.031	.105	.110	.018	.045	**.167**[a]	-.003	-.109
Categoric	.37 (.60)	-.051	-.078	-.104	-.076	-.062	-.033	-.061	.062	-.005	.035	-.010	-.102	.125
Semantic Associate	.57 (.68)	.093	.118	-.070	.066	.019	.050	-.001	.076	.032	.067	-.067	-.003	.007
SCEFT														
Specific	1.74 (1.18)	-.014	-.110	.047	-.085	-.041	.026	.006	.001	-.090	-.048	-.020	-.001	.104
Extended	3.90 (1.79)	-.082	.074	**.170**[a]	-.038	-.048	.065	.120	.105	.056	-.035	**.168**[a]	-.108	.042
Categoric	.65 (.84)	**.132**[a]	.047	-.004	-.027	-.072	.062	.022	.047	-.018	.007	.026	-.118	.001
Semantic Associate	4.22 (2.06)	-.003	-.040	-.119	.106	.050	-.031	-.126	-.077	.046	.073	-.035	.117	-.029

NB: Willingly Approached Set of Statistically Unlikely Pursuits (WASSUP): PF = Popular Fame, FaR = Family Life, WI = World Impact, PI = Political Influence, FrR = Friend Relationships, W = Wealth, CA = Creative Accomplishments. BIS = Behavioural Inhibition, Behavioural Activation System (BAS) Subscales: D = Drive, FS = Fun Seeking, RR = Reward Responsivity, DYS = BAS Dysregulation, HPS = Hypomanic Personality Scale. Significant correlations in bold, [a] $p < .05$, [b] $p < .01$, [c] $p < .001$

Regression Analysis

An exploratory hierarchical multiple regression analysis was conducted to investigate which combination of the goal-striving, reward sensitivity, extreme goal-planning, and goal-related memory measures explained the largest proportion of variance in HPS scores.

HPS scores were entered as the dependent variable, with scores on the ISS Activation and ISS Depression measures entered into the first block of the regression to account for the effect of current subclinical bipolar mood symptoms upon memory recall and scores on the goal-related questionnaires. The goal-related memory questionnaire measures which correlated with HPS scores were entered into the second block using forward entry, to allow the assessment of the additive contributions of the goal measure subscales to be examined (including the WASSUP and BIS/BAS Scales), with the memory recall and future event measures entered into the third block (SCEPT-Win specific memories and semantic associates, and SCEFT categoric memories) (see Table 4.1.4).

Table 4.1.4 Results of the regression analysis investigating the proportion of variance explained in HPS scores according to extreme goal-striving, reward sensitivity, goal-related memory recall and future event imagination.

	R^2	*B*	*SE B*	*β*	*t*
Step 1	.218***				
ISS Activation		.04	.01	.47	6.45***
ISS Depression		.00	.01	.01	.10
Step 2	.314***				
ISS Activation		.02	.01	.21	3.26***
ISS Depression		.01	.01	.05	.85
WASSUP Creative Accomplishments		.66	.14	.28	4.76***
WASSUP Political Influence		1.30	.34	.22	3.78***
BAS Drive		.90	.20	.27	4.49***
BAS Fun Seeking		1.09	.24	.26	4.60***
Step 3	.032**				
ISS Activation		.02	.01	.23	3.68**
ISS Depression		.01	.01	.05	.90
WASSUP Creative Accomplishments		.60	.14	.25	4.41***
WASSUP Political Influence		1.06	.36	.18	2.95**
BAS Drive		.85	.20	.25	4.31***
BAS Fun Seeking		1.06	.23	.26	4.59***
SCEPT Win Semantic Associate		1.98	.80	.16	2.47*
SCEPT Win Specific Memories		.52	.49	.06	1.06
SCEFT Categoric		1.41	.55	.14	2.56*

Note: *** $p < .001$, ** $p < .01$,* $p < .05$. BAS = Behavioural Activation, ISS = Internal States Scale, WASSUP = Willingly Approached Set of Statistically Unlikely Pursuits Scale, SCEPT = Sentence Completion for Events in the Past Test, SCEFT = Sentence Completion for Events in the Future Test.

The regression equation was significant overall ($F_{(8, 156)} = 22.539$, $p < .001$) and explained 56.7% of variance in HPS scores. The regression met criteria for independent errors (Durbin-Watson = 2.065), and no substantial multicolinearity existed between

predictor variables (VIFs < 1.2, Tolerances > .80). When controlling for current hypo/manic and depressive symptoms in the first block (ISS Activation and Depression subscales), tendencies to plan extreme goals relating to creative accomplishments and political influence (WASSUP scales), the heightened sensitivity to rewards and drive in the pursuit of goals (BAS Drive and Reward Responsivity), and tendencies to associate past goal success to semantic self-information (SCEPT Win) and imagine future repeating events (SCEFT) were independent predictors of HPS scores.

4.1.5 Discussion

The current study investigated the associations between goal-striving and reward responsivity in relation to the vulnerability to hypomania and bipolar disorder. Whilst previous research has suggested that individuals with bipolar disorder and those at-risk may possess dysfunctional recall strategies for autobiographical memories (e.g., Scott et al., 2000; Mansell & Lam, 2004; Delduca et al., 2010; Dempsey et al., *submitted-c, e, f*), no study has investigated the way in which goal-related memory recall may influence vulnerability to hypomania in relation to goal-pursuit. Although one previous study had suggested that the experience of hypomanic episodes by individuals diagnosed with bipolar disorder appeared to be associated with the imagination of vivid images relating to future enjoyable events (Gregory et al., 2010), it was unclear how goal-related memory recall processes may be associated with hypomania vulnerability in at-risk individuals.

The results of the current study supported our first prediction that the vulnerability to hypomania would be associated with the setting of extreme goals and increased reward sensitivity, with HPS scores positively associated with all of the extreme goal subscales of the WASSUP scale and with increased reward responsivity as measured by the BAS subscales, consistent with previous observations (e.g., Johnson & Carver, 2006; Jones et al., 2007). In relation to our second prediction, that hypomania vulnerability would be associated with the recall of overgeneral memories for past goal-related events, HPS scores were positively associated with tendencies to generate memories relating to generic semantic information about the self during past goal-related successes. The greater vulnerability to hypomania was also associated with the generation of fewer specific memories relating to past goal-related successes, consistent with our predictions.

In terms of the associations between goal-related memory and extreme goal-planning, it was noted that tendencies to plan extreme goals relating to extrinsic and public success were correlated with hypomanic personality traits and with tendencies to produce semantic associates for past successes. Semantic associates refer to a class of generic memory representations which incorporate general information about the self without

reference to a specific event or to an extended period of time. In the current study, semantic associates for past successes included statements such as: “The time when I felt particularly successful... everything seemed easy”, “I had achieved… the ability to overcome any problems thrown at me”, “I had achieved… academic success and development as a person”. Rather than being associated with the recall of specific successes (e.g., winning a competition), individuals at a higher vulnerability to hypomania appear to focus more upon generalised information about the self. Regression analysis also indicated that the vulnerability to hypomania was associated with the pursuit of extreme goals relating to creative accomplishments and political fame, behavioural activation in relation to fun seeking and drive to accomplish goals, and with the recall of generalised information in relation to past goal-related successes and the imagination of future categoric, or repeating, events, independent of current bipolar symptoms.

That hypomanic personality traits are associated with the setting of extreme goals which may attract public attention and rewards, such as achieving celebrity fame, is consistent with previous research (Gruber & Johnson, 2009). The setting of extreme goals was also associated with hypomania vulnerability when controlling for current bipolar mood symptoms, again consistent with previous observations (Johnson & Carver, 2006). These results lend support to the hypothesis that the extreme goal-striving associated with hypomania vulnerability is not just due to the current experience of hypo/manic or depressive symptoms, but does suggest that other psychological factors may confer vulnerability, namely heightened reward sensitivity and goal-related memory processes. The current study is also consistent with previous observations that individuals vulnerable to hypomania and individuals diagnosed with bipolar disorders have tendencies to recall their autobiographical memories in general levels of detail (Scott et al., 2000; Mansell & Lam, 2004; Dempsey et al., *submitted-c*). However, the current study suggests that at-risk individuals tend to focus upon general semantic information about the self for past goal-achievements rather than recall specific memories for past successes.

One mechanism which may explain the recall of goal-related successes in general detail is positive rumination, which encapsulates three different forms of cognitive responses to positive affect. One subtype of positive rumination is self-focused rumination, relating to repetitive thought processes focused upon the self and goal-accomplishment (Feldman et al., 2008). Higher scores on the self-focused subscale of the Responses to Positive Affect scale developed by Feldman and colleagues (2008) have been associated with elevated self-esteem, hypomania vulnerability and manic symptoms within non-clinical samples (Feldman et al., 2008). The engagement in self-focused positive rumination may assist in the excessive focus upon generalised self-focused goal-related

successes relating to one's capabilities in achieving goals, rather than the recall of specific successful events which may not portray the self in a self-positive manner. Whilst the current study cannot account for the influence of positive ruminative thought processes on goal-related memory recall, further research is required to evaluate whether positive rumination is associated with the embellishment of goal-related events in memory and whether such events have been subjected to self-appraisal biases, contributing to more extreme goal-pursuit in vulnerable individuals.

There are some additional limitations to consider. Due to the cross-sectional nature of the study it is unclear as whether striving for extreme goals and goal-related memory processes are associated with hypomania vulnerability over the long term. It also unclear whether vulnerable individuals continue to endorse these extreme goals and what the impact of long term extreme goal-pursuit may have on an individual's well-being. It may be possible that the association between extreme goal setting and hypomania could be due to a third factor, such as self-focused positive rumination which may be a stronger prospective predictor of hypomania vulnerability than dysfunctional goal-related memory. Due the exploratory nature of the correlational analyses conducted in the current study, there is a risk of Type 1 errors through multiple comparisons. The current sample was also largely female and there was no assessment of the participants' past clinical histories. It is possible that some participants may have previously experienced clinically significant mood symptoms, and may have scored more highly on the goal sensitivity measures, for example, due to their past experiences of bipolar spectrum symptoms. Whilst the current study focused upon individuals with personality traits associated with a predisposition for hypomania, whether similar goal-related memory processes are prevalent in individuals diagnosed with bipolar disorder requires investigation.

4.1.6 Conclusions

In sum, whilst previous research has suggested that individuals on the bipolar disorder spectrum possess dysfunctional "overgeneral" autobiographical memory recall strategies, the current study suggests that at-risk individuals have tendencies to focus upon generalised self-knowledge rather than individual occasions of success when thinking about past goal-related memories. The recall of semantic information for past goal-related successes was also independent of bipolar mood symptoms, suggesting that the recall of self-information for past goal successes is not just due to heightened activated states. The results of the current study are in line with the self-focused positive rumination literature which suggests that thought processes focused upon the self and the accomplishment of goals are associated with hypomania vulnerability and extreme goal-pursuit.

Section 5

Studies Seven & Eight

The Specificity of Autobiographical Memory Recall Across the Bipolar Affective Disorder Spectrum

Robert C. Dempsey

Patricia A. Gooding

&

Steven H. Jones

5.0 Abstract

The overgeneral recall of autobiographical memories is prevalent in major depressive disorder and appears to be a cognitive vulnerability factor for depression in non-clinical samples. Previous research has suggested that individuals diagnosed with bipolar disorder, and those at-risk for bipolar illnesses, can experience similar difficulties in the recall of specific autobiographical memories. Although there is a developing body of research investigating memory specificity in bipolar samples, many of these studies are associated with methodological issues, particularly in the use of non-standardised memory assessments. The following section details two studies which investigated autobiographical memory specificity in individuals currently in remission from bipolar disorder and a sample of healthy controls, as well as in individuals considered to be at risk for experiencing future bipolar disorders.

Study Seven investigated the specificity of autobiographical memory recall in individuals considered to be at a low, moderate, or a high risk for hypomania using Williams & Broadbent's (1986) Autobiographical Memory Test. In contrast to previous research, Study Seven found that individuals at a high-risk for hypomania reported greater overgeneral autobiographical memory across positive and negative memories compared to low and moderate-risk participants, but there were no significant between group differences in response latencies for the time taken to recall memories. Study Eight investigated autobiographical memory specificity in a sample of eighteen individuals currently in remission from bipolar disorder and a comparison group of eighteen age and gender-matched non-bipolar control participants. Bipolar participants demonstrated greater overgeneral autobiographical memory than the control group, with bipolar participants also recalling more negative general memories than the control group. Whilst the bipolar group were more overgeneral in their memory recall, participants diagnosed with bipolar disorder were also significantly faster to recall specific negative autobiographical memories than controls.

The results of Studies Seven and Eight support a continuum view of increased overgenerality across vulnerable individuals and individuals diagnosed with bipolar disorder. Study Eight suggests that whilst bipolar disorder is associated with a general tendency to be overgeneral during autobiographical memory recall, individuals with bipolar disorder have ready access to specific negative memories via more direct forms of memory recall. The increased availability of self-negative memories is consistent with previous research demonstrating that bipolar individuals have particular sensitivities to self-negative information even during remission. The implications of these results are discussed.

Section 5.1

Introduction: Autobiographical Memory Specificity Across the Bipolar Disorder Spectrum

5.1.1 General Introduction

Similar cognitive factors are thought to underlie the vulnerability to major depressive disorder and bipolar disorder. Research has suggested that the engagement in ruminative thought patterns (Nolen-Hoeksema, 1991), tendencies to make dysfunctional self-appraisals (Jones et al., 2006; Mansell et al., 2007; Jones & Day, 2008), and the overgeneral recall of autobiographical memories are associated with the vulnerability to mood disorders (Gibbs & Rude, 2004; Delduca et al., 2010).

Autobiographical memory is a form of hierarchically structured episodic memory, where memory representations are differentiated according to the specificity of the detail described for the original memory event (Conway & Pleydell-Pearce, 2000). Lifetime periods are the broadest level of representation, which encapsulate memories for periods of time lasting years, organised by thematic content (e.g., "relationships"). General Events are a more specific intermediate level of representation which encompass memories for events with shorter durations than lifetime periods (e.g., "when I went on holiday to…"), and can also feature repeating occurrences of the same type of event (e.g., "going shopping"). Memory representations at the General Events level also form clusters of generally-detailed events, usually according to thematic content, such as self-propositional information or goal-attainment knowledge. The most detailed level of memory representation, Event Specific Knowledge (ESK), refers to the memory for specific events which are unique events with durations of less than a day (e.g., "during my job interview") (Conway and Pleydell-Pearce, 2000). Representations at the ESK level are associated with sensory-perceptual information relating to the original event (e.g., mental imagery), the recall of which allows for the correct identification and detailed recall of that specific event (Johnson et al., 1988; Conway & Pleydell-Pearce, 2000).

Memory recall within the autobiographical memory system can occur in one of two ways, through generative or direct recall. Generative recall refers to a staged, top-down recall process whereby a specific memory representation is identified through the activation of representations located at the Lifetime Periods level, through to General Events, and the activation of a specific memory in ESK. Direct recall refers to the immediate activation of a specific memory through the presentation of a cue that activates the ESK unique to that event.

A variety of studies have indicated that a number of mental health conditions are associated with difficulties in the full and specific recall of autobiographical memories, including major depressive disorder (Williams & Scott, 1988), suicidality (Williams & Broadbent, 1986; Williams & Dritschel, 1988), and bipolar disorder (Scott et al., 2000; Mansell & Lam, 2004). Individuals diagnosed with these conditions tend to generate general descriptions of memories, known as the "overgeneral" memory bias, where the recall process becomes stuck at the intermediate general memory representations of the memory system (Conway & Pleydell-Pearce, 2000). The overgeneral recall of autobiographical memories has been associated with poorer illness outcomes in depressed individuals (Peeters et al., 2002; Raes et al., 2006; Sumner et al., 2010), including greater probabilities of remaining clinically depressed at a four week follow-up (Hermans et al., 2008), and with poorer responses to antidepressant medication (Brittlebank et al., 1993) and electro-convulsive therapy (Raes et al., 2008a). The inability to recall specific autobiographical memories would appear to have an important impact upon an individual's psychological well-being.

Although few studies have been conducted in bipolar samples, research has suggested that individuals in remission from bipolar disorder and depressed individuals report low specificities of autobiographical memory (Scott et al., 2000; Mowlds et al., 2010). However, one study has suggested that remitted bipolar patients are more general in their recall of negative memories compared to remitted unipolar patients (Mansell & Lam, 2004). Somewhat mixed findings have been reported in samples of currently unwell bipolar individuals, with similar patterns of memory specificity reported between currently manic and depressed bipolar patients and currently depressed unipolar patients (Tzemou and Birchwood, 2007). However, Van der Gucht and colleagues (2009) observed that currently hypomanic and manic bipolar patients recalled fewer specific negative memories than non-bipolar participants. Although Tzemou and Birchwood (2007) and Van der Gucht and colleagues (2009) reported little difference in memory specificity between currently manic and depressed bipolar patients, Gregory and colleagues have suggested that different bipolar mood episodes are associated with qualitatively different memory recall processes (Gregory et al., 2010). Using a memory-focused interview, currently euthymic bipolar individuals reported that past euthymic states were associated with intrusive memories and mental imagery of the past, which were rated as less distressing compared to intrusions during past depressive episodes. In contrast, previous hypomanic episodes were associated with pleasant and vivid images of imagined future events, whilst previous depressions were associated with intrusive memories of past negative events and with vivid and distressing images of future negative events (Gregory et al., 2010).

Few studies have investigated the specificity of autobiographical memory in individuals considered to be at-risk for future bipolar disorder. Delduca and colleagues (2010) compared performance on the Autobiographical Memory Test (AMT: Williams & Broadbent, 1986) between groups of students reporting high or low scores on the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986), an established self-report measure of the risk for future hypomania and bipolar disorder. Basing their hypotheses on the Interacting Cognitive Subsystems (ICS) framework (Barnard & Teasdale, 1991), Delduca and colleagues predicted that high-risk individuals would recall more specific autobiographical memories than low-risk participants, assuming that the high-risk participants are more likely to be engaged in experiential modes of processing associated with specific memory recall and hypomanic states. Delduca and colleagues (2010) reported that the high-risk group recalled more specific memories in response to negative cue words than the low-risk group, with no group differences in the recall specificities of positive memories. The high-risk participants were also faster to recall memories across cue valences and for negative memories.

One interpretation of these findings is that the behavioural risk for hypomania is associated with an increased availability of self-negative information in autobiographical memories, possibly reflecting a latent negative self-concept or self-schema. The availability of negative information about the self may prompt potentially dysfunctional emotion regulation strategies that attempt to reduce negative moods and increase positive affect (Thomas & Bentall, 2002), as has been suggested by the depression avoidance and response styles literatures. However, there is a concern regarding the cue words used in Delduca and colleagues' (2010) study, where the negative cue words may have prompted the direct recall of specific negative memories (e.g., "angry", "lonely", "sorry") compared to the use of less positive "pleasant" cues which may not have activated specific representations of positive memories (e.g., "safe", "surprised", "interested"). Although, Delduca and colleagues (2010) acknowledge this, it remains unclear how individuals at-risk for future bipolar disorder perform on the Autobiographical Memory Test.

A recent study by Dempsey and colleagues (*submitted-c*) used a sentence completion measure of autobiographical memory specificity, and observed that individuals at a high risk for hypomania recalled more general negative autobiographical memories than individuals at a low-risk for hypomania, in contrast to Delduca et al's findings. A second study by Dempsey et al. (*submitted-d*) suggested that individuals at a higher risk for hypomania have more overgeneral memory biases for past goal-related events, particularly in relation to semantic information about the self in the pursuit of goals, which was associated with heightened sensitivity to rewards and more extreme goal-pursuit.

Although there is a growing body of research investigating autobiographical memory specificity in bipolar disorder, many of these studies contain methodological flaws. Whilst some studies conducted within bipolar samples have used the standardised AMT (Scott et al., 2000; Tzemou & Birchwood, 2007; Van der Gucht et al., 2009), subsequent studies have used interview-based assessments of memory specificity (Gregory et al., 2010) or have substantially deviated from the standardised AMT procedure (Mansell & Lam, 2004). For example, Mansell and Lam (2004) presented their participants with two lists of four positive and four negative cue words, and asked participants to recall a memory for one word of their choice from each list. Participants in Mansell & Lam's study may have preferentially recalled particular memories as an affect regulatory strategy, by avoiding cue words relating to unpleasant memories. In sum, there is a dearth of research investigating autobiographical memory specificity using the standardised AMT procedure within samples of individuals diagnosed with bipolar disorder and those at-risk for future bipolar disorders. At present only one study has investigated the specificity of autobiographical memory recall using the standardised AMT procedure in a sample of individuals in remission from bipolar disorder (Scott et al., 2000).

5.1.2 The Present Research

This section details two studies which investigated the specificity of autobiographical memory recall using the Autobiographical Memory Test (Williams & Broadbent, 1986), in an at-risk sample for hypomania, and within a sample of individuals currently in remission from bipolar disorder. Study Seven investigated the specificity of autobiographical memory using the AMT in groups of individuals at a low, moderate or high risk for hypomania, and aimed to investigate whether high-risk individuals would report similar biases in memory specificity as suggested by Delduca and colleagues (2010), or report similar levels of overgenerality as suggested by previous studies in bipolar samples (e.g., Scott et al., 2000; Mansell & Lam, 2004). Study Eight replicated the AMT procedure used in Study Seven within a sample of individuals diagnosed with bipolar disorder in remission from symptoms, and an age and gender matched control group. Study Eight attempted to address methodological issues identified in previous studies by using the standardised AMT format. A sample of individuals currently in remission from bipolar disorder were recruited to avoid potential confounds with the experience of extreme mood states.

Section 5.2

Study Seven

The Specificity of Autobiographical Memory in Individuals at Risk for Hypomania

5.2.1 Introduction

The primary aim of Study Seven was to investigate the specificity of autobiographical memory recall in a sample of individuals considered to be at a behavioural risk for hypomania and future bipolar disorders. In contrast to the previous study conducted within groups of individuals at a low or a high degree of risk for bipolar disorder (Delduca et al., 2010), the current study investigated memory specificity in individuals considered to be at a low, moderate, or a high degree of risk as indexed by scores on the Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986). Previous studies have compared moderate versus high-risk groups in relation to behavioural activation sensitivities and hypomania vulnerability (e.g., Alloy et al, 2006), whilst other studies have sampled groups of students at a low, moderate and high risk or "caseness" for bipolar disorder based upon HPS scores when investigating between-group differences in mood fluctuations (Hofmann & Meyer, 2006) and bipolar symptom experiences (Udachina & Mansell, 2007). The current study adopted a similar approach and recruited groups of participants at a low, moderate and a high vulnerability for hypomania.

The comparison between individuals at a moderate and at a high level of risk allows for a more stringent investigation of whether autobiographical memory specificity is associated with an elevated risk for bipolar disorder when compared to individuals who posses moderate degrees of risk. Comparing between groups of individuals at a high or low risk may only assess the presence versus a complete absence of bipolar risk factors, whilst the majority of individuals typically report scores of around 15-17 on the Hypomanic Personality Scale (e.g., Dempsey et al., *in press*). Although the personality traits associated with hypomania can be associated with negative outcomes, including the vulnerability to bipolar disorder and other psychiatric conditions (Kwapil et al., 2000), possessing some hypomanic characteristics can be advantageous in moderation, such as increased drive, energy, and creativity (Meyer & Hofmann, 2005; Furnham, Batey, Anand & Manfield, 2008). Individuals who report low scores on the HPS, who therefore posses few of the personality traits associated with hypomania, may themselves reflect an "abnormal" group of individuals.

Although the majority of the research into autobiographical memory has used the standardised Autobiographical Memory Task (AMT) devised by Williams & Broadbent (1986), including the previous investigation in an at-risk sample for bipolar disorder (Delduca et al., 2010), there has been some concern that the AMT procedure may not be sufficiently sensitive to detect overgeneral memory recall within non-clinical samples (Raes et al., 2007). Despite these reservations regarding the AMT and it's suitability for use with non-clinical samples, Study Seven utilised the standardised AMT procedure within an at-risk sample in order to allow comparisons with the previous study by Delduca and colleagues (2010). The AMT was also used in the current study in order to compare performances between an at-risk sample (Study Seven) and a sample of individuals in remission from bipolar disorder (Study Eight). The General Discussion (Section 6) will consider the methodological issues regarding the assessment of memory specificity using the standardised AMT task and the recently devised sentence completion measures of memory specificity as used in Studies Five and Six.

Hypotheses

It was hypothesised that the greater risk for hypomania would be associated with the overgeneral recall of negative memories. Due to concerns regarding the use of negatively biased cue words in Delduca and colleagues' (2010) study, the current study hypothesised that individuals at a higher risk for hypomania and future bipolar disorders would report similar biases in memory recall as suggested by previous research conducted in bipolar patient samples (e.g., Scott et al., 2000; Mansell & Lam, 2004). This hypothesis is consistent with a continuum view of bipolar disorder, whereby individuals at risk for experiencing hypomania and developing bipolar affective disorders would be considered to perform in a similar manner to bipolar individuals on the AMT. It was anticipated that the high-risk group would recall more overgeneral negative memories than the moderate and low risk groups, with the low-risk group reporting fewer overgeneral negative memories than the moderate-risk group.

It was also anticipated that participants across groups would recall specific memories in shorter (faster) response latencies than general memories, consistent with the notion that generative retrieval is more time-consuming and effortful than direct recall processes (Conway & Pleydell-Pearce, 2000). In addition, it was anticipated that individuals at a higher-risk for hypomania would be faster to recall specific negative memories consistent with previous research (Delduca et al., 2009). This fast recall of negative memories may reflect a failure to protect the self from the unpleasant emotional consequences of recalling specific negative memories (Conway & Pleydell-Pearce, 2000),

possibly due to poor emotion regulation strategies (Williams, 2006), but also as a consequence of direct retrieval processes whereby individuals are unable to avoid recalling specific memories through overgenerality (Conway & Pleydell-Pearce, 2000). The fast and automatic recall of specific negative memories would then prompt dysfunctional attempts to cope with such self-negative information in at-risk individuals, as suggested by the rumination literature (Thomas & Bentall, 2002; Thomas et al., 2007). Although high-risk individuals may be more overgeneral in their memory recall under generative retrieval conditions, these individuals may retain the fast recall of some specific memories due to direct retrieval processes, as suggested by previous research conducted in both non-bipolar clinical samples (Hauer et al., 2008) and bipolar samples (Tzemou & Birchwood, 2007).

5.2.2 Method

Design

The current study used a 3 x 2 x 2 design, with HPS group as a between-subjects factor (low, moderate or high), and two within-subject factors on the AMT, cue word valence (positive versus negative) and memory specificity (specific versus general).

Participants

A total of 358 participants from the community of the University of Manchester completed the Hypomanic Personality Scale (HPS) as part of a previous study (Dempsey et al., 2011), and consented to leaving their contact details for the current study. 153 participants from the screening stage were invited via email to take part in the current study according to whether they scored one standard deviation above (High HPS group, n = 62) or below the group mean (Low HPS group, n = 54), whilst a group of individuals who reported HPS scores that were equal to the mean of the screening group were recruited for the Moderate HPS group (n = 37). A final sample of 58 participants took part in the study (19 low, 20 moderate, and 17 high-risk participants, see Table 5.2.2). Participants took part voluntarily for no incentive (n = 11) or received course credits (n = 47).

Materials

The Hypomanic Personality Scale (HPS)

The HPS is a 48-item questionnaire designed to assess the prevalence of hypomanic personality traits, which have been associated with vulnerability to hypomania and bipolar affective disorders (Eckblad & Chapman, 1986). Participants rate whether each hypomanic trait is true or false in relation to their own personality (e.g. “I often feel excited and happy for no apparent reason”). Individuals who score highly on the HPS are considered to be at a

greater risk for experiencing hypomanic mood episodes, and also at a high risk for developing bipolar affective disorders and experiencing psychopathological symptoms over time (Eckblad & Chapmn, 1986). The HPS has demonstrated good internal consistency (α = .87) and good test-retest reliability (*r* = .81; Eckblad & Chapman, 1986). Good internal consistency was demonstrated in the current study (α = .88).

The Internal States Scale (ISS)

The ISS is a 16-item self-report measure of current bipolar mood symptoms (Bauer et al., 1991). Each item on the ISS refers to a symptom associated with bipolar disorders, with items constituting four subscales measuring depressive symptoms (ISS Depression), hypo/manic symptoms (ISS Activation), interpersonal conflict (ISS Perceived Conflict), and well-being (ISS Well-Being). Participants rate the intensity of each symptom on 100mm visual analogue scales anchored by 0 ("Not at all/rarely") to 100 ("Very much so/most of the time"), with greater scores on the subscales reflecting the experience of more intense mood symptoms. Self-reported ISS scores are positively correlated with ratings of bipolar symptom severities made by clinicians (Bauer et al., 1991). The ISS subscales have demonstrated acceptable to good levels of reliability (α = .73-.82; Jones & Day, 2008; Dempsey et al., 2011). High levels of reliability were noted in the current study across the ISS subscales (ISS Activation, α = .81; ISS Depression, α = .84; ISS Perceived Conflict, α = .79; ISS Well-being, α = .86).

The Positive and Negative Affect Schedule (PANAS)

The PANAS is a 20-item measure of current positive and negative emotional states (Watson et al., 1988). Participants rate the extent to which they are currently experiencing 10 positive (e.g., "happy", "active", "proud") and 10 negative emotional states (e.g., "hostile", "ashamed", "distressed"), on five point scales (from 1 "Very slightly or not at all" to 5 "Extremely"). These positive and negative emotional states form two 10 item subscales measuring current levels of positive and negative affect. The PANAS subscales have demonstrated high levels of reliability in previous studies (Positive Affect, α = .86-.90; Negative Affect α = .84-.87; Watson et al., 1988) and in the current study (Positive Affect, α = .87; Negative Affect α = .81).

The Autobiographical Memory Test (AMT)

The AMT is a cued memory task designed to assess the specificity of autobiographical memory recall (Williams & Broadbent, 1986), which has been used in a variety of clinical and non-clinical samples, including patients with recent histories of attempted suicide

(Williams & Dritschel, 1988), patients with major depressive disorder (Brittlebank et al., 1993), hypomanic students (Delduca et al., 2010), and non-clinical student samples (Raes et al., 2003).

Participants completing the AMT are presented with a series of cue words by the experimenter and are required to recall a memory that relates to the cue which encompasses a specific event, defined as an event that occurred at a particular time and a place with a duration of less than one day (Williams & Broadbent, 1986). Participants are instructed to recall a different memory or event for each cue word, to not recall events that have occurred over the previous seven days as these may reflect short-term memories, and are also given a time limit in which to recall a memory (60 seconds in the current study).

A pre-test was conducted in a separate sample prior to the current study to assess the emotional valence and intensity of a series of 44 cue words that have been used across previous AMT studies. A convenience sample of 30 native English speakers (Mean age = 26.33 years, S.D. = 5.13; 20 females, 10 males) from the community of the University of Manchester completed a short online study and were asked to provide a rating for each cue word's valence and intensity on a seven-point scale (from -3 to +3, "extremely negative" to "extremely positive"). Based upon the results of the pre-test, a series of twelve cue words were chosen for use in the current study, including six positive and six negative cues, and three high and low intensity cue words for each valence (see Table 5.2.1 below). Eight of these cue words had previously been used in a study conducted in a sample of remitted bipolar patients (Mansell & Lam, 2004).

Table 5.2.1 Cue words used in the current Autobiographical Memory Test.

		Valence	
		Positive	Negative
Intensity	High	Adored* Excited Optimistic*	Failure* Hate* Hopeless
	Low	Confident* Happy Successful*	Guilt Pessimistic* Unconfident*

* Cue words used by Mansell & Lam (2004)

Procedure

Participants who had been successfully screened into one of the study's groups were invited via email to take part in the face-to-face AMT study. After obtaining informed consent, participants completed the PANAS and the ISS to assess their mood and symptoms at baseline, and received standardised instructions for the AMT (see Appendix). Participants were instructed not to recall events that occurred within the previous seven days to prevent the recall of events from short-term memory. To familiarise the participants with the AMT and with the objective of the study to recall specific autobiographical memories, participants completed three practice trials (the practice cue words included: "Bread", "Holiday", and "Library"). The researcher (R.D.) gave a prompt if the participant failed to identify a specific event ("Can you think of a specific event? One particular episode?"). The researcher commenced the AMT once the participant had understood the nature of the AMT task and had successfully recalled three specific memories in the practice trials.

Participants were given a time limit of 60 seconds for each cue word in which to recall a specific memory during the main AMT task. The researcher audio-recorded the recalled memories on a digital dictaphone for later transcription. If the participant failed to recall a memory within the 60 second time limit this was noted as an omission. The participants were presented with twelve cue words in a randomised order. The researcher read out each cue in turn and presented participants with the cue word printed on a flashcard. Participants also completed a follow-up event-reporting and appraisal diary, including daily measures of subclinical bipolar mood symptoms and additional questionnaire measures not part of this study. The participants received a full debrief at the conclusion of the study, and were thanked for their participation. The study received ethical approval from the School of Psychological Sciences Research Ethics Committee at the University of Manchester.

Data Coding

Responses on the AMT recall task were transcribed and coded for their specificity by the first author (R.D.). Responses on the memory task were coded as Specific, an Omission, or General, with general responses qualified in line with previous studies (Raes et al., 2003; (Raes et al., 2003; Taylor et al., 2010c). The responses were coded in according to the following definitions: *Specific*, referring to the recollection of a specific event which occurred at a particular time and a place with a duration of less than a day (e.g., "my job interview at…"); *Extended*, an event that lasted longer than one day (e.g., "when I went on holiday to…"); *Categoric*, encompassing categories of events or repeating events (e.g.,

"going to the pub"); *Semantic Associate*, referring to information about the self or others which does not refer to any event (e.g., "I am a poor cook"); or as an *Omission*. Semantic associates, extended and categoric memories were collapsed into one "general memory" category for data analysis. The response latency between the presentation of the cue word and the participant's first utterance relating to the recalled memory was later measured using a stopwatch (see Appendix for the coding manual). An independent rater receiving training in using the AMT coding scheme and coded a random sample of 25% (n = 14) of the memory transcripts for their specificity and recall latencies (in total 168 memories)[1]. The independent rater was blind to the group allocations of the transcripts.

Data Analysis

Memory specificity data, questionnaire scores, and the response latency timings were checked for normality from review of histograms and by conducting Kolmogorov-Smirnoff tests, across individual groups and the sample as a whole. Data did not substantially deviate from normality. Between-group differences in questionnaire scores were assessed using analyses of variance, as were differences in response latencies on the AMT. The proportions of specific and general memories recalled on the AMT were compared between-groups using a mixed design analysis of variance and planned comparisons, with follow-up univariate ANOVAS employed to further analyse observed interaction effects. A Kruskal-Wallis test conducted to investigate between-group differences in the number of omissions.

5.2.3 Results

Preliminary data analysis indicated that two participants in the moderate HPS group were outliers on the memory specificity measures (S.D.s > 2.5, above the mean scores for omissions and general memories recalled on the AMT) and were excluded from subsequent analyses. Data analysis was conducted upon the remaining 56 participants (see Table 5.2.2 below for sample characteristics).

Sample Characteristics

Table 5.2.2 displays the demographic characteristics of the low, moderate and high risk groups, as well as scores on the Internal States Scale (ISS) and Positive and Negative Affect Schedule (PANAS) as measured at baseline, prior to the AMT task.

[1] There are no strict guidelines on the proportion of memories on the AMT that require coding by a second rater for the purposes of assessing inter-rater reliability. Previous studies have coded between 10% (Delduca et al., 2010), to 20% (Williams et al., 2006) and 33% of recall memories (Mowlds et al., 2010).

Table 5.2.2. Demographic characteristics and mean scores on the self-report measures of bipolar symptoms and emotional states across the High, Moderate and Low risk groups.

	Low-risk participants Mean (S.D)	*Moderate-risk participants* Mean (S.D.)	*High-risk participants* Mean (S.D.)
N	19	20	17
Gender	1 male; 18 female	5 male; 15 female	2 male; 15 female
HPS	5.11 (2.16)	17.27 (1.31)	27.94 (4.32)
HPS Range scores	2-8	16-19	24-37
Age (years)	23.58 (3.82)	23.25 (5.30)	21.94 (3.03)
ISS Activation	107.53 (92.33)	167.50 (84.03)	219.76 (90.85)
ISS Depression	21.95 (34.36)	34.95 (42.42)	29.29 (38.85)
ISS Perceived Conflict	79.42 (93.87)	99.18 (62.27)	107.82 (71.64)
ISS Well-being	173.21 (58.59)	164.27 (72.80)	184.00 (48.23)
PANAS – PA	27.37 (6.09)	29.55 (7.98)	29.94 (5.27)
PANAS - NA	12.37 (2.99)	14.55 (6.13)	13.59 (2.94)

Note: HPS = Hypomanic Personality Scale, ISS = Internal States Scale, PANAS: PA = Positive Affect; NA = Negative Affect (standard deviations are presented in parentheses)

Univariate ANOVAs indicated that there were no significant between-group differences in the mean age of the participants ($F_{(2, 53)} = .747$, $p = .479$), whilst a separate ANOVA indicated that significant differences existed in mean HPS scores across groups ($F_{(2, 53)} = 198.895$, $p < .001$; planned comparisons, $p < .001$). Mean HPS and ISS scores for the high and low groups were similar to those reported by Delduca and colleagues (2010), whilst mean HPS scores of the moderate group were consistent with mean scores reported in similar studies (Jones et al., 2007; Dodd et al., 2010). A Fisher's exact test using the Freeman-Halton extension for 2 x 3 contingency tables confirmed that there were no between-group differences in gender ratios ($p = .217$) (Freeman & Halton, 1951). No between-group differences were noted for PANAS or the ISS scores, except for the ISS Activation scale ($F_{(2, 55)} = 7.208$, $p < .01$), with planned contrasts indicating that the Low-risk group reported lower ISS Activation scores than the Moderate-risk group ($p < .05$) and high-risk group ($p < .05$), whilst a non-significant trend was noted between the moderate and high-risk groups ($p = .074$).

Inter-rater reliability

A random sample of 25% transcripts from across the three risk groups were coded by an independent rater to check the reliability of the coding for the specificity of the recalled memories and the timing of the response latencies. There were high levels of agreement between coders for the specificity of the recalled memories (92.86% agreement; Cohen's Kappa = .79). High levels of agreement in the response latency timings were also observed between the coders (r = .95, p < .001), and no significant differences in response latency timings between raters were observed (t(167) = -.952, p = .342).

Autobiographical Memory Specificity

Table 5.2.3, displays the mean number of autobiographical memories recalled by participants across the low, moderate and high-risk groups according to cue word valences and the specificity of the recalled memory.

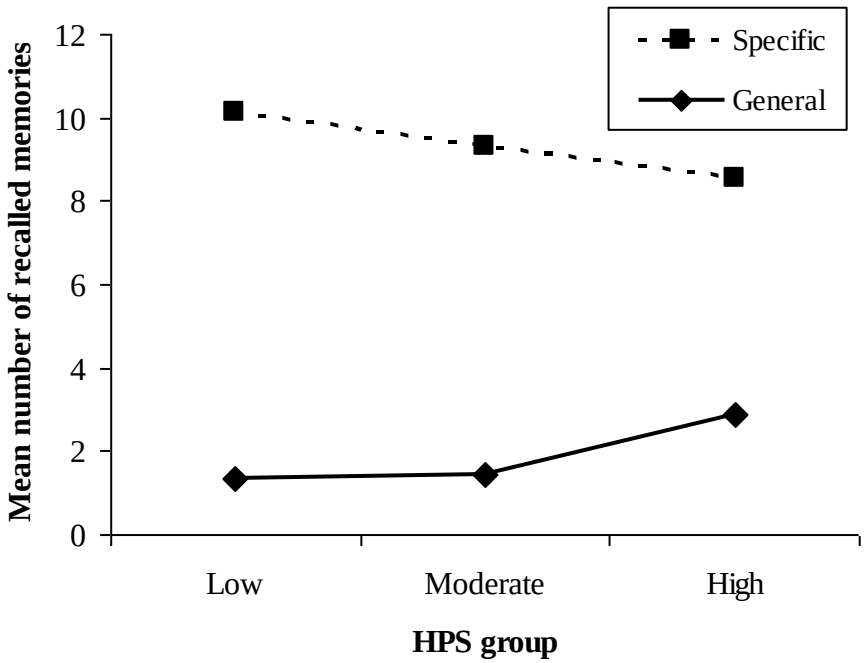
Table 5.2.3. The valence and specificity of recalled autobiographical memories across the whole sample and by high, moderate and low risk groups.

Memory Specificity Mean (S.D.)	*HPS Group* Low	Moderate	High	All Groups
All cues				
Specific	10.15 (1.84)	9.32 (1.95)	8.56 (2.31)	9.38 (2.08)
General	1.35 (1.76)	1.42 (1.21)	2.88 (1.93)	1.84 (1.75)
Omissions	.53 (.61)	1.15 (1.23)	.59 (1.18)	.77 (1.06)
Positive cues				
Total memories	5.79 (.41)	5.65 (.59)	5.82 (.53)	5.75 (.51)
Specific	5.35 (.99)	4.84 (1.07)	4.69 (1.25)	4.98 (1.10)
General	.45 (.83)	.79 (.86)	1.13 (1.15)	.77 (.95)
Omissions	.20 (.41)	.37 (.60)	.19 (.54)	.25 (.51)
Negative cues				
Total memories	5.68 (.48)	5.15 (.81)	5.64 (.71)	5.46 (.71)
Specific	4.80 (1.01)	4.47 (1.17)	3.88 (1.46)	4.39 (1.25)
General	.90 (1.07)	.63 (.68)	1.76 (1.34)	1.07 (1.13)
Omissions	.30 (.47)	.84 (.84)	.38 (.72)	.52 (.71)

N.B. HPS = Hypomanic Personality Scale.

A 3 x 2 x 2 mixed design analysis of variance was conducted to investigate between-group differences in memory specificity with group as a between-subjects factor (low, moderate or high), and cue word valence (positive vs. negative) and memory specificity (specific vs. general) as within-subject factors. The ANOVA revealed a significant main effect of cue word valence ($F_{(1, 53)} = 1.685$, $p < .001$), with participants recalling more memories for positive (M = 5.75, S.D. = .51) than negative cues (M = 5.46, S.D. = .71) irrespective of memory specificity, but the group by valence interaction did not reach significance ($F_{(2, 53)} = 2.110$, $p = .131$). A significant main effect of memory specificity was observed ($F_{(1, 53)} = 254.831$, $p < .001$), indicating that participants were more likely to generate specific (M = 9.38, S.D. = 2.08) than general memories on the AMT (M = 1.84, S.D. = 1.75), which was further qualified by a significant interaction effect between memory specificity and group ($F_{(2, 53)} = 4.098$, $p < .05$) (See Figure 5.2.1 below). The interaction effect between memory specificity and HPS group was further explored in a univariate ANOVA, with the difference in the number of specific versus general memories recalled (i.e., specific minus general memories) as the dependent variable and group as a between-subjects factor. The ANOVA was significant ($F_{(2, 53)} = 3.556$, $p < .05$), with the high-risk group reporting greater overgenerality than the low (planned contrasts, $p < .05$) and moderate groups ($p < .05$), in line with predictions.

Figure 5.2.1 The interaction effect of memory specificity and risk group (HPS group)



Note: HPS = Hypomanic Personality Scale.

A significant interaction effect between memory specificity and valence was also observed ($F_{(1, 53)} = 10.400$, $p < .01$), indicating that participants were more likely to recall specific memories in response to positive cues and respond more generally to negative memory cues, but the three-way interaction between memory valence, specificity and group was not significant ($F_{(2, 53)} = 1.522$, $p = .228$). A Kruskal-Wallis test was conducted to investigate whether there were between-group differences in the number of omissions made on the AMT, and indicated that there were no significant group differences in omissions ($\chi^2 = 4.175$, d.f. = 2, $p = .124$). Although there were some between-group differences in ISS Activation scores, no significant bivariate correlations were noted between the ISS subscales and the memory specificity data, either within groups or across the sample as a whole, therefore activation was not included as a covariate in the analyses.

Memory Recall Latencies

Table 5.2.4 details the mean response latencies in seconds for memories recalled on the AMT task according to their cue valence and specificity, and according to HPS group.

Table 5.2.4. Response latencies on the Autobiographical Memory Test across the whole sample and the low, moderate and high risk groups

Recall Latency (sec) Mean (S.D.)	*HPS Group*			*Total*
	Low	Moderate	High	
All cues				
All memories	13.35 (5.48)	15.21 (5.26)	13.38 (5.03)	14.03 (5.24)
Specific	12.65 (5.58)	13.21 (3.60)	13.16 (7.07)	13.01 (5.41)
General	12.41 (7.49)	19.56 (11.68)	15.07 (7.57)	16.06 (9.49)
Positive memories				
All	12.04 (6.33)	15.11 (7.03)	12.44 (6.95)	13.26 (6.80)
Specific	11.22 (6.45)	12.51 (4.78)	12.73 (9.77)	12.14 (7.05)
General	12.67 (8.61)	21.08 (14.77)	13.65 (8.70)	16.56 (11.88)
Negative memories				
All	14.67 (6.54)	15.31 (5.66)	14.33 (5.08)	14.80 (5.72)
Specific	14.09 (6.45)	13.92 (5.12)	13.59 (7.72)	13.88 (6.33)
General	13.40 (8.52)	18.83 (10.91)	15.22 (7.99)	15.81 (9.02)

Note: HPS = Hypomanic Personality Scale.

Across the whole sample, specific memories were recalled in shorter response latencies (Mean RT = 13.01, S.D. = 5.41) than general memories (Mean RT = 16.06, S.D. = 9.49) (t = -2.152, d.f. = 40, $p < .05$) supporting our predictions. However, no significant differences in the response latencies for positive (Mean RT = 13.26, S.D. = 6.80) versus negative memories (Mean RT = 14.79, S.D. = 5.72) were noted (t = -1.661, d.f. = 55, p = .102). When analysed by group, a repeated-measures 2 x 3 ANOVA with memory valance treated as a within-subject factor (positive versus negative) and HPS group as a between-subjects factor (low, moderate, and high), found no main effect of valence upon response latencies ($F_{(2, 53)} = 2.839$, $p = .089$), and no interaction effect between valence and group for response latencies ($F_{(2, 53)} = .631$, $p = .536$). Due to some participants recalling twelve specific memories, and hence not having response latencies for general memories (i.e., a response latency of 0 = immediate memory recall), between-group differences in response latencies for positive compared to negative memories (valence), and in the recall of general compared to specific memories (specificity) were analysed separately. Univariate ANOVAs indicated that there were no significant group differences in response latencies for specific ($F_{(2, 55)} = .060$, $p = .942$) or general memories ($F_{(2, 40)} = 1.929$, $p = .159$).

5.2.4 Discussion

This study investigated the specificity of autobiographical memory across groups of individuals considered to be at a low, moderate or high-risk for hypomania and bipolar disorder. Individuals at a high risk for hypomania were found to recall more general memories compared to moderate and low-risk individuals, with no observed overgeneral bias for the recall of emotionally negative memories, partially supporting the predictions. In contrast to the previous AMT study conducted in groups of individuals at a low and a high risk for hypomania (Delduca et al., 2010), which reported that high-risk individuals were more specific in their recall of negative autobiographical memories than low-risk individuals, the current study suggests that the vulnerability to hypomania and future bipolar disorders is associated with an overgeneral bias irrespective of memory valence. Whilst specific memories were recalled more quickly than general memories across groups, in line with the predictions, no significant group differences in recall latencies were noted, in contrast to the predictions and previous research (Delduca, et al., 2010).

The observation that a high risk for hypomania was associated with an overgeneral recall bias, irrespective of memory valence, is similar to previous observations made in a sample of remitted bipolar individuals by Scott and colleagues (2000). Individuals at a high trait-based vulnerability to bipolar disorder, as well as those individuals diagnosed with bipolar disorder (Scott et al., 2000; Mansell & Lam, 2004), both report an overgeneral

autobiographical memory bias compared to low-risk individuals and healthy non-bipolar controls, suggesting that overgenerality may be a vulnerability factor for bipolar disorder. However, as there were no significant differences in memory specificity between the moderate and low-risk groups, it remains unclear as to whether the severity of overgenerality increases linearly as the risk for bipolar disorder increases from those at a low to a moderate degree of risk.

In contrast to Study Five, there was no significant interaction between memory valence and group; with the three groups recalling similar numbers of memories on the AMT irrespective of memory specificity (see Table 5.2.3). The lack of a significant interaction appears to be due to the AMT measure, which has previously been criticised for not being sufficiently sensitive to autobiographical memory processes in non-clinical samples (Raes et al., 2007). A similar pattern has been observed in a previous study, where groups of high and low HPS scorers recalled similar numbers of positive and negative memories on the AMT (Delduca et al., 2010). In contrast, the SCEPT sentence completion task used in the earlier study (Dempsey et al., *submitted-c*), which presents participants with non-valenced sentence stems which are later coded for their valence, appears to be more sensitive to group differences in the recall of positive and negative memories as indicated by the significant interaction of valence and group reported in that study. As the AMT presents a fixed number of valenced cue words, as well as practice trials and the repetition of specificity instructions, this may constrain participants' trait-based tendencies to recall memories of a particular valence compared to the sentence completion task. Interestingly, previous research in non-clinical samples has had to collapse data collected on the AMT across valence during data analysis (Gibbs & Rude, 2004), all of these points suggest that the AMT may be a less sensitive measure of memory valence biases in non-clinical samples compared to the SCEPT procedure (Raes et al., 2007).

Study Seven has a number of strengths. Firstly, a set of emotionally balanced cue words were selected on the basis of a cue word valence pre-test. The final cue word set consisted of a range of positive (e.g., "happy", "excited", "successful") and negative memory cues (e.g., "hate", "failure", "hopeless"), which appeared to prime a wider range of both positive and negative memories compared to the cues used in previous research (Delduca et al., 2010). The current study also sampled individuals at a low, moderate and high risk for hypomania to more stringently assess whether overgenerality is a marker of the heightened vulnerability to hypomania. In sum, the current study suggests that a tendency to recall overgeneral memories across both positive and negative cues on the AMT is associated with the heightened vulnerability to hypomania, consistent with observations made in samples of individuals with bipolar disorder (Scott et al., 2000).

There are a number of limitations to consider with the current study. In particular, the experimenter was not blind to the group status of participants and it is not clear whether this may have affected participants' responses on the AMT task. Although there were high levels of inter-rater reliability between the experimenter and the group-blind independent raters for the memory codings, it is remains unclear whether experimenter bias may influence memory specificity (Williams & Broadbent, 1986). In addition, The high-risk group recruited in the current study consisted of participants who scored greater than 24 on the HPS, consistent with the lower cut-off of the previous study investigating autobiographical memory specificity in at-risks group for bipolar disorder (Delduca et al., 2010), with an upper score of 37. In comparison to other studies, which have often recruited participants with HPS scores greater than 30 for high-risk (e.g., Kwapil et al., 2000), there is the possibility that the high-risk participants in the current study are not fully representative of those individuals who are at a heightened risk for bipolar spectrum disorders (who may report more extreme HPS scores). Future research may need to consider recruiting "high-risk" participants using a more stringent cut-off on the HPS in order to more successfully investigate dysfunctional memory processes in those at a high-risk for bipolar spectrum disorders.

In addition, whilst current bipolar mood symptoms were measured using the Internal States Scale (Bauer et al., 1991), the current study did not include an assessment of participants' past clinical histories, such as the previous experiences of clinically significant depressed moods, which may have influenced memory specificity (Mansell & Lam, 2004). There is also evidence to suggest that ruminative thinking styles and reduced executive processing capacities can reduce the specificity of autobiographical memory (e.g., Williams, 2006; Dalgleish et al, 2007), however, these factors were not measured in the current study and it remains unclear whether an interaction between hypomania vulnerability and rumination or executive processes is associated with increased overgenerality. Also, the current sample was mostly female, and as there was no screening assessment of participants' past clinical histories it is not clear whether some participants had previously experienced clinically significant mood symptoms and whether such individuals were at a heightened risk for bipolar disorder. A final limitation is that the current study was cross-sectional in design. There is a clear need for longitudinal studies to investigate the causal mechanisms of overgeneral memory specificity in at-risk individuals, and the effect of overgeneral memory upon the development of clinically significant bipolar symptoms in those at a high risk.

5.2.5 Conclusions

In sum, the results of the current study support the hypothesis that individuals at an elevated risk for hypomania report similar overgeneral biases in their recall of autobiographical memories as observed in previous studies conducted in samples of individuals with bipolar disorder (e.g., Scott et al., 2000). The current study does not support previous observations that the heightened vulnerability to bipolar disorder is associated with the increased specificity of autobiographical memory recall for negative memories (Delduca et al., 2010). This study is the first demonstration that individuals at an elevated risk for hypomania report an overgeneral memory bias on the Autobiographical Memory Test, and lends support to the hypothesis that overgeneral memory may exist on a continuum of increasing severity from high-risk individuals to individuals with diagnosed bipolar disorders.

Section 5.3

Study Eight

The Specificity of Autobiographical Memory Recall in Remitted Bipolar Individuals & Matched Controls

5.3.1 Introduction

The overgeneral recall of autobiographical memories has been evidenced in a number of mental health conditions, including major depressive disorder (Williams & Scott, 1988; Barnhofer et al., 2002) and suicidality (Williams & Broadbent, 1986; Williams & Dritschel, 1988). Research has suggested that individuals diagnosed with bipolar disorder also generate such overgeneral biases in autobiographical memory recall (Scott et al., 2000; Mansell & Lam, 2004; Tzemou & Birchwood, 2007). However, these studies are associated with a number of methodological issues, in particular, the use of non-standardised assessments of autobiographical memory specificity (e.g., Mansell & Lam, 2004; Gregory et al, 2010). The primary aim of the current study was to investigate the specificity of autobiographical memory recall in a group of individuals currently in remission from bipolar disorder and in a group of healthy non-bipolar individuals, matched for age and gender with the bipolar participants. Individuals currently in remission from bipolar disorder were recruited into the study to avoid any potential effects of extreme mood disturbances and symptoms upon memory recall.

Whilst individuals with bipolar disorder appear to possess an overgeneral memory bias, it is not currently clear whether individuals in remission from bipolar disorder report greater overgenerality for positive or negative cues or across memory valences. The current study aimed to replicate Scott and colleagues' (2000) previous investigation into autobiographical memory specificity in remitted bipolar individuals using the standardised AMT procedure, to assess whether bipolar disorder is associated with an overgeneral memory bias across memory valences (as suggested by Scott et al., 2000), or with an overgeneral memory bias for negative memories (e.g., Mansell and Lam, 2004).

A sample of individuals diagnosed with bipolar disorder in remission from symptoms and a control group of healthy non-bipolar individuals matched for age and gender with the bipolar participants were recruited for the current study, in order to allow comparisons with the investigations conducted in remitted bipolar samples reported by Scott and colleagues (2000) and Mansell & Lam (2004). In addition, the study of a remitted bipolar sample affords the measurement of cognitive processes in individuals who

are not currently experiencing extreme mood symptoms, and allows for the investigation of processes which may be impaired during periods of normal functioning and which may confer a risk for future relapse.

Hypotheses

It was hypothesised that individuals diagnosed with bipolar disorder would report greater overgeneral autobiographical memory biases than control participants in line with previous observations (Scott et al., 2000), with bipolar participants predicted to recall more general than specific memories in response to negative cue words consistent with previous observations (Mansell & Lam, 2004). In relation to the time taken to recall memories, it was anticipated that specific memories would be recalled faster than general memories, consistent with observations made in Study Seven. Furthermore, it was anticipated that individuals with bipolar disorder would be faster to recall specific autobiographical memories for negative events.

5.3.2 Method

Design

The current study incorporated a 2 x 2 x 2 design, with group as a between-subjects factor (bipolar vs. control), and memory valence (positive vs. negative) and memory specificity (specific vs. general) on the AMT as within-subject factors.

Participants

A sample of 18 participants diagnosed with bipolar disorder (11 female, 7 male), currently in remission from symptoms as confirmed by SCID interview, and a control group of 18 healthy non-bipolar individuals who were matched for age and gender with the bipolar group were recruited (11 female, 7 male) (See Table 5.3.1 for group demographics).

Participants were recruited using a number of methods. Advertisements for were placed on the University of Manchester's Research Volunteering website, and on campus notice boards. The first author also made short presentations about the study to service-user support groups located in the Greater Manchester region, and sent information sheets and flyers to local support services with the agreement of local managers. An online advertisement was displayed on the Manic Depression Fellowship e-community, a website containing self-help information and discussion forums for individuals with bipolar disorder. Advertisements for the study were also placed in the Spectrum Participant Pool Newsletter, a quarterly newsletter sent to individuals with bipolar disorder who have

consented to receiving updates about current research activities from the Spectrum Centre for Mental Health Research at Lancaster University. Participants for the control group were recruited via the University of Manchester's Research Volunteering website advertisements placed on community website forums for Greater Manchester.

Inclusion criteria for the study for the bipolar group included the willingness and ability to provide written informed consent as assessed by the researcher, meeting SCID criteria for the remission of bipolar symptoms (not meeting criteria for the experience of mood symptoms within the past month), fluent English speaking ability, and aged 18 years or older. As prior research had suggested that around one third of patients currently receiving ECT will experience some form of memory loss (Rose et al., 2003), and the severity of overgeneral memory recall is associated with increased substance dependence (Gandolphe & Nandrino, 2011), individuals who had received ECT in the previous 12 months and those who had diagnosed substance abuse disorders were excluded from the study (as assessed by the SCID interview). Participants in the control group completed the screening module from the SCID and self-certified that they had not been diagnosed with any form of mental health condition. Control participants were fluent English speakers and aged 18 years or older.

Diagnostic Interview

The Structured Clinical Interview for DSM-IV Disorders (SCID-I) was used to confirm diagnoses of bipolar disorder and current episode status of participants in the bipolar group (First, Spitzer, Gibbon & Williams, 2002). The first author (R.D.) conducted all interviews in face-to-face meetings with the participants, and completed the following SCID modules: Screening module, Current and Past Mood Episodes (Module A), the Psychotic Symptom Screener (Modules B/C), and Substance Use (Module E). The SCID interview was audio-recorded on a digital dictaphone with the participant's consent.

The first author received a combination of training in administering the SCID interview through role-play activities, watching SCID training DVDs, and through the use of the published training manual for the SCID (First, Gibbon, Spitzer & Williams, 2002).

Questionnaire Measures

To assess current mood states and bipolar mood symptoms, participants completed the CES-D scale, Internal States Scale (ISS) and the PANAS (see Section 5.2.2 for details on the PANAS and ISS). The CES-D scale is a 20-item measure of current depressive symptoms (Radloff, 1977), which has been used to assess the prevalence of depressive symptoms in both clinical (Calam et al., *submitted*) and non-clinical samples (Dempsey et

al., 2011). Each item on the CES-D refers to a symptom relating to depression, with participants required to rate the extent to which they have experienced each symptom over the past week on a four point scale (from 0 = “Rarely”, to 3 = “Most of the time”). Example items include: “thought my life had been a failure”, “I talked less than usual”, and “I had crying spells”. Higher scores on the CES-D reflect the experience of more intense depressive symptoms, with scores of 16 and above indicative of clinically significant levels of depression (Radloff, 1991). High levels of internal consistency have been reported in previous studies (Cronbach's α = .89-.91; Dempsey et al., 2011; Jones & Day, 2008).

Autobiographical Memory Measures

The Autobiographical Memory Test (AMT) procedure from Study Seven was used in the current study (as described in Section 5.2).

Procedure

Participants were directed by the advertisements to contact the researcher to express their interest in taking part in the study, and were sent copies of the Participant Information Sheet and Consent Form. Once participants had decided to take part, the researcher confirmed that the participant understood the objectives and procedures involved in the study and were willing to give their informed consent to participating in the study.

The researcher met the participants twice over a one-week period, either at their home, at the University of Manchester, or in a meeting room of a local support service, depending on the participant’s wishes. The first meeting consisted of the SCID interview, and the completion of a series of baseline questionnaires. The second meeting took place a week later and involved completing the AMT procedure and additional measures not reported here. Participants also completed some additional questionnaire measures relating to memory recall and cognitive style which are not germane to the current study[2]. At the end of the second meeting, participants received a full debrief about the study and were provided with a sheet containing contact details for local support services and a feedback questionnaire which the participant could complete anonymously and return via post at a later date. The study received full ethical approval from the NHS Greater Manchester South Research Ethics Committee.

[2] In addition to the AMT task, participants completed self-report measures of cognitive styles during the first meeting as well as an event and symptom reporting diary in the seven days between meetings, with event appraisal processes and symptom fluctuations as recorded by the diary compared with performance on the AMT. Data analysis did not indicate any relationship between memory specificity and the diary measures, therefore the diary was not analysed further

Data Coding

Responses on the AMT were coded for their specificity and recall latencies using the same coding scheme from Study Seven (see Section 5.2), with the recalled memories coded as *Specific*, as an *Omission* for non-responses, with general memories qualified as either *Extended* or *Categoric* memories, or as a *Semantic Associate*. The response latency between the presentation of the cue word and the participant's recall of a memory was measured by a stopwatch based upon the digital recordings. The memory specificity and response latency data were coded by the first author (R.D.), whilst three independent raters coded 25% of the memory recall and latency data to check the reliability of the coding.

Data Analysis

Data was screened for normality via review of histograms and was screened for outliers by calculation of z-scores. Data did not substantially deviate from normality except for the number of omissions made on the AMT, which were analysed using non-parametric statistics. A multivariate analysis of variance was conducted to assess between-group differences in scores on the mood and symptom measures (CES-D, ISS and PANAS scales). The mean number of autobiographical memories recalled on the AMT, with the general memories collapsed into one category, was subjected to a 2 (group) x 2 (memory valence, positive vs. negative) x 2 (memory specificity, specific vs. general) mixed design analysis of variance to investigate between-group differences between the bipolar and non-bipolar groups. Independent samples t-tests were conducted to investigate between-group differences in response latencies.

5.3.3 Results

Sample Characteristics

The final sample included 18 individuals diagnosed with bipolar disorder (14 bipolar I disorder; 4 bipolar II disorder), and 18 non-bipolar controls matched for age and gender with the bipolar participants (see Table 5.3.1 for demographic information).

Table 5.3.1 Demographic characteristics of the bipolar and control groups

	Bipolar Group	Control Group
Mean age in years (S.D.)	36.28 (14.00)	35.39 (13.48)
Age range (years)	19 - 65	19 - 65
Gender ratio	11 Female, 7 Male	11 Female, 7 Male
Highest Educational Attainment		
PhD	2	2
Masters degree (MSc/MA)	3	4
Bachelors degree (BSc/BA)	5	3
Further Education/A-Level	7	7
GCSE/O-Level	1	2
Employment status		
Full-time Student	5	10
Full-time Employed	0	5
Part-time Employed	1	2
Retired	3	1
Self-employed	1	0
Unemployed	8	0
Ethnicity		
Caucasian-British	17	17
Caucasian-European	1	1

An independent samples t-test confirmed that there were no significant differences in mean participant ages between the bipolar and non-bipolar groups ($t(34) = .194$, $p = .847$, *ns*). Participants in the bipolar group had a mean age of 27.65 years (S.D. = 11.49) at their first diagnosis of bipolar disorder, and a mean of 9.17 years (S.D. = 11.68) since their first diagnosis. A number of participants in the bipolar group had received previous diagnoses of major depressive disorder (n = 5) or severe comorbid depression and anxiety (n = 2) prior to receiving formal bipolar diagnoses. Participants in the bipolar group had experienced a mean number of 13.71 depressive episodes (S.D. = 10.38), 4.53 manic episodes (S.D. = 3.52), 10.88 hypomanic episodes (S.D. = 11.85), and a mean number of 3.00 mixed mood episodes (S.D. = 4.99). Participants in the bipolar group had a mean number of 1.83 hospitalisations for past mood episodes (S.D. = 2.71). In contrast to a previous autobiographical memory study, bipolar participants in the current study reported the experience of more depressive and manic episodes, and were of a younger age than participants in remission from bipolar disorder recruited in a previous investigation

(Mansell & Lam, 2004) (Please note that other autobiographical memory studies present little information regarding the clinical characteristics of their bipolar samples).

Two participants in the bipolar group were not currently receiving any form of medication for bipolar disorder, whilst the remaining participants either received monotherapy (n = 5) or polytherapy (n = 11) medication regimes. Prescribed medications included mood stabilisers (n = 9), antidepressants (n = 9), anticonvulsants (n = 7), antipsychotic (n = 7), and tranquiliser medications (n = 1), whilst three participants received medication for pain-related conditions.

In relation to psychological therapies, thirteen participants had previously received some form of psychological therapy for bipolar disorder, including cognitive-behavioural therapy (n = 7), cognitive therapy (n = 1), relapse prevention training (n = 1), psychoanalytic therapy (n = 1), psychoeducation (n = 1), whilst two participants had received non-structured outpatient contact with a psychologist (n = 2). Participants had received an average of 28.71 hours of psychological therapy (S.D. = 27.68).

Inter-rater Reliability

A random sample of 40% of the transcripts (15 transcripts in total) was coded by three independent raters who received training in the use of the AMT coding manual and were blind to group allocation[3]. There were high levels of agreement between the first author and the independent raters in the memory specificity codings (Cohen's Kappas = .84 for rater one, .82 for rater two, and .77 for rater three; 90% agreement across all raters)[4]. A separate independent rater coded the response latencies for the AMT task, with high levels of agreement in response latency codings noted between the independent rater and the first author ($r = .91$, $p < .001$), and no significant differences between raters were noted for the response latency data ($t(179) = -.554$, $p = .580$).

Baseline Mood Symptoms

A MANOVA was conducted to investigate between-group differences in mood symptom scores (CES-D, ISS and PANAS) between the bipolar and non-bipolar control participants. The MANOVA was significant overall ($F_{(1, 35)} = 2.884$, $p < .05$). However, only scores on the CES-D scale differed between groups ($F_{(1, 35)} = 6.45$, $p < .05$), with bipolar participants reporting higher scores than controls (see Table 5.3.2). Scores on the mood measures (ISS,

[3] Three psychology undergraduate students from the University of Manchester assisted in conducting a coding check on the memory specificity. The volunteers were trained by the first author (RD) in using the coding scheme and completed a series of practice items.

[4] Although there exist inter-rater reliability calculations for occasions where three or more raters have coded the same data (e.g., Fleiss' Kappa), as the three volunteers coded separate portions of data (which collectively totalled 25% of the sample) only separate Cohen's Kappas could be computed to compare coding with the first author.

PANAS and CES-D) measures for both the control and bipolar participants were consistent with previous research (Knowles et al., 2007; Mansell et al., 2011; Calam et al, *submitted*).

Table 5.3.2 Table of results of the Multivariate Analysis of Variance conducted upon mean scores on the baseline mood and symptom questionnaire measures across bipolar and control groups (Standard deviations in parentheses).

	Control Group *Mean (S.D.)*	*Bipolar Group* *Mean (S.D.)*	*F*	*p*	η^2
CES-D	7.12 (5.01)	15.22 (11.83)	6.45	.01	.17
ISS Activation	90.13 (87.30)	122.94 (108.42)	.929	.34	.03
ISS Depression	31.31 (42.99)	21.94 (24.68)	.625	.44	.02
ISS Perceived Conflict	70.39 (64.54)	69.63 (56.40)	.001	.97	.00
ISS Well-Being	143.63 (64.28)	166.44 (66.09)	1.036	.33	.03
PANAS Negative Affect	12.06 (3.296)	13.83 (5.22)	1.359	.25	.00
PANAS Positive Affect	31.44 (7.01)	30.61 (6.55)	.126	.73	.04

Note: CES-D = Center for Epidemiological Studies Depression Scale, ISS = Internal States Scale, PANAS = Positive and Negative Affect Schedule.

Autobiographical Memory Specificity

Means and standard deviations for the specificities of recalled autobiographical memories are presented in Table 5.3.3. The control group recalled a greater mean number of specific memories compared to the bipolar group, with a higher mean number of general memories across memory valences recalled by the bipolar group compared to the control group.

A 2 x 2 x 2 mixed design analysis of variance (ANOVA) was conducted to investigate the presence of statistically significant between-group differences in autobiographical memory specificity across the bipolar and non-bipolar control groups, with group (bipolar vs. control) as a between-participant factor, and memory valence (specific vs. general) and memory specificity (positive vs. negative) as within-participant factors.

Table 5.3.3 Autobiographical memory specificity across the remitted bipolar and non-bipolar control groups (Means and standard deviations in parentheses)

Memory Specificity	*Bipolar Group*	*Control Group*	*Total*
All cues			
Total memories	11.33 (1.19)	11.29 (.77)	11.31 (.99)
Specific	6.39 (2.89)	10.18 (2.16)	8.23 (3.17)
General	4.94 (2.96)	1.12 (2.32)	3.09 (3.27)
Omissions	.67 (1.19)	.71 (.77)	.69 (.99)
Positive cues			
Total memories	5.72 (.46)	5.76 (.43)	5.74 (.44)
Specific	4.16 (1.47)	5.29 (.85)	4.71 (1.32)
General	1.56 (1.34)	.47 (.87)	1.02 (1.25)
Omissions	.28 (.46)	.24 (.44)	.26 (.44)
Negative cues			
Total memories	5.61 (.85)	5.53 (.62)	5.57 (.74)
Specific	2.22 (1.63)	4.88 (1.65)	3.51 (2.11)
General	3.39 (1.87)	.65 (1.69)	2.06 (2.21)
Omissions	.39 (.85)	.47 (.62)	.43 (.74)

The ANOVA revealed no main effect of memory valence ($F_{(1, 34)} = 2.06$, $p = .160$) and no interaction between valence and group ($F_{(1, 34)} = .26$, $p = .610$). A main effect of memory specificity was observed ($F_{(1, 34)} = 36.16$, $p < .001$), with both groups recalling greater numbers of specific (M = 8.23, S.D. = 3.17) than general memories (M = 3.09, S.D. = 3.27). This was further qualified by a significant interaction effect between specificity and group ($F_{(1, 34)} = 19.24$, $p < .001$), indicating that the non-bipolar control group recalled greater numbers of specific memories on the AMT (M = 10.18, S.D. = 2.16) compared to the bipolar group (M = 6.39, S.D. = 2.89), and that the control group recalled fewer general memories (M = 1.12, S.D. = 2.32) compared to the bipolar group (M = 4.94, S.D. = 2.96).

A significant interaction effect was also found between memory valence and memory specificity ($F_{(1, 34)} = 27.61$, $p < .001$), with greater numbers of specific memories recalled for positive (M = 4.71, S.D. = 1.32) compared to negative cues (M = 3.51, S.D. = 2.11), and more general memories recalled for negative (M = 2.06, S.D. = 2.21) compared to positive cues (M = 1.02, S.D. = 1.25). This interaction effect was further qualified by a significant three-way interaction effect between memory specificity, valence and group

($F_{(1,\ 34)}$ = 14.73, p < .01). T-tests were conducted to further analyse the three-way interaction (with Bonferroni correction applied for multiple comparisons, adjusted p = .0125). The t-tests confirmed that there were no differences in the quantities of specific (t(17) = 1.130, p = .275) and general memories (t(17) = -.527, p = .61) recalled for the positive and negative cue words in the control group, indicating that the non-bipolar control participants recalled similar proportions of specific and general memories for both positive and negative cues. However, a cross-over interaction effect was noted for the bipolar group, whereby the bipolar participants recalled significantly greater numbers of general memories for negative compared to positive cues (t(17) = -7.083, p < .001), but recalled fewer specific memories for negative compared to positive cues (t(17) = 7.432, p < .001).

Figure 5.3.1 Interaction effect of memory specificity and valence for the bipolar group

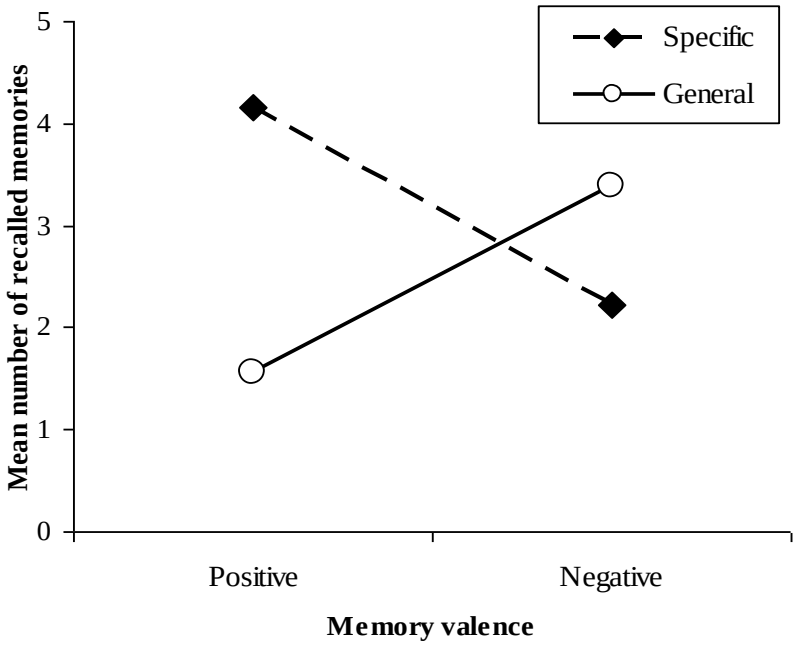
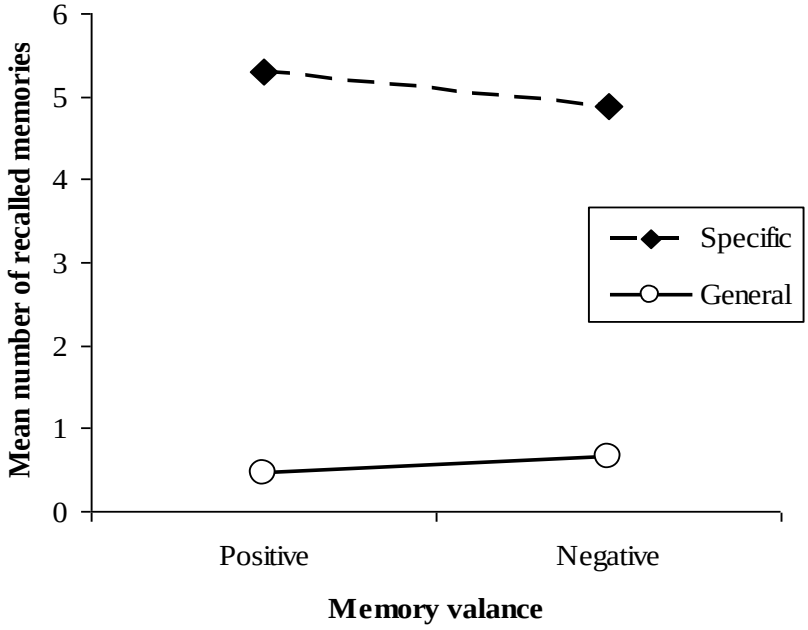


Figure 5.3.2 Interaction effect of memory specificity and valence for the control group



A Mann-Whitney test indicated that the bipolar and non-bipolar groups did not differ in the number of omissions made on the AMT task (U = 130.500, p = .405). Current hypo/manic symptoms (ISS Activation) or depressive symptoms (CES-D scores) were not significantly correlated with any of the memory specificity measures within or across groups; neither ISS Activation nor CESD required covarying in the memory specificity analyses. No significant correlations were noted between the number of hours of psychological therapies received by the bipolar group and memory specificity.

Memory Response Latencies

Table 5.3.4, below, presents the mean and standard deviations for the response latencies on the AMT according to the valence and specificity of the recalled memories, and across the bipolar and non-bipolar control groups and the sample as a whole. As shown in Table 5.3.3, faster response latencies were recorded for the control group for positive cues compared to the bipolar group, although the bipolar group appeared to be faster to recall memories for negative cues across specificities, with bipolar participants appearing to be faster to recall specific negative memories than general negative memories.

Table 5.3.4. Response latencies (seconds) on the Autobiographical Memory Test across the bipolar and non-bipolar control groups

Response Latency Mean (S.D.)	Bipolar Group	Control Group	Total
All cues			
Total	17.98 (12.51)	17.27 (4.80)	17.64 (9.44)
Specific memories	18.77 (19.37)	16.91 (5.49)	17.87 (14.24)
General memories	18.47 (13.31)	19.24 (6.23)	18.61 (12.20)
Positive memories			
All	20.94 (15.41)	15.42 (3.83)	18.26 (11.55)
Specific	20.62 (20.46)	15.30 (5.37)	18.04 (15.17)
General	23.46 (19.15)	16.82 (7.41)	22.28 (17.66)
Negative memories			
All	15.02 (10.19)	19.11 (8.31)	17.01 (9.41)
Specific	11.20 (5.84)	18.51 (8.39)	15.09 (8.09)
General	16.84 (12.12)	20.32 (3.57)	17.21 (11.51)

A series of independent samples t-tests were conducted to investigate whether statistically significant between-group differences in response latencies existed between the bipolar and control groups[5]. Four individual t-tests with Bonferroni corrections (corrected $\alpha = .0125$) were conducted to control for Type I errors through multiple testing. The t-tests indicated that whilst there were no between-group differences in the response latencies for specific positive ($t(19.458) = -1.065$, $p = .300$), for general positive ($t(15) = -.579$, $p = .571$), or for general negative memories ($t(17) = .395$, $p = .698$), participants in the bipolar group were significantly faster to recall specific negative memories (Mean response latency = 11.20 seconds, S.D. = 5.84) than the non-bipolar participants (M = 18.51, S.D. = 8.39) ($t(30) = 2.825$, $p < .01$).

5.3.4 Discussion

The current study attempted to address methodological issues highlighted in previous investigations into autobiographical memory in individuals with bipolar disorder, and to assess whether individuals in remission from bipolar disorder reported similar biases in their recall of autobiographical memories as reported in depressed and suicidal individuals.

[5] T-tests and not ANOVAs were conducted due to some participants in the control group recalling twelve specific memories on the AMT, meaning that a 2x2x2 ANOVA could not be conducted on the response latency data due to these participants not having response latencies for general memories.

Participants diagnosed with bipolar disorder reported more extreme overgeneral autobiographical memory compared to the non-bipolar participants, with the bipolar group recalling fewer specific and more general memories than the control group in line with the predictions. The bipolar participants also recalled more general memories and fewer specific memories for negative compared to positive cues, whilst the non-bipolar participants recalled similar proportions of specific and general memories for the positive and negative cues on the AMT. These results are consistent with our predictions and with previous observations (Scott et al., 2000; Mansell & Lam, 2004). The current study also provides the first data relating to the response latencies for the recall of autobiographical memories by individuals with bipolar disorder. Although the bipolar participants were more overgeneral in their autobiographical memory recall, when bipolar individuals were able to recall specifically detailed negative memories they did so more quickly than the controls. Whilst overgenerality in bipolar individuals may predominantly due to generative memory recall, a top-down recall process (Conway & Pleydell-Pearce, 2000), the fast recall of specific negative memories would suggest that individuals with bipolar disorder have ready access to self-negative information possibly through direct retrieval processes.

The overgeneral recall of autobiographical memories and the specific recall of negative memories by individuals with bipolar disorder may have an important impact upon an individual's well-being during remission. The overgeneral recall of memories is considered to arise as a consequence of mnemonic interlock, where attempts to recall specific memories are aborted in the general memory representations leading to the establishment of an over elaborated network of general memories, which is "encouraged by and itself encourages ruminative self-focus" (p. 261, Williams, 1996). The generative recall process becomes trapped within the general memory representations, leading to the overgeneral recall of memories. The prevalence of overgeneral memory during remission from bipolar disorder may explain the presence of negative rumination and subsyndromal depressive symptoms in remitted individuals diagnosed with bipolar disorder (Post et al, 2003b; Thomas et al., 2007; Van der Gucht et al., 2009). These over-elaborated networks of general memories may become easily activated during remission, which when coupled with further ruminative self-focus and dysfunctional coping strategies leads to the maintenance of depressive mood states. Indeed, previous research has suggested that whilst individuals in remission from bipolar disorder recall more overgeneral negative memories, these memories are more frequently rehearsed on a daily basis (Mansell & Lam, 2004).

Interestingly, whilst the current study suggests that individuals with bipolar disorder were more overgeneral in their memory recall than non-bipolar controls, bipolar individuals also had shorter response latencies for the recall of specific negative memories.

The fast and specific recall of negative memories by individuals with bipolar disorder suggests that some negative memories are readily available through direct memory recall. This may have an important implication on an individual's emotional well-being, particularly as specific memories are more image-based than general memories (Williams, et al., 1999; Mansell & Lam, 2004), and imagery is associated with the amplification of mood states in bipolar disorder (Holmes, Geddes, Colom & Goodwin, 2008). Although the current study did not assess whether these specific negative memories were intrusive or featured traumatic events, previous research has suggested that individuals with bipolar disorder recall high frequencies of intrusive images and memories (Tzemou & Birchwood, 2007; Gregory et al., 2010). Research has also suggested that individuals with bipolar disorder who don't experience intrusions are more overgeneral in their memory recall, lending support to the hypothesis that overgenerality can function as an emotion regulation strategy for avoiding unpleasant but non-intrusive memories (Williams, 2006; Tzemou & Birchwood, 2007). The fast recall of specific negative memories in the current study may be indicative of poor emotion regulation in the bipolar group, where individuals are unable to use abortive generative retrieval to avoid recalling unpleasant specific memories. Alternatively, the fast recall of the specific negative memories may have resulted from the presentation of negative cue words which immediately primed the recall of specifically detailed memories via direct retrieval processes (Conway & Pleydell-Pearce, 2000). However it is unclear whether this is unique to bipolar disorder as similar differences in memory specificity under direct and generative retrieval conditions have been reported in individuals with histories of past traumatic abuse (Hauer et al., 2008). Although the mode of memory retrieval may determine the specificity and speed of recall in bipolar samples, this may be a more transdiagnostic process and not limited to bipolar disorder.

Another possibility is that the frequent recall of specific negative memories following environmental cues leads to the development of direct associative links between the cue and recalled memory. The establishment of these associative links may result in the direct, automatic, and fast recall of specific negative memories following a commonly encountered cue, similar to the associative route to emotion described by the SPAARS framework (Power & Dalgleish, 1997; Jones, 2001). As these specific negative memories become more automatically recalled they would become increasingly experienced as "coming out of the blue" (Jones, 2001), and may be appraised as unpleasant, intrusive and distressing (Tzemou & Birchwood, 2007). The establishment of these direct associative links would mean that the individual is unable to suppress or avoid the recall of these specific negative memories through generative memory recall, which would ordinarily result in the generation of an overgeneral memory and the avoidance of recalling

particularly unpleasant memories in specific detail (Williams, 2006). However, due to a lack of transdiagnostic studies into autobiographical memory specificity it is unclear whether these associative memory processes are unique to bipolar disorder

From a methodological perspective, there is an ongoing discussion regarding the role of task instructions upon memory specificity, with the suggestion that a poor memory for AMT task instructions is associated with greater overgenerality (Yanes, Roberts & Carlos, 2008). Whilst the bipolar sample in the current study demonstrated marked overgenerality compared to the control participants, the majority of participants retained and repeated the specificity instructions when attempting to recall a specific memory. Although the current study did not explicitly test the participant's memory for the task instructions, participants in the bipolar group still generated more generic descriptions of their autobiographical memories despite having appeared to retain the specificity instructions, suggesting that overgenerality in bipolar samples may not be simply due to poor memory for task instructions. As per Study Seven, the experimenter was not blind to the participant's group membership, however, the independent raters were not aware of whether the participants were part of the bipolar or control groups, and high levels of inter-rater reliability were noted across raters. Although the experimenter could influence whether participants feel more or less comfortable in recalling personal memories on the AMT task, it is unlikely that the experimenter can influence memory specificity to a great extent given the independent coding check conducted as part of the AMT.

There are some additional limitations to consider with Study Eight. As the control participants were not screened for family histories of mental health disorders this may have led to the recruitment of individuals who may be highly vulnerable to bipolar disorder. Future studies should consider screening the family histories of control participants and using standard clinical interviewing assessments to ensure that control group volunteers have not experienced past mental health problems, especially as such individuals may not have sought medical help but may have experienced clinically significant symptoms. In addition, it was not possible to fully account for various clinical variables and their effects upon memory specificity due to the small-scale nature of the study, such as the effects of CBT and substance use. Participation in CBT has been associated with post-therapy improvements in memory specificity in depressed individuals (e.g., Williams et al., 2000; McBride et al., 2007). Research has also suggested that the active use of substances is associated with overgenerality, particularly current cannabis use (Gandolphe & Nandrino, 2011). Although participants with diagnosed substance use disorders were screened out of Study Eight, no study has yet considered how current substance use is associated with memory specificity in bipolar samples or how the lifetime use of substances may affect

autobiographical memory specificity. It may be reasonable to suspect that the lifetime use of illicit substances may contribute to impairments in the ability to recall specific autobiographical memories given the high prevalence of co-morbid substance use disorders and substance use in individuals diagnosed with bipolar disorder (Regier et al., 1990; McElroy et al., 2001; Merikangas et al., 2007; Agrawal et al., 2011). Future investigations should consider the role of both past and current substance use upon autobiographical memory and executive processing capacities. Although the results may suggest that the bipolar participants could have been avoiding recalling some unpleasant negative memories through abortive generative memory recall, as the current study did not include a measure of avoidant coping styles, such as those used by Hermans et al (2005), it is unclear whether these results are truly due to an avoidant emotion regulation strategy.

The recruitment of participants diagnosed with bipolar disorder was also reliant upon the SCID interview (First et al., 2002a; 2002b), where participants were classified as in remission if they had not experienced any bipolar symptoms within the past four weeks. However, the formal DSM-IV-TR criteria for remission are for two months free of symptoms (APA, 2000). The participants in Study Eight may have been experiencing some subsyndromal mood symptoms as suggested by the elevated CES-D depression scores. However, the current study and previous research has indicated that memory specificity is not associated with current bipolar symptoms (Van der Gucht et al., 2009). Taking these points into consideration, future memory studies may need to carefully consider how to screen individuals in remission from bipolar disorder, and will also need to incorporate measures of current mood symptoms to ensure that patterns of memory specificity in "remitted" bipolar individuals may not just be the result of subsyndromal mood symptoms.

5.3.5 Conclusions

In sum, the results of Study Eight support previous observations of overgenerality in autobiographical memory recall in bipolar disorder, particularly in the generative recall of general negative memories, but suggest that bipolar individuals have ready access to some specific negative memories potentially through more direct forms of memory recall. Study Eight successfully addressed methodological issues highlighted in previous research and suggests that overgeneral memory in bipolar disorder is not simply due to the use of non-standardised assessments of autobiographical memory specificity. The results of the current study also highlights the need for future research into the basic scientific processes underlying autobiographical memory specificity in bipolar disorder, and suggests some important avenues for future investigations, particularly into the nature of generative versus direct forms of memory recall in individuals diagnosed with bipolar disorder.

Section 5.4

General Discussion for Studies Seven & Eight

5.4.1 General Discussion

Two studies were conducted to investigate the specificity of autobiographical memory recall in individuals identified as possessing personality traits which act as a predisposition for experiencing hypomania and developing future bipolar disorders (Study Seven), and within a sample of individuals who have been diagnosed with bipolar disorder currently in remission from symptoms (Study Eight).

Study Seven investigated autobiographical memory specificity in individuals at a low, moderate or high risk for hypomania using the standardised AMT. Individuals at a high risk for hypomania were more overgeneral in their recall of both positive and negative autobiographical memories compared to moderate and low risk individuals, consistent with previous observations made in remitted bipolar individuals (Scott et al., 2000). This pattern of increased overgenerality was in contrast to Delduca and colleagues' (2010) study who reported that high-risk participants recall more specific negative memories than low-risk individuals, and were faster to recall memories than low-risk individuals. However, no between-group differences in response latencies were noted in Study Seven, although specific memories were recalled in shorter response latencies than general memories. Although the results of Study Seven contrast with the previous study conducted in an at-risk sample (Delduca et al., 2010), both studies sampled participants from the same university community, used similar sample sizes, and similar mean scores on the Internal States Scale measure of bipolar symptoms were reported by the high and low groups across studies. These similarities suggests that the differences in results are not due to differences in sample characteristics but may instead be related to procedural differences between studies, possibly in relation to the cue words used by the studies.

Study Eight replicated the AMT procedure from Study Seven in a sample of individuals diagnosed with bipolar disorder, who were currently in remission from symptoms, and a control group of non-bipolar individuals who were matched for age and gender with the bipolar participants. The results of Study Eight indicated that the bipolar group reported greater overgenerality in autobiographical memory recall compared to the control group consistent with previous observations (Scott et al., 2000). Furthermore, the remitted bipolar participants recalled more general and fewer specific negative memories, consistent with previous work (Mansell & Lam, 2004). Study Eight also provided the first evidence regarding the time taken to recall autobiographical memories by individuals with bipolar disorder (the "response latency"). The results suggested that whilst bipolar disorder

is primarily characterised by an overgeneral memory bias, individuals with bipolar disorder appear to have fast and ready access to memories relating to specific emotionally negative events. These results are consistent with the two proposed forms of memory recall as described by Conway & Pleydell-Pearce (2000), where individuals with bipolar disorder report more overgeneral memories during generative recall, but are able to recall specific negative memories in short response latencies due to more direct memory recall processes. Whilst this should be treated as preliminary evidence, future investigations should consider manipulating memory recall processes and assessing memory specificity in bipolar individuals. For example, Hauer and colleagues (2008) have previously manipulated the imageability of memory cue words in order to elicit direct and generative forms of memory recall within a clinical sample, with highly imageable cues considered to immediately activate the specific memory representations leading to direct memory recall.

The results of Study Eight further extend Scott and colleagues' (2000) investigation into memory specificity in bipolar disorder by suggesting that whilst bipolar disorder is associated with a propensity to recall memories in general levels of detail, individuals diagnosed with bipolar disorder appear to have ready access to some specific negative memories. This suggests some interesting avenues for future research, in particular the nature of generative versus direct forms of memory recall in bipolar disorder. Despite bipolar disorder being associated with greater overgenerality, individuals diagnosed with bipolar disorder appear to have ready access to some specific memories for emotionally negative events, although it is unclear why certain specific negative events are recalled faster than other negative memories.

In relation to the wider theoretical implications of these studies, there is support for the notion that there exists a continuum of increasing overgeneral memory severity incorporating low to high risk individuals through to individuals with formal bipolar diagnoses. The results of Study Eight, in particular, are consistent with psychological models of bipolar disorder which highlight the role of self-negative processes and cognitions in the experience of bipolar disorder, particularly the Depression Avoidance Hypothesis and the (negative) Ruminative Responses literatures. The tendency by individuals in remission from bipolar disorder to recall autobiographical memories in general levels of detail may result from the engagement in ruminative thought processes, and the subsequent establishment of over-elaborated networks of general memories as suggested by Williams' (1996) mnemonic interlock concept. Indeed, propensities to engage in ruminative responses to both positive and negative experiences have been reported in bipolar samples (Johnson et al., 2008a), with the negative rumination remaining prevalent even during remission from symptoms (Thomas et al., 2007; Van der Gucht et

al., 2009). One possibility is that the availability of general memories during remission from bipolar disorder encourages ruminative thought processes, as described by mnemonic interlock (Williams, 1996), and may explain the prevalence of subsyndromal depressive symptoms and prolonged ruminative self-focus in individuals in remission from bipolar disorder (Post et al., 2003b; Thomas et al., 2007).

There is also some evidence to suggest that individuals with bipolar disorders are highly sensitive to self-negative information (Bentall & Thompson, 1990; French et al., 1996), possess negative attributional styles (Lyon et al., 1999; Knowles et al., 2007) and have low underlying self-esteem despite outward appearances of high self-esteem (Winters & Neale, 1985), which may reflect latent negative self-beliefs and schemas of low self-worth (Bentall et al., 2006). Interestingly, a qualitative analysis of the memories recalled by Mansell and Lam's (2004) participants indicated that autobiographical memories were associated with themes relating to a pervasive negative self-concept (Mansell & Hodson, 2009). The direct availability of some specific negative memories in bipolar individuals, as suggested by the current study, would lend support to these observations and could suggest that individuals diagnosed with bipolar disorder may be unable to avoid certain negative unpleasant memories through overgenerality, with those memories possibly relating to a higher-order negatively biased self-concept consistent with the Depression Avoidance Hypothesis (Neale, 1988; Bentall et al., 2006).

Although Study Eight addressed methodological issues in the investigation of autobiographical memory in individuals currently in remission from bipolar disorder, it is still unclear how memory specificity differs between currently manic and depressed bipolar individuals. Whilst Van der Gucht and colleagues (2009) administered the AMT to groups of currently manic, depressed and euthymic bipolar individuals, they only reported between-group differences in the recall of specific but for not general memories. It is unclear whether bipolar mood episodes were associated with overgeneral memory recall in Van der Gucht and colleagues' study, as has previously been suggested (Tzemou & Birchwood, 2007). There is also the practical issue of whether currently unwell bipolar individuals are able to fully engage with the AMT procedure, or whether autobiographical memory specificity during severe depressive and manic episodes is affected by extreme mood disturbances.

There are a number of strengths associated with the research presented within this section. Both studies Seven and Eight utilised standardised assessments of autobiographical memory specificity, in the form the cued-memory AMT task, and used a range of cue words to prime a range of positive and negative memories. Previous research has used sets of negatively biased cue words (Delduca et al., 2010), or have deviated from

the standard AMT procedure (Mansell & Lam, 2004), which may have unintentionally confounded results. Whilst there has been one previous investigation using the standard AMT procedure in a remitted bipolar sample (Scott et al., 2000), there had been no subsequent attempt to replicate their study using the standardised AMT procedure within a sample of remitted bipolar individuals.

There are a number of considerations for future investigations into memory specificity following the current research. Whilst both studies focused upon addressing methodological issues in the assessment of autobiographical memory in previous studies, neither study assessed the extent to which executive processing capacities may have influenced memory specificity. Executive processes are considered to moderate autobiographical memory recall processes (Conway & Pleydell-Pearce, 2000), with research indicating that reductions in processing capacities are associated with greater overgenerality (Dalgleish et al., 2007; Ros et al, 2010). However, none of the previous investigations in memory specificity in bipolar samples had evaluated the effect of executive processing capacities upon memory specificity, so this criticism is not just limited to the current research. Ruminative thought processes have also been associated with reduced memory specificities (Lyubormirsky et al., 1998), and with reduced executive processing capacities (Watkins & Brown, 2002; Philippot & Brutoux, 2008). However, neither positive nor negative forms of rumination were significantly associated with the specificity of autobiographical memory in Study Eight. Future evaluations of memory specificity require the assessment of executive processing capacities and ruminative thought processes and their effects upon memory, both of which are components of the CaRFAX framework as detailed by Williams (2006).

From a methodological perspective, it is recommended that future studies adopt the standardised AMT procedure and a balanced set of cue words which prime emotionally positive and negative experiences relevant to bipolar disorder. As the current study has suggested that direct and generative memory recall processes may be associated with different memory specificities, future research should consider the mode of memory recall as well as the psychological processes underlying memory specificity. In relation to this, Study Eight was not sufficiently powered to allow for the analysis of whether trait positive and negative rumination were associated with memory specificity. Future investigations will require better powered designs than the current study. Ideally, studies should incorporate two control groups, including a clinical comparison group of individuals with major depressive disorder and a healthy control group, to more stringently investigate whether bipolar disorder is characterised by an overgeneral memory bias.

Finally, from a wider theoretical perspective, none of the main psychological theories for bipolar disorder provide an adequate description of how autobiographical memory specificity is related to the experience of bipolar disorder. There is a clear need for future investigations into the processes implicated in autobiographical memory recall in bipolar individuals as previously suggested, but also in the development of robust theoretical frameworks which integrate the more basic cognitive processes with higher-order processes (e.g., self-appraisal) within the development of symptoms and experience of bipolar disorder.

5.4.2 Conclusions

The current section detailed two studies which investigated the specificity of autobiographical memory recall in individuals at-risk for hypomania and future bipolar disorder, and in individuals diagnosed with bipolar disorder and a group of non-bipolar controls. Study Seven reported that the higher risk for hypomania was associated with increased overgenerality in memory recall compared to low and moderate risk participants, in contrast to previous observations (Delduca et al,. 2010), although no specific effects of valence upon memory specificity were noted. Study Eight observed that individuals with bipolar disorder reported more extreme overgenerality in autobiographical memory than non-bipolar control participants, with tendencies to recall greater numbers of negative memories and fewer specific negative memories compared to positive memories by the bipolar participants. This pattern of memory recall in the bipolar group may be indicative of avoidance of unpleasant memories through generative memory processes as suggested by the functional avoidance mechanism described in Williams' (2006) CaRFAX model. Despite this possibly trait-based tendency to be overgeneral, bipolar individuals also recalled specific negative memories in faster response latencies than controls. Both studies suggest avenues for further research into memory specificity in bipolar disorder, particularly into the mode of memory recall and the effects of generative versus direct recall processes upon symptom courses in individuals diagnosed with bipolar disorder.

Section 6

General Discussion

The research presented within this thesis was motivated by the limitations of the previous investigations into the nature of autobiographical memory specificity in bipolar disorder, and also the limited understanding of how the specificity of memory recall is associated with the vulnerability to hypomania and future bipolar disorders. A series of eight studies were conducted under five broad research aims.

6.1 *Research Aim 1* - Investigate the associations between positive and negative cognitive style measures implicated in mood disorders

Research Aim 1 was to further investigate the associations between positive and negative cognitive styles associated with bipolar disorder in relation to the vulnerability to hypomania. Two studies were conducted as part of this research aim. Study One investigated the cross-sectional associations between measures of positive and negative cognitive styles, including rumination and self-appraisal styles which have been implicated in the exacerbation of mood symptoms and the development of mood disorders, and also investigated the similarity and potential redundancy of these measures through a principal components analysis. Study Two consisted of a six month follow-up of Study One and investigated which of the positive and negative cognitive style measures were associated with prospective bipolar mood symptoms.

The results of Study One indicated that the whilst vulnerability to hypomania was associated with both positive and negative forms of rumination and self-appraisal, only cognitive style measures relating to attempts to increase and maintain positive emotional states were associated with the vulnerability to hypomania when accounting for concurrent subclinical mood symptoms. Current depressive symptoms as measured by the CES-D scale were correlated with cognitive styles associated with the reduction of positive mood states and the maintenance of negative moods, including a lack of self-focused positive rumination. The measures in Study One were reduced to three components relating to cognitive styles that attempt to increase positive affect, increase negative affect, and a normalisation of experiences component, reflecting a reappraisal process.

Study Two, a six month follow-up of participants from Study One, indicated that the engagement in negative cognitive styles was prospectively associated heightened mood symptoms, including sub-clinical forms of hypo/manic, depression and interpersonal conflict as measured by the Internal States Scale. However, positive cognitive styles, and the positive style component produced in Study One, were negatively correlated with

prospective depressive symptoms and were not significantly correlated with follow-up hypo/manic symptoms. This latter finding is contrary to suggestions that cognitive thought patterns that amplify positive mood states are associated with exacerbations in manic symptoms in individuals vulnerable to hypomania (Feldman et al, 2008). One explanation is that cognitive responses to positive affect may only increase moods and hypo/manic symptoms in the short-term in at-risk individuals, and that more negatively biased thought processes are implicated in the development of not just depressive but also hypomanic symptoms over long periods of time. In relation to this, Study Two noted that only the reporting of negative life events experienced between time-points were associated with increases in hypomania vulnerability scores. Although hypomania vulnerability appears to be cross-sectionally associated with positive cognitive style biases, negative cognitive processes and negative life events appear to be prospectively associated with an increased vulnerability to hypomania. However, there remains a relative dearth of research investigating the prospective associations between cognitive styles and mood symptoms within vulnerable samples for bipolar disorder.

6.2 *Research Aim 2* - Investigate the cognitive vulnerability to hypomania: autobiographical memory specificity, problem-solving capabilities, and positive and negative rumination

Three studies were conducted as part of Research Aim 2. Study Three described the development of the UMEPS means-end problem solving task. Study Four performed a further validation of the UMEPS in a separate sample and investigated how problem-solving capabilities are associated with appraisals of defeat and entrapment implicated in depression and suicidality. Study Five investigated the cognitive vulnerability to hypomania in relation to autobiographical memory specificity, positive and negative rumination, and problem-solving effectiveness as measured by the UMEPS, to investigate whether similar patterns of cognitive vulnerabilities are associated with hypomania as previously suggested for depression.

Study Three detailed the development of the UMEPS task, a process-focused measure of psychosocial problem-solving. Whilst self-report questionnaire measures of problem-solving exist, these measures do not necessarily measure the *process* of solution generation but more appraisals of low confidence in problem-solving. It has been suggested that problem-solving appraisals may be symptomatic of low-esteem during depressed states and also a contributing factor to the development of depressive symptoms (Dixon et al., 1993). Therefore, the UMEPS task was designed to feature a range of problematic situations which were likely to be encountered by student populations in order

to avoid the reliance upon measures of more generic participant-made appraisals of their own problem-solving abilities. Performance on the UMEPS was compared to current depressive symptoms and the use of resourcefulness behaviours in problem-solving. It was hypothesised that more effective problem-solving as measured by the UMEPS task, in terms of the generation of more relevant solution means, more specifically detailed and more effective solutions would be associated with greater resourcefulness and with reduced depressive symptoms.

Indeed, current depressive symptoms were associated with lower resourcefulness, the generation of fewer relevant solution steps to problems and with less specifically detailed solutions. In contrast, resourcefulness was associated with the generation of more relevant solution steps, with more effective and more specifically detailed solutions as rated by an observer. The number of relevant solution means generated on the UMEPS also differentiated between groups of students reporting high and low levels of depressive symptoms, in accord with previous studies in clinically depressed individuals (e.g., Marx et al., 1992). In contrast to Study Three, a student version of the MEPS task developed in a North American sample had failed to demonstrate that the generation of solutions differentiated between students reporting high and low severities of current depressive symptoms (Blankstein et al., 1992).

Study Four aimed to further validate the UMEPS task in a separate sample and investigate whether self-appraisals of defeat and entrapment implicated in the development of depression and suicidality are associated with differential components of problem-solving. Previous studies had only investigated the associations between defeat and entrapment in relation to confidence in problem-solving and not solution generation (Taylor et al., 2010b). As there is some debate as to whether defeat and entrapment represent the same construct, relating to perceptions of failure without available means to escape (Taylor et al, 2009), or inter-related but qualitatively different constructs (Gilbert & Allen, 1998), Study Four explored whether separate or combined defeat and entrapment constructs were associated with problem-solving capabilities. Partial correlations controlling for the effect of current depressive symptoms indicated that whilst defeat was associated with more pessimistic self-appraisals of solution effectiveness, entrapment was associated with the generation of irrelevant and unfocused solutions to problematic situations. These associations were also supported in mediation analyses. In sum, Study Four suggested that the associations between depression and poorer problem-solving may be better explained by the differential associations between defeat and entrapment. These associations also appeared to be consistent with a model of social problem-solving (D’Zurilla & Goldfried, 1970; D'Zurilla & Nezu, 1990; Bell & D’Zurilla, 2009), whereby

defeat appears to represent a negative problem-solving orientation, relating to negative self-appraisals of problem-solving abilities, but entrapment relates to an ineffective problem-solving style, relating to the use of poor strategies to address and overcome problems (Bell & D'Zurilla, 2009).

Study Five investigated between-group differences in rumination, problem-solving and autobiographical memory specificity across high and low-risk individuals for hypomania. Individuals at a higher risk for hypomania reported greater tendencies to engage in both positive and negative rumination, poorer problem-solving and greater overgeneral memory than low-risk participants. However, only tendencies to engage in self-focused positive rumination, depression-focused negative rumination, and the recall of negative general memories differentiated between the high and low-risk groups once concurrent bipolar mood symptoms were accounted for. Although these results are broadly consistent with observations made in bipolar samples (e.g., Scott et al., 2000; Mansell & Lam, 2004; Johnson et al., 2008), the lack of significant between-group differences in problem-solving once current mood symptoms are controlled for is consistent with observations made in a similar study which compared group membership between individuals diagnosed with bipolar disorder and healthy controls (Scott et al., 2000). Similar patterns of cognitive vulnerability in relation to hypomania as previously suggested for depression were observed, in relation to negative rumination and overgeneral memory, although the higher risk for hypomania was also associated with self-focused forms of positive rumination but not poorer problem-solving. Poorer problem-solving appeared to be better explained by current mood symptoms and may not form part of a trait-based vulnerability to hypomania.

6.3 *Research Aim 3* - Investigate the relationship between the specificity of goal-related autobiographical memory and extreme goal-pursuit

Study Six was a preliminary investigation into the associations between goal-sensitivity and the specificity of goal-related memories in relation to hypomania vulnerability. As previous research had suggested that the association between goal-directed behaviours and hypomania vulnerability is independent of current bipolar mood symptoms (Gruber & Johnson, 2009), Study Six investigated whether a trait-based bias in goal-related memory recall may explain the relationship with extreme goal pursuit in hypomanic individuals.

A non-clinical sample of 165 participants completed self-report measures of extreme goal-planning, reward sensitivity, hypomania vulnerability, sub-clinical bipolar mood symptoms, and sentence completion measures of the specificity of autobiographical memories for past goal-related events and of future event imagination. The vulnerability to

hypomania was associated with the recall of semantic associate information for past goal-related successes, relating to generalised information about the self for past accomplishments, as well as with the imagining of future repeated successes, the setting of extreme extrinsic goals with potential public rewards and increased behavioural activation, independent of current depressive and hypo/manic mood symptoms. Tendencies to recall semantic information about the self in relation to past goal-related successes were also associated with the pursuit of extreme extrinsic goals on the WASSUP, including creative accomplishments and world influence, heightened behavioural activation but lower behavioural inhibition.

The results of Study Six were consistent with previous observations that extreme goal-planning and hypomania vulnerability are not simply due to current bipolar mood symptoms (Gruber & Johnson, 2009), but also suggest that the recall of generalised memories for past goal-related successes is associated with extreme goal-striving in hypomanic individuals. Although future investigations are required, one suggestion is that high-risk individuals may over-embellish past goal accomplishments in the form of memories via positive ruminative thought processes, which may in turn contribute to increases in positive affect, goal-directed behaviours, and hypo/manic symptoms.

6.4 *Research Aim 4* - Investigate the specificity of autobiographical memory in individuals at a low, moderate and high risk for hypomania

Study Seven was conducted to investigate Research Aim 4, and was a partial replication of a previous AMT study (Delduca et al., 2010). Study Seven investigated memory specificity using the AMT in three groups of HPS scorers (low, moderate, and high). Individuals at a higher risk for hypomania reported more extreme overgeneral autobiographical memory compared to moderate and low-risk individuals, with no specific effects noted for the recall of positive or negative memories. Whilst no between-group differences were noted in the time taken to recall memories in response to cues, specific memory representations were recalled in faster response times than general memories.

Study Seven represents the second attempt at investigating autobiographical memory specificity within an at-risk sample for bipolar disorders using the standardised AMT paradigm. In contrast to Delduca and colleagues' (2010) study which suggested that hypomania vulnerability is associated with the faster and more specific recall of negative memories, Study Seven suggested that the higher risk for hypomania is associated with an increased overgeneral memory bias, but found no between-group differences in response latencies. Studies Five to Seven suggest that the higher risk for hypomania and future bipolar disorders is associated with an increased overgeneral memory bias across a range

of memory assessments, similar to observations made of overgenerality in bipolar samples (e.g., Scott et al., 2000; Mansell & Lam, 2004; Tzemou & Birchwood, 2007), indicating that increased overgenerality may function as a risk factor for bipolar disorder.

6.5 *Research Aim 5* - Investigate the specificity of autobiographical memory in remitted bipolar individuals and matched non-bipolar controls: is there evidence for an overgeneral recall bias for negative autobiographical memories?

Study Eight investigated the specificity of autobiographical memory within a sample of individuals diagnosed with bipolar disorder currently in remission from symptoms, and a sample of healthy non-bipolar controls. Whilst there have been a small number of studies conducted within bipolar samples, some of these studies had diverged from the standardised AMT procedure (Mansell & Lam, 2004; Gregory et al., 2010), or had sampled participants across different phases of bipolar disorder (e.g., Tzemou & Birchwood, 2007; Van der Gucht et al., 2009), meaning that it was somewhat unclear as to what form of an overgeneral memory bias is associated with bipolar disorder in remission, which may function as a vulnerability factor for future relapse. Study Eight adopted the standardised AMT procedure used in Study Seven to assess autobiographical memory specificity.

The results of Study Eight indicated that individuals in remission from bipolar disorder reported more extreme autobiographical overgeneral memory than the non-bipolar controls, consistent with previous observations (Scott et al., 2000; Tzemou & Birchwood, 2007). Individuals with bipolar disorder were also faster to recall specific negative memories than controls, although there were no other between-group differences in response latencies. These results suggest a possible dichotomy in the recall of autobiographical memories, whereby bipolar disorder would appear to be associated with a general trait-based tendency to be overgeneral during generative memory recall but may have more direct access to some specific memories for negative events. Study Eight is the first study to report data relating to the response latencies for memory recall in bipolar individuals, and suggests some intriguing questions for further research.

6.6 *Discussion of results across studies*

A number of common patterns and themes have emerged across the studies conducted within this thesis. In terms of ruminative thought processes, individuals at a higher risk for hypomania demonstrated tendencies to engage in rumination in response to both positive and negative events. Although, Study One suggested that hypomania vulnerability was

primarily cross-sectionally associated with positive cognitive styles, a six month follow-up suggested that negative forms of rumination were associated with increased prospective bipolar symptom severities, including depressive and hypo/manic symptoms. In addition, increases in the self-reported vulnerability to hypomania were associated with the reporting of negative life events between time points. Although positive ruminative cognitive styles are considered to contribute to the development of manic symptomatology (Feldman et al, 2008), positive rumination may only contribute to short term increases in mood and symptoms.

That positive forms of rumination may only be associated with short-term boosts in mood may be consistent with the results of Study Six, which discussed how self-focused positive rumination may assist in the over embellishment of generalised self-focused accounts of past goal related successes. This over-exaggeration of past goal successes via rumination may contribute to increased positive affect, goal-directed behaviours, grandiose thoughts about the self, and activated (hypomanic) symptoms, and may fundamentally constitute a depression avoidance mechanism through excessive positive ruminative thought processes and biased memory recall.

Further investigations are required to assess the precise time course of these positive ruminative strategies and whether these positively focused cognitive styles contribute to short term or longer term increases in positive affect and in hypo/manic symptoms. If this short-term positive rumination represents a depression avoidance strategy, possibly to cope with self-negative cognitions and schemas, the prospective associations between negative cognitive styles and bipolar mood symptoms in Study Two may reflect that positive rumination is only associated with short-term increases in mood in vulnerable individuals. The positive rumination measure used in this thesis (the Responses to Positive Affect Scale; Feldman et al., 2008) has not yet been used with currently manic, hypomanic or depressed bipolar patients, so it is not fully clear how positive and negative rumination are associated with clinically significant bipolar mood episodes.

In relation to problem-solving, whilst Study Five suggested that high-risk individuals performed more poorly on the UMEPS problem-solving task than low-risk participants, these between-group differences disappeared once concurrent mood symptoms were accounted for. An alternative proposition is that hypomanic individuals may only be motivated to participate in problem-solving behaviours where there are clear goal-related outcomes. There is some evidence to suggest that individuals vulnerable to hypomania are highly sensitive to rewards associated with goal-attainment (Johnson & Carver, 2006; Jones et al., 2007) and engage in approach behaviours to goals (Jones et al., 2007). Individuals with hypomanic tendencies may only fully engage in problem-solving

approach behaviours when the resolution of problematic situations is associated with a definite reward, similar to the sensitivities to extrinsic goals associated with hypomania vulnerability in previous research (Gruber & Johnson, 2009). Alternatively, problematic situations may be appraised as having a low-reward value, as resolving the problem may only assist in escaping a negative situation and not assist in accomplishing a significant and extrinsically rewarding goal. Hypomanic individuals may be more likely to avoid problematic situations and instead use more distraction-based responses, and endorse the use of risky and dangerous activities as responses to negative experiences as suggested by previous research (Thomas & Bentall, 2002). Although the UMEPS studies presented within this thesis did not consider the possible role of problem-solving outcomes upon the engagement in solution generation behaviours, whether individuals at a heightened vulnerability to hypomania are more likely to generate solution means to problems associated with high and public reward may be an interesting avenue for future research to explore.

Four studies conducted separate investigations into the specificity of autobiographical memory recall in relation to the vulnerability to hypomania and the experience of bipolar disorder. The first study, Study Five, investigated between-group differences in memory specificity, rumination and problem-solving in high and low-risk individuals for hypomania. Study Five observed that individuals at a higher risk for hypomania recalled fewer specific positive memories and greater numbers of general negative memories than low-risk individuals on a sentence completion measure of memory specificity.

Study Six, a preliminary investigation into the relationships between memory specificity and goal-pursuit, suggested that the higher risk for hypomania is associated with the recall of generalised semantic information about the self in relation to past goal-related successes. The tendency to generate semantic associates for past goal-related successes was also associated with the planning of extreme extrinsic goals, including goals relating to celebrity fame and worldwide influence. These associations were independent of current mood symptoms and suggests that the heightened sensitivity towards goals in hypomanic individuals may be in part explained by goal-related memory recall biases. As generalised memory representations do not describe specific behavioural plans to accomplish goals, but more goal-related outcomes (Conway & Pleydell-Pearce, 2000), Study Six's results suggest that the tendency to strive for extreme goals may be related to the over embellishment of past successes and the overly positive interpretation of propositional information about the self in the form of generalised memories. Whilst previous research conducted within a bipolar sample had suggested that hypomanic episodes can be

associated with mental imagery relating to future positive events (Gregory et al, 2010), Study Six was the first investigation into goal-related memory processes in relation to hypomania vulnerability.

Study Seven investigated the specificity of autobiographical memory within individuals at a low, moderate or high risk for hypomania using the AMT. Individuals at a higher-risk for hypomania reported more extreme overgeneral autobiographical memory than moderate and low-risk individuals. Study Eight replicated Study Seven's AMT procedure and reported that individuals in remission from bipolar disorder reported more extreme overgenerality for negative memories than a matched group of non-bipolar healthy controls. Convergent evidence has been provided by these four studies to suggest that the vulnerability to hypomania and the experience of bipolar disorder is associated with an overgeneral memory bias.

6.7 Methodological Considerations

6.7.1 *Assessing the Specificity of Autobiographical Memory*

A considerable challenge in researching the specificity of autobiographical memory recall is the measurement of memory specificity. Two different forms of memory assessments were used in the current thesis, the standardised cued memory paradigm, the "Autobiographical Memory Test" (Williams & Broadbent, 1986), and sentence completion measures of memory specificity (SCEPT: Raes et al., 2007) and of future event imagination (Anderson & Dewhurst, 2009).

In the current thesis, individuals at a higher risk for hypomania reported more extreme overgenerality on the AMT and sentence completion measures (Studies Five, Six and Seven). The results of these studies raise further questions about the previous AMT study conducted in samples of individuals at low and high risk for hypomania (Delduca et al., 2010), which reported that high-risk individuals were more specific in their memory recall than low-risk individuals on the AMT task. Study Five also supported Raes and colleagues' (2007) claim that the SCEPT task is more sensitive measure of overgeneral autobiographical memory compared to the cued AMT task, with greater numbers of sentence completions made in reference to general than specific memories across low and high-risk groups. Study Seven, in comparison, noted that participants across groups were more likely to recall specific than general memories in response to cue words on the AMT.

Whilst the AMT has remained the most widely used measure of memory specificity across a range of clinical and non-clinical studies, a number of concerns have been highlighted in the use of the AMT. These concerns include the reduced anonymity of the

participant when completing the face-to-face AMT, meaning that participants may be more guarded in their memory recall and less likely to fully disclose information relating to their memories for past experiences for fear of embarrassment. The extent to which responses on the face-to-face AMT may be affected by the experimenter is unclear, particularly as the experimenter was not blind to the group status of participants in the two AMT studies presented in this thesis. Possible experimenter effects upon participant responses on the AMT have not yet been debated within the research literature, although experimenter bias may have affected cue word presentation. Indeed a recent review has highlighted differences across studies in the presentation of cues and in the time limit to recall memories as possible contributing factors to the variability of results between studies investigating overgeneral memory (Griffiths et al., *in* press). Although it may not always be possible to ensure that the experimenter is blind to the group status of participants in AMT studies, future studies should include group-blind independent coders and interviewers to minimise possible experimenter bias. Internet-based studies remove any experimenter influence from performance on the memory recall task, assuming that participants may be more truthful and honest in their recall of memories through increased anonymity (e.g., Studies Five and Six). The AMT also requires the selection of balanced cue words to ensure that a range of positive and negative memories are primed for recall.

There has also been some research to suggest that the specificity of autobiographical memory recall on the AMT may be influenced by a participant's memory for task instructions (Yanes et al., 2008). It has been argued that the use of extensive instructions, practice trials, and the repetition of specificity prompts during the AMT may lead to non-clinical individuals who are habitually overgeneral to overcome their overgeneral tendencies and recall specific memories under the conditions of the AMT (Raes et al., 2007, Debeer, Hermans & Raes, 2009). Interestingly, a "minimal instructions" version of the AMT, which omits the specificity instructions, has been reported to detect higher prevalences of overgeneral memory in non-clinical student participants than the traditional AMT instructions (Debeer et al., 2009). As previously discussed, participants diagnosed with bipolar disorder appear to retain the specificity instructions during the AMT task described in Study Eight, and would often repeat the instructions when attempting to retrieve a specific memory. Although neither of the AMT studies in this thesis assessed participants' memory for task instructions, participants across studies appeared to retain the specificity instructions across trials despite recalling overgeneral memories.

6.8 *Strengths & Limitations of the Current Thesis*

There are a number of strengths and limitations to consider in relation to the research presented in this thesis. A key strength of the current research is the use of a variety of methodological approaches across studies, including the use of validated self-report questionnaire measures of mood, cognitive styles (e.g., rumination, appraisal styles), the development and application of a new process-focused measure of problem solving (the "UMEPS" task), and the use of standardised memory recall assessments including the AMT and sentence completion tasks to assess memory specificity in individuals vulnerable to hypomania and future bipolar disorders.

The studies conducted in the thesis have used Eckblad and Chapman's (1986) Hypomanic Personality Scale (HPS) as a measure of the vulnerability to hypomania and future bipolar disorders. As discussed in the study chapters, mean scores on the HPS reported in the current thesis were consistent with scores reported in previous studies conducted within similar British student samples using the "pure" HPS scale (e.g., Dodd et al., 2010). Although a minority of studies have mixed the items of the HPS in order to address potential participant response bias (e.g., Meyer & Hofmann, 2005), research has failed to find evidence of associations between HPS scores and socially desirability using the pure HPS scale (Johnson et al., 2008a), and there is no clear evidence that mixing items improves the sensitivity of the HPS. The use of the pure HPS scale in the current thesis has been justified given the high degree of consistency between mean HPS scores reported in the studies described in this thesis and those conducted in similar British samples using the pure HPS (e.g., Jones et al., 2007; Jones & Day, 2008; Dodd et al., 2010).

There are some ethical issues to consider when identifying individuals from analogue and student samples as being at risk for bipolar disorder, particularly in the potential for individuals to be wrongly identified to be at-risk, or even diagnosed with bipolar disorder, through the use of clinical interviewing instruments such as the SCID (First et al., 2002a, 2002b). In relation to this, because the student-based studies in the thesis did not include a measure of whether participants had previously experienced mental health problems, it is possible that some participants who have experienced clinically significant mood symptoms were recruited into these samples. Also as the majority of the student studies conducted in this thesis were internet-based, there are further ethical considerations regarding the ability of the researcher to provide support to individuals who are identified as being vulnerable based upon scores on clinical measures.

In light of these concerns, a decision was made to use the HPS to assess the cognitive vulnerability to hypomania before commencing this programme of research. The HPS measures personality traits associated with non-episodic presentations of bipolar

disorder, as currently euthymic bipolar and cyclothymic individuals appear to possess hypomania-related personality traits outside of clinically significant mood episodes (Eckblad & Chapman, 1986). Whilst other measures of mood disorder vulnerability exist (e.g., the General Behavior Inventory, GBI; Depue et al., 1981), these measures may be unsuitable for use with non-clinical studies incorporating screening stages. In particular, the large number of items and verbose nature of some items on the GBI may increase rates of attrition during web-based screening stages. Although the HPS ranges for the high-risk groups sampled in the current thesis are similar to those used by a previous autobiographical memory investigation (Delduca et al., 2010), other studies have used more stringent cut-offs and higher HPS scores to identify individuals at an elevated risk for bipolar disorder (e.g., Hofmann & Meyer, 2006; Ankers & Jones, 2009). Using more stringent cut-offs on the HPS may more accurately sample individuals at an elevated risk for bipolar disorder in the investigation of autobiographical memory processes.

A limitation associated with the use of the Internal States Scale (ISS) across various studies in the thesis is that the ISS is only a measure of transient (24 hour) mood symptoms (e.g., Studies One, Two, Five to Seven). Future studies may need to consider how autobiographical memory processes are associated with more enduring mood symptoms in bipolar samples. However, previous research has failed to note significant associations between more sensitive clinician-rated measures of manic and depressive symptoms with autobiographical memory specificity within currently unwell and remitted bipolar individuals (Van der Gucht et al., 2009). In addition, a small number of members of staff from the University of Manchester were recruited into Studies One and Six, who were of an older age than the undergraduate students who made up the majority of the studies' samples. Whilst the inclusion of these participants did not appear to have biased the results, it is possible that the sampling of significant numbers of older aged participants may be problematic in the investigation of processes implicated in the risk for bipolar disorder, particularly as the average age of onset for bipolar affective illness is considered to be in the mid to late twenties (Goodwin & Jamieson, 1990; Depp et al., 2009; Baldessarini et al., 2010). Future studies should consider screening out older aged participants in student samples, particularly mature students who may be significantly older than the average undergraduate student.

Different recruitment strategies were used for the non-clinical autobiographical memory studies in this thesis, including the screening of participants into high versus low risk groups based upon HPS scores (Study Five), or into low, moderate and high risk groups (Study Seven), and also the use of a non HPS screened continuum sample (Study Six). A common pattern across these studies is that the higher risk for bipolar disorder, in

terms of HPS score and HPS group, was associated with an increased overgeneral memory bias. Whilst the continuum sample in Study Six was recruited for the purposes of powering factor analyses, which were ultimately not reported here, the sampling of risk groups in Studies Five and Seven was to afford direct comparisons with previous research. The use of these different sampling strategies and convergence of their findings is a key strength of the current thesis

In relation to participant genders, greater numbers of female compared to male participants were recruited across the non-clinical studies reported in this thesis (Studies One to Seven), with similar percentages of female participants recruited in these studies compared to similar studies conducted in British samples (e.g., 70-90% female; Knowles et al., 2005; Jones & Day, 2008; Mansell et al., 2008; Dodd et al., 2010). There is a concern that these studies may not accurately reflect potential gender differences in the cognitive processes implicated in the affective disorders. However, the largely female samples in the current thesis and the aforementioned research are representative of the largely female student populations at the sampled institutions, although such samples are unlikely to be generalisable to the wider general population and this is a clear limitation associated with the sampling of undergraduate university students. Considerable attempts were made to increase the numbers of male participants recruited into the studies presented here, although anecdotally male participants were be harder to contact and less motivated to participate in studies. Future research may need to incorporate more attractive incentives in order to improve the gender ratios of their samples.

Whilst the current research has investigated whether autobiographical memory specificity is associated with the cognitive vulnerability to hypomania and bipolar disorder, whether individuals with more a biological vulnerability to bipolar disorder report similar overgeneral memory biases is not currently clear. Although overgenerality appears to be a cognitive phenomenon (Dalgleish et al., 2001), no studies have been conducted within groups of individuals at a genetic vulnerability to bipolar disorder, for example, relatives of individuals diagnosed with bipolar disorder. If overgeneral autobiographical memory recall is not prevalent in individuals with a biological vulnerability to bipolar affective illness, this would lend further credence to the argument that reduced memory specificity is largely a cognitive phenomenon, and would support the development of cognitive-behavioural techniques to improve memory specificity.

Study Eight sampled individuals currently in remission from bipolar disorder to ensure that performance on the study procedures was not substantially influenced by current mood states. The sampling of currently unwell and episodic patients raises complex ethical and practical issues, particularly in the obtainment of informed consent from

individuals who may not have the full mental capacity to do so. In addition, currently unwell participants may not have the ability or motivation to fully engage with study procedures, experimental tasks, and careful consideration is required to ensure that participation in research does not impact upon the participant's wellbeing. The sampling of currently euthymic and remitted bipolar patients does, however, allow for the investigation of processes associated with the vulnerability to future relapses, particularly as a theme of this thesis is the potential role of memory specificity and other cognitive processes in the vulnerability to bipolar disorders. Although participants in the control group of Study Eight completed the screening questions of the SCID interview, the controls were not screened for past family histories of mental health disorders. Individuals with family members with diagnosed mental health conditions may themselves be vulnerable to bipolar disorder and other conditions. Future research should consider screening the family histories of volunteers when recruiting for control groups.

Due to the cross-sectional nature of a number of studies in the current thesis, it remains somewhat unclear as to how the specificity of autobiographical memory recall, problem-solving as measured by the UMEPS task, and goal-related memory processes are associated with the vulnerability to hypomania and other symptoms of bipolar disorders over the longer-term. There is a clear need for future research to investigate how these processes may contribute to the development of mood disorders in vulnerable individuals and to relapse in individuals diagnosed with bipolar disorders, particularly in relation to the proportion of variance in prospective symptoms or risk of bipolar disorder that these cognitive processes can explain independent of baseline mood symptoms.

One concern regarding the investigation into autobiographical memory specificity in bipolar disorder is the extent to which memory specificity may be explained by the psychological mechanisms outlined in Williams' (2006) CaRFAX model. The CaRFAX model proposed that a combination of executive processing resources, capture and ruminative processes, and functional avoidance relating to emotion regulation are implicated in the recall of overgeneral memories (Williams, 2006). Although the current thesis has not been able to substantially further the understanding of the role of the CaRFAX processes in overgeneral memory in bipolar disorder, research presented in this thesis does suggest directions for further studies into the mechanisms underlying overgenerality.

It is noteworthy that the majority of autobiographical memory studies do not consider the combined influence of the CaRFAX process upon memory. Although, a recent study has suggested that only capture and rumination, and executive processes, make independent contributions to the severity of overgeneral memory in a healthy student

sample, and these processes did not appear to interact in relation to memory specificity contrary to the predictions of CaRFAX (Sumner, Griffith, & Mineka, 2011). However, deficits in these processes should be more pronounced in clinical samples, so interactions between the CaRFAX processes may very well be observed in individuals with diagnosed affective disorders. Although there remains little supporting evidence and little development of the CaRFAX overgeneral memory model, the research presented in thesis has addressed several important methodological issues in the assessment of autobiographical memory in previous studies, allowing for the refinement of further research into the processes underlying memory specificity in bipolar samples.

In relation to the CaRFAX overgeneral memory processes, executive processes are postulated to moderate the recall process within the memory system (Conway & Pleydell-Pearce, 2000; Williams, 2006), with reduced specificities of autobiographical memory associated with reduced executive processing capacities (Dalgleish et al, 2007). Neither the current thesis nor previous studies have fully considered how executive processing capacities may be implicated in reduced memory specificity in bipolar disorder. However, care is required when assessing executive processing in relation to memory specificity, as the completion of cognitively demanding tasks may only serve to reduce processing capacities (e.g., Neshat-Doost et al., 2008).

Another unexplored aspect of the CaRFAX model is that of the affect regulatory properties of overgeneral memory. Given that bipolar disorder is a condition characterised by poor emotion regulation (Goodwin & Jamison, 1990; Hyman, 2000), understanding the affective regulatory properties of autobiographical memory specificity may assist in promoting effective therapeutic techniques in the management of mood swings. Whilst one study reported that the experience of childhood traumas were not associated with the severity of overgenerality in adults diagnosed with bipolar disorder (Mowlds et al., 2010), Tzemou and Birchwood (2007) noted currently hospitalised bipolar individuals who did not experience intrusive memories of past traumas were more overgeneral in their memory recall compared to those who experienced intrusions. The key difference between these two studies is that Mowlds and colleagues (2010) did not assess the prevalence of intrusive memories of past traumas, so the lack of associations between overgeneral memory and past traumas may actually be explained by the intrusion of distressing memories. Overgenerality may develop as a general means of coping with past negative experiences, but when bipolar individuals experience distressing intrusions of past events, overgenerality is unable to suppress the retrieval of these memories and their associated emotions. Whether the quick recall of some specific negative memories in Study Eight was due to the direct recall of intrusive or distressing memories was not clear. Future

investigations will need to consider the modes of memory retrieval, as well as the potentially intrusive nature of negative memories when evaluating the specificity of memory recall in individuals diagnosed with bipolar disorder.

Taking the results of Study Eight into consideration, there appears to be increasing support for the hypothesis that whilst overgenerality may assist in avoiding unpleasant emotions, which may not be a harmful means of emotion regulation in the short-term (Hermans et al., 2005; Raes et al., 2006c), long-term overgenerality may be dysfunctional (Williams, 2006). The availability of generally detailed self-propositional memories has also been associated with ruminative thought processes (Raes et al., 2006d), which are associated with the maintenance of depressive states (Nolen-Hoeksema & Morrow, 1993), with both rumination and overgeneral memory associated with impairments in the ability to effectively generate solutions to psychosocial problems (Goddard et al., 1996; Watkins et al., 2000; Williams et al., 2006), which appear to form a triumvirate of inter-related cognitive vulnerability processes associated with the mood disorders (Raes et al., 2005a; 2006d). The common observation that individuals with bipolar disorders report ongoing subsyndromal depressive symptoms even during remission from mood episodes (Post et al., 2003b) may be due to this availability of generalised negative memories and ruminative processes during euthymia. Indeed, previous research has noted that although individuals with bipolar disorder are more overgeneral in their recall of negative memories, they report the increased rehearsal of these memories on a daily basis (Mansell & Lam, 2004).

In addition, Section 5 was not able to present data collected as part of two event-appraisal diary studies which were conducted alongside the AMT studies described in Studies Seven and Eight. These diaries were designed as pilot investigations into whether biases in the appraisal of recently experienced events, and the experience of bipolar mood symptoms over a seven day period, were associated with the degree of overgeneral memory recall in the respective AMT studies. Data analysis failed to find significant associations between performance on the AMT and the diary measures, due to a lack of statistical power. Future investigations may consider using Experience Sampling Methodologies (Csikszentmihalyi & Larson, 1987; Myin-Germeys et al., 2001) to further explore whether cognitive biases associated with memory specificity are associated with tendencies to over, or perhaps under, emotionally and cognitively respond to the experience of recent daily events in individuals with bipolar disorder.

6.9 *Directions for Future Research*

As previously discussed across the experimental chapters, there are a number of future research directions given the somewhat preliminary and developing research literature investigating autobiographical memory specificity in bipolar disorder. One particular question which so far remains unanswered is whether the overgenerality for negative memories in bipolar individuals is a result of past experiences of severe depressive episodes (Nandrino et al., 2002), which are associated with the cognitive processes underlying a reduced specificity of autobiographical memory (i.e., negative rumination, reduced executive processing capacities, and functional avoidance; Williams, 2006). If overgeneral memory primarily develops as a consequence of severe depressive episodes (Nandrino et al., 2002; Mansell & Lam, 2004), and the associated rumination and establishment of over-elaborated networks of generally detailed memories through mnemonic interlock, would overgenerality be evident in individuals who have exclusively experienced hypomanic or manic states but not depression, for example, individuals with hyperthymic temperaments? Or would such individuals report a more positive form of overgenerality, featuring an established network of generic memory representations which may exclusively feature positive autobiographical memories?

Further research is also required to assess the prospective associations between memory specificity and the course of bipolar disorder. Previous research conducted within major depression has reported that an overgeneral memory bias is associated with greater probabilities of remaining clinically depressed at a four week follow-up (Hermans et al., 2008), with the more specific recall of negative memories associated with reduced depression severities at three and seven month follow-ups in depressed patient samples (Peeters et al., 2002; Raes et al., 2006a). However, it is currently unclear as to whether the severity of overgeneral memory is associated with similarly poorer outcomes in bipolar disorder at long-term follow-up.

On a different note, an interesting and underdeveloped area of research has investigated the potential overlap between self-schemas and autobiographical memory. Both self-schematic models and autobiographical memory are considered to form representations of the self in relation to past experiences, which assist in the interpretation of recent experiences, anticipation of future events, and direction of thought patterns and behaviours (Williams et al., 2007). There is some intriguing evidence to suggest that the activation of latent self-schematic models can be associated with the reduced specificity of autobiographical memory, particularly where there is a substantial conceptual overlap between memory cues and self-schematic content (Dalgleish et al., 2003). Indeed, one study noted that both depressed patients and patients with borderline personality disorder

recalled fewer specific autobiographical memories in response to cues that closely matched dysfunctional attitudes endorsed on the DAS scale (Spinhoven et al., 2007). A separate study reported that the priming of self-referent content by cue words on the AMT relating to perceptions of current, past and future selves, is associated with the recall of fewer specific autobiographical memories in formerly depressed patients but not in never-depressed controls (Crane, Barnhofer, & Williams, 2007). As negative self-schemas are considered to be formed and consolidated as a consequence of the experience of severe depressive episodes and negative life events (e.g., Beck, 1976), such schemas and overgeneral memory specificities should not be prevalent in never-depressed individuals.

However, the nature of self-schematic models in individuals diagnosed with bipolar disorder is currently poorly defined and under-researched, with some disagreements between theories as to the exact nature of schemas in bipolar disorder (as discussed in Section 1.2). There is also no evidence-based theory of autobiographical memory which is specifically relevant to the experience of bipolar disorder. Whilst there have been some developments in psychological theories of bipolar disorder, at present none of these theories really consider the influence of memory specificity recall upon the course of the disorder and the development of symptoms. There is also a lack of an adequate psychological theory that considers how various psychological processes implicated in the affective disorder interact, including rumination, appraisals, memory recall and the availability of self-schematic models. Indeed, one difficulty at the outset of the work presented within the current thesis was the unavailability of a theoretical framework that clearly described how autobiographical memory recall may be affected by a diagnosis of bipolar disorder. In relation to this, one particular issue with the current theoretical literature in bipolar disorder is that theories have been developed which test only one cognitive process, usually self-appraisals (e.g., Jones, 2001; Mansell et al., 2007), which are heavily reliant upon the use of self-report questionnaire measures to validate the theory's assumptions.

However, a recent promising study has used a variety of direct and indirect cognitive tasks to devise potential representations of suicide schemas in individuals with psychotic disorders (Pratt et al., 2010). These methods used by Pratt and colleagues (2010) could feasibly be applied to bipolar samples to understand the structure of self-schematic models in individuals across phases of bipolar disorder, and assist in devising a more integrative cognitive model than the theoretical frameworks that currently exist.

6.10 *Clinical Implications*

Although the investigation of autobiographical memory recall in individuals diagnosed with bipolar disorder may have the potential to make substantial contributions to the refinement of psychotherapy, there remain few published studies which have investigated autobiographical memory in bipolar samples. There is evidence in major depressive disorder that overgenerality is a cognitive phenomenon (Dalgleish et al., 2001), is predictive of poorer responses to antidepressant medication and electro-convulsive therapy (Brittlebank et al., 1993; Raes et al., 2008a), but appears to be modifiable via cognitive-behavioural therapies (Williams et al., 2000; McBride et al., 2007; Raes, Williams & Hermans, 2009), which may suggest promise for the development of memory-focused therapies for bipolar disorder. However, any potential clinical implications for bipolar disorder should be tempered due the largely preliminary nature of the current research literature. Indeed, a key argument from this thesis is that a substantial amount of further research is required into the role of autobiographical memory recall in relation to symptom development in bipolar disorder. It would be unwise to suggest substantial clinical approaches based upon the current state of the research literature.

However, there are number of interesting research questions arising from this thesis which may further assist in developing specific clinical interventions for improving memory specificity in bipolar disorder. One interesting parallel between the autobiographical memory literature and more clinically focused research is that previous research has reported that individuals with bipolar disorder have particular difficulties in identifying the prodromal symptoms, or early warning signs, of depression (Lam & Wong, 1997; Lam, Wong & Sham, 2001; Lam & Wong, 2005). It is interesting to note that previous research (e.g., Mansell & Lam, 2004), and Study Eight, suggest that individuals with bipolar disorder have tendencies to generate generalised descriptions of their past negative experiences during memory recall, which may be low in sensory-perceptual information and vividness. Whilst Study Eight indicated that some specific negative memories are ready available for recall by bipolar individuals, it is not fully clear as to what sort of negative events are retrieved via direct retrieval processes, and whether these memories may relate to prodromal symptoms. However, improving the recall specificity for negative autobiographical memories through cognitive-behavioural techniques, such as mindfulness (Williams et al., 2000), may assist in improving the specificity of a client with bipolar disorder's memories for past experiences which may overlap with depressive prodromes. The improved memory specificity for past negative experiences may assist in identifying the subtle changes associated with subsyndromal depressive symptoms, and may help in developing effective behavioural techniques for the client to apply when

prodromal symptoms emerge. Interestingly, a prospective study by Lam and colleagues (2001) reported that those individuals who reported the use of behavioural coping strategies for prodromal symptoms also had fewer depressive relapses over an 18-month follow-up (Lam et al., 2001). One future study could investigate depressive prodrome recognition and autobiographical memory specificity within a remitted bipolar sample.

A longer term aim for the autobiographical memory in bipolar disorder literature would be to develop an evidence-based form of Memory Specificity Training (MeST: Raes et al., 2009) for use with individuals diagnosed with bipolar disorders. MeST has previously shown promise in improving memory specificity, decreasing negative ruminative thought processes, and in improving solution generation during problem-solving in a pilot study with a small sample of inpatients with major depressive disorder (Raes et al., 2009). Although a number of CBT-focused interventions have been developed and tested within bipolar samples (see Section 1.2), many of these interventions have received only small-scale preliminary validation, and many lack a clear theoretical basis (Jones, 2004). A potential MeST for bipolar disorder would need to be deliverable as a solo intervention and adaptable for use alongside other techniques, such as social rhythm therapy (IPSRT; Frank et al., 2005) which have shown promise for bipolar disorder.

6.11 *Conclusions*

The research presented in this thesis attempted to further the understanding of the nature of the specificity of autobiographical memory recall within individuals diagnosed with bipolar disorder and those considered at-risk for hypomania and future bipolar disorder. A number of findings have been reported across the studies reported in this thesis.

The vulnerability to hypomania and to future bipolar disorders was found to be associated with tendencies to engage in both positive and negative forms of ruminative thought processes, and increases in hypomania vulnerability over six months was associated with the experience of negative life events in at-risk individuals. Subclinical manic symptoms at a six month follow-up were primarily associated with negative but not positive forms of rumination contrary to their predicted associations, although a lack of positive rumination was associated with prospective increases in depressive symptoms. Whilst high-risk individuals reported poor problem-solving capabilities than low-risk individuals, these differences did not appear to be independent of current mood symptoms, suggesting that means-end problem-solving is due more to state-based factors, in this case mood symptoms, than a trait-based vulnerability to hypomania. High-risk individuals also reported more extreme overgeneral autobiographical memory across two different assessments, in contrast to previous research (Delduca et al., 2010); with one study

indicating that the higher risk for hypomania was associated with increased overgenerality for negative memories consistent with previous studies conducted within bipolar samples. Individuals in remission from bipolar disorder also reported more extreme overgenerality in autobiographical memory than matched health controls, but demonstrated the fast recall of some specific negative memories.

In sum, these results suggest that there exists a continuum of increasing severity of overgeneral autobiographical memory, inclusive of individuals at higher risk for future bipolar disorders through to individuals with formal diagnoses of bipolar disorder. The vulnerability to bipolar disorder appeared to be associated with tendencies to engage in ruminative responses to both positive and negative experiences, and with the overgeneral recall of autobiographical memories, but not with deficits in problem-solving. Both vulnerable individuals and people with formal bipolar diagnoses demonstrated more marked overgeneral memory, with two studies suggesting that there is a particular bias for the overgeneral recall of negative autobiographical memories, similar to the overgenerality noted in major depressive disorder.

Although the study of the psychology of autobiographical memory has great potential for informing the development of effective evidence-based memory-focused therapies for bipolar disorder, substantial further research is required into the effect of memory specificity upon illness outcomes and into the basic psychological processes which underlie the overgeneral memory bias noted in bipolar spectrum individuals. This thesis has represented an attempt to overcome methodological problems in the somewhat small and limited research literature of autobiographical memory in bipolar disorder. However, there remains a wider issue relating to the lack of psychological models which adequately explain the cognitive profile of bipolar affective illness. Without further research into the nature of the basic cognitive processes in bipolar disorder, and the development of adequate psychological theoretical frameworks, there is the risk that improvements in health outcomes for individuals diagnosed with bipolar illnesses via evidence-based psychotherapies may not be achieved.

References

Abraham, K. (1911). Notes on the psychoanalytic investigation and treatment of manic-depressive insanity and allied conditions. In E. Jones (Ed.), *Selected Papers of Karl Abraham*. London: Hogarth.

Agrawal, A., Nurnberger Jr, J. I., & Lynskey, M. T. (2011). Cannabis involvement in individuals with bipolar disorder. *Psychiatry Research*, 185(3), 459-461.

Akiskal, H.S., & Akiskal, K., (1992). Cyclothymic, hyperthymic and depressive temperaments as subaffective variants of mood disorders. In A., Tasman, & M. B. Riba, (Eds.), *Review of Psychiatry*, Vol. 11. (pp. 43-62). Washington DC: American Psychiatric Press.

Akiskal, K. S., & Mallya, G. (1987). Criteria for the 'soft' bipolar spectrum: Treatment implications. *Psychopharmacological Bulletin*, 23, 68–73.

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Cogswell, A., Smith, J. M., Neeren, A. M., et al. (2006). Behavioral approach system (BAS) sensitivity and bipolar spectrum disorders: A retrospective and concurrent behavioural high-risk design. *Motivation and Emotion*, 30, 143-155.

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Gerstein, R. K., Keyser, J. D., Whitehouse, W. G., et al. (2009). Behavioral approach system (BAS)–relevant cognitive styles and bipolar spectrum disorders: concurrent and prospective associations. *Journal of Abnormal Psychology*, 118(3), 459-471.

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders*, (4th ed). Washington DC: Author.

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition – Text Revision (DSM-IV-TR)*. Washington DC: Author.

Anderson, R.J., & Dewhurst, S.A. (2009). Remembering the past and imagining the future: Differences in event specificity of spontaneously generated thought. *Memory*, 17(4), 367-373.

Angst, J., & Gamma, A. (2002). A new bipolar spectrum concept: A brief review. *Bipolar Disorders, 4*, 11-14.

Angst, J., Gamma, A., Benazzi, F., Ajdacic, V., Eich, D., & Rossler, W. (2003). Toward a re-definition of subthreshold bipolarity: Epidemiology and proposed criteria for bipolar-II, minor bipolar disorders and hypomania. *Journal of Affective Disorders, 73*(1-2), 133-146.

Ankers, D., & Jones, S. H. (2009). Objective assessment of circadian activity and sleep patterns in individuals at behavioural risk of hypomania. *Journal of Clinical Psychology*, 65(10), 1071-1086.

Applegate, E., El-Deredy, W., & Bentall, R. P. (2009). Reward responsiveness in psychosis-prone groups: Hypomania and negative schizotypy. *Personality and Individual Differences*, 47(5), 452-456.

Arie, M., Apter, A., Orbach, I., Yefet, Y., & Zalzman, G. (2008). Autobiographical memory, interpersonal problem solving, and suicidal behavior in adolescent inpatients. *Comprehensive Psychiatry*, 49, 22-29.

Baca-Garcia, E., Perez-Rodriguez, M. M., Basurte-Villamor, I., Fernandez del Moral, A. L., Jimenez-Arriero, M. A., Gonzalez de Rivera, J. L., et al. (2007a). Diagnostic stability of psychiatric disorders in clinical practice. *The British Journal of Psychiatry*, 190, 210-216.

Baca-Garcia, E., Perez-Rodriguez, M. M., Basurte-Villamor, I., López-Castromán, J., Fernandez del Moral, A. L., Jimenez-Arriero, M. A., et al. (2007b). Diagnostic stability and evolution of bipolar disorder in clinical practice: a prospective cohort study. *Acta Psychiatrica Scandinavica*, 115, 473-480.

Bagby, R. M., & Parker, J. D. A. (2001). Relation to rumination and distraction with neuroticism and extraversion in a sample of patients with major depression. *Cognitive Therapy and Research*, 25(1), 91-102.

Baldessarini, R. J., Bolzani, L., Cruz, N., Jones, P. B., Lai, M., Lepri, B., et al. (2010). Onset-age of bipolar disorders at six international sites. *Journal of Affective Disorders*, 121(1-2), 143-146.

Baldessarini, R. J., Tondo, L., Faedda, G. L., Suppes, T. R., Floris, G., & Rudas, N. (1996). Effects of the rate of discontinuing lithium maintenance treatment in bipolar disorders. *Journal of Clinical Psychiatry*, 57(10), 441-448.

Ball, J. R., Mitchell, P. B., Corry, J. C., Skillecorn, A., Smith, M., & Malhi, G. S. (2006). A randomized controlled trial of cognitive therapy for Bipolar Disorder: Focus on long-term change. *Journal of Clinical Psychiatry*, 67(2), 277-286.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.

Barnard, P. J. (2004). Bridging between basic theory and clinical practice. *Behaviour Research and Therapy*, 42, 977–1000.

Barnard, P. J., & Teasdale, J. D. (1991). Interacting cognitive subsystems: A systemic approach to cognitive-affective interaction and change. *Cognition & Emotion*, 5(1), 1-39.

Barnhofer, T., de Jong-Meyer, R., Kleinpaß, A., & Nikesch, S. (2002). Specificity of autobiographical memories in depression: An analysis of retrieval processes in a think-aloud task. *British Journal of Clinical Psychology*, 41, 411-416.

Bauer, M. S., Crits-Christophe, P., Ball, W. A., Dewees, E., McAllister, T., Alahi, P., et al. (1991). Independent assessment of manic and depressive symptoms by self-rating. *Archives of General Psychiatry*, 48, 807-812.

Bebbington, P., & Ramana, R. (1995). The epidemiology of bipolar affective disorder. *Social Psychiatry and Psychiatric Epidemiology*, 30, 279-292.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: the hopelessness scale. *Journal of Consulting and Clinical Psychology*, 42, 861-865.

Beevers, C. G., & Meyer, B. (2002). Lack of positive experiences and positive expectancies mediate the relationship between BAS responsiveness and depression. *Cognition & Emotion*, 16(4), 549-564.

Bell, A. C., & D'Zurilla, T. J. (2009). Problem-solving therapy for depression: A meta-analysis. *Clinical Psychology Review*, 29(4), 348-353.

Bellivier, F., Golmard, J., Henry, C., Leboyer, M., & Schürhoff, F. (2001). Admixture analysis of age at onset of bipolar I affective disorder. *Archives of General Psychiatry*, 58(5), 510-512.

Benazzi, F. (1999). Bipolar II disorder is common among depressed outpatients. *Psychiatry and Clinical Neurosciences*, 53, 607-609.

Benazzi, F. (2001). Is 4 days the minimum duration of hypomania in bipolar II disorder? *European Archives of Psychiatry and Clinical Neuroscience*, 251, 32-34.

Benazzi, F. (2004). Level of functioning in hypomania of bipolar II disorder. *Canadian Journal of Psychiatry*, 49(3), 214-215.

Benazzi, F. (2007). Bipolar Disorder – focus on bipolar II disorder and mixed depression. *The Lancet*, 369(9565), 935-945.

Benazzi, F., & Akiskal, H. (2006). The duration of hypomania in bipolar-II disorder in private practice: methodology and validation. *Journal of Affective Disorders*, 96, 189-196.

Bentall, R. P., Tai, S., & Knowles, R. (2006). Psychological processes and the pathways to mania: Exploring the manic defence hypothesis. In S. H. Jones, & R. P. Bentall, (Eds.). *The Psychology of Bipolar Disorder: New Developments and Research Strategies*. (pp. 117-137). Oxford: Oxford University Press.

Bentall, R. P., & Thompson, M. (1990). Emotional Stroop performance and the manic defence. *British Journal of Clinical Psychology*, 29(2), 235-237.

Bernhard, B., Schaub, A., Kümmler, P., Dittmann, S., Severus, E., Seemüller, F., et al. (2006). Impact of cognitive-psychoeducational interventions in bipolar patients and their relatives. *European Psychiatry*, 21, 81-86.

Bertelsen, B., Harvald, B., & Hauge, M. (1977). A Danish twin study of manic-depressive disorders. *The British Journal of Psychiatry*, 130, 330-351.

Beynon, S., Soares-Weiser, K., Woolacott, N., Duffy, S., & Geddes, J. R. (2008). Psychosocial interventions for the prevention of relapse in bipolar disorder: systematic review of controlled studies. *The British Journal of Psychiatry*, 192, 5-11.

Bizzarri, J. V., Sbrana, A., Rucci, P., Ravani, L., Massei, G. J., Gonnelli, C., et al. (2007). The spectrum of substance abuse in bipolar disorder: reasons for use, sensation seeking and substance sensitivity. *Bipolar Disorders*, 9, 213-220.

Blankstein, K. R., Flett, G. L., & Johnston, M. E. (1992). Depression, problem-solving ability, and problem-solving appraisals. *Journal of Clinical Psychology*, 48(6), 749-759.

Blechert, J., & Meyer, T. D. (2005). Are measures of hypomanic personality, impulsive nonconformity and rigidity predictors of bipolar symptoms? *British Journal of Clinical Psychology*, 44, 15-27.

Bowden, C. L. (2000). Efficacy of lithium in mania and maintenance therapy of bipolar disorder. *Journal of Clinical Psychiatry*, 61(Suppl. 9), 35-40.

Bray, S., Barrowclough, C., & Lobban, F. (2007). The social problem-solving abilities of people with borderline personality disorder. *Behaviour Research and Therapy*, 45(6), 1409-1417.

Brewin, C.R., Reynolds, M., & Tata, P. (1999). Autobiographical memory processes and the course of depression. Journal of Abnormal Psychology, 108(3), 511-517.

Brittlebank, A. D., Scott, J., Williams, J. M. G., & Ferrier, I. N. (1993). Autobiographical memory in depression: state or trait marker? *The British Journal of Psychiatry* 162, 118-121.

Burnside, E., Startup, M., Byatt, M., Rollinson, L., & Hill, J. (2004). The role of overgeneral autobiographical memory in the development of adult depression following childhood trauma. *British Journal of Clinical Psychology*, 43, 365-376.

Burwell, R. A., & Shirk, S. R. (2007). Subtypes of rumination in adolescence: associations between brooding, reflection, depressive symptoms, and coping. *Journal of Clinical Child and Adolescent Psychology*, 36(1), 56-65.

Calam, R., Jones, S., Sanders, M., Dempsey, R., & Sadhnani, V. (*submitted*). Parenting, household organisation and the emotional and behavioural adjustment of young children in families with a parent with bipolar disorder.

Carver, C., & White, T. (1994). Behavioural inhibition, behavioural activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67, 319–333.

Carver, C. S., & Johnson, S. L. (2009). Tendencies toward mania and tendencies toward depression have distinct motivational, affective, and cognitive correlates. *Cognitive Therapy and Research*, 33, 552-569.

Casper, R. C., Redmond, D. E., Katz, M. M., Schaffer, C. B., Davis, J. M., & Koslow, S. H. (1985). Somatic symptoms in primary affective disorder: presence and relationship to the classification of depression. *Archives of General Psychiatry*, 42, 1098-1104.

Cassano, G. B., Pini, S., Saettoni, M., Rucci, P., & Del'Osso, L. (1998). Occurrence and clinical correlates of psychiatric comorbidity in patients with psychotic disorders. *Journal of Clinical Psychiatry*, 59(2), 60-68.

Cassidy, F., Ahearn, E. P., & Carroll, B. J. (2001). Substance abuse in Bipolar Disorder. *Bipolar Disorders*, 3, 181-188.

Cate Carter, T.D., Mundo, E., Parikh, S.V., & Kennedy, J.L. (2003). Early age at onset as a risk factor for poor outcome of bipolar disorder. *Journal of Psychiatric Research*, 37(4), 297-303.

Center for Cognitive Therapy (1988). *A manual of Cognitive Therapy Rating Scales*. Philadelphia, PA: University of Pennsylvania.

Chen, Y., & Dilsaver, S. C. (1996). Lifetime rates of suicide attempts among subjects with bipolar and unipolar disorders relative to subjects with other axis I disorders. *Biological Psychiatry*, 39(10), 896-899.

Chen, Y. R., Swann, A. C., & Johnson, B. A. (1998). Stability of diagnosis in bipolar disorder. *The Journal of Nervous and Mental Disease*, 186(1), 17-23.

Clarke, I. (1999). Cognitive therapy and serious mental illness. An Interacting Cognitive Subsystems approach. *Clinical Psychology and Psychotherapy*, 6, 375-383.

Clements, K., & Turpin, G. (1996). The life events scale for students: validation for use with British samples. *Personality and Individual Differences*, 20, 747-751.

Colom, F., Vieta, E., Martínez-Arán, A., Reinares, M., Goikolea, J. M., Benaberre, A., et al. (2003). A randomized trial on the efficacy of group psychoeducation in the prophylaxis of recurrences in bipolar patients whose disease is in remission. *Archives of General Psychiatry*, 60, 402-407.

Colom, F., Vieta, E., Sánchez-Moreno, J., Goikolea, J. M., Popova, E., Bonnin, C. M., et al. (2009a). Psychoeducation for bipolar II disorder: An exploratory, 5-year outcome subanalysis. *Journal of Affective Disorders*, 112, 30-35.

Colom, F., Vieta, E., Sánchez-Moreno, J., Palomino-Otiniano, R., Reinares, M., Goikolea, J. M., et al. (2009b). Group psychoeducation for stabilised bipolar disorders: 5 year outcome of a randomised clinical trial. *The British Journal of Psychiatry*, 194, 260-265.

Conway, M. A., Collins, A. F., Gathercole, S. E., & Anderson, S. J. (1996). Recollections of true and false autobiographical memories. *Journal of Experimental Psychology: General*, 125(1), 69-95.

Conway, M. A., Meares, K., & Standart, S. (2004). Images and goals. *Memory*, 12(4), 525-531.

Conway, M.A. & Pleydell-Pearce, C.W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, 107(2), 261-288.

Craddock, N., & Jones, I. (1999). Genetics of bipolar disorder. *Journal of Medical Genetics*, 36, 585-594.

Craddock, N., & Sklar, P. (2009). Genetics of bipolar disorder: successful start to a long journey. *Trends in Genetics*, 25(2), 99-105.

Crane, C., Barnhofer, T., Visser, C., Nightingale, H., & Williams, J. M. G. (2007). The effects of analytical and experiential rumination on autobiographical memory specificity in individuals with a history of major depression. *Behaviour Research and Therapy*, 45, 3077-3087.

Crane, C., Barnhofer, T., & Williams, J. M. G. (2007). Cue self-relevance affects autobiographical memory specificity in individuals with a history of major depression. *Memory*, 15(3), 312-323.

Crane, C., Barnhofer, T., & Williams, J. M. G. (2007a). Reflection, brooding, and suicidality: A preliminary study of different types of rumination in individuals with a history of major depression. *British Journal of Clinical Psychology*, 46, 497-504.

Crane, C., & Duggan, D. S. (2009). Overgeneral autobiographical memory and age of onset of childhood sexual abuse in patients with recurrent suicidal behaviour. *British Journal of Clinical Psychology*, 48, 93-100.

Csikszentmihalyi, M, & Larson, R. (1987). Validity and reliability of the Experience Sampling Method. *Journal of Nervous and Mental Disease*, 175, 526-536.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*(1), 16-29.

Dalgleish, T., Golden, A. J., Barrett, L. F., Au Yeung, C., Murphy, V., Tchanturia, K., et al. (2007). Reduced specificity of autobiographical memory and depression: The role of executive control. *Journal of Experimental Psychology: General*, 136(1), 23-42.

Dalgleish, T., Spinks, H., Yiend, J., & Kuyken, W. (2001). Autobiographical memory style in seasonal affective disorder and its relationship to future symptom remission. *Journal of Abnormal Psychology*, 110(2), 335-340.

Dalgleish, T., Tchanturia, K., Serpell, L., Hems, S., Yiend, J., de Silva, P., et al. (2003). Self-reported parental abuse relates to autobiographical memory style in patients with eating disorders. *Emotion*, 3(3), 211-222.

Dalton, E. J., Cate-Carter, T. D., Mundo, E., Parikh, S. V., & Kennedy, J. L. (2003). Suicide risk in bipolar patients: the role of co-morbid substance use disorders. *Bipolar Disorders*, 5, 58-61.

D'Argembeau, A., & Van der Linden, M. (2006). Individual differences in the phenomenology of mental time travel: The effect of vivid visual imagery and emotion regulation strategies *Consciousness and Cognition*, 15(2), 342-350

Das Gupta, R., & Guest, J. F. (2002). Annual cost of bipolar disorder to UK society. *The British Journal of Psychiatry*, 180, 227-233.

de Decker, A., Hermans, D., Raes, F., & Eelen, P. (2003). Autobiographical memory specificity and trauma in inpatient adolescents. *Journal of Clinical Child and Adolescent Psychology*, 32(1), 22-31.

Debeer, E., Hermans, D., and Raes, F. (2009). Associations between components of rumination and autobiographical memory specificity as measured by a Minimal Instructions Autobiographical Memory Test. *Memory*, 17(8), 892-903.

Delduca, C. M., Jones, S. H., & Barnard, P. (2010). A preliminary investigation of the effect of hypomanic personality on the specificity and speed of autobiographical memory recall. *Memory*, 18(1), 12-26.

Dempsey, R. C., Gooding, P. A., & Jones, S. H. (2011). Positive and negative cognitive style correlates of the vulnerability to hypomania. *Journal of Clinical Psychology*, 67(7), 673-690. (*Section 2.1*).

Dempsey, R. C., Gooding, P. A., & Jones, S. H. (*submitted-e*). Autobiographical memory specificity in individuals vulnerable to hypomania. (*Section 5.2, this thesis*)

Dempsey, R. C., Gooding, P. A., & Jones, S. H. (*submitted-f)*. The availability and specificity of autobiographical memories in individuals currently in remission from bipolar disorder. (*Section 5.3*)

Dempsey, R. C., Gooding, P. A., & Jones, S. H. (*submitted-b*). The differential associations of defeat and entrapment with psychosocial problem-solving. *(Section 3.2, this thesis)*

Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-d*). A preliminary investigation into the relationships between dysfunctional goal striving and goal-related memory recall processes in the vulnerability to hypomania. (*Section 4*)

Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-a*). The development of the University Means-End Problem Solving task as a measure of problem solving capabilities in British students. (*Section 3.1*)

Dempsey, R. C., Jones, S. H., & Gooding, P. A. (*submitted-c*). Investigating the cognitive vulnerability to hypomania: Autobiographical memory specificity, positive and negative rumination, and psychosocial problem solving. (*Section 3.3*)

Depp, C. A., Stricker, J. L., Zagorsky, D., Goodale, L. C., Eyler, L. T., Patterson, T. L., et al. (2009). Disability and self-management practices of people with Bipolar Disorder: A web-based survey. *Community Mental Health Journal*, 45, 179-187.

Depue, R. A., & Iacono, W. G. (1989). Neurobehavioral aspects of affective disorders. *Annual Review of Psychology*, 40(1), 457-492.

Depue, R. A., Slater, J. F., Wolfstetter-Kausch, H., Klein, D., Goplerud, E., & Farr, D. (1981). A behavioural paradigm for identifying persons at risk for bipolar depressive disorder: A conceptual framework and five validation studies. *Journal of Abnormal Psychology*, 90(5), 381-437.

Dixon, W. A., Heppner, P. P., Burnett, J. W., Anderson, W. P., & Wood, P. K. (1993). Distinguishing between antecedents, concomitants and consequences of problem-solving appraisal and depressive symptoms. *Journal of Counselling Psychology*, 40, 357-364.

Dodd, A. L., Mansell, W., Sadhnani, V., Morrison, A. P., & Tai, S. (2010). Principal components analysis of the Hypomanic Attitudes and Positive Predictions Inventory and associations with measures of personality, cognitive style and analogue symptoms in a student sample. *Behavioural and Cognitive Psychotherapy*, 38, 15-33.

D'Zurilla, T. J., Chang, E. C., Nottingham, E. J., & Faccini, L. (1998). Social problem-solving deficits and hopelessness, depression, and suicidal risk in college students and psychiatric inpatients. *Journal of Clinical Psychology*, 54(8), 1091-1107.

D'Zurilla, T. J., & Goldfried, M. R. (1971). Problem solving and behavior modification. *Journal of Abnormal Psychology*, 78, 107-126.

D'Zurilla, T. J., & Nezu, A. M. (1990). Development and preliminary evaluation of the Social Problem-Solving Inventory. *Psychological Assessment*, 2(2), 156-163.

Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology*, 95(3), 214-222.

Evans, J., Williams, J. M. G., O'Loughlin, S., & Howells, K. (1992). Autobiographical memory and problem-solving strategies of parasuicide patients. *Psychological Medicine*, 22, 399-405.

Fajutrao, L., Locklear, J., Priaulx, J., & Heyes, A. (2009). A systematic review of the evidence of the burden of bipolar disorder in Europe. *Clinical Practice and Epidemiology in Mental Health*, 5(3), doi: 10.1186/1745-0179-5-3.

Fava, G. A., Bartolucci, G., Rafanelli, C., & Mangelli, L. (2001). Cognitive-behavioral management of patients with bipolar disorder who relapsed while on lithium prophylaxis. *Journal of Clinical Psychiatry*, 62(7), 556-559.

Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to positive affect: A self-report measure of rumination and dampening. *Cognitive Therapy and Research*, 32(4), 507-525.

Ferguson, E., Matthews, G., & Cox, T. (1999). The Appraisal of Life Events (ALE) scale: Reliability and validity. *British Journal of Health Psychology*, 4, 97-116.

Ferrier, I. N., Stanton, B. R., & Scott, J. (1999). Neuropsychological function in euthymic patients with bipolar disorder. *British Journal of Psychiatry*, 175, 246-251.

Field, A. (2005). *Discovering statistics using SPSS* (2nd Edition). London: SAGE Publications Ltd.

First, M. B., Gibbon, M., Spitzer, R. L., & Williams, J. B. W. (2002a). *User's guide for the SCID-I Stuctured Clinical Interview for DSM-IV-TR Axis I Disorders (Research Version)*. New York, NY: Biometrics Research, New York State Psychiatric Institute.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (2002b). *Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition With Psychotic Screen (SCID-I/P W/ PSY SCREEN)*. New York: Biometrics Research, New York State Psychiatric Institute.

Frank, E. (2005). *Treating bipolar disorder: A clinician's guide to Interpersonal and Social Rhythm Therapy.* New York: Guilford Press.

Frank, E., Hlastala, S., Ritenour, A., Houck, P., Tu, X. M., Monk, T. H., et al. (1997). Inducing lifestyle regularity in recovering bipolar disorder patients: Results from the maintenance therapies in bipolar disorder protocol. *Biological Psychiatry*, 41, 1165-1173.

Frank, E., Kupfer, D. J., Thase, M. E., Mallinger, A. G., Swartz, H. A., Fagiolini, A. M., et al. (2005). Two-year outcomes for Interpersonal and Social Rhythm Therapy in individuals with Bipolar I Disorder. *Archives of General Psychiatry*, 62, 996-1004.

Freeman, G. H., & Halton, J. H. (1951). Note on exact treatment of contingency, goodness of fit and other problems of significance. *Biometrika*, 38(1-2), 141-149.

French, C. C., Richards, A., & Scholfield, E. J. C. (1996). Hypomania, anxiety and the emotional Stroop. *British Journal of Clinical Psychology*, 35(4), 617-626.

Fulford, D., Johnson, S. L., & Carver, C. S. (2008). Commonalities and differences in characteristics of persons at risk for narcissism and mania. *Journal of Research in Personality*, 42, 1427-1437.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences*, 44, 1060-1069.

Galvez, J. F., Thommi, S., & Ghaemi, S. N. (2011). Positive aspects of mental illness: A review in bipolar disorder. *Journal of Affective Disorder*s, 128(3), 185-190.

Gandolphe, M. C., & Nandrino, J. L. (2011). Overgeneralisation of autobiographical memory strategies in cannabis users and multiple psychoactive substance consumers. Encephale, 37(2), 144-152.

Garland, A., Harrington, J., House, R., & Scott, J. (2000). A pilot study of the relationship between problem-solving skills and outcome in major depressive disorder. *British Journal of Medical Psychology*, 73(3), 303-309.

Garland, E.J., Remick, R.A., & Zis, A.P. (1988). Weight gain with Antidepressants and Lithium. *Journal of Clinical Psychopharmacology*, 8(5), 323-330.

Geddes, J. R., Burgess, S., Hawton, K., Jamison, K., & Goodwin, G. M. (2004). Long-term lithium therapy for bipolar disorder: Systematic review and meta-analysis of randomized controlled trials. *American Journal of Psychiatry*, 161(2), 217-222.

Gibbs, B. R., & Rude, S. S. (2004). Overgeneral autobiographical memory as depression vulnerability. *Cognitive Therapy and Research*, 28(4), 511-526.

Gilbert, P., & Allan, S. (1998). The role of defeat and entrapment (arrested flight) in depression: an exploration of an evolutionary view. *Psychological Medicine*, 28, 585-598.

Gitlin, M. (1999). Lithium and the Kidney: An updated review. *Drug Safety*, 20(3), 231-243.

Gitlin, M. J., Swendsen, J., Heller, T. L., & Hammen, C. (1995). Relapse and impairment in bipolar disorder. *American Journal of Psychiatry*, 152(11), 1635-1640.

Goddard, L., Dritschel, B., & Burton, A. (1996). Role of autobiographical memory in social problem solving and depression. *Journal of Abnormal Psychology*, 105(4), 609-616.

Goddard, L., Dritschel, B., & Burton, A. (1997). Social problem solving and autobiographical memory in non-clinical depression. *British Journal of Clinical Psychology*, 36(3), 449-451.

Goddard, L., Dritschel, B., & Burton, A. (2001). The effects of specific retrieval instruction on social problem-solving in depression. *British Journal of Clinical Psychology*, 40, 297-308.

Goldberg, J. F., Harrow, M., & Grossman, L. S. (1995). Course and outcome in bipolar affective disorder: a longitudinal follow-up study. *American Journal of Psychiatry*, 152, 379-384.

Goldberg, J. F., Gerstein, R. K., Wenze, S. J., Welker, T. M., & Beck, A. T. (2008). Dysfunctional attitudes and cognitive schemas in bipolar manic and unipolar depressed outpatients: Implications for cognitively based psychotherapeutics. *Journal of Nervous & Mental Disease*, *196*(3), 207-210.

Goodwin, F. K., Fireman, B., Simon, G. E., Hunkeler, E. M., Lee, J., & Revicki, D. (2003). Suicide risk in bipolar disorder during treatment With lithium and divalproex. *JAMA*, 290(11), 1467-1473.

Goodwin, F. K., & Jamison, K. R. (1990). Manic-Depressive Illness. New York: Oxford University Press.

Grant, B. F., Stinson, F. S., Hasin, D. S., Dawson, D. A., Chou, S. P., Ruan, W. J., et al. (2005). Prevalence, correlates, and comorbidity of bipolar I disorder and axis I and II disorders: Results from the National Epidemiological Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*, 66(10), 1205-1215.

Gray, J. A. (1987). Perspectives on anxiety and impulsivity: A commentary. *Journal of Research in Personality*, 21(4), 493-509.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition and Emotion*, 4(3), 269-288.

Gregory, J. D., Brewin, C. R., Mansell, W., & Donaldson, C. (2010). Intrusive memories and images in bipolar disorder. *Behaviour Research and Therapy*, 48(7), 698-703.

Griffith, J. W., Sumner, J.A., Raes, F., Barnhofer, T., Debeer, E., & Hermans, D. (*in press*). Current psychometric and methodological issues in the measurement of overgeneral autobiographical memory. *Journal of Behavior Therapy and Experimental Psychiatry*, doi: 10.1016/j.jbtep.2011.05.008

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348-362.

Gruber, J., & Johnson, S. L. (2009). Positive emotional traits and ambitious goals among people at risk for mania: The need for specificity. *International Journal of Cognitive Therapy*, 2(2), 176-187.

Harmon-Jones, E., & Allen, J. B. (1997). Behavioral activation sensitivity and resting frontal EEG asymmetry: Covariation of putative indicators related to risk for mood disorders. *Journal of Abnormal Psychology*, *106*(1), 159-163.

Harvey, A. G. (2008). Sleep and circadian rhythms in bipolar disorder: Seeking synchrony, harmony, and regulation. *The American Journal of Psychiatry*, 165, 820-829.

Harvey, A. G., Bryant, R. A., & Dang, S. T. (1998). Autobiographical memory in Acute Stress Disorder. *Journal of Consulting and Clinical Psychology*, 66, 500-506.

Harvey, A. G., Schmidt, D. A., Scarnà, A., Semler, C. N., & Goodwin, G. M. (2005). Sleep-related functioning in euthymic patients with bipolar disorder, patients with insomnia, and subjects without sleep problems. *American Journal of Psychiatry*, 162(1), 50-57.

Harvey, A., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive Behavioural Processes across Psychological Disorders: A Transdiagnostic Approach to Research and Treatment*. Oxford: Oxford University Press.

Hauer, B. J. A., Wessel, I., Geraerts, E., Merckelbach, H., & Dalgleish, T. (2008). Autobiographical memory specificity after manipulating retrieval cues in adults reporting childhood sexual abuse. *Journal of Abnormal Psychology*, 117(2), 444-453.

Hawton, K., Sutton, L., Haw, C., Sinclair, J., & Harriss, L. (2005). Suicide and attempted suicide in Bipolar Disorder: A systematic review of risk factors. *Journal of Clinical Psychiatry*, 66(6), 693-704.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408-420.

Healy, D., & Williams, J. M. (1989). Moods, misattributions and mania: An interaction of biological and psychological factors in the pathogenesis of mania. *Psychiatric Developments*, *7*(1), 49-70.

Heeren, A., Van Broeck, N., & Philippot, P. (2009). The effects of mindfulness on executive processes and autobiographical memory specificity. *Behaviour Research and Therapy*, 47(5), 403-409.

Heppner, P., & Petersen, C. H. (1982). The development and implications of a personal problem solving inventory. *Journal of Counseling Psychology*, 29, 66–75.

Hermans, D., de Decker, A., de Peuter, S., Raes, F., Eelen, P., & Williams, J. M. G. (2007). Autobiographical memory specificity and affect regulation: coping with a negative life event. *Depression and Anxiety*, 25(9), 787-792.

Hermans, D., Defranc, A., Raes, F., Williams, J. M. G., & Eelen, P. (2005). Reduced autobiographical memory as an avoidant coping style. *British Journal of Clinical Psychology*, 44, 583-589.

Hermans, D., Van den Broeck, K., Belis, G., Raes, F., Pieters, G., & Eelen, P. (2004). Trauma and autobiographical memory specificity in depressed inpatients. *Behaviour Research and Therapy*, 42, 775-789.

Hermans, D., Vandromme, H., Debeer, E., Raes, F., Demyttenaere, K., Brunfaut, E., et al. (2008). Overgeneral autobiographical memory predicts diagnostic status in depression. *Behaviour Research and Therapy*, 46, 668-677.

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Perlis, R.H., Suppes, T., et al. (2002). Practice Guideline for the treatment of patients with Bipolar Disorder (Revision). *American Journal of Psychiatry*, 159(4, Supplement), 64-110.

Hofmann, B.U., & Meyer, T.D., (2006). Mood fluctuations in people putatively at risk for bipolar disorders. *British Journal of Clinical Psychology*, 45, 105-110.

Holden, R. R., & Fekken, G. C. (1988). Test-retest reliability of the hopelessness scale and its items in a university population. *Journal of Clinical Psychology*, 44, 40-43.

Holmes, E. A., Geddes, J. R., Colom, F., & Goodwin, G. M. (2008). Mental imagery as an emotional amplifier: application to bipolar disorder. *Behaviour Research and Therapy*, 46, 1251-1258.

Holzwarth, K., & Meyer, T. D. (2006). The dysregulation of the "behavioural activation system": An independent dimension. *Personality and Individual Differences, 41*(2), 319-328.

Honig, A., Arts, B. M. G., Ponds, R. W. H. M., & Riedel, W. J. (1999). Lithium induced cognitive side-effects in bipolar disorder: a qualitative analysis and implications for daily practice. *International Clinical Psychopharmacology*, 14, 167-171.

Honig, A., Hofman, A., Hilwig, M., Noorthoorn, E., & Ponds, R. (1995). Psychoeducation and expressed emotion in bipolar disorder: preliminary findings. *Psychiatry Research*, 56(3), 299-301.

Huxley, N., & Baldessarini, R. J. (2007). Disability and its treatment in bipolar disorder patients. *Bipolar Disorders*, 9, 183-196.

Hyman, S. E. (2000). Goals for research on bipolar disorder: The view from NIMH. *Biological Psychiatry*, *48*, 436– 441.

Johnson, J., Gooding, P., & Tarrier, N. (2008c). Suicide risk in schizophrenia: Explanatory models and clinical implications, The Schematic Appraisal Model of Suicide (SAMS) *Psychology and Psychotherapy: Theory, Research and Practice*, 81(1), 55-77.

Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General*, 117, 371-376.

Johnson, S. L. (2005a). Life events in bipolar disorder: Towards more specific models. *Clinical Psychology Review*, 25, 1008-1027.

Johnson, S. L. (2005b). Mania and dysregulation in goal pursuit: a review. *Clinical Psychology Review*, 25, 241-262.

Johnson, S. L., Ballister, C., & Joiner, T. E. (2005). Hypomanic vulnerability, terror management, and materialism. *Personality and Individual Differences*, 38, 287–296.

Johnson, S. L., & Carver, C. S. (2006). Extreme goal setting and vulnerability to mania among undiagnosed young adults. *Cognitive Therapy & Research*, 30, 377-395.

Johnson, S. L., Cuellar, A. K., Ruggero, C., Winett-Perlman, C., Goodnick, P., White, R., et al. (2008b). Life events as predictors of mania and depression in Bipolar I Disorder. *Journal of Abnormal Psychology*, 117(2), 268-277.

Johnson, S. L., Eisner, L. R., & Carver, C. S. (2009). Elevated expectancies among persons diagnosed with bipolar disorder. *British Journal of Clinical Psychology*, 48(2), 217-222.

Johnson, S. L., & Jones, S. (2009). Cognitive correlates of mania risk: Are responses to success, positive moods, and manic symptoms distinct or overlapping? *Journal of Clinical Psychology*, 65(9), 891-905.

Johnson, S. L., McKenzie, G., & McMurrich, S. (2008a). Ruminative responses to negative and positive affect among students diagnosed with bipolar disorder and major depressive disorder. *Cognitive Therapy and Research*, 32, 702-713.

Johnson, S. L., Ruggero, C. J., & Carver, C. S. (2005). Cognitive, behavioral, and affective responses to reward: Links with hypomanic symptoms. *Journal of Social and Clinical Psychology*, 24(6), 894-906.

Johnson, S. L., Sandrow, D., Meyer, B., Winters, R., Miller, I., Solomon, D., et al. (2000). Increases in manic symptoms after life events involving goal attainment. *Journal of Abnormal Psychology*, 109(4), 721-727.

Jones, L., Scott, J., Haque, S., Gordon-Smith, K., Heron, J., Caesar, S., et al. (2005a). Cognitive style in bipolar disorder. *The British Journal of Psychiatry*, 187, 431-437.

Jones, S. (2004). Psychotherapy of Bipolar Disorder: a review. *Journal of Affective Disorders*, 80, 101-114.

Jones, S., & Day, C. (2008). Self-appraisal and behavioural activation in the prediction of hypomanic personality and depressive symptoms. *Personality and Individual Differences*, 45(7), 643-648.

Jones, S., Shams, M., & Liversidge, T. (2007). Approach goals, behavioural activation and risk of hypomania. *Personality and Individual Differences*, 43, 1366-1375.

Jones, S., Twiss, J., & Anderson, I. M. (2009). Do negative cognitive style and personality predict depression symptoms and functional outcomes in severe bipolar and unipolar disorders? *International Journal of Cognitive Therapy*, 2(4), 343-353.

Jones, S. H. (2001). Circadian rhythms, multilevel models of emotion and Bipolar Disorder - An initial step towards integration? *Clinical Psychology Review*, 21(8), 1193-1209.

Jones, S. H. (2006). Circadian rhythms and internal attributions in bipolar disorder. In S. H. Jones, & R. P. Bentall (Eds.). *The Psychology of Bipolar Disorder: New Developments and Research Strategies*. (pp. 91-116). Oxford: Oxford University Press.

Jones, S. H., & Burrell-Hodgson, G. (2008). Cognitive-behavioural treatment of first diagnosis bipolar disorder. *Clinical Psychology and Psychotherapy*, 15, 367-377.

Jones, S. H., Hare, D. J., & Evershed, K. (2005b). Actigraphic assessment of circadian activity and sleep patterns in bipolar disorder. *Bipolar Disorders*, 7, 176-186.

Jones, S. H., Mansell, W., & Waller, L. (2006). Appraisal of hypomania-relevant experiences: Development of a questionnaire to assess positive self-dispositional appraisals in bipolar and behavioural high risk samples. *Journal of Affective Disorders, 93*, 19-28.

Jones, S. H., Tai, S., Evershed, K., Knowles, R., & Bentall, R. (2006). Early detection of bipolar disorder: a pilot familial high-risk study of parents with bipolar disorder and their adolescent children. *Bipolar Disorders*, 8, 362-372.

Joormann, J., & Siemer, M. (2004). Memory accessibility, mood regulation, and dysphoria: difficulties in repairing sad mood with happy memories*? Journal of Abnormal Psychology*, 113(2), 179-188**.**

Kam, J. Y. W., Bolbecker, A. R., O'Donnell, B. F., Hetrick, W. P. & Brenner, C. A. (*in press*). Prospective predictors of mood episodes in bipolar disorder. *Journal of Affective Disorders*, doi:10.1016/j.jad.2011.06.060.

Kaney, S., Bowen-Jones, K., & Bentall, R. P. (1999). Persecutory delusions and autobiographical memory. *British Journal of Clinical Psychology*, 38, 97-102.

Kao, C., Dritschel, B. H., & Astell, A. (2006). The effects of rumination and distraction on overgeneral autobiographical memory retrieval during social problem solving. *British Journal of Clinical Psychology*, 45, 267-272.

Kasch, K., Rottenberg, J., Arnow, B. A., & Gotlib, I. H. (2002). Behavioral activation and inhibition systems and the severity and course of depression. *Journal of Abnormal Psychology*, 111(4), 589-597.

Keck, P. E., McElroy, S. L., Havens, J. R., Altshuler, L. L., Noeln, W. A., Frye, M. A., et al. (2003). Psychosis in bipolar disorder: Phenomenology and impact on morbidity and course of illness. *Comprehensive Psychiatry*, 44(4), 263-269.

Keck, P. E., McElroy, S. L., & Strakowski, S. M. (1998). Anticonvulsants and antipsychotics in the treatment of bipolar disorder. *Journal of Clinical Psychiatry*, 59 (Supplement 6), 74-81.

Kerr, N., Scott, J., & Phillips, M. L. (2005). Patterns of attentional deficits and emotional bias in bipolar and major depressive disorder. *British Journal of Clinical Psychology*, 44, 343-356.

Kessing, L. V. (2005). Diagnostic stability in bipolar disorder in clinical practise as according to ICD-10. *Journal of Affective Disorders*, 85, 293-299.

Kessler, R. C., Rubinow, D. R., Holmes, C., Abelson, J. M., & Zhao, S. (1997). The epidemiology of DSM-III-R bipolar I disorder in a general population survey. *Psychological Medicine*, 27, 1079-1089.

Kilbourne, A. M., Cornelius, J. R., Han, X., Pincus, H. A., Shad, M., Salloum, I., et al. (2004). Burden of general medical conditions among individuals with bipolar disorder. *Bipolar Disorders*, 6, 368-373.

Kleindienst, N., & Greil, W. (2003). Lithium in the long-term treatment of bipolar disorders. *European Archives of Psychiatry and Clinical Neuroscience*, 253, 120-125.

Kleiner, J., Altshuler, L., Hendrick, V., & Hershman, J.M. (1999). Lithium-induced subclinical hypothyroidism: Review of the literature and guidelines for treatment. *Journal of Clinical Psychiatry*, 60(4), 249-255.

Knowles, R., Tai, S., Christensen, I., & Bentall, R. (2005). Coping with depression and vulnerability to mania: A factor analytic study of the Nolen-Hoeksema (1991) Response Styles Questionnaire. *British Journal of Clinical Psychology*, 44, 99-112.

Knowles, R., Tai, S., Jones, S. H., Highfield, J., Morriss, R., & Bentall, R. P. (2007). Stability of self-esteem in bipolar disorder: comparisons among remitted bipolar patients, remitted unipolar patients and healthy controls. *Bipolar Disorders*, 9, 490-495.

Knubben, K., Reischies, F. M., Adli, M., Schlattmann, P., Bauer, M., & Dimeo, F. (2007). A randomised, controlled study on the effects of a short-term endurance training programme in patients with major depression. *British Journal of Sports Medicine*, 41, 29-33.

Kocsis, J. H., Shaw, E. D., Stokes, P. E., Wilner, P., Elliot, A. S., Sikes, C., et al. (1993). Neuropsychologic effects of lithium discontinuation. *Journal of Clinical Psychopharmacology*, 13(4), 268-275.

Kuyken, W., & Brewin, C. R. (1995). Autobiographical memory functioning in depression and reports of early abuse. *Journal of Abnormal Psychology*, 104, 585-591.

Kuyken, W., Howell, R., & Dalgleish, T. (2006). Overgeneral autobiographical memory in depressed adolescents with, versus without, a reported history of trauma. *Journal of Abnormal Psychology*, 115(3), 387–396.

Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the hypomanic personality scale. *Journal of Abnormal Psychology*, 109(2), 222-226.

Lam, D. (2006). What can we conclude from studies on psychotherapy for bipolar disorder? *The British Journal of Psychiatry*, 188, 321-322.

Lam, D., & Mansell, W. (2008). Mood-dependent cognitive change in a man with bipolar disorder who cycles every 24 hours. *Cognitive and Behavioral Practice*, 15, 255-262.

Lam, D., & Wong, G. (1997). Prodromes, coping strategies, insight and social functioning in bipolar affective disorders. *Psychological Medicine*, 27, 1091-1100.

Lam, D., Wong, G., & Sham, P. (2001). Prodromes, coping strategies and course of illness in bipolar affective disorder - a naturalistic study. *Psychological Medicine*, 31, 1397-1402.

Lam, D., Wright, K., & Sham, P. (2005a). Sense of hyper-positive self and response to cognitive therapy in bipolar disorder. *Psychological Medicine*, 35, 69-77.

Lam, D., Wright, K., & Smith, N. (2004). Dysfunctional assumptions in bipolar disorder. *Journal of Affective Disorders*, 79, 193-199.

Lam, D. H., Bright, J., Jones, S., Hayward, P., Schuck, N., Chisholm, D., et al. (2000). Cognitive therapy for bipolar illness - A pilot study of relapse prevention. *Cognitive Therapy and Research*, 24(5), 503-520.

Lam, D. H., Hayward, P., Watkins, E. R., Wright, K., & Sham, P. (2005b). Relapse prevention in patients with bipolar disorder: Cognitive therapy outcome after 2 years. *American Journal of Psychiatry*, 162, 324-329.

Lam, D. H., Jones, S. H., Hayward, P., & Bright, J. A. (1999). *Cognitive therapy for Bipolar Disorder: A therapist's guide to concepts, methods and practice*. Chicester: John Wiley & Sons.

Lam, D. H., McCrone, P., Wright, K., & Kerr, N. (2005c). Cost-effectiveness of relapse-prevention cognitive therapy for bipolar disorder: 30-month study. *The British Journal of Psychiatry*, 186, 500-506.

Lam, D. H., Watkins, E. R., Hayward, P., Bright, J., Wright, K., Kerr, N., et al. (2003). A randomized controlled study of cognitive therapy for relapse prevention for bipolar affective disorder. *Archives of General Psychiatry*, 60, 145-152.

Leibetseder, M. M., Rohrer, R. R., Mackinger, H. F., & Fartacek, R. R. (2006). Suicide attempts: patients with and without an affective disorder show impaired autobiographical memory specificty. *Cognition & Emotion*, 20(3/4), 516-526.

Lenox, R. H., & Hahn, C. (2000). Overview of the mechanism of action of lithium in the brain: Fifty-year update. *Journal of Clinical Psychiatry*, 61(Suppl. 9), 5-15.

Lewisohn, P. M., Klein, D. N., & Seeley, J. R. (1995). Bipolar disorders in a community sample of older adolescents: prevalence, phenomenology, comorbidity and course. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34(4), 454-463.

Lex, C., Meyer, T.D., Marquart, B., & Thau, K. (2008). No strong evidence for abnormal levels of dysfunctional attitudes, automatic thoughts, and emotional information-processing biases in remitted bipolar I affective disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, 81(1), 1-13.

Lo, C. S. L., Ho, S. M. Y., & Hollon, S. D. (2008). The effects of rumination and negative cognitive styles on depression: A mediation analysis. *Behaviour Research and Therapy*, 46(4), 487-495.

Lomax, C., Barnard, P. J., & Lam, D. (2009). Cognitive processing in bipolar disorder conceptualised using the Interacting Cognitive Subsystems (ICS) model. *Psychological Medicine*, 39(5), 773-783.

Loudon, J. B., Blackburn, I. M., & Ashworth, C. M. (1977). A study of the symptomatology and course of manic illness using a new scale. *Psychological Medicine*, 7, 723-729.

Lozano, B. E., & Johnson, S. L. (2001). Can personality traits predict increases in manic and depressive symptoms? *Journal of Affective Disorders*, 63, 103-111.

Lyubomirsky, S., Caldwell, N. D., & Nolen-Hoeksema, S. (1998). Effects of ruminative and distracting responses to depressed mood on retrieval of autobiographical memories. *Journal of Personality and Social Psychology*, 75(1), 166-177.

Lyubomirsky, S., & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology*, 69(1), 176-190.

Lyubomirsky, S., & Tkach, C. (2003). The consequences of dysphoric rumination. In C. Papageorgiou & A. Wells (Eds.), *Rumination: Nature, theory, and treatment of negative thinking in depression* (pp. 21-41). Chichester, England: John Wiley & Sons.

Lyon, H. M., Startup, M., & Bentall, R. P. (1999). Social cognition and the manic defence: Attributions, selective attention, and self-schema in bipolar affective disorder. *Journal of Abnormal Psychology*, 108(2), 273-282.

Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-Based Cognitive Therapy for Depression: Replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology*, 72(1), 31-40.

Maalouf, F. T., Klein, C., Clark, L., Sahakian, B. J., LaBarbara, E. J., Versace, A., et al. (2010). Impaired sustained attention and executive dysfunction: Bipolar disorder versus depression-specific markers of affective disorders. *Neuropsychologia*, 48, 1862-1868.

Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2007). The efficacy of problem solving therapy in reducing mental and physical health problems: A meta-analysis. *Clinical Psychology Review*, 27(1), 46-57.

Mackinger, H. F., Pachinger, M. M., Leibetseder, M. M., & Fartacek, R. R. (2000). Autobiographical memories in women remitted from major depression. *Journal of Abnormal Psychology*, 109(2), 331-334.

Maj, M., Pirozzi, R., & Magliano, L. (1996). Late non-response to lithium prophylaxis in bipolar patients: prevalence and predictors. *Journal of Affective Disorders*, 39, 39-42.

Maj, M., Pirozzi, R., Magliano, L., & Bartoli, L. (1998). Long-term outcome of lithium prophylaxis in bipolar disorder: A 5-year prospective study of 402 patients at a lithium clinic. *American Journal of Psychiatry*, 155, 30-35.

Malkoff-Schwartz, S., Frank, E., Anderson, B., Sherrill, J. T., Siegel, L., Patterson, D., et al. (1998). Stressful life events and social rhythm disruption in the onset of manic and depressive bipolar episodes. *Archives of General Psychiatry*, 55, 702-707.

Mansell, W., & Hodson, S. (2009). Imagery and memories of the social self in people with bipolar disorders: empirical evidence, phenomenology, theory and therapy. In L. Stopa (Ed.). *Imagery and the Threatened Self: Perspectives on Mental Imagery and the Self in Cognitive Therapy*. (pp. 232-264). Hove: Routledge.

Mansell, W., & Lam, D. (2004). A preliminary study of autobiographical memory in remitted bipolar disorder and unipolar depression and the role of imagery in the specificity of memory. *Memory*, 12(4), 437-446.

Mansell, W., Morrison, A.P., Reid, G., Lowens, I., & Tai, S. (2007). The interpretations of, and responses to, changes in internal states: An integrative cognitive model of mood swings and bipolar disorders. *Behavioural and Cognitive Psychotherapy*, 35, 515-539.

Mansell, W., Paszek, G., Seal, K., Pedley, R., Jones, S., Thomas, N., et al. (2011). Extreme Appraisals of Internal States in Bipolar I Disorder: A Multiple Control Group Study. *Cognitive Therapy & Research*, 35, 87-97.

Mansell, W., Rigby, Z., Tai, S., & Lowe, C. (2008). Do current beliefs predict hypomanic symptoms beyond personality style? Factor analysis of the Hypomanic Attitudes and Positive Predictions Inventory (HAPPI) and its association with hypomanic symptoms in a student population. *Journal of Clinical Psychology*, 64(4), 1-16.

Mansell, W., & Scott, J. (2006). Dysfunctional beliefs in individuals with bipolar disorder. In S. H. Jones, & R. P. Bentall (Ed.). *The Psychology of Bipolar Disorder: New Developments and Research Strategies*. (pp. 73-90). Oxford: Oxford University Press.

Marx, E. M., Williams, J. M. G., & Claridge, G. C. (1992). Depression and social problem solving. *Journal of Abnormal Psychology*, 101(1), 78-86.

McBride, C., Segal, Z., Kennedy, S., & Gemar, M. (2007). Changes in autobiographical memory specificity following cognitive behavioural therapy and pharmacotherapy for major depression. *Psychopathology*, 40, 147-152.

McElroy, S. L., Altshuler, L. L., Suppes, T., Keck, P. E., Frye, M. A., Denicoff, K. D., et al. (2001). Axis I psychiatric comorbidity and its relationship to historical illness variables in 288 patients with bipolar disorder. *American Journal of Psychiatry*, 158, 420-426.

McGuffin, P., Rijsdijk, F., Andrew, M., Sham, P., Katz, R., & Cardno, A. (2003). The heritability of bipolar affective disorder and the genetic relationship to unipolar depression. *Archives of General Psychiatry*, 60, 497-502.

McIntyre, R. S., Konarski, J. Z., Soczynska, J. K., Wilkins, K., Panjwani, G., Bouffard, B., et al. (2006). Medical comorbidity in bipolar disorder: Implications for functional outcomes and health service utilization. *Psychiatry Services*, 57(8), 1140-1144.

McNally, R. J., Lasko, N. B., Macklin, M. L., & Pitman, R. K. (1995). Autobiographical memory disturbance in combat-related posttraumatic stress disorder. *Behaviour Research and Therapy*, 33(6), 619-630.

McNally, R. J., Litz, B. T., Prassas, A., Shin, L. M., & Weathers, F. W. (1994). Emotional priming of autobiographical memory in post-traumatic stress disorder. *Cognition and Emotion*, 8(4), 351-367.

Merikangas, K. R., Akiskal, H. S., Angst, J., Greenberg, P. E., Hirschfeld, R. M. A., Petukhova, M., et al. (2007). Lifetime and 12-Month prevalence of bipolar spectrum disorder in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 64(5), 543-552.

Merikangas, K. R., Jin, R., He, J., Kessler, R. C., Lee, S., Sampson, N. A., et al. (2011). Prevalence and correlates of Bipolar Spectrum Disorder in the World Mental Health Survey Initiative. *Archives of General Psychiatry.* 68(3), 241-251.

Meyer, B., Beevers, C. G., Johnson, S. L., & Simmons, E. (2007). Unique association of approach motivation and mania vulnerability. *Cognition & Emotion*, 21(8), 1647-1688.

Meyer, B., Johnson, S. L., & Carver, C. S. (1999). Exploring behavioral activation and inhibition sensitivities among college students at risk for bipolar spectrum symptomatology. *Journal of Psychopathology and Behavioral Assessment*, 21(4), 275-292.

Meyer, B., Johnson, S. L., & Winters, R. (2001). Responsiveness to threat and incentive in bipolar disorder: Relations of the BIS/BAS scales with symptoms. *Journal of Psychopathology and Behavioral Assessment*, 23(3), 133-143.

Meyer, T. D., & Hautzinger, M. (2003). Screening for bipolar disorders using the Hypomanic Personality Scale. *Journal of Affective Disorders*, 75, 149-154.

Meyer, T. D., & Hofmann, B. U. (2005). Assessing the Dysregulation of the Behavioral Activation System: The Hypomanic Personality Scale and the BIS–BAS Scales. *Journal of Personality Assessment*, 85(3), 318-324.

Meyer, T. D., & Krumm-Merabet, C. (2003). Academic performance and expectations for the future in relation to a vulnerability marker for bipolar disorders: the hypomanic temperament. *Personality and Individual Differences*, 35, 785-796.

Meyer, T. D., & Maier, S. (2006). Is there evidence for social rhythm instability in people at risk for affective disorders? *Psychiatry Research*, 141, 103-114.

Miklowitz, D. J. (2008). Adjunctive psychotherapy for Bipolar Disorder: state of the evidence. *American Journal of Psychiatry*, 165, 1408-1419.

Miklowitz, D. J., Alatiq, Y., Goodwin, G. M., Geddes, J. R., Fennell, M. J. V., Dimidjian, S., et al. (2009). A pilot study of Mindfulness-Based Cognitive Therapy for Bipolar Disorder. *International Journal of Cognitive Therapy*, 2(4), 373-382.

Miklowitz, D., Simoneau, T. L., George, E. L., Richards, J. A., Kalbag, A., Sachs-Ericsson, N., et al. (2000). Family-focused treatment of bipolar disorder: 1 year effects of a psychoeducational program in conjunction with pharmacotherapy. *Biological Psychiatry*, 48(6), 582-592.

Miranda, R., & Nolen-Hoeksema, S. (2007). Brooding and reflection: Rumination predicts suicidal ideation at 1-year follow-up in a community sample *Behaviour Research and Therapy*, 45(12), 3088-3095.

Möller, H. (2003). Bipolar Disorder and Schizophrenia: Distinct illness or a continuum? *Journal of Clinical Psychiatry*, 64(Suppl6), 23-27.

Montagnon, F., Saïd, S., & Lepine, J. P. (2002). Lithium: poisonings and suicide prevention. *European Psychiatry*, 17, 92-95.

Moore, R. G., Watts, F. N., & Williams, J. M. G. (1988). The specificity of personal memories in depression. *British Journal of Clinical Psychology*, 27, 275-276.

Moore, S. A., & Zoellner, L. A. (2007). Overgeneral autobiographical memory and traumatic events: an evaluative review. *Psychological Bulletin*, 133(3), 419-437.

Moorey, S., Holting, C., Hughes, P., Knynenberg, P., & Michael, A. (2001). Does problem solving ability predict therapy outcome in a clinical setting? *Behavioural and Cognitive Psychotherapy*, 29, 485-495.

Moorey, S., Hughes, P., Knynenberg, P., & Michael, A. (2000). The Problem Solving Scale in a sample of patients referred for cognitive therapy. *Behavioural and Cognitive Psychotherapy*, 28, 131-138.

Mowlds, W., Shannon, C., McCusker, C. G., Robinson, D., Wilson, A., & Mulholland, C. (2010). Autobiographical memory specificity, depression, and trauma in bipolar disorder. *British Journal of Clinical Psychology*, 49(2), 217-233.

Mur, M., Portella, M. J., Martínez-Arán, A., Pifarré, J., & Vieta, E. (2007). Persistent neuropsychological deficit in euthymic bipolar patients: Executive function as a core deficit. *Journal of Clinical Psychiatry*, 68(7), 1078-1086.

Murray, C. J. L., & Lopez, A. D. (1996). *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020.* Boston, MA: Harvard University Press.

Murray, G., & Johnson, S. L. (2010). The clinical significance of creativity in bipolar disorder. *Clinical Psychology Review*, 30(6), 721-732.

Myin-Germeys, I., van Os, J., Schwartz, J. E., Stone, A. A., & Delespaul, P. A. (2001). Emotional reactivity to daily life stress in psychosis. *Archives of General Psychiatry, 58*(12), 1137-1144.

Nandrino, J., Pezard, L., Posté, A., Réveillère, C., & Beaune, D. (2002). Autobiographical memory in major depression: A comparison between first-episode and recurrent patients. *Psychopathology*, 35, 335-340.

Neale, J. M. (1988). Defensive function in manic episodes. In Oltmanns, T. F. & Maher, B. A.(Ed.). *Delusional Beliefs*. (pp. 138-156). New York: Wiley.

Nemeroff, C. B. (2000). An ever-increasing pharmacopoeia for the management of patients with bipolar disorder. *Journal of Clinical Psychiatry*, 61(Suppl. 13), 19-25.

Neshat-Doost, H. T., Dalgleish, T., & Golden, A. J. (2008). Reduced specificity of emotional autobiographical memories following self-regulation depletion. *Emotion*, 8(5), 731-736.

Newman, C. F. (2005). Reducing the risk of suicide in patients with bipolar disorder: Interventions and safeguards *Cognitive and Behavioral Practice*, 12(1), 76-88.

Newman, C. F., Leahy, R. L., Beck, A. T., Reilly-Harrington, N., & Gyulai, L. (2002). *Bipolar disorder: A cognitive therapy approach*. Washington: American Psychological Association.

Nezu, A. M. (1987). A problem-solving formulation of depression: Literature review and proposal of a pluralistic model. *Clinical Psychology Review*, 7(2), 121-144.

Nezu, A. M., & Perri, M. G. (1989). Social problem-solving therapy for unipolar depression: An initial dismantling investigation. *Journal of Consulting and Clinical Psychology*, 57(3), 408-413.

Nezu, A. M., & Ronan, G. F. (1988). Social problem solving as a moderator of stress-related depressive symptoms: A prospective analysis. *Journal of Counselling Psychology*, 35(2), 134-138.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, 100(4), 569-582.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *Journal of Personality and Social Psychology*, 61(1), 115-121.

Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition & Emotion*, 7(6), 561-570.

Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, 102(1), 20-28.

Nusslock, R., Abramson, L. Y., Harmon-Jones, E., Alloy, L. B., & Hogan, M. E. (2007). A goal-striving life event and the onset of hypomanic and depressive episodes and symptoms: Perspective from the Behavioral Approach System (BAS) Dysregulation Theory. *Journal of Abnormal Psychology*, 116(1), 105-115.

O'Connor, B. P. (2000a). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments and Computers*, 32, 396-402.

O'Connor, B. P. (2000b). SPSS, SAS, and MATLAB programs for determining the number of components and factors using parallel analysis and Velicer's MAP test. Available from: http://people.ok.ubc.ca/brioconn/nfactors/nfactors.html.

Olson, M. L., & Kwon, P. (2008). Brooding perfectionism: Refining the roles of rumination and perfectionism in the etiology of depression. *Cognitive Therapy and Research*, 32(6), 788-802.

Park, R. J., Goodyer, I. M., & Teasdale, J. D. (2002). Categoric overgeneral autobiographical memory in adolescents with major depressive disorder. *Psychological Medicine*, 32, 267-276.

Park, R. J., Goodyer, I. M., & Teasdale, J. D. (2004). Effects of induced rumination and distraction on mood and overgeneral autobiographical memory in adolescent Major Depressive Disorder and controls. *Journal of Child Psychology and Psychiatry*, 45(5), 996-1006.

Patelis-Siotis, I., Young, L. T., Robb, J. C., Marriott, M., Bieling, P. J., Cox, L. C., et al. (2001). Group cognitive behavioral therapy for bipolar disorder: a feasibility and effectiveness study. *Journal of Affective Disorders*, 65, 145-153.

Peeters, F., Wessel, I., Merckelbach, H., & Boon-Vermeeren, M. (2002). Autobiographical memory specificity and the course of major depressive disorder. *Comprehensive Psychiatry*, 43(5), 344-350.

Perlick, D. A., Rosenheck, R. A., Kacyznski, R., & Kozma, L. (2004). Medication non-adherence in bipolar disorder: A patient-centered review of research findings. *Clinical approaches in bipolar disorders*, 3(2), 56-64.

Perlis, R. H. (2005). Managing Bipolar Disorder: Misdiagnosis and quality of life. *The American Journal of Managed Care*, 11(9), S267-S270.

Perlis, R. H., Miyahara, S., Marangell, L. B., Wisniewski, S. R., Ostacher, M., DelBello, M. P., et al. (2004). Long-Term implications of early onset in bipolar disorder: data from the first 1000 participants in the systematic treatment enhancement program for bipolar disorder (STEP-BD). *Biological Psychiatry*, 55, 875-881.

Perry, A., Tarrier, N., Morriss, R., McCarthy, E., & Limb, K. (1999). Randomised controlled trial of efficacy of teaching patients with bipolar disorder to identify early symptoms of relapse and obtain treatment. *British Medical Journal*, 318, 149-153.

Philippot, P., & Brutoux, F. (2008). Induced rumination dampens executive processes in dysphoric young adults. *Journal of Behavior Therapy and Experimental Psychiatry*, 39(3), 219-227.

Platt, J. J., & Spivack, G. (1975). *Manual for the Means-Ends Problem Solving Test (MEPS): A measure of interpersonal problem solving skill*. Philadelphia, PA: Hahnemann Medical College and Hospital.

Pollock, L. R., & Williams, J. M. G. (2004). Problem-solving in suicide attempters. *Psychological Medicine*, 34, 163-167.

Post, R. M., Leverich, G. S., Nolen, W. A., Kupka, R. W., Altshuler, L. L., Frye, M. A., et al. (2003a). A re-evaluation of the role of antidepressants in the treatment of bipolar depression: data from the Stanley Foundation Bipolar Network. *Bipolar Disorders*, 5, 396-406.

Post, R. M., Denicoff, K. D., Leverich, G. S., Altshuler, L. L., Frye, M. A., Suppes, T. M., et al. (2003b). Morbidity in 258 bipolar outpatients followed for 1 year with daily prospective ratings on the NIMH life chart method. *Journal of Clinical Psychiatry*, 64, 680–690.

Power, M.J. (2005). Psychological approaches to bipolar disorder: a theoretical critique. *Clinical Psychology Review*, 25, 1101-1125.

Power, M. J., & Dalgleish, T. (1997). *Cognition and emotion: from order to disorder*. Hove: Psychology Press.

Pratt, D., Gooding, P., Johnson, J., Taylor, P.J. & Tarrier, N. (2010). Suicide schemas in non-affective psychosis: An empirical investigation. *Behaviour Research and Therapy*, 48, 1211-1220.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36(4), 717-731.

Puffet, A., Jehin-Marchot, D., Timsit-Berthier, M., & Timsit, M. (1991). Autobiographical memory and major depressive states. *European Psychiatry*, 6(3), 141-145.

Radloff, L. S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385-401.

Radloff, L. S. (1991). The use of the Center for Epidemiological Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence*, 20(2), 149-166.

Raes, F., Hermans, D., de Decker, A., Eelen, P., & Williams, J. M. G. (2003). Autobiographical memory specificity and affect regulation: An experimental approach. *Emotion*, 3(2), 201-206.

Raes, F., Hermans, D., Williams, J. M. G., Beyers, W., Brunfaut, E., & Eelen, P. (2006a). Reduced autobiographical memory specificity and rumination in predicting the course of depression. *Journal of Abnormal Psychology*, 115(4), 699-704.

Raes, F., Hermans, D., Williams, J. M. G., Demyttenaere, K., Sabbe, B., Pieters, G., et al. (2005a). Reduced specificity of autobiographical memory: A mediator between rumination and ineffective social problem-solving in major depression? *Journal of Affective Disorders*, 87, 331-335.

Raes, F., Hermans, D., Williams, J. M. G., Demyttenaere, K., Sabbe, B., Pieters, G., et al. (2006b). Is overgeneral autobiographical memory an isolated memory phenomenon in major depression? *Memory*, 14(5), 584-594.

Raes, F., Hermans, D., Williams, J. M. G., & Eelen, P. (2005b). Autobiographical memory specificity and emotional abuse. *British Journal of Clinical Psychology*, 44, 133-138.

Raes, F., Hermans, D., Williams, J. M. G., & Eelen, P. (2006c). Reduced autobiographical memory specificity and affect regulation. *Cognition & Emotion*, 20(3/4), 402-429.

Raes, F., Hermans, D., Williams, J. M. G., & Eelen, P. (2007). A sentence completion procedure as an alternative to the Autobiographical Memory Test for assessing overgeneral memory in non-clinical populations. *Memory*, 15(5), 495-507.

Raes, F., Hermans, D., Williams, J. M. G., Geypen, L., & Eelen, P. (2006d). The effect of overgeneral autobiographical memory retrieval on rumination. *Psychologica Belgica*, 46(1/2), 131-141.

Raes, F., Sienaert, P., Demyttenaere, K., Peuskens, J., Williams, J. M. G., & Hermans, D. (2008a). Overgeneral memory predicts stability of short-term outcome of electroconvulsive therapy for depression. *The Journal of ECT*, 24(1), 81-83.

Raes, F., Verstraeten, K., Bijttebier, P., Vasey, M., & Dalgleish, T. (2010). Inhibitory control mediates the relationship between depressed mood and overgeneral memory recall in children. *Journal of Clinical Child and Adolescent Psychology*, 39(2), 276-281.

Raes, F., Watkins, E., Williams, J. M. G., & Hermans, D. (2008b). Non-ruminative processing reduces overgeneral autobiographical memory retrieval in students. *Behaviour Research and Therapy*, 46, 748-756.

Raes, F., Williams, J. M. G., & Hermans, D. (2009). Reducing cognitive vulnerability to depression: A preliminary investigation of MEmory Specificity Training (MEST) in inpatients with depressive symptomatology. *Journal of Behavior Therapy and Experimental Psychiatry*, 40(1), 24-38.

Rea, M. M., Tompson, M. C., Miklowitz, D., Goldstein, M. J., Hwang, S., & Mintz, J. (2003). Family-focused treatment versus individual treatment for bipolar disorder: results of a randomized clinical trial. *Journal of Consulting and Clinical Psychology*, 71(3), 482-492.

Regeer, E. J., ten Have, M., Rosso, M. L., Hakkaart-van Roijen, L., Vollebergh, W., & Nolen, W. A. (2004). Prevalence of bipolar disorder in the general population: a reappraisal study of the Netherlands mental health survey and incidence study. *Acta Psychiatrica Scandinavica*, 110(5), 374-382.

Regier, D.A., Farmer, M.E., Rae, D.S., Locke, B.Z., Keith, S.J., Judd, L.L., & Goodwin, F.K. (1990). Comorbidity of mental disorder with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *Journal of the American Medical Association*, 264, 2511-2518.

Reid, S. (2009). Intrusive imagery and goals: a control theory perspective. *The Cognitive Behaviour Therapist*, 2, 134-144

Rivas-Vazquez, R. A., Johnson, S. L., Rey, G. J., Blais, M. A., & Rivas-Vazquez, A. (2002). Current treatments for bipolar disorder: A review and update for psychologists. *Professional Psychology: Research and Practice*, 33(2), 212-223.

Rizvi, S., & Zaretsky, A. (2007). Psychotherapy through the phases of Bipolar Disorder: Evidence for general efficacy and differential effects. *Journal of Clinical Psychology In Session*, 63(5), 491-506.

Roelofs, J., Huibers, M., Peeters, F., Arntz, A., & van Os, J. (2008). Rumination and worrying as possible mediators in the relation between neuroticism and symptoms of depression and anxiety in clinically depressed individuals. *Behaviour Research and Therapy*, 46, 1283-1289.

Ros, L., Latorre, J. M., & Serrano, J. P. (2010). Working memory capacity and overgeneral autobiographical memory in young and older adults. *Aging, Neuropsychology, and Cognition*, 17(1), 89-107.

Rose, D., Wykes, T., Leese, M., Bindman, J., & Fleischmann, P. (2003). Patients' perspectives on electroconvulsive therapy: systematic review. *British Medical Journal*, 326. DOI: 10.1136/bmj.326.7403.1363

Rosenbaum, M. (1980). A schedule for assessing self-control behaviors: Preliminary findings. *Behavior Therapy*, 11, 109-121.

Russell, S. J., & Browne, J. L. (2005). Staying well with bipolar disorder. *Australian and New Zealand Journal of Psychiatry*, 39(3), 187-193.

Sajatovic, M., Davies, M., & Hrouda, D. R. (2004). Enhancement of treatment adherence among patients with bipolar disorder. *Psychiatric Services*, 55, 264-269.

Sajatovic, M., Valenstein, M., Blow, F. C., Ganoczy, D., & Ignacio, R. V. (2006). Treatment adherence with antipsychotic medications in bipolar disorder. *Bipolar Disorders*, 8, 232-241.

Sachs, G. S., Nierenberg, A. A., Calabrese, J. R., Marangell, L. B., Wisniewski, S. R., Gyulai, L., et al. (2007). Effectiveness of adjunctive antidepressant treatment for bipolar depression. *The New England Journal of Medicine*, 356(17), 1711-1722.

Schmitz, J. M., Averill, P., Sayre, S., McCleary, P., Moeller, F. G., & Swann, A. (2002). Cognitive-behavioural treatment of bipolar disorder and substance abuse: A preliminary randomised study. *Addictive Disorders & Their Treatments*, 1(1), 17-24.

Schotte, D. E., & Clum, G. A. (1987). Problem-solving skills in suicidal psychiatric patients. *Journal of Consulting and Clinical Psychology*, 55(1), 49-54.

Schürhoff, F., Bellivier, F., Jouvent, R., Mouren-Siméonid, M., Bouvard, M., Allilaire, J., et al. (2000). Early and late onset bipolar disorders: two different forms of manic-depressive illness? *Journal of Affective Disorders*, 58(3), 215-221.

Scott, J. (2001). Cognitive therapy as an adjunct to medication in bipolar disorder. *The British Journal of Psychiatry*, 178(Suppl. 41), S164-S168.

Scott, J., Garland, A., & Moorhead, S. (2001). A pilot study of cognitive therapy in bipolar disorders. *Psychological Medicine*, 31, 459-467.

Scott, J., Paykel, E., Morriss, R., Bentall, R., Kinderman, P., Johnson, T., et al. (2006). Cognitive-behavioural therapy for severe and recurrent bipolar disorders. *The British Journal of Psychiatry*, 188, 313-320.

Scott, J., & Pope, M. (2002). Self-reported adherence to treatment with mood stabilizers, plasma levels, and psychiatric hospitalization. *American Journal of Psychiatry*, 159, 1927-1929.

Scott, J., & Pope, M. (2003). Cognitive styles in individuals with bipolar disorders. *Psychological Medicine*, 33(6), 1081-1088.

Scott, J., Stanton, B., Garland, A., & Ferrier, I. N. (2000). Cognitive vulnerability in patients with bipolar disorder. *Psychological Medicine*, 30, 467-472.

Seal, K., Mansell, W., & Mannion, H (2008). What lies between hypomania and bipolar disorder? A qualitative analysis of 12 non-treatment-seeking people with a history of hypomanic experiences and no history of major depression. *Psychology and Psychotherapy: Theory, Research and Practice*, 81, 33-53.

Serretti, A., & Olgiati, P. (2005). Profiles of ‘‘manic’’ symptoms in bipolar I, bipolar II and major depressive disorders. *Journal of Affective Disorders*, 84, 159-166.

Sidley, G. L., Whitaker, K., Calam, R. M., & Wells, A. (1997). The relationship between problem-solving and autobiographical memory in parasuicide patients. *Behavioural and Cognitive Psychotherapy*, 25(2), 195-202.

Simon, N. M., Otto, M. W., Wisniewski, S. R., Fossey, M., Sagduyu, K., Frank, E., et al. (2004). Anxiety disorder comorbidity in bipolar disorder patients: Data from the first 500 participants in the systematic treatment enhancement program for bipolar disorder (STEP-BD). *American Journal of Psychiatry*, 161(12), 2222-2229.

Simpson, S. G., & Jamison, K. R. (1999). The risk of suicide in patients with bipolar disorders. *Journal of Clinical Psychiatry*, 60(Suppl 2), 53-56.

Smith, D., Jones, I., & Simpson, S. (2010). Psychoeducation for bipolar disorder. *Advances in Psychiatric Treatment*, 16, 147-154.

Smith, J. M., & Alloy, L. B. (2009). A roadmap to rumination: A review of the definition, assessment, and conceptualization of this multifaceted construct. *Clinical Psychology Review*, 29, 116-128

Solomon, D. A., Keitner, G. I., Miller, I. W., Shea, M. T., & Keller, M. B. (1995). Course of illness and maintenance treatments for patients with bipolar disorder. *Journal of Clinical Psychiatry*, 56(1), 5-13.

Spinhoven, P., Bockting, C. L. H., Kremers, I. P., Schene, A.H., & Williams, J. M. G. (2007). The endorsement of dysfunctional attitudes is associated with an impaired retrieval of specific autobiographical memories in response to matching cues. *Memory*, 15(3), 324-338.

Spinhoven, P., Bockting, C. L. H., Schene, A. H., Koeter, M. W. J., Wekking, E. M., & Williams, J. M. G. (2006). Autobiographical memory in the euthymic phase of recurrent depression. *Journal of Abnormal Psychology*, 115(3), 590-600.

Stokes, D. J., Dritschel, B. H., & Bekerian, D. A. (2008). Semantic and episodic autobiographical memory recall for memories not directly associated with childhood sexual abuse. *Journal of Family Violence*, 23(6), 429-435.

Sumner, J. A., Griffith, J. W., & Mineka, S. (2011). Examining the mechanisms of overgeneral autobiographical memory: Capture and rumination, and impaired executive control. *Memory*, 19(2), 169-183.

Sumner, J. A., Griffith, J. W., & Mineka, S. (2010). Overgeneral autobiographical memory as a predictor of the course of depression: a meta-analysis. *Behaviour Research and Therapy*, 48(7), 614-625.

Sutherland, K., & Bryant, R. A. (2007). Rumination and overgeneral autobiographical memory. *Behaviour Research and Therapy*, 45, 2407-2416.

Sutherland, K., & Bryant, R. A. (2008). Social problem solving and autobiographical memory in posttraumatic stress disorder. *Behaviour Research and Therapy* 46 154-161.

Swales, M. A., Williams, J. M. G., & Wood, P. (2001). Specificity of autobiographical memory and mood disturbance in adolescents. *Cognition & Emotion*, 15(3), 321-331.

Swartz, H. A., Frank, E., Frankel, D. R., Novick, D., & Houck, P. (2009). Psychotherapy as monotherapy for the treatment of bipolar II depression: a proof of concept study. *Bipolar Disorders*, 11, 89-94.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (Fourth Edition). Boston: Allyn and Bacon.

Talarico, J. M., Berntsen, D., & Rubin, D. C. (2009). Positive emotions enhance recall of peripheral details. *Cognition & Emotion*, 23(2), 380-398.

Taylor, P., & Mansell, W. (2008). "I Get So Energetic and Dominating!" A study of hypomanic personality and conflicting self-perception during activated states in a co-operative task. *Personality and Individual Differences*, 45(6), 483-487.

Taylor, P. J., Gooding, P. A., Wood, A. M., Johnson, J., Pratt, D., & Tarrier, N. (2010a). Defeat and entrapment in schizophrenia: The relationship with suicidal ideation and positive psychotic symptoms. *Psychiatry Research*, 178(2), 244-248.

Taylor, P. J., Gooding, P. A., Wood, A. M., & Tarrier, N. (2010c). Memory specificity as a risk factor for suicidality in non-affective psychosis: The ability to recall specific autobiographical memories is related to greater suicidality. *Behaviour Research and Therapy*, 48, 1047-1052.

Taylor, P. J., Gooding, P., Wood, A. M., & Tarrier, N. (*in press*). The role of defeat and entrapment in depression, anxiety and suicide. *Psychological Bulletin*.

Taylor, P. J., Wood, A. M., Gooding, P., Johnson, J., & Tarrier, N. (2009). Are defeat and entrapment best defined as a single construct? *Personality and Individual Differences*, 47, 795-797.

Taylor, P. J., Wood, A. M., Gooding, P., & Tarrier, N. (2010b). Appraisals and suicidality: The mediating role of defeat and entrapment. *Archives of Suicide Research*, 14(3), 236-247.

Teasdale, J. D. (1999). Emotional processing, three modes of mind and the prevention of relapse in depression. *Behaviour Research and Therapy*, 37, S53-S77.

Thomas, J., & Bentall, R. P. (2002). Hypomanic traits and response styles to depression. *British Journal of Clinical Psychology*, 41, 309-313.

Thomas, J., Bentall, R. P., Knowles, R., & Tai, S. (2009). Indirect measurement of dysfunctional attitudes in bipolar affective disorder. *Psychology and Psychotherapy: Theory, Research and Practice*, 82, 261-266.

Thomas, J., Knowles, R., Tai, S., & Bentall, R. P. (2007). Response styles to depressed mood in bipolar affective disorder. *Journal of Affective Disorders*, 100, 249-252.

Tondo, L., Baldessarini, R. J., Hennen, J., Floris, G., Silvetti, F., & Tohen, M. (1998). Lithium treatment and risk of suicidal behavior in bipolar disorder patients. *Journal of Clinical Psychiatry*, 59(8), 405-415.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: a psychometric analysis. *Cognitive Therapy & Research*, 27(3), 247-259.

Tzemou, E., & Birchwood, M. (2007). A prospective study of dysfunctional thinking and the regulation of negative intrusive memories in bipolar 1 disorder: implications for affect regulation theory. *Psychological Medicine*, 37, 689-698.

Udachina, A., & Mansell, W. (2007). Cross-validation of the Mood Disorders Questionnaire, the Internal State Scale, and the Hypomanic Personality Scale. *Personality and Individual Differences*, 42, 1539-1549.

Urošević, S., Abramson, L. Y., Harmon-Jones, E., & Alloy, L. B. (2008). Dysregulation of the behavioral approach system (BAS) in bipolar spectrum disorders: Review of theory and evidencestar, open. *Clinical Psychology Review*, 28(7), 1188-1205.

Valentino, K., Toth, S. L., & Cicchetti, D. (2009). Autobiographical memory functioning among abused, neglected, and non-maltreated children: the overgeneral memory effect. *Journal of Child Psychology and Psychiatry*, 50(8), 1029-1038.

Van der Gucht, E., Morriss, R. Lancaster, G., Kinderman, P., & Bentall, R.P. (2009). Psychological processes in bipolar affective disorder: negative cognitive style and reward processing. *The British Journal of Psychiatry*, 194, 146–151.

Vieta, E. (2005). Improving treatment adherence in bipolar disorder through psychoeducation. *Journal of Clinical Psychiatry*, 66(S1), 24-29.

Vrielnyck, N., Deplus, S., & Philipot, P. (2007). Overgeneral autobiographical memory and depressive disorder in children. *Journal of Clinical Child and Adolescent Psychology*, 36(1), 95-105.

Watkins, E., & Baracaia, S. (2002). Rumination and social problem-solving in depression. *Behaviour Research and Therapy*, 40, 1179-1189.

Watkins, E., & Brown, R. G. (2002). Rumination and executive function in depression: An experimental study. *Journal of Neurology Neurosurgery and Psychiatry*, 72(3), 400-402.

Watkins, E., & Teasdale, J. D. (2001). Rumination and overgeneral memory in depression: Effects of self-focus and analytical thinking. *Journal of Abnormal Psychology*, 110(2), 353-357.

Watkins, E., & Teasdale, J. D. (2004). Adaptive and maladaptive self-focus in depression. *Journal of Affective Disorders*, 82 1-8.

Watkins, E., Teasdale, J. D., & Williams, R. M. (2000). Decentring and distraction reduce overgeneral autobiographical memory in depression. *Psychological Medicine*, 30, 911-920.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.

Weissman, A., & Beck, A. T. (1978). Development and validation of the Dysfunctional Attitudes Scale: A preliminary investigation. Presented at the annual meeting of the association for the advancement of behavior therapy, Chicago.

Wessel, I., Meeren, M., Peeters, F., Arntz, A., & Merckelbach, H. (2001). Correlates of autobiographical memory specificity: the role of depression, anxiety and childhood trauma. *Behaviour Research and Therapy*, 39, 409-421.

Williams, J. M. G. (1996). Depression and the specificity of autobiographical memory. In D. C. Rubin (Ed.). *Remembering our past. Studies in autobiographical memory*. (pp. 244-267). Cambridge, England: Cambridge University Press.

Williams, J. M. G. (2006). Capture and rumination, functional avoidance, and executive control (CaRFAX): Three processes that underlie overgeneral memory. *Cognition & Emotion*, 20(3/4), 548-568.

Williams, J. M. G., Alatiq, Y., Crane, C., Barnhofer, T., Fennell, M. J. V., Duggan, D. S., et al. (2008). Mindfulness-based cognitive therapy (MBCT) in bipolar disorder: Preliminary evaluation of immediate effects on between-episode functioning. *Journal of Affective Disorders*, 107, 275-279.

Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., et al. (2007). Autobiographical memory specificity and emotional disorder. *Psychological Bulletin*, 133(1), 122-148.

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, 95(2), 144-149.

Williams, J. M. G., Chan, S., Crane, C., Barnhofer, T., Eade, J., & Healy, H. (2006). Retrieval of autobiographical memories: The mechanisms and consequences of truncated search. *Cognition & Emotion*, 20(3/4), 351-382.

Williams, J. M. G., & Dritschel, B. H. (1988). Emotional disturbance and the specificity of autobiographical memory. *Cognition & Emotion, 2*,221-234.

Williams, J. M. G., Healy, H. G., & Ellis, N. C. (1999). The effect of imageability and predicability of cues in autobiographical memory. *The Quarterly Journal of Experimental Psychology: Section A*, 52(3), 555 - 579.

Williams, J. M. G., & Scott, J. (1988). Autobiographical memory in depression. *Psychological Medicine*, 18, 689-695.

Williams, J. M. G., Teasdale, J. D., Segal, Z. V., & Soulsby, J. (2000). Mindfulness-based cognitive therapy reduces overgeneral autobiographical memory in formerly depressed patients. *Journal of Abnormal Psychology*, 109(1), 150-155.

Winokur, G., Clayton, P. J., & Reich, T. (1969). *Manic Depressive Illness*. St Louis: CV Mosby.

Winters, K. C., & Neale, J. M. (1985). Mania and low self-esteem. *Journal of Abnormal Psychology 94*(3), 282-290.

Wright, K., Lam, D., & Newsom-Davis, I. (2005). Induced mood change and dysfunctional attitudes in remitted bipolar I affective disorder. *Journal of Abnormal Psychology*, 114(4), 689-696.

Yanes, P. K., Roberts, J. E., & Carlos, E. L. (2008). Does overgeneral autobiographical memory result from poor memory for task instructions? *Memory*, 16(7), 669-677.

Zaretsky, A. E. (2003). Targeted psychosocial interventions for bipolar disorder. *Bipolar Disorders*, 5(Suppl. 2), 80-87.

Zaretsky, A., Lancee, W., Miller, C., Harris, A., & Parikh, S. V. (2008). Is cognitive-behavioural therapy more effective than psychoeducation in bipolar disorder? *Canadian Journal of Psychiatry*, 53(7), 441-448.

Zaretsky, A. E., Segal, Z. V., & Gemar, M. (1999). Cognitive therapy for bipolar depression: a pilot study. *Canadian Journal of Psychiatry*, 44, 491-494.

Appendix

Behavioural Inhibition & Activation Scale (BIS/BAS)

Each item of this questionnaire is a statement that a person may either agree with or disagree with. For each item, indicate how much you agree or disagree with what the item says. Choose only one response to each statement. Please be as accurate and honest as you can be. Respond to each item as if it were the only item. That is, don't worry about being "consistent" in your responses. Choose from the following four response options:

4 = very true for me
3 = somewhat true for me
2 = somewhat false for me
1 = very false for me

---

1. A person's family is the most important thing in life ___
2. Even if something bad is about to happen to me, I rarely experience fear or nervousness. ___
3. I go out of my way to get things I want. ___
4. When I'm doing well at something I love to keep at it. ___
5. I'm always willing to try something new if I think it will be fun. ___
6. There are times in which I get immediately excited when I see an opportunity for something, while in other periods of time this is not the case at all ___
7. How I dress is important to me. ___
8. When I get something I want, I feel excited and energised. ___
9. Criticism or scolding hurts me quite a bit. ___
10. When I want something I usually go all-out to get it. ___
11. There are periods in which I try especially hard to get what I want, and in other periods of time I do nothing at all to get what I want ___
12. I will often do things for no other reason than that they might be fun. ___
13. It's hard for me to find the time to do things such as get a haircut. ___
14. If I see a chance to get something I want, I move on it right away. ___
15. I feel pretty worried or upset when I think or know someone is angry at me. ___
16. When I see an opportunity for something I like I get excited right away. ___
17. I often act on the spur of the moment. ___
18. If I think something unpleasant is going to happen I usually get pretty "worked up." ___
19. I often wonder why people act the way they do. ___
20. Sometimes when I want to achieve something I seriously pursue a goal while I don't do this at all at other times ___
21. When good things happen to me, it affects me strongly. ___
22. I feel worried when I think I have done poorly at something important. ___
23. I crave excitement and new sensations. ___
24. When I go after something I use a "no holds barred" approach. ___
25. It differs a lot: There are episodes in which I give it a try immediately if I see a chance to get something I want while in other episodes I do not go after it at all ___
26. I have very few fears compared to my friends. ___
27. It would excite me to win a contest. ___
28. I worry about making mistakes. ___

The Center for Epidemiological Studies Depression Scale (CES-D)

Below is a list of ways that you might have felt or behaved. Please indicate how often you have felt this way during the past week. Please tick one of four options:

Rarely or none of the time (less than one day)
Some or a little of the time (1-2 days)
Occasionally or a moderate amount of time (3-4 days)
Most or all of the time (5-7 days)

---

1. I was bothered by things that usually don't bother me.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

2. I did not feel like eating; my appetite was poor.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

3. I felt that I could not shake off the blues even with help from my family or friends.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

4. I felt that I was just as good as other people.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

5. I had trouble keeping my mind on what I was doing.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

6. I felt depressed.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

7. I felt that everything I did was an effort.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

8. I felt hopeful about the future.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

9. I thought my life had been a failure.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

10. I felt fearful.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

11. My sleep was restless.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

12. I was happy

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

13. I talked less than usual.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

14. I felt lonely.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

15. People were unfriendly.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

16. I enjoyed life.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

17. I had crying spells.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

18. I felt sad.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

19. I felt that people dislike me.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

20. I could not get going.

Rarely (less than a day)	Sometimes (1-2 days)	Occasionally (3-4 days)	Most of the time (5-7 days)

Defeat scale

Please read each of the following statements carefully and indicate how often you have felt like this **in the previous seven days** by circling a number on the scale.

	Never	Rarely	Sometimes	Mostly	Always/ All the time
1. I feel that I have not made it in life	1	2	3	4	5
2. I feel that I am a successful person	1	2	3	4	5
3. I feel defeated by life	1	2	3	4	5
4. I feel that I am basically a winner	1	2	3	4	5
5. I feel that I have lost my standing in the world	1	2	3	4	5
6. I feel that life has treated me like a punch bag	1	2	3	4	5
7. I feel powerless	1	2	3	4	5
8. I feel that my confidence has been knocked out of me	1	2	3	4	5
9. I feel able to deal with whatever life throws at me	1	2	3	4	5
10. I feel that I have sunk to the bottom of the ladder	1	2	3	4	5
11. I feel completely knocked out of action	1	2	3	4	5
12. I feel that I am one of life's losers	1	2	3	4	5
13. I feel that I have given up	1	2	3	4	5
14. I feel down and out	1	2	3	4	5
15. I feel I have lost important battles in life	1	2	3	4	5
16. I feel that there is no fight left in me	1	2	3	4	5

Entrapment scale

Please read each of the following statements carefully and indicate how much you feel like this by circling a number on the scale.

	Not at all like me	A little like me	Moderately like me	Quite a bit like me	Extremely like me
I want to get away from myself	1	2	3	4	5
I feel powerless to change myself	1	2	3	4	5
I would like to escape from my thoughts and feelings	1	2	3	4	5
I feel trapped inside myself	1	2	3	4	5
I would like to get away from who I am and start again	1	2	3	4	5
I feel I'm in a deep hole I can't get out of	1	2	3	4	5
I am in a situation I feel trapped in	1	2	3	4	5
I have a strong desire to escape from things in my life	1	2	3	4	5
I am in a relationship I can't get out of	1	2	3	4	5
I often have the feeling that I would just like to run away	1	2	3	4	5
I feel powerless to change things	1	2	3	4	5
I feel trapped by my obligations	1	2	3	4	5
I can see no way out of my current situation	1	2	3	4	5
I would like to get away from other more powerful people in my life	1	2	3	4	5
I have a strong desire to get away and stay away from where I am now	1	2	3	4	5
I feel trapped by other people	1	2	3	4	5

Event-rating scale (ERS: Study Two)

This questionnaire asks some questions relating to the experience of positive and negative events that have happened over the past six months, and how optimistic you feel for the upcoming six months. For each of the questions below please provide a rating of between 0 and 100 and type that answer into the textbox.

1. How many positive life events have you experienced over the past 6 months?
(e.g., weddings, graduation, job promotions, achievements)

Very Few — Many/A Lot
0 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

2. How many negative life events have you experienced over the past 6 months?
(e.g., bereavements, unemployment, losses)

Very Few — Many/A Lot
0 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

3. Overall, how happy/positive were the events of the last six months?

Not very happy/positive — Very happy/positive
0 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

4. Overall, how sad/negative were the events of the last six months?

Not very sad/negative — Very sad/negative
0 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

5. How do you feel when you think about the past six months of your life?

Very negative/sad — Very positive/happy
0 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

6. Looking forward, how optimistic or pessimistic do you feel about the next six months of your life?

Very pessimistic — Neither optimistic or pessimistic — Very optimistic
0 — 50 — 100
|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|….ι….|

Hypomania Interpretations Questionnaire (HIQ-10)

Listed below are situations that you may or may not have ever experienced. For each situation, please circle the letter next to each reason that corresponds to how much that might explain the situation for you. Please check every item for each question. Also, answer whether you have experienced the situation in the last 3 months by circling A (yes) or B (no). Please answer all questions.

A	B	C	D
Not at all	Somewhat	Quite a bit	A great deal

1. If I thought my thoughts were going too fast I would probably think it was because:

I am intelligent and full of good ideas.	A	B	C	D
There are too many competing tasks for me at present.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

2. If I was on the go so much that other people couldn't keep up with me, I would probably think it was because:

I am overdoing it and will soon need a rest.	A	B	C	D
I have more stamina than other people.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

3. If my thoughts were coming so thick and fast that other people couldn't keep up, I would probably think it was because:

I am full of good ideas and others are too slow.	A	B	C	D
There are too many demands on my time.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

4. If I was feeling 'sped up' inside, I would probably think it was because:

I am under pressure from work or social demands.	A	B	C	D
I am in good spirits and can take on challenges.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

5. If I felt physically restless and kept moving from one activity to the next, I would probably think it was because:

I am full of energy and raring to go.	A	B	C	D
There is too much pressure and I need a break.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

6. If I felt impulsive, I would probably think it was because:

I could make rapid decisions and good choices.	A	B	C	D
There are lots of external demands.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

7. If I felt in high spirits and full of energy, I would probably think it was because:

I am a talented person with lots to offer.	A	B	C	D
Things happen to be going well for me at present.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

8. If I woke up earlier than normal and felt full of energy, I would probably think it was because:

I am a happy, positive and energetic person.	A	B	C	D
Something has disrupted my routine.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

9. If I found my thinking was very quick and clear, I would probably think it was because:

There are few distractions at present.	A	B	C	D
I am clever and talented.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

10. If I found that tastes, smells or things I touched seemed more vivid, I would probably think it was because:

It is just a phase and will pass.	A	B	C	D
I am more sensitive and ‘tuned in’ than other people.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

Hypomanic Personality Scale (HPS)

Please answer each item true or false. Some items may sound like others, but all of them are slightly different. Answer each item individually, and don't worry about how you answered a somewhat similar previous item.

Circle either:

True False The beauty of sunsets is greatly overrated. (EXAMPLE)

True False 1. I consider myself to be pretty much an average kind of person.

True False 2. It would make me nervous to play the clown in front of other people.

True False 3. I am frequently so "hyper" that my friends kiddingly ask me what drug I'm taking.

True False 4. I think I would make a good nightclub comedian.

True False 5. Sometimes ideas and insights come to me so fast that I cannot express them all.

True False 6. When with groups of people, I usually prefer to let someone else be the center of attention.

True False 7. In unfamiliar surroundings, I am often so assertive and sociable that I surprise myself.

True False 8. There are often times when I am so restless that it is impossible for me to sit still.

True False 9. Many people consider me to be amusing but kind of eccentric.

True False 10. When I feel an emotion, I usually feel it with extreme intensity.

True False 11. I am frequently in such high spirits that I can't concentrate on any one thing for too long.

True False 12. I sometimes have felt that nothing can happen to me until I do what I am meant to do in life.

True False 13. People often come to me when they need a clever idea.

True False 14. I am no more self-aware than the majority of people.

True False 15. I often feel excited and happy for no apparent reason.

True False 16. I can't imagine that anyone would ever write a book about my life.

True False 17. I am usually in an average sort of mood, not too high and not too low.

True False 18. I often have moods where I feel so energetic and optimistic that I feel I could outperform almost anyone at anything.

True False 19. I have such a wide range of interests that I often don't know what to do next.

True False 20. There have often been times when I had such an excess of energy that I felt little need to sleep at night.

True False 21. My moods do not seem to fluctuate any more than most people's do.

True False 22. I very frequently get into moods where I wish I could be everywhere and do everything at once.

True False 23. I expect that someday I will succeed in several different professions.

True False 24. When I feel very excited and happy, I almost always know the reason why.

True False 25. When I go to a gathering where I don't know anyone, it usually takes me a while to feel comfortable.

True False 26. I think I would make a good actor, because I can play many roles convincingly.

True False 27. I like to have others think of me as a normal kind of person.

True False 28. I frequently write down the thoughts and insights that come to me when I am thinking especially creatively.

True False 29. I have often persuaded groups of friends to do something really adventurous or crazy.

True False 30. I would really enjoy being a politician and hitting the campaign trail.

True False 31. I can usually slow myself down when I want to.

True False 32. I am considered to be kind of a "hyper" person.

True False 33. I often get so happy and energetic that I am almost giddy.

True False 34. There are so many fields I could succeed in that it seems a shame to have to pick one.

True False 35. I often get into moods where I feel like many of the rules of life don't apply to me.

True False 36. I find it easy to get others to become sexually interested in me.

True False 37. I seem to be a person whose mood goes up and down easily.

True False 38. I frequently find that my thoughts are racing.

True False 39. I am so good at controlling others that it sometimes scares me.

True False 40. At social gatherings, I am usually the "life of the party".

True False 41. I do most of my best work during brief periods of intense inspiration.

True False 42. I seem to have an uncommon ability to persuade and inspire others.

True False 43. I have often been so excited about an involving project that I didn't care about eating or sleeping.

True False 44. I frequently get into moods where I feel very speeded-up and irritable.

True False 45. I have often felt happy and irritable at the same time.

True False 46. I often get into excited moods where it's almost impossible for me to stop talking.

True False 47. I would rather be an ordinary success in life than a spectacular failure.

True False 48. A hundred years after I'm dead, my achievements will probably have been forgotten.

The Internal States Scale (ISS)

For each of the following statements, please mark an "X" at the point on the line that best describes the way you have felt over the past 24 hours. While there may have been some change during that time, try to give a single summary rating for each item.

	Not at all/ Rarely	Very much so/ Much of the time
Today my mood is changeable	0	100
Today I feel irritable	0	100
Today I feel like a capable person	0	100
Today I feel like people are out to get me	0	100
Today I actually feel great inside	0	100
Today I feel impulsive	0	100
Today I feel depressed	0	100
Today my thoughts are going fast	0	100
Today it seems like nothing will ever work out for me	0	100
Today I feel overactive	0	100
Today I feel as if the world is against me	0	100
Today I feel "sped up" inside	0	100
Today I feel restless	0	100
Today I feel argumentative	0	100
Today I feel energised	0	100

Today I feel:	Depressed/Down	Normal	Manic/High
	-50	0	+50

Interpretations of Depression Questionnaire (IDQ)

Listed below are situations that you may or may not have experienced. For each situation, please circle the letter next to each reason that corresponds to how much that might explain the situation for you. Please check every item for each question. Also, answer whether you have experienced the situation in the last 3 months by circling A (yes) or B (no). Please answer all questions.

A	B	C	D
Not at all	Somewhat	Quite a bit	A great deal

1. If I felt I couldn't enjoy life as easily as other people, I would probably think it was because:

Current pressures are distracting me from my interests	A	B	C	D
I don't get pleasure from anything anymore	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

2. If I experience guilty feelings even though I may not have done anything particularly wrong I would probably think it was because:

I am being hard on myself because I under strain at the moment	A	B	C	D
I am a bad person and deserve to be punished	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

3. If I have exploded at others and afterwards felt bad about myself I would probably think it was because:

I am a nasty person.	A	B	C	D
I am under a lot of pressure at the moment.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

4. If I felt cut off from other people I would probably think it was because:

I am an insensitive person.	A	B	C	D
Things are difficult at the moment and I have little energy for other things.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

5. If I had upsetting or bad thoughts going through my mind I would probably think it was because:

I am rather low at present but when things improve the thoughts will go.	A	B	C	D
I am a worthless person to have these types of thoughts.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

6. If I felt down on myself I would probably think it was because:

I am a bad person, even towards myself.	A	B	C	D
Current problems are leading me to be rather hard on myself.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

7. If I felt that the future was bleak and things were unlikely to improve I would probably think was because:

Situations look bleak, but will change as things improve.	A	B	C	D
I am a negative pessimistic person	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

8. If there were times when I struggled to control an urge to cry or found myself crying without really understanding why I would probably think it was because:

I am a weak, pathetic, person.	A	B	C	D
My difficulties have affected me just at the moment.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

9. If I have periods of time when I felt a persistent sense of gloom I would probably think it was because:

I am a failure and a burden to others.	A	B	C	D
Things are going wrong for me just at present.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

10. If I felt that nothing was working out for me I would probably think it was because:

Too many obstacles are being put in my way at present.	A	B	C	D
I struggle to get anything right in my life.	A	B	C	D

Have you experienced this situation in the last 3 months? A-yes B-no

Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment.

Please write the appropriate number in the space next to each word. Use the following scale to record your answers

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

1	___	interested	2	___	irritable
3	___	distressed	4	___	alert
5	___	excited	6	___	ashamed
7	___	upset	8	___	inspired
9	___	strong	10	___	nervous
11	___	guilty	12	___	determined
13	___	scared	14	___	attentive
15	___	hostile	16	___	jittery
17	___	enthusiastic	18	___	active
19	___	proud	20	___	afraid

The Problem Solving Scale (PSS)

Please indicate how characteristic or descriptive each of the following statements is of you by using the code given below.

+3 very characteristic of me, extremely descriptive.
+2 rather characteristic of me, quite descriptive
+1 somewhat characteristic of me, slightly descriptive.
-1 somewhat uncharacteristic of me, slightly undescriptive
-2 rather uncharacteristic of me, quite undescriptive
-3 very uncharacteristic of me, extremely nondescriptive

When I do a boring job, I think about the less boring parts of the job and the reward that I will receive once I am finished.	
When I have to do something that is anxiety arousing for me, I try to visualize how I will overcome my anxieties while doing it.	
When I am faced with a difficult problem, I try to approach its solution in a systematic way.	
When I find that I have difficulties in concentrating on my reading, I look for ways to increase my concentration.	
When I plan to work, I remove all the things that are not relevant to my work.	
When I try to get rid of a bad habit I first try to find out all the factors that maintain this habit.	
When I find it difficult to settle down and do a certain job, I look for ways to help me settle down.	
First of all I prefer to finish a job that I have to do and then start doing the things I really like.	
When I feel that I am too impulsive, I tell myself ‘‘stop and think before you do anything’’	
Even when I am terribly angry at somebody, I consider my actions very carefully.	
Facing the need to make a decision I usually find out all the possible alternatives instead of deciding quickly and spontaneously.	
When I realise that I cannot help myself but be late for an important meeting, I tell myself to keep calm.	
I usually plan my work when faced with a number of things to do.	
When I am short of money, I decide to record all my expenses in order to plan more carefully for the future.	
If I find it difficult to concentrate on a certain job, I divide the job into smaller segments.	

Responses to Positive Affect scale (RPA)

People think and do many different things when they feel happy. Please read each of the following items and indicate whether you never, sometimes, often, or always think or do each one when you feel happy, excited, or enthused. Please indicate what you generally do, not what you think you should do.

1	2	3	4
Almost never	Sometimes	Often	Almost always

When you are feeling happy, how often do you…

1)	…notice how you feel full of energy	1	2	3	4
2)	…savour this moment	1	2	3	4
3)	…think "I am getting everything done"	1	2	3	4
4)	…think about how you feel up for doing everything	1	2	3	4
5)	…think "I am living up to my potential"	1	2	3	4
6)	…think "It is too good to be true"	1	2	3	4
7)	…think about how happy you feel	1	2	3	4
8)	…think about how strong you feel	1	2	3	4
9)	…think about things that could go wrong	1	2	3	4
10)	…remind yourself that these feelings won't last	1	2	3	4
11)	…think "People will think I am bragging“	1	2	3	4
12)	…think about how hard it is to concentrate	1	2	3	4
13)	…think "I am achieving everything"	1	2	3	4
14)	…think "I don't deserve this"	1	2	3	4
15)	…think "My streak of luck is going to end soon"	1	2	3	4
16)	…think about how proud you are of yourself	1	2	3	4
17)	…think about the things that have not gone well for you.	1	2	3	4

Ruminative Responses Scale (RRS)

You will find below a list of things which people might do or think when they feel sad, low or in a depressed mood. Please indicate if you never, sometimes, often or always react in these ways when you feel sad or depressed mood, by placing a tick in the appropriate column. Please indicate what you generally do, not what you think you ought to do.

	Never	Sometimes	Often	Always
1. Think about how alone you feel				
2. Think "I won't be able to do my job if I don't snap out of this"				
3. Think about your feelings of fatigue and achiness				
4. Think about how hard it is to concentrate				
5. Think "what am I doing to deserve this?"				
6. Think about how passive and unmotivated you feel				
7. Analyse recent events to try to understand why you are depressed				
8. Think about how you don't seem to feel anything anymore				
9. Think "why can't I get going?"				
10. Think "why do I always react this way?"				
11. Go away by yourself and think about why you feel this way				
12. Write down what you are thinking and anlayse it				
13. Think about a recent situation wishing it had gone better				
14. Think "I won't be able to concentrate if I keep feeling this way"				
15. Think "why do I have problems other people don't have?"				
16. Think "why can't I handle things better?"				
17. Think about how sad you feel				
18. Think about all your shortcomings, failings, faults and mistakes				
19. Think about how you don't feel up to doing anything				
20. Analyse your personality to try to understand your feelings				
21. Go somewhere alone to think about your feelings				
22. Think about how angry you are with yourself				

Items from the Sentence Completion for Events from the Past Test (SCEPT) & Sentence Completion for Events in the Future Test (SCEFT)

SCEPT Instructions

Below you will find eleven sentences. Actually these are only parts of sentences, because only the beginning of each of the sentences is provided. The purpose of the task is for you to complete each of the sentences by thinking about and recalling a specific autobiographical memory by typing your answer in the textbox provided. An "autobiographical memory" refers to your memory for a specific event that you have previously experienced, which may have occurred at any time from when you were small up until now. You can complete the sentences any way you want, just as long as what you write corresponds to the provided stem. Also, make sure that each of the sentences refers to a different topic or event.

Original SCEPT Items

1. I still remember well how . . .
2. I still recall how/that I . . .
3. Last year . . .
4. In the past . . .
5. Last week I . . .
6. I can still picture how . . .
7. When I think back to/of . . .
8. I will never forget . . .
9. The most important thing that I have ever…
10. Last year I . . .
11. At the time when I …

SCEPT-Win/Loss Items

1. The word "winner" reminds me of when I...
2. When I failed...
3. The time I felt particularly successful...
4. It was disappointing when…
5. My greatest achievement was...
6. "Loss" makes me think of when...
7. I had achieved...
8. I was let down when...

Items from the Sentence Completion for Events in the Future Test (SCEFT)

(Anderson & Dewhurst, 2009, same instructions as the SCEPT)

1. In the future I can see well how . . .
2. In the future I imagine how/that I . . .
3. Next year . . .
4. In the future . . .
5. Next week I . . .
6. In the future I can picture how . . .
7. When I look forward to . . .
8. In the future I will . . .
9. The most important thing that I will ever . . .
10. Next year I . . .
11. At some time I will . . .

The University Means-End Problem Solving Task (UMEPS)

Instructions: During our day-to-day lives we are faced with a variety of problems which we must solve in order to cope successfully with our environment. In this study we are interested in how people respond to a problem and how they would attempt to overcome that problem.

Below are a series of situations. Please read each situation and think about how you would solve that situation. As you read each problem, try to imagine yourself in the situation and think about what you would do to bring the story to a resolution. Be sure to state what steps you might take to achieve the stated outcome. Once you have decided how you would overcome the problem in question, please write/type your answer in the box. Please also provide a rating for how effective you think that solution would be for that situation.

Break up with boyfriend/girlfriend
You have been in a relationship with your boyfriend/girlfriend for the past two years. You are very happy and feel positive about the future of the relationship. However, your boyfriend/girlfriend has decided to end your relationship. Although you wish to still be with him/her, you know that the relationship is over. You are unsure how to pursue a friendship with your former boyfriend/girlfriend. We end the story with your relationship improving with your former boy/girlfriend.

Want to have a relationship
Compared to your friends, you have little luck in meeting potential boyfriends/girlfriends. As you have got older, many of your friends are now in stable long-term relationships. You are starting to feel somewhat lonely because your friends spend more time with their boyfriends/girlfriends. Even though you are shy, you want to meet a new romantic partner. We end the story with you feeling less lonely.

Trouble with job supervisor
You have kept working at your part-time weekend job whilst you study at university. Although you have worked in the same job for many years, you still enjoy working there. Even though you work harder than your colleagues, your supervisor seems to dislike you and is overly critical of your work. You have started to hate your job and your supervisor, but you cannot afford to not to have a part-time job. The story ends with you ceasing to hate your job.

Gambling
You and your friends have recently started to visit the local casino. You enjoy the banter and thrill of gambling, particularly when your friends lose their money. As you have started to visit the casino more frequently, one of your friends has expressed concern over how much money you are losing when gambling. You check your bank statements and realise that your friend may be right. We end the story with your gambling debts being reduced.

Problems with course-mates
As part of your degree, you have to design and run an experiment with a group of your course mates. The lecturer has appointed you as chair of the group, with responsibility for managing the group and the experiment. You are finding that some of your course mates aren't turning up to meetings or doing their share of the work. Because this project forms a big part of your grade for the year, you need to get a good grade from running the group and a successful experiment. We end the story with your group running a successful experiment and being awarded a good coursework grade.

Lost essay materials
You have been working hard on researching the topic of your new essay question. You have been spending a fair amount of time in the library searching through academic journals and books as you plan out your essay. When you come to write the essay a couple of days later, you realise that you have lost your notes and essay plan you had carefully researched at the library. There isn't much time for you to write and hand-in the essay. We end the story with you completing the essay in time for the deadline.

Friend is avoiding you
You have started to get the impression that one of your friends is ignoring you. You have tried sending emails, text messages, making phone calls and also tried contacting them through online social-networking websites without any luck. You wonder whether you have done something wrong. You are generally concerned about your friend, particularly as you haven't seen them or heard from them in a long time. We end the story with you eventually contacting your friend.

Stranded after a night out
You are on a night out with your university friends and housemates in a nearby city to where you study. You have to leave early to travel back, after saying goodbye to your friends and leaving the nightclub you become lost. Eventually you find your way to the train station. Unfortunately the last train has gone, with your friends onboard, and you are stranded with little money. The story ends with you returning to the house which you share with your friends.

Poor relationship with parents
Although you spend most of your time away at university, you still have a poor relationship with your parents. Whilst you spend little time back at home, you still seem to get into heated arguments with your parents on a regular basis. When you are at university you keep thinking about your parents. You wish that you could have a better relationship with them. We end the story with your feeling closer to your parents.

Depressed feelings
Although you are generally a positive and upbeat person, you find yourself getting upset at the slightest little thing. You are also scared that you'll just start crying for no reason, but you cannot think of a specific reason for these feelings. You've lost all motivation for doing your course-work and you don't want to socialise anymore. You want to overcome these feelings. We end the story with you overcoming these feelings.

Worry about how to pay back student loan
Like many students you took out a student loan to help pay your tuition fees, rent and living costs. You have just checked your bank and student loan statements and realise that your overall debt is much larger than what you anticipated. You are also concerned that you don't have a job lined up for when you graduate. As you look at your statements you wonder how you will repay your debts. We end the story with you overcoming your worries regarding the repayment of your debt.

Worry about finances
You are concerned about whether you have enough money to afford going on nights out with friends, on top of paying your bills. You have started to notice that you have less money at the end of each month. You want to have an active social life, but you don't want to run up large amounts of debt. You still have another year of university to complete, so you wonder how you can manage your money better until then. The story ends with you feeling less worried about your finances.

Alcohol abuse
Like many undergraduate students, you enjoy going out binge drinking in pubs and nightclubs with your friends. However, you are now finding it harder to concentrate during your lectures and seminars the day after a drinking session. Sometimes your hangover is so awful that you cannot get out of bed to go to university. You think that your drinking may be jeopardising your university work and degree. The story ends with you finding it easier to concentrate.

Social Isolation
You have moved into your university halls of residence at the start of your first year of your degree course. You have moved to a new city many hundreds of miles away from your family and friends back home. You do not know anyone at your new university or in your new city. You are currently sat alone in your flat, and you feel afraid to go out. We end the story with your feelings of loneliness going away.

Stress
There are number of upcoming deadlines for pieces of coursework for your degree. You have started to feel stressed about how much coursework you have, and the decreasing amount of time in which you have to complete it. Your other course mates seem to be managing their time more

effectively compared to you. You wonder how you will be able to manage your time and complete your coursework on time. We end the story with you handing in your finished coursework on time.

Exam revision
It is the end of the semester and your lectures have now finished. You have just realised that your examinations are due to start in three weeks time. You have only completed a small amount of the assigned reading for your courses and you have not kept your lecture notes up to date. You need to get good grades in these exams to improve your overall grade average. We end the story with you feeling prepared for your exams.

Start of new university year
You have decided that you want to make the most of this upcoming academic year. During fresher's week you signed up to a number of interesting societies and have volunteered to be a student representative for your course and volunteer for a local charity. A couple of weeks into the semester you feel increasingly excited about all the things you are doing. However, you also feel that you can't slow down or relax. The story ends with your feelings of excitement being reduced.

Argument with housemates
You are sharing a house with two of your friends from university. Although you get along with your housemates, you have found yourself in the middle of a number of arguments between your two housemates. You try your best to stay out of these arguments as you don't want to take sides, but the situation isn't improving. As you still get along with everyone you feel that you should do something to resolve this situation. We end the story with the tension between yourself and your housemates being reduced.

Worry over job hunting
You are only a few months away from graduating from university. Like many final year students, you are thinking about your future job prospects and graduate career options. You have recently read in a newspaper that there will be fewer graduate jobs available, meaning there will be more applicants per available job. You are sure that you want to get a job, but you are worried that there is too much competition from other graduates for the best graduate training scheme job. The story ends with the reduction of your worries about your future career.

Sleeping too much
When you first came to university you were able to stay out late and then attend lectures, play sports with friends and generally have a good time, whilst keeping up with your work. But it is now your final year and you find that you spend your nights tossing and turning. You also find that your sleep is troubled by nightmares. The story ends with your quality of sleep improving.

Abdominal pain
You are normally in good health, but you have recently begun to experience stomach cramps. You've also been feeling stressed out with lab classes where you are not on top of your work and which you dread. You have noticed that you feel agitated and nervous throughout the day. In the past you have ignored the early signs of illness and have recovered without having to seek help. We end the story with your symptoms disappearing.

Losing self-confidence
Now you are in your third year you feel that you want to do as well as you can and you are aiming for a first. You have to write a short dissertation half way through the first semester. To your surprise, your tutor makes a number of negative comments on your first draft of your dissertation. You also have to give a talk critically analysing a journal article. During your talk people look bored. You are starting to lose confidence in yourself. The story ends with you managing to improve your own self-confidence.

Problems with course-mates
As part of your degree, you have to design and run an experiment with a group of your course mates. The lecturer has appointed you as chair of the group, with responsibility for managing the group and the experiment. You are finding that some of your course mates aren't turning up to meetings or doing their share of the work. You need to get a good grade because this project forms a big part of your overall grade for the year. We end the story with your group running a successful experiment and being awarded a good grade.

The Willingly Approached Set of Statistically Unlikely Pursuits scale (WASSUP)

(Modified by R. Dempsey for use with British samples, * = amended items)

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

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

1. celebrities will want to be your friends.	
2. each day of your work will be fulfilling.	
3. everyone you know will love you.	
4. someone will write a book about your life.	
5. whenever you have a problem, your friends will drop what they are doing to support you.	
6. you will appear regularly on TV.	
7. you will be famous.	
8. you will be important in political circles.	
9. you will be on a magazine list of the sexiest people alive.	
10. you will be president/leader of your country.*	
11. you will create a great work of art, music, or poetry.	
12. you will create world peace.	
13. you will develop a TV show or a movie.	
14. you will do only things you really like to do, and nothing else.	
15. you will enjoy every day to the max.	
16. you will have 10 close friends.	
17. you will have 100 friends	
18. you will have 20 million pounds or more.*	
19. you will have 40 close friends.	
20. you will have a major role in a movie.	
21. you will have a million pounds or more. *	
22. you will have more than 50 lovers in your lifetime.	
23. you will have the closest family relationships imaginable.	
24. you will run a FTSE 100 company.*	
25. you will self-actualize or reach Nirvana.	
26. you will stop world hunger.	
27. you will write a popular book.	
28. your children will see you as the perfect parent.	
29. your relationship with your partner will be sheer bliss for years.	
30. your relationship will be more romantic than Romeo and Juliet	

Autobiographical Memory Test Instructions

I am interested in your memory for events that have happened in your life. I am going to read to you some words. For each word I want you to think of an event that happened to you which the word reminds you of. The event could have happened at any point in your life from when you were small to last week, but please do not include memories from last week. It might be an important event, or trivial event.

The memory you recall should be a specific event – that is: an event that lasted less than a day and occurred at a particular time and place. So if I said the word "good" – it would not be OK to say, "I always enjoy a good party", because that does not mention a specific event. But it would be OK to say "I had a good time at Jane's party" because that is a specific event. It is important to try and retrieve a different memory or event for each cue word.

Let us try some words for practice: Bread, Library & Holiday

Coding Manual for AMT Study (R. Dempsey 2010)

Responses on the AMT will be coded for:

1. **Specificity of Memory** – referring to the level of detail described in the memory.
2. **Response Latency** – the time taken for the participant to recall the memory, referring to the time between the end of the cue word presentation to the start of the participant's memory recall.

Specificity of Memory Coding

Responses on the AMT task will be coded as either a specific memory, a general/overgeneral memory or an omission:

Memory Specificity		
Specific		- Refers to an event that took place at a particular time and a place - Event also has a duration of *less* than a day - Participants may explicitly refer to a time or place, OR it may be inferred from the memory description that the event took place at particular time/location (e.g. "when I had my job interview at x…").
General	Extended	- An event that took a longer period of time than a day - Could refer to a relatively specific time – but lasted more than a day, e.g. going on a holiday, spending a weekend with a friend/boyfriend/girlfriend/partner/spouse, etc. - Event could also have taken longer than a week, e.g. referring to weeks – going on a summer camp
	Categoric	- Refers to either a category of events or to a repeating series of events (e.g. "when I went shopping…") - No reference to a specific occasion – not able to determine that the participant is referring to a specific occasion
	Semantic Associate	- Participant doesn't make reference to any sort of event, but makes a connection to themselves or to something else in relation to the cue word. - E.g. self reference such as a trait or a skill/ability – e.g. "I am a poor cook", "I'm always pessimistic" - Alternatively, the participant may just make some form of general trait(ish) statement, such as "me and my brother have never got along that well"
Omission		- No response to cue word (participant may fail to recall a memory within the time limit) or an unintelligible response. - If a participant recalls a memory outside of the 60 second limit, this is coded as an omission.

Response Latency Timing

- The time between the experimenter's presentation of the cue word (e.g. "Happy", "Sad", "Pessimistic"), to the first utterance of the recalled memory (this is highlighted in the transcript).
- Utterances/fillers such as "erm", "ah", or utterances that do not refer to the recalled memory are not counted.

The University Means-End Problem Solving Task Scoring Manual

Overview of UMEPS coding	
Number of relevant means	A count of the number of effective solution steps (or "means")
Number of irrelevant means	A count of the number of ineffective solution steps (or "means")
Effectiveness of the solution(s)	Observer and participant made ratings of the effectiveness of the described solution(s).
Specificity of solution	An observer-made rating of the specificity of the described solution, in terms of the amount of detail described in the solution.

Number of relevant means

This is a simple count of the number of steps described in the solution. The number of relevant means should be a count of each potentially effective step to achieve the outcome. A relevant mean should refer to an action or behaviour that attempts to reduce the problem, rather than restating the desired outcome. For example, for a situation describing an individual who is losing too money gambling, stating that "I would stop gambling" doesn't refer to a step that would be taken to overcome the problem (stopping gambling is too generic and doesn't refer to a specific strategy or step). However, stating: "stop going to the casino", "take less money with me when I do go to the casino", or "visit the casino less frequently" would all count as relevant means as each refer to specific behavioural strategies that would assist in reducing money lost when gambling. During coding, raters may encounter occasions where participants state very similar means in the same solution description. Each solution mean should refer to a separate mean, and not be a restatement of a previously mentioned mean. For example, if a participant states that they would talk to or seek advice from two different individuals, this should be treated as two separate solution means (if effective) (e.g. "I would talk to my course leader/lecturer, and also talk to my friends from the lecture about problem *x*").

Number of irrelevant means

This is a count of the number of ineffective or irrelevant steps described in a solution. Irrelevant solution means could include attempts to resolve the problem in an ineffective manner or that would exacerbate the current problem (e.g., "I would panic"), and may also include descriptions of behaviours, actions, or solution steps that are simply not relevant to the problematic situation at hand.

Effectiveness of solution(s)

For our studies, a point 5 likert scale was selected for the observer ratings of solution efficacy to match the 5 point scale ratings made by the participants for the likelihood of their solutions solving the problem (see next page for further guidelines on scoring solution effectiveness).

Guidelines for the observer-ratings of solution efficacy		
Score	*Efficacy of solution*	*Scoring guidelines*
1	Very ineffective	- Solution doesn't attempt to resolve the problem - Very unclear how solution would resolve problem - Stated solution has a high likelihood of exacerbating the problem or has a high likelihood of creating further problems - Solution(s) may be of a highly risky nature
2	Ineffective	- Solution(s) demonstrate a weak attempt to resolve problem - Low chances of solution(s) resolving the problem - Some chance of the solution exacerbating the problem, or creating new problems - Solution(s) may be of a risky nature (but not highly risky – see above)
3	Neutral	- Solution(s) are neither effective nor ineffective - Solution(s) may have equal chances of resolving & failing to resolve the problem (50/50 chances).
4	Effective	- Solution demonstrates a good attempt to resolve problem - Solution(s) have a good chance of resolving problem (but not guaranteed/not a definitive solution) - Some chance that solution will not work (but low chance)
5	Very effective	- A very clear focus upon resolving the problem at hand - Solution features a number of different means to resolve the problem. - Participant may describe solution means in a detailed sequence - The solution(s) have a very good chance of resolving the problem. - Solution(s) may be particularly novel or resourceful (but realistic to apply in nature).

Specificity of solution means

The solution means generated on the UMEPS can also be subjected to an observer rating of "specificity", referring to the amount of detail described by the participant in their solution to the stated problem.

Score	***Specificity of solution***	***Scoring guidelines***
1	Very unspecific	- Solution is described in minimal detail (e.g. one to two words). - Solution is vague and contains no detailed or additional information
2	Unspecific	- One to two sentences. - Solution is still generally vague, and lacking in additional information.
3	Specific	- Solution contains at least 2 sentences. - Some additional information is included.
4	Moderate Specificity	- Four sentences or more. - Contains a fair amount of additional information. - Extra detail is provided on at least one aspect of the solution.
5	Very specific	- Very detailed solution/story. - Clear information (no vague or ambiguous information). - Numerous suggestions made. - Extra detail provided on three or more aspects of the solution.