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**Emotion Regulation in Context:
Moderators of Responses to Positive
Affect, Mania Risk and
Mood Symptoms.**

Claire L. McGrogan

PhD

2021

Emotion Regulation in Context:
Moderators of Responses to Positive
Affect, Mania Risk and
Mood Symptoms.

Claire L. McGrogan

A thesis submitted in partial fulfilment of the
requirements for the award of
Doctor of Philosophy of the
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Abstract

Emotion dysregulation is central to bipolar disorder and is also experienced by people considered to be at risk of mania. Several models of bipolar disorder, such as the Depression Avoidance Account (Abraham, 1911; Neale, 1988), Positive Emotion Persistence (Gruber, 2011) and Integrative Cognitive Model of mood swings (Mansell et al., 2007) highlight the relevance of use of emotion regulation strategies to the development and maintenance of mood symptoms. It is therefore suggested that understanding how emotion regulation relates to affect outcomes in the context of mania risk may help to identify people at risk of transition to bipolar disorder. Previous work has typically focused on the influence of negative affect regulation; however, the strategies used in response to positive affect are also understood to be relevant to general well-being and psychopathology, particularly bipolar disorder, but are less extensively researched. Additionally, where these associations have been explored, findings are often mixed, possibly as a result of lack of consideration of potential contextual moderators of the influence of emotion regulation strategies on affect, notably the beliefs individuals endorse about the malleability of emotions, and their social, and situational settings.

In addition to a systematic review that presents extant evidence relating to emotion regulation in mania risk, four studies were conducted to 1) explore the potential moderating role of use of positive emotion regulation strategies on the associations between mania risk and affect outcomes, 2) assess how beliefs about emotion malleability relate to mania risk and use of positive emotion regulation strategies, and investigate if 3) social and 4) situational contexts

moderate the relationships between use of these strategies, mania risk and affect outcomes.

Findings suggest that mania risk and emotion regulation strategies share similar associations with affect, however these relationships are independent rather than moderating. Additionally, trait tendencies to use specific strategies appear to be more influential than context-specific regulation, however further research exploring dynamic associations between contextual factors with high-risk populations is needed.

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Author's Declaration

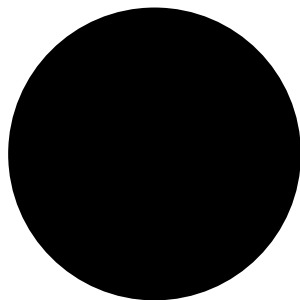
I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Department of Psychology Ethics Committee

I declare that the Word Count of this Thesis is 47,602.

Name: Claire L. McGrogan

Signature:



Chapter 1:

Emotion Regulation

1.1 Affect

Affect, mood and emotion are terms often used interchangeably in everyday language to represent internal states and communicate to others how we may be feeling. However, theoretically these terms represent distinct concepts.

Table 1.1: Examples of Domains of Emotion

Experiential	Behavioural	Physiological
Positive affect Negative affect	Facial expression Laughter Crying	Cardiovascular reactivity Electrodermal response Somatic response

Moods are considered more enduring affective states that are less clearly defined, and less closely related to specific stimuli or momentary changes in the environment. Emotions are conceptualised as multifaceted responses to personally meaningful stimuli that occur across experiential, behavioural, and physiological domains (Table 1.1; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005; Mauss & Robinson, 2009). Emotions generally occur across shorter-term periods than moods and are specific positive or negative affect states (Lazarus, 1993) that can be clearly defined (e.g., happiness, sadness, or fear). The Modal Model of Emotion Generation (Gross, 2015a) posits that emotion occurs in response to situational cues (either external cues in the environment or changes in internal states) that grab your attention. Once attended to, situations are appraised in a positive or negative manner. The nature

of these appraisals then informs the emotional response. As depicted in Figure 1.1, this sequence is cyclical, with emotion responses (including experiential, physiological, and behavioural factors) also influencing situations. It has been proposed that if mood is the “*pervasive and sustained emotional climate*”, then emotions are “*fluctuating changes in the weather*” (American Psychological Association, 1994, p.763). Affect is an overarching term that captures both emotions and moods.

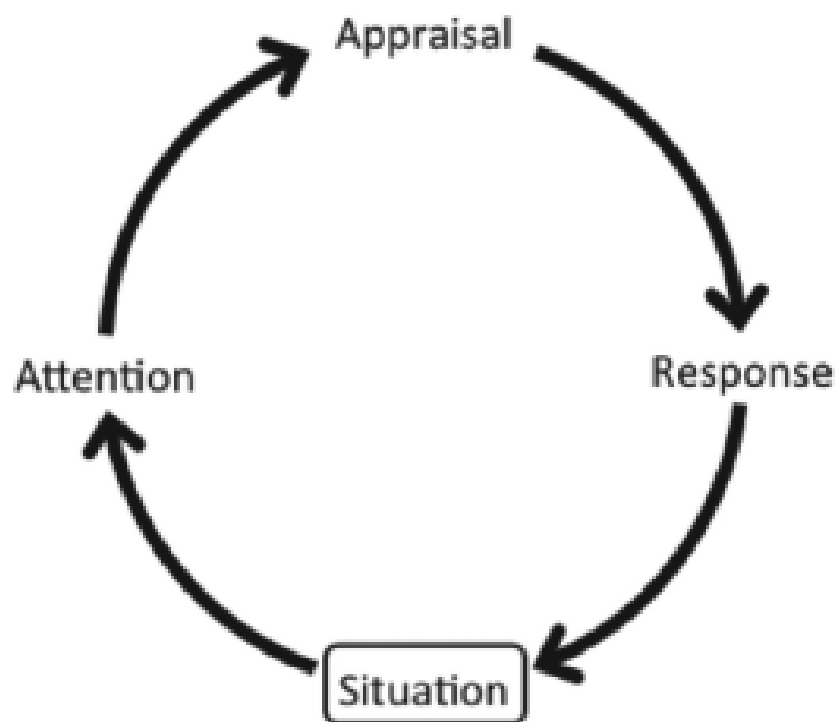


Figure 1.1: Modal Model of Emotion (Gross, 2015a)

1.2 Emotion Regulation

Given the significance of emotions to everyday functioning (e.g., effective communication, interpersonal relationships, and general well-being; Larsen, 2009), it is unsurprising that a wealth of literature exists to examine the ways in which individuals respond to and regulate their emotions.

Emotion regulation is defined as “processes individuals engage in to initiate, maintain, intensify, or eliminate mood states” (Gross, 1998, p. 275) and

refers to the cognitive and behavioural strategies employed to either maintain, upregulate (i.e., increase intensity), or downregulate (i.e., decrease intensity) of both positive and negative affect (see Table 1.2). Specific emotion regulation strategies are defined in sections 1.2.1 and 1.2.2.

Table 1.2: Emotion Regulation Strategies used to Upregulate and Downregulate Positive and Negative Affect

	Positive Affect		Negative Affect	
	Antecedent Focused	Response Focused	Antecedent Focused	Response Focused
Upregulating		Positive rumination Savouring	Catastrophising	Negative rumination Self-blame
Downregulating		Dampening	Distraction Risk-taking Cognitive reappraisal Positive refocusing Putting into perspective Planning for the future	Other-blaming Suppression Acceptance Active coping

One of the most influential theories within the field of emotion regulation is the Process Model (Gross, 1998a; Gross, 2015b). The Process Model highlights how each phase of emotion-generation presents a unique opportunity for regulatory intervention, with different strategies being appropriate for use at different stages (Figure 1.2). The situational phase represents two distinct points for regulatory effort. Firstly, situational selection, such that individuals may choose to engage with or avoid situations depending on how they align with their emotional goals. For example, avoiding situations likely to result in confrontation when trying to avoid feeling anxious. Secondly, individuals may choose to employ strategies that serve to modify the situation (e.g., problem solving) in order to change its emotional impact. Thirdly, within the attentional phase, strategies may be used to either orient attention away from facets of the situation that are not

compatible with emotion goals (e.g., distraction), or towards specific elements that support these goals (e.g., positive refocusing). The fourth point of emotion regulation occurs in the appraisal phase, where strategies such as cognitive reappraisal are used to alter the meaning assigned to the situation. Finally, within the response phase strategies such as suppression may be used to modify how emotions are expressed. Strategies used in the situation, attention, and appraisal phases (antecedent-focused strategies), before an emotion is experienced, are generally considered more adaptive and preventative than strategies used to modify an emotion that has fully manifested (response-focused strategies, e.g., Gross, 1998a). Further, antecedent-focused strategies are typically unconscious and automatic, while response-focused strategies are generally conscious and effortful (e.g., Gross, 2015b).

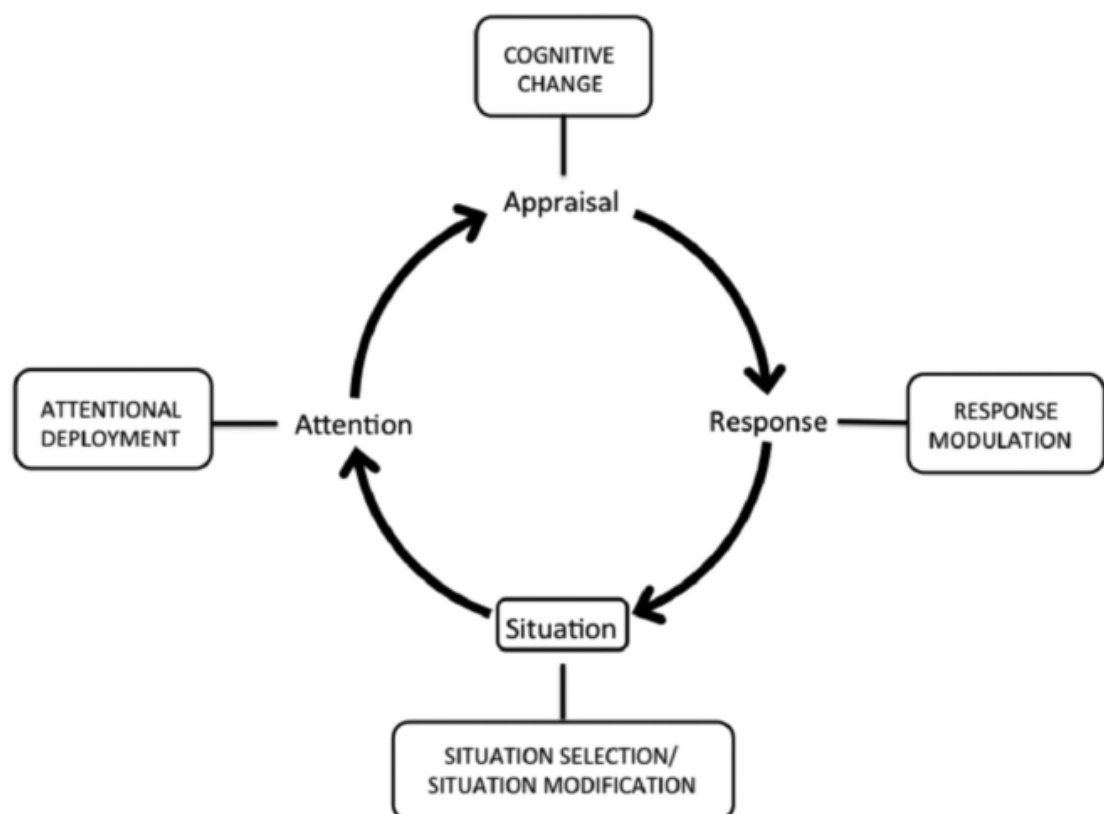


Figure 1.2: The Process Model of Emotion Regulation (Gross, 2015b)

In addition to understanding when emotion regulation occurs, it is also important to understand factors which influence the manner in which individuals choose to regulate their emotions (e.g., if an emotion should be maintained, upregulated, or downregulated), and the strategies they select to achieve this. Building on the original Process Model, Gross (2015b) postulates that selection of specific emotion regulation strategies is dependent upon the valuations individuals assign to different emotions (e.g., is this emotion good or bad for me?) These valuations are informed by perceptions of inputs from the world, including reaction from others and previous affective experiences.

It is generally assumed that people are motivated to reduce negative affect states and enhance positive affect (Larsen, 2009). However, not all strategies used in response to changes in affect align with this goal. Given the wealth of literature relating to responses to negative affect, it could be assumed that positive affect is a by-product of these regulatory efforts, such that positive affect increases when negative affect is downregulated. However, it is suggested that positive and negative affect, and the strategies used to modify them, are distinct (e.g., Diener & Lucas, 1999; Larsen, 2009).

1.2.1 Regulation of negative affect

Much of the literature on emotion regulation is concerned with strategies used in response to low mood and negative emotional states. Of these, strategies that intensify negative affect are generally considered maladaptive (e.g., Nolen-Hoeksema, 1991).

Negative rumination, a response-focused strategy defined as the tendency to respond to negative affective states with excessive thoughts about the experience and consequences of low mood, is one of the most extensively

researched of these strategies. It has been consistently linked to increased negative affect, reduced well-being (e.g., lower life-satisfaction, reduced self-esteem, fewer positive relationships with others and poor sleep) and negative physical health outcomes, such as impaired immune responses (e.g., Calkins, Hearon, Capozzoli, & Otto, 2013; Harrington & Loffredo, 2010; Thomsen et al., 2004). Negative rumination can be further delineated into two distinct constructs: brooding, a more absorbing, emotion-focused form of rumination, and reflection, a more neutral form of thinking about low mood with some focus on problem solving. Reflection is generally considered a more adaptive form of rumination and is typically less strongly associated with measures of low mood and poor well-being than brooding (e.g., Schoofs, Hermans, & Raes, 2010), and is positively associated with personal growth (Harrington & Loffredo, 2010).

Catastrophising is also a widely researched response to negative affect. An antecedent-focused strategy defined as emphasis and amplification of the most negative aspects of a situation, catastrophising has also been found to predict negative affect (e.g., Garnefski & Kraaij, 2007). Similar findings exist for tendencies to engage in self-blame in response to negative affect (e.g., Steel, 2016).

A number of strategies intended to reduce negative mood states are also considered to be maladaptive. A common result of use of these strategies is that the initial reduction in negative affect is often followed by a subsequent increase. This is most evident for risk-taking or engaging in dangerous activities that have considerable potential to cause harm (e.g., excessive drinking or substance misuse). Risk-taking is antecedent-focused and has been found to be positively associated with negative affect, and negatively predict positive affect (Thomas & Bentall, 2002). Other-blaming (i.e., blaming other individuals or the environment)

is response-focused and serves to initially reduce negative affect by displacement of responsibility for negative mood, experiences or consequences. However, as no active attempts are made to resolve the negative aspects of the situation, further low mood often results.

Suppression (i.e., inhibiting the emotional experience or expression), which is response-focused, and distraction (i.e., directing attention away from emotions), which is antecedent-focused, are generally considered to be less maladaptive than other strategies within this grouping. Distraction typically serves to lessen negative affect and increase positive affect (e.g., Lyubomirsky, Layous, Chancellor, & Nelson, 2015). Strategies that involve some form of proactive attempts to change the situation (e.g., problem-solving) or the perception of the situation are generally considered to be adaptive. For example, cognitive reappraisal, also referred to as positive refocusing, is an antecedent-focused strategy which involves constructing a perception of an event or experience that influences the emotional response in a positive manner. Similarly, putting into perspective and planning for the future, which are antecedent-focused, as well as acceptance, and active coping, which are response focused, also form a more adaptive response to negative affect and stress (e.g., Steel, 2016).

1.2.2 Regulation of positive affect

Responses to positive affect have been less extensively studied. However, more recently research has begun to recognise the relevance of effective positive affect regulation to overall well-being. For example, the broaden-and-build theory (Fredrickson, 2004) posits that while negative emotions orient people towards a narrow range of coping-focused behaviours which are beneficial in the short-term (e.g., fleeing a dangerous situation), positive affect encourages a wider range of

approach behaviours towards new experiences. This wider range of approach behaviours then lead to further potential positive experiences, for example creating new social relationships, and provide longer-term benefits to well-being.

Typically, emotion regulation strategies are defined as ways of coping with unwanted affect states. However, positive psychology developed the concept of savouring as a means of enhancing positive affect and well-being. Savouring is response-focused and considered to be a more adaptive response to positive affect. Defined as attending to and appreciating positive mood without effort to modify them, savouring is predictive of subjective reports of happiness, life-satisfaction and self-esteem and negatively associated with indices of depression (e.g., Bryant, 2003). Use of savouring has also been found to mediate the relationship between occurrence of positive events and reports of subsequent happiness (Jose, Lim, & Bryant, 2012) and is associated with increased self-esteem (Wood, Heimpel, & Michela, 2003). Dampening is also a response-focused strategy, but is the theoretical opposite to savouring, in that it is used to reduce the intensity and duration of positive affect experience. Tendencies to dampen positive affect are generally considered to be maladaptive and are correlated with measures of increased negative affect and reduced self-esteem (e.g., Wood et al., 2003).

These differences in self-esteem may be an underlying mechanism that influences tendencies to engage in dampening or savouring. It is suggested that people with lower self-esteem show greater tendencies to dampen positive affect as they perceive themselves as less deserving of, or able to maintain, positive mood states (e.g., Parrott, 1993). In contrast, those higher in self-esteem are more likely to savour positive affect in order to maintain emotions that they consider to be more typical of themselves (e.g., Mayer & Stevens, 1994).

1.2.3 Emotion Regulation and Psychopathology

In addition to associations between emotion regulation and general well-being, particular interest is paid to how responses to different affective states relate to the development and maintenance of psychopathology. Affective disturbances are common in mental health disorders, and the strategies used in response to mood difficulties are often a target for therapeutic interventions, such as cognitive behavioural therapy (e.g., Mennin, Fresco, Ritter, & Heimberg, 2015; Suveg, Sood, Comer, & Kendall, 2009). Overall, the literature suggests that psychopathology is associated with use of maladaptive strategies, but not related to adaptive emotion regulation (e.g., Sheppes, Suri, & Gross, 2015). These findings suggest that individuals with mental health disorders do not experience difficulties with using adaptive strategies but do display increased tendencies to employ maladaptive responses.

The association between emotion regulation and psychopathology is perhaps most clearly represented by hypotheses defined within the Response Styles Theory (RST; Nolen-Hoeksema, 1991). The RST posits that the strategies people employ in response to depressed mood states influence the severity and duration of their symptoms, with ruminative response styles predicting more negative outcomes than distraction-based responses. A number of studies have provided support for this theory, with use of rumination positively predicting onset, severity and duration of depressive episodes (e.g., Nolen-Hoeksema, 2000; Spasojević & Alloy, 2001). Rumination is generally considered to be a transdiagnostic process that maintains a number of psychopathologies, as it is also positively associated with anxiety disorders, substance use disorders, eating disorders, posttraumatic-stress disorder, and obsessive-compulsive disorder (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Nolen-Hoeksema, 2000;

Watkins, 2009). Additionally, as a more maladaptive ruminative response, brooding is associated with onset, duration, and severity of depressive symptoms, while reflection, a more adaptive form of rumination, is not (e.g., Treynor, Gonzalez, & Nolen-Hoeksema, 2003).

A number of reviews have highlighted the specific relevance of the use of further putatively maladaptive emotion regulation strategies to mood disturbances apparent across a range of clinical conditions (e.g., Aldao et al., 2010; Sheppes et al., 2015). For example, a meta-analytical review concluded that use of suppression and avoidance were generally associated with anxiety, depression, substance use and eating disorders, while problem-solving and reappraisal were either negatively, or not, associated with these conditions (Aldao et al., 2010). Catastrophising and self-blame are also associated with depression and anxiety symptoms (Garnefski & Kraaij, 2007).

Most of the literature relating to associations between emotion regulation and psychopathology focuses on responses to negative affect. However positive affect regulation is also recognised as significant. A review by Carl and colleagues presents evidence of transdiagnostic disturbances in positive affect regulation across psychological disorders (Carl, Soskin, Kerns, & Barlow, 2013). For example, depression and anxiety are characterised by increased avoidance and use of strategies, such as dampening, to down-regulate positive mood, while bipolar disorder features greater tendencies to both upregulate and downregulate positive affect. Given that bipolar disorder is characterised by mood fluctuations (e.g., Henry et al., 2008), and defined by mania, investigating how individuals with bipolar disorder respond to different affective states presents a unique opportunity to understand how use of individual strategies may predict both high and low mood symptoms. A number of strategies have been identified as having

particular relevance to bipolar disorder, outlined in section 2.3. Further, Feldman and colleagues developed the concept of positive rumination, defined as persistent thoughts about attributes and life experiences, in the context of bipolar disorder. Positive rumination is considered a more maladaptive response to positive affect in the context of mania risk and bipolar disorder, as it serves to further amplify elevated mood states (Feldman, Joormann, & Johnson, 2008). However, in the general population, positive rumination is considered more adaptive and has been linked with better well-being and increased positive affect (e.g., Olofsson, Boersma, Engh, & Wurm, 2014).

As emotion regulation is a universal experience, it is suggested that understanding how use of strategies may relate to both beneficial and detrimental outcomes offers a non-pathologizing way of promoting better well-being for people experiencing mood difficulties. Additionally, insight into how emotion regulation relates to vulnerability of mania and transition to clinically significant mood episodes, particularly in relation to responses to positive affect, would further contribute to models of mania risk and help to identify areas for early intervention that may reduce or prevent transition to bipolar disorder.

Chapter 2:

Bipolar Disorder and Mania Risk

2.1 Bipolar Disorder

Bipolar disorder (BD) is a mood disorder characterised by periods of excessive high mood (i.e., mania or hypomania), and in some instances, episodes of low mood and depression. Diagnostic criteria for mania and depression are displayed in Table 2.1. Global prevalence is approximated between 0.6% and 0.7% (Ferrari et al., 2016). Prevalence appears balanced across genders, however some differences are apparent in symptomology, with men appearing more vulnerable to mania (Robb, Young, Cooke, & Joffe, 1998) while women are likely to experience more depressive episodes (e.g., Altshuler et al., 2010). Both BD I and BD II (see Table 2.1 for distinction) are recognised as conditions which result in periods of disability or severe impairments, with consequences for social and personal functioning (e.g., Hirschfeld, Lewis, & Vornik, 2003; Judd et al., 2008). Bipolar disorder is considered a life-long condition, with relapse rates estimated between 60% and 85% within five years (Gignac, McGirr, Lam, & Yatham, 2015; Goodwin & Jamison, 2007). Individuals diagnosed with bipolar disorder also frequently report some degree of impairment, including subclinical affect dysregulation, during periods of remission (Mercer & Becerra, 2013).

Table 2.1: DSM V Diagnostic Criteria for Mania and Depression (APA, 2013)

Mania	Depression
Core criteria:	Core criteria
A distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased goal-directed activity or energy, lasting at least 1 week* and present most of the day, nearly every day (or for any duration if hospitalisation is necessary).	Depressed mood or loss of interest of pleasure lasting and at least 5 additional symptoms present within the same 2-weeks period.
At least 3* of the following:	At least 5 of the following:
<ol style="list-style-type: none"> 1. Inflated self-esteem or grandiosity 2. Decreased need for sleep 3. Pressured speech and increased talkativeness 4. Racing thoughts or flight of ideas 5. Distractibility 6. Increased goal-directed activity or psychomotor agitation 7. Excessive involvement in activities with likely to result in harm (e.g., reckless sexual behaviour, excessive spending) 	<ol style="list-style-type: none"> 1. Depressed mood for most of the day, nearly every day 2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day 3. Significant change in appetite or weight (i.e., weight gain or loss of 5% of body weight within a month) 4. Insomnia or hypersomnia nearly every day 5. Psychomotor agitation or retardation nearly everyday 6. Fatigue or loss of energy nearly every day 7. Feelings of worthlessness or excessive and inappropriate guilt nearly every day 8. Diminished ability to think or concentrate, or indecisiveness, nearly every day 9. Recurrent thoughts of death or suicidal ideation
*4 if mood is irritable	
<p>Mood disturbances must be sufficiently severe to cause marked impairment in social or occupational functioning or necessitate hospitalisation to prevent harm and not occur as a result of substance use, medication or another medical condition.</p> <p>*Hypomania is diagnosed when the mood disturbance is present for at least 4 days and does not result in significant impairment to social or occupational functioning or necessitate hospitalisation.</p> <p>BD I is defined by at least one episode of mania, with or without lifetime experience of depression.</p> <p>BD II is defined by at least one major depressive episode and at least one episode of mania or hypomania.</p>	

2.2 Mania risk

Given the life-long, progressive course and potential severity of bipolar disorder, it is unsurprising that a growing area of research exists with the aim of identifying factors which may contribute to the risk of developing the disorder. However, relative to other areas such as psychosis (Yung et al., 1996), until recently mania risk was largely under researched.

One of the most useful means of identifying risk is with the use of staging models, which posit that the development of psychological disorders progresses from an at-risk phase through to meeting threshold for full diagnosis. For example, Yung and colleagues developed a tool which reliably discriminated individuals considered to be ultra-high risk for psychosis from those considered to be low risk, based on a number of items reflective of Diagnostic and Statistical Manual of Mental Disorders (DSM) diagnostic criteria (Yung et al., 1996) and predicted transition to psychosis within 12 months (Yung et al., 2003; Yung, Phillips, Yuen, & McGorry, 2004). Greater understanding of risk of psychosis has allowed for the development of a range of psychological and pharmacological interventions, tailored to different stages of risk which have been shown to effectively delay or prevent transition to psychosis (e.g., McGorry et al., 2013; Yung et al., 2010).

In relation to bipolar disorder, a wealth of research exists which highlights the need for a reliable means of identifying individuals at-risk of mania. For example, delayed diagnosis of bipolar disorder is frequently associated with poorer functional and well-being outcomes, while early intervention may help to reduce the severity and impact of mood disturbance, and potentially delay, or in some cases, prevent full transition (Berk et al., 2007; Conus, Macneil, & McGorry,

2014; Correll et al., 2007). Additionally, staging models are also useful in informing the development of more targeted interventions, tailored to the specific needs of individuals at each stage of risk.

Within the last decade, considerable progress has been made within this area, with the development of assessment tools such as the Bipolar At-Risk (BAR) criteria (Bechdolf et al., 2010). BAR has been found to have good reliability, with 23% of participants who met at least one of the risk criteria transitioning to (hypo)mania within the first 250 days of observation, compared with 0.7% of individuals who did not meet any criteria. Additionally, in a prospective study, 14% of participants deemed to be at-risk received subsequent bipolar diagnoses. Staging models of mania risk include several factors that contribute to a cumulative risk profile. These include age (with peak age of onset considered to be between 18 and 25 years); emerging mood symptoms (sub-threshold mania is a reliable predictor of transition to BD; Bechdolf et al., 2010), familial risk (having a first-degree relative with bipolar disorder), and behavioural indices (see Section 5.2.2 for a discussion of indices of risk). Investigations of associations between mania risk and psychological mechanisms, such as emotion regulation, are often based on behavioural indices (e.g., hypomanic personality). Use of behavioural measures of risk are further discussed in Section 5.2.2.2. Given that people at risk of mania experience affective disturbances and there is an increased probability that these individuals will transition to bipolar disorder, understanding factors that contribute to this transition are important. As the literature provided convincing evidence that transdiagnostic disturbances in emotion regulation, which also contribute to mood difficulties, are a risk factor for psychopathology (as outlined in section 1.2.3), it is suggested that investigating

associations between mania risk and how people regulate their emotions, and the outcomes associated with these processes, may further inform models of risk.

2.3 Models of Bipolar disorder and the role of emotion regulation

A number of models have been proposed to explain how underlying vulnerabilities to mania are expressed and result in transition to bipolar disorder, four of which are summarised within this section. A common feature of these models is a shared emphasis on how affective disturbances, central to bipolar disorder, may be explained by how people respond to the way they are feeling and their current circumstances (e.g., what they are doing). Associations between models of bipolar disorder and relevant emotion regulation strategies are displayed in Figure 2.1. Throughout this section, the relevance of emotion regulation strategies to each of these models will be outlined.

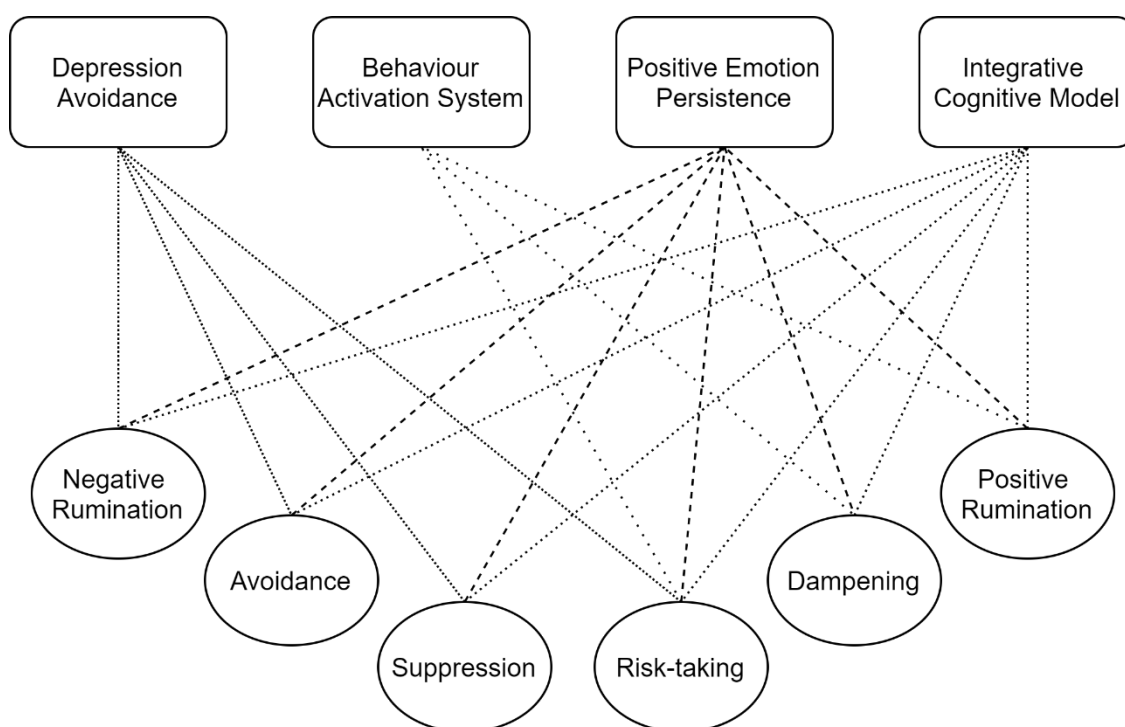


Figure 2.1: Models of Bipolar Disorder and Associated Emotion Regulation Strategies

2.3.1 Depression Avoidance

The Depression Avoidance Account suggests that mania arises as a consequence of disproportionate attempts to avoid low mood (Abraham, 1911; Neale, 1988). It is hypothesised that mania and depression share common underlying cognitive mechanisms, including disturbances in self-esteem. It is suggested that the inflated self-confidence and grandiosity that characterise mania serve to protect against negative self-evaluations and low self-esteem associated with depression. Additionally, the strategies individuals use in response to negative affect state are of particular relevance (e.g., Response Styles Theory, Nolen-Hoeksema, 1991). For example, increased risk-taking to alleviate negative emotions may serve to drive mood towards mania instead.

2.3.2 Behavioural Activation System (BAS) Dysregulation

It is suggested that bipolar disorder is characterised by increased sensitivity of neurocognitive systems (i.e., BAS) that orient individuals towards goal pursuits and influence responsivity to rewards. Dysregulation of BAS is associated with increased vulnerability to mood episodes, such that heightened BAS activation is predictive of mania while deactivation predicts depression.

In support of this theory, numerous studies have found bipolar disorder and mania risk to be associated with ambitious goal setting, perfectionism and elevated positive affect in response to reward (e.g. Gruber & Johnson, 2009; Johnson, 2005; Johnson & Carver, 2006; Lam, Wright, & Smith, 2004). Additionally, increased engagement in goal-oriented activities is highlighted as a diagnostic feature of mania (American Psychological Association, 2013).

2.3.3 Positive Emotion Persistence

Similar to BAS, the Positive Emotion Persistence model (Gruber, 2011) postulates that disturbances in positive affectivity is the core underlying mechanism of bipolar disorder and mania risk. The model highlights how elevated positive affect is apparent across a range of contexts (e.g., in response to positive, neutral, and negative events; Gruber, Harvey, & Johnson, 2009; Gruber, Johnson, Oveis, & Keltner, 2008) and is driven by attentional biases towards rewarding stimuli in the environment and maintained by exaggerated use of strategies to further upregulate mood (Johnson, Gruber, & Eisner, 2007). For example, bipolar disorder is associated with increased tendencies to engage in positive rumination and risk-taking, and difficulties with downregulation of positive affect (e.g., Crosson & Hughes, 1987). The type of positive emotions individuals experience is also of particular relevance, as people with bipolar disorder have been found to report greater self-relevant goal-oriented positive emotions, such as joy and pride, and less pro-social positive emotions, such as love and compassion (Gruber & Johnson, 2009).

As individuals with bipolar disorder do not demonstrate the same persistence of negative emotions across contexts, it is suggested that this disturbance in positive affect may be a specific vulnerability marker for bipolar disorder.

2.3.4 Integrative cognitive model

The integrative cognitive model (ICM; Mansell, Morrison, Reid, Lowens, & Tai, 2007; Figure 2.2) posits that mood swings central to bipolar disorder and mania risk arise as a result of a number of factors that influence the way in which individuals respond to changes in their internal states. The model states that

changes in internal states (such as increases in positive or negative affect, or physiological arousal) are appraised as having extreme personal meaning. These appraisals are informed by beliefs individuals hold (e.g., relating to affect regulation), which are based on life experiences, including current environmental factors, and previous experiences of mood episodes. Appraisal of internal states then trigger use of either ascent or descent behaviours, including cognitive emotion regulation strategies, such as rumination. However, as appraisals are often conflicting and changeable, individuals may attach different meanings to internal states at different times, difficulties arise in the selection and implementation of these responses. For example, feeling happy or energetic may be appraised as beneficial and trigger further engagement in goal-oriented activities and emotion regulation strategies, such as positive rumination and risk-taking, which serve to further bolster elevated mood states. However, when these feelings are appraised in a negative manner as being problematic (e.g., potentially a warning that the individual is becoming manic), this may trigger descent behaviours such as self-criticism and use of dampening. Further difficulties arise when the use of regulatory behaviours is disproportionate to the needs of internal states. For example, when moderate intensity positive affect is appraised as having extreme negative meaning, disproportionate use of dampening may downregulate mood further than was intended and give rise to low mood states, which are then also appraised, and the cycle continues. Extreme appraisals have been found to predict mania risk and mood symptom in both non-clinical samples, and those with bipolar disorder (Kelly, Dodd, & Mansell, 2017).

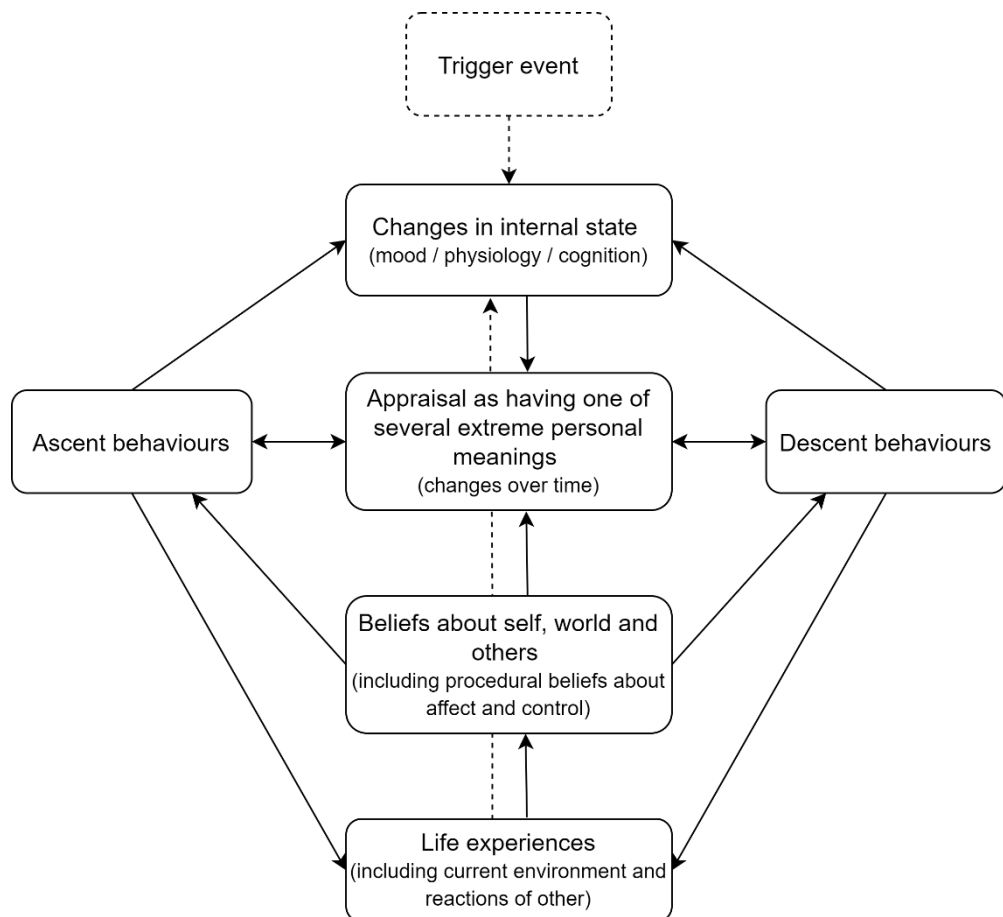


Figure 2.2: Integrative Cognitive Model of Mood Swings (ICM; Mansell et al., 2007)

The ICM highlights how the selection and implementation of responses to affective states, such as emotion regulation strategies, can lead to the development and maintenance of mood regulation difficulties and emphasises how the wider contexts in which these strategies are being used are influential. Contextual factors are further discussed in Chapter 4.

2.3.5 Summary of models

Central to these models is the proposition that mood disturbances in bipolar disorder result from difficulties with emotion regulation. A wealth of evidence exists to support this. For example, risk-taking, in response to negative affect, has been found to predict both mania and depression symptoms cross-sectionally (Thomas & Bentall, 2002) and longitudinally (Fletcher, Parker, & Manicavasagar, 2014). Rumination is also associated with depression

symptoms (Thomas & Bentall, 2002). In response to positive affect, use of positive rumination has been found to predict mania symptoms and elevated self-esteem, and negatively predict depression (Feldman et al., 2008). Dampening is associated with increased depression, but also mania symptoms (e.g., Fletcher et al., 2014; Gilbert, Nolen-Hoeksema, & Gruber, 2013).

Previous reviews have found that bipolar disorder was associated with increased use of predominantly maladaptive responses to both positive and negative affect (Dodd, Lockwood, Mansell, & Palmier-Claus, 2019; Koenders et al., 2020). Similar patterns of emotion regulation tendencies are reported by those considered to be at risk of mania, see Chapter 3 for a systematic review (McGrogan, Dodd, & Smith, 2019). It is therefore suggested that greater understanding of how these factors relate to mania risk is important for understanding more about the psychological risk factors that are related to transition to bipolar disorder and identify potential areas for targeted intervention. Given the relevance of effortful, response-focused emotion regulation to bipolar disorder and mania risk, use of these strategies will be the focus of the work presented in this thesis.

Chapter 3:

Emotion regulation strategies in mania risk:

A Systematic Review

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3.1 Abstract

Background: Difficulties in emotion regulation may contribute to the development of mania. This review aimed to assess how emotion regulation strategies reported by individuals at risk of mania compare with clinical and non-clinical controls.

Methods: Search terms relating to mania risk and emotion regulation were entered into three databases. Sixteen studies were included.

Results: Mania risk was typically associated with overall endorsement of emotion regulation strategies, particularly dampening, and positive and negative rumination.

Discussion: Findings were limited by overall lack of evidence for individual strategies, lack of consideration of key mediating factors and reliance upon self-report designs.

3.2 Introduction

Clinical staging models hold the central hypothesis that the development of psychological disorders, such as bipolar disorder, follows a progression pathway from “at-risk” to a prodromal period, and transition to diagnosable bipolar disorder (e.g., Berk, Hallam, & McGorry, 2007). As mania is the defining feature of bipolar disorder (American Psychological Association, 2013), research on mechanisms related to mania risk is crucial for understanding potential risk factors. Understanding the precursors of bipolar disorder identifies potential areas for the development of targeted treatments for prevention and early intervention (Berk et al., 2007). Research on premorbid risk factors (whether biological, environmental, or psychological) necessarily involves undiagnosed populations using accepted indicators of mania risk, in the same vein as influential research on factors that characterize the high risk of psychosis (e.g., Ruhrmann et al., 2010).

In studies investigating vulnerability to bipolar disorder, mania risk is conceptualized as familial, where an individual's first-degree relative has a diagnosis of bipolar disorder (heritability is estimated at 80%; Logotheti, Chatziioannou, Venizelos, & Kolisis, 2019) or behavioural, where an individual exhibits emerging mood symptoms (e.g., Scott et al., 2016) or elevated levels of hypomanic personality traits (e.g., overconfidence, gregariousness, and energetic behaviour; Eckblad & Chapman, 1986). While heritability is clearly an important risk factor, behavioural high-risk measures such as the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986) predict future manic episodes and transition to bipolar disorder (Kwapil et al., 2000). A review (Waugh, Meyer, Youngstrom, & Scott, 2014) found that trait measures were typically a

more reliable indicator of mania risk than those investigating high mood symptoms in nonclinical populations. As such, trait measures such as the HPS are commonly used as a proxy measure of mania risk.

Given the disturbances to both negative and positive emotion regulation seen in bipolar disorder (for a review, see Dodd et al., 2019), particular interest has been directed towards whether the strategies individuals employ to regulate their emotions are associated with mania risk. Emotion regulation strategies are defined as “processes individuals engage in to initiate, maintain, intensify, or eliminate mood states” (Gross, 1998b, p. 275) and are commonly classified as adaptive and protective (e.g., reappraisal) or maladaptive and contributing to risk (e.g., rumination; Aldao et al., 2010). Much of the existing literature typically examines the role of regulation of negative affect and its consequences for well-being. For example, a meta-analysis (Aldao et al., 2010) reported that anxiety, depression, eating, and substance-related disorders were more strongly associated with putatively maladaptive strategies such as rumination and suppression, whereas putatively adaptive strategies (e.g., reappraisal and acceptance) were less strongly related.

Regulation of positive affect is increasingly understood as being important for mental health and well-being. A review suggested a transdiagnostic disturbance in positive emotion regulation in emotional disorders (Carl et al., 2013). For example, anxiety and depression were characterized by excessive avoidance and downregulation of positive affect.

The evidence suggests that difficulties in emotion regulation are apparent across psychopathology, particularly in regard to rumination, which has been identified as contributing to a number of mental health conditions (e.g., Wahl, van

den Hout, & Lieb, 2019). Early emotion regulatory models of bipolar disorder have typically focused on the role of negative emotion regulation, such as rumination, as in theories of depression (e.g., Response Styles Theory; Nolen-Hoeksema, 1991). However, contemporary research has begun to highlight the importance of responses to positive and activated mood states in bipolar disorder, and evidence suggests that positive emotion regulation is particularly problematic for individuals at risk of mania (Gruber, Kogan, Mennin, & Murray, 2013). For example, a measure for responses to positive affect (Feldman et al., 2008) was developed specifically with mania risk and bipolar disorder in mind. To complement measures of rumination and risk-taking in response to negative emotion, this measures propensity to engage in the positive rumination (e.g., focusing on how good positive emotion feels) and dampening of positive emotions (e.g., thinking good feelings will not last). Along with ruminating on negative emotions, both positive rumination and dampening differentiate people with bipolar disorder from non-clinical controls and are associated with poorer outcomes in people with bipolar disorder (Dodd et al., 2019). These are, therefore, potential mechanisms of change for psychological interventions for bipolar disorder. To inform the development of targeted interventions for people who may be at risk of developing bipolar disorder in the future, there is a substantial need for research investigating whether these emotion regulation strategies relate to mania risk in non-clinical populations, whether tendencies to engage in maladaptive emotion regulation strategies differentiate people at mania risk from controls who did not meet risk criteria, and if they distinguish risk of mania from vulnerability to other disorders. In addition, research with risk groups helps to disentangle whether maladaptive emotion regulation is a

contributing factor of developing mania, or the result of previous experience of clinically significant mood episodes.

An integrative cognitive model of mood swings and bipolar disorder (Mansell et al., 2007) suggests that these regulatory attempts are driven by appraisals of internal states, such that a positive appraisal of high mood would drive upregulating strategies, whereas a negative appraisal of that same mood state would drive downregulating strategies. Given that bipolar disorder is characterized by episodes of excessive low and high mood (American Psychological Association, 2013), putatively maladaptive emotion regulation strategies are linked to bipolar disorder (Dodd et al., 2019), and disturbances to both positive and negative emotion regulation are emphasized by contemporary psychological models, there is a clear theoretical and clinical justification for investigating both negative and positive emotion regulation as potential risk factors underlying vulnerability to developing bipolar disorder. As such, the aim of this review was to synthesize findings across studies investigating associations between mania risk and tendencies to use positive and negative emotion regulation strategies.

3.3 Method

3.3.1 Search Strategy

A systematic search was conducted across three databases (PsycARTICLES, Scopus, and Web of Science), identifying peer-reviewed articles published between January 1980 and July 2018. Search terms relating to mania risk (mania risk, bipolar risk, or hypomania) and emotion regulation strategies (emotion regulation, mood regulation, affect regulation, response style, rumination, amplify, or dampening) were based on author's knowledge of emotion

regulation in bipolar disorder. Sensitivity checks were conducted to ensure search terms captured key articles previously identified during scoping searches. Reference lists of relevant reviews were also screened (Kelly et al., 2017; Mansell & Pedley, 2008; Townsend & Altshuler, 2012).

3.3.2 Eligibility

All study designs were eligible for inclusion if they included quantitative measures of emotion regulation strategies used to regulate either positive or negative affect and either a familial or an established, validated measure of behavioural high risk for mania (e.g., HPS: Eckblad & Chapman, 1986; or the General Behavior Inventory: Depue, Krauss, Spoont, & Arbisi, 1989).

Studies were excluded if they assessed general emotion regulation (e.g., ability to regulate) rather than the use of specific strategies, had not been peer-reviewed, were not available as full text, did not present novel empirical data (e.g., reviews, meta-analyses, protocols), or were not available in the English language.

3.3.3 Screening

All articles identified across the three databases (PsycARTICLES, Scopus, and Web of Science) were collated ($N = 1,232$). At each stage (title, abstract, and full text), articles were independently screened by CMc and AD, and reviewers met to discuss any discrepancies in the screening lists. Agreement percentages were calculated, and interrater reliability was quantified using Cohen's kappa (k). After excluding duplicates ($n = 121$), 1,111 articles were screened at the title. A total of 1,070 were excluded and 41 were screened at abstract (85.4%, $k = 0.92$), with a further 21 excluded (88.5%, $k = 0.85$). The remaining articles ($N = 20$) were screened at the full-text level and four were

excluded (87.5%, $k = 0.52$), resulting in a final total of 16, see Figure 3.1 for detail of screening.

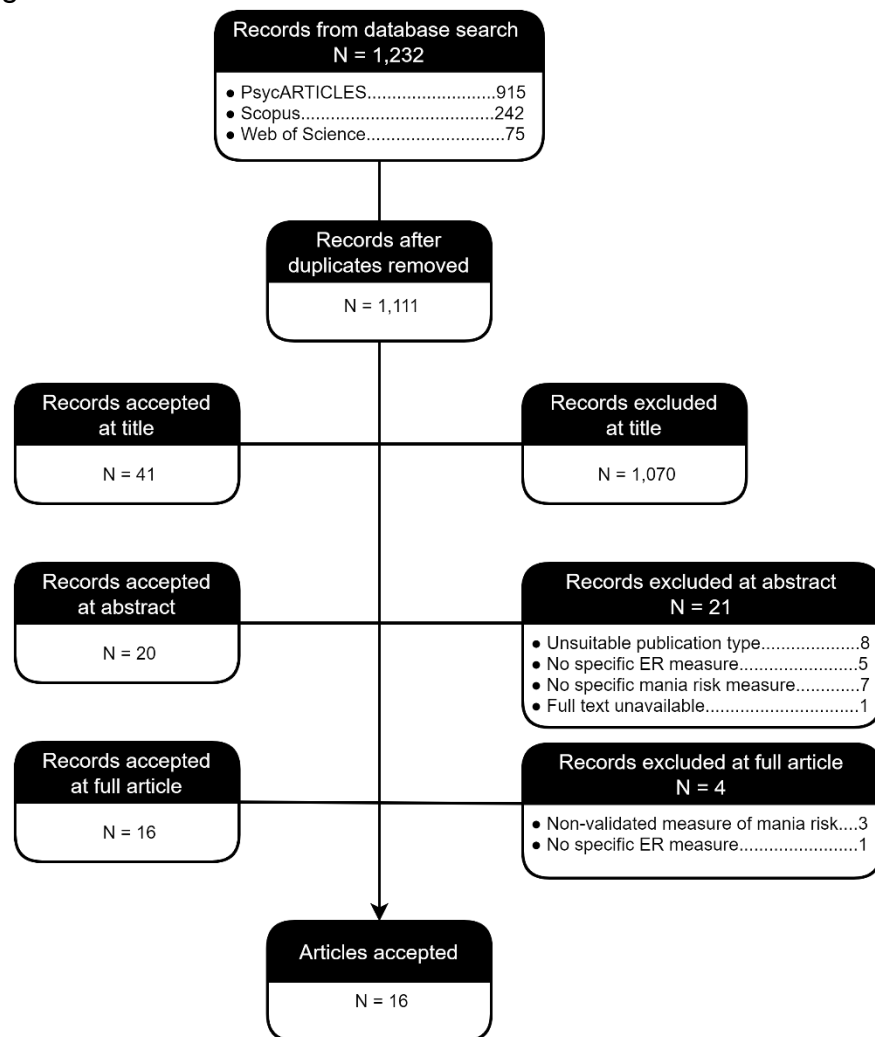


Figure 3.1: Screening Diagram

Study quality was assessed following recommendations from (Petticrew & Roberts, 2008). Each study was rated as high, medium, or low quality based on (a) the relevance of the research question to the aim of the review; (b) the internal validity of the study (i.e., how well-controlled the study was and the robustness of inferences of causality); (c) external validity of the study (i.e., the generalizability of findings); and (d) potential ethical implications of the study. Criteria were individually rated on a scale from 1 (low) to 3 (high) and mean scores calculated for overall quality. Papers were not excluded based on quality scores.

Table 3.1: Study and Sample Characteristics

Author(s)	Sample	Methodology	Mania Risk Measure	ER Measures	Summary of Key Findings.	Quality Score
Behavioural Mania Risk						
Carver & Johnson 2009	Students N = 235 USA	Cross-sectional <i>Pen-and-paper format</i>	HPS	<i>Self-report</i> RPA SBI	HPS significantly correlating with all subscale measures of RPA. <i>Dampening</i> $r = .20$ <i>Emotion focused rumination</i> $r = .31$ <i>Self-focused rumination</i> $r = .26$	Medium
Dempsey, Gooding & Jones 2011	University staff and students N = 353 Age M = 22.62 (SD = 6.38) UK	Cross-sectional <i>Online</i>	HPS	<i>Self-report</i> RPA RSS	Mania risk positively correlated with RPA and RSS rumination. <i>Dampening</i> $p = .178$ <i>Emotion focused rumination</i> $p = .306$ <i>Self-focused rumination</i> $p = .2.78$ <i>Rumination</i> $p = .265$ <i>Reflection</i> $p = .32$ <i>Brooding</i> $p = .217$	Medium
Feldman, Joormann & Johnson 2008	Students N = 182 Age M = 19.37 USA	Cross-sectional <i>Pen-and-paper format</i>	HPS	<i>Self-report</i> RPA RSQ	HPS positive correlate with all RPA subscales. <i>Dampening</i> $r = .28$ <i>Emotion focused rumination</i> $r = .3$ <i>Self-focused rumination</i> $r = .16$	Medium
Fisk, Dodd & Collins 2015	Students N = 134 Age: 18 – 40+ UK	Cross-sectional <i>Online</i>	HPS	<i>Self-report</i> RPA RSQ	Mania risk positively correlated with all RPA subscales and RSQ dangerous activities subscale. <i>Dampening</i> $r = .27$ <i>Emotion focused rumination</i> $r = .3$ <i>Self-focused rumination</i> $r = .25$ <i>Dangerous Activities</i> $r = .3$ Rumination and active coping were not associated with risk.	Medium
Fulford, Johnson & Carver 2008	Students N = 233 Age >18 USA	Cross-sectional <i>Pen-and-paper format</i>	HPS	<i>Self-report</i> RPA	Mania risk positively correlated with RPA subscales. <i>Dampening</i> $r = .2$ <i>Emotion focused rumination</i> $r = .32$ <i>Self-focused rumination</i> $r = .27$	Medium

Author(s)	Sample	Methodology	Mania Risk Measure	ER Measures	Summary of Key Findings.	Quality Score
Giovanelli, Hoerger, Johnson & Gruber 2013	Students N = 482 Age M = 19.33 (SD = 4.33) USA	Cross-sectional <i>Online</i>	HPS	<i>Self-report</i> RPA	HPS significantly correlated with positive urgency ($r = .39$)	Medium
Heissler, Kanske, Schonfelder & Wessa 2013	<i>Case-control</i> <u>HP</u> N = 22 Age M = 20.95 (SD = 1.59) <u>Non-HP (Controls)</u> N = 24 Age M = 22.29 (SD = 2.93) <i>Groups matched for age, gender and handedness.</i> <i>All participants reported no history of mental illness, verified by diagnostic interviews.</i> Germany	Cross-sectional Experimental Repeated measures High/Low risk groups <u>Stimuli</u> IAPS • 16 high arousal positive • 16 high arousal negative • 16 neutral <u>Viewing conditions</u> • Passive viewing (control) • Reappraisal • Distraction (maths task)	HPS	fMRI Data Amygdala activation <i>Self-report</i> ERQ Emotional States Rating Scale (9-point scale unpleasant to pleasant)	During reappraisal, HP groups displayed enhanced activation in the right amygdala compared to non-HP ($\eta^2 = .2$). This indicates less down-regulation of amygdala in HP group. During distraction, HP group displayed more activation in the left inferior parietal cortex than non-HP ($\eta^2 = .3$).	High
Johnson & Jones 2009	Students N = 638 Age M = 30.34 (SD = 11.36) median = 27 UK, USA	Cross-sectional <i>Pen-and-paper format</i> <i>Online</i>	HPS	<i>Self-report</i> RPA	HPS was positively associated with dampening ($r = .13$).	Medium
Knowles, Tai, Christensen & Bentall 2005	Students N = 528 Age M = 19.27 (SD = 2.37)	Cross-sectional <i>Pen-and-paper format</i>	HPS	<i>Self-report</i> RSQ	Mania risk was associated with rumination ($r = .22$), risk-taking ($r = .38$) and adaptive coping ($r = .13$).	Medium

Author(s)	Sample	Methodology	Mania Risk Measure	ER Measures	Summary of Key Findings.	Quality Score
Raes, Daems, Feldman, Johnson & Gucht 2009	<u>Sample 1</u> Students N = 170 Age: 18 - 58 M = 20.66 (SD = 6.34)	Cross-sectional <i>Pen-and-paper format</i> <i>Online</i>	GBI	<i>Self-report</i> RPA RSS	Mania risk (GBI) was significantly associated with dampening ($r = .26$).	Medium
	<u>Sample 2</u> N = 528 Age: 18 - 76 M = 29.38 (SD = 11.24)				Positive rumination was not associated with mania risk.	
Steel 2015	Students N = 187 Age: 18 – 64 M = 24.3 (SD = 9.1) UK	Cross-sectional <i>Online</i>	HPS	<i>Self-report</i> CERQ	HPS positively correlated with rumination ($r = .21$) and reappraisal ($r = .33$). Risk was not associated with self-blame, acceptance, refocusing, planning, putting into perspective, catastrophizing or blaming others.	Medium
Thomas & Bentall 2002	Students N = 166 Age M = 22.85 (SD = 8.22) UK	Cross-sectional <i>Pen-and-paper format</i>	HPS	<i>Self-report</i> RSQ	All RSQ subscales were associated with HPS scores. <i>Rumination</i> $\beta = .23$ <i>Distraction</i> $\beta = .37$ <i>Dangerous activities</i> $\beta = .49$	Medium
Familial Mania Risk						
Green, Lino, Hwang, Sparks, James & Mitchell 2011	<u>BD-I Patients</u> N = 105 Age: 21 - 78 M = 52.39 (SD = 14.10) <u>Unaffected Biological Relatives</u> N = 124 Age: 18 - 85 M = 52.30 (SD = 15.65) <u>Healthy Controls</u> N = 63 Age: 20 - 82 M = 58.30 (SD = 16.83) Austria	Cross-sectional <i>Pen-and-paper format</i>	Self-reported first-degree relative with diagnosed BD-I	<i>Self-report</i> CERQ	<u>Rumination</u> BD > UR > HC ($\eta^2 = .2$) <u>Catastrophizing</u> BD > UR ($d = .5$) BD > HC ($d = .8$) <u>Putting into perspective</u> BD < UR ($d = .4$) <u>Self-blame</u> BD > UR > HC ($\eta^2 = .11$) No between groups differences on other subscales.	High

Author(s)	Sample	Methodology	Mania Risk Measure	ER Measures	Summary of Key Findings.	Quality Score
Kanske, Schonfelder, Forneck & Wessa 2015	<p><i>Case-control</i></p> <p><u>Sample 1</u></p> <p>Euthymic BD-I Patients</p> <p>N = 22</p> <p>Age</p> <p>M = 39.4 (SD = 11.8)</p> <p>Healthy Controls</p> <p>N = 22</p> <p>Age</p> <p>M = 40.5 (SD = 11.8)</p> <p><u>Sample 2</u></p> <p>Unaffected Biological Relatives</p> <p>N = 17</p> <p>Age:</p> <p>M = 36.7 (SD = 16.3)</p> <p>Healthy Controls</p> <p>N = 17</p> <p>Age</p> <p>M = 35.94 (SD = 15.63)</p> <p><i>Groups matched for gender, age and education.</i></p> <p><i>Germany</i></p>	<p>Cross-sectional</p> <p>Experimental</p> <p>Repeated Measures</p> <p>IAPS images</p> <p>-32 high arousal emotional</p> <p>(16 positive, 16 negative)</p> <p>-16 neutral low arousal</p> <p>Conditions</p> <ul style="list-style-type: none"> • Reappraisal • Distraction • Viewing (control) 	Diagnostic interview YMRS	fMRI data Self-report CERQ	<p>UR indicated stronger downregulation of positive emotion during reappraisal compared with controls.</p> <p><u>Habitual ER</u></p> <p>BD group reported more frequent rumination ($d = 1.2$), self-blame ($d = 1.1$) and catastrophizing ($d = .7$) than UR. No difference in positive reappraisal between BD and UR groups.</p> <p>UR also reported less frequent positive reappraisal than controls ($d = .08$).</p>	High
	<p><i>Case-control</i></p> <p><u>Children of Bipolar Parents (CBP)</u></p> <p>N = 30</p> <p>Age: 13 - 19 years</p> <p>M = 15.9 (SD = 1.92)</p> <p><i>7 children met diagnostic criteria for mood disorder (Affected-CBP)</i></p> <p><u>Control Children</u></p> <p>N = 30</p> <p>Age: 13 - 19</p> <p>M = 16.07 (SD = 1.7)</p> <p><i>Groups matched for age and gender</i></p> <p><i>UK</i></p>	<p>Cross-sectional</p> <p><i>Pen-and-paper format</i></p>	Structured Clinical Diagnostic Interview for DSM-IV Axis I Disorders. Bech-Refaelson Mania Scale MAS	Self-report RSQ	<p>No significant effect of risk status on rumination or risk-taking.</p> <p>CBP reported lower levels of active coping than control children ($d = .47$).</p>	

Author(s)	Sample	Methodology	Mania Risk Measure	ER Measures	Summary of Key Findings.	Quality Score
Pavlickova, Turnbull, Myin-Germeys & Bentall 2015	<i>Case-control</i>					
	<u>Children of Bipolar Parents (CBP)</u> N = 30 Age: 13 – 19 years M = 15.9 (SD = 1.92)	Prospective (6 days) ESM	Diagnostic interviews Bech-Refaelson Mania Scale MAS	<i>Self-report</i> ESM entries Rumination Active coping Risk taking	CBP children reported significantly more risk taking ($d = .4$)	High
	<u>Control Children</u> N = 30 Age: 13 – 19 years M = 16.07 (SD = 1.7) UK	<i>Pen-and-paper format</i>			CBP group reported less rumination ($d = .03$) and less active coping ($d = .03$).	

ASMR: Altman Self-Rating Mania Scale; CERQ: Cognitive Emotion Regulation Questionnaire; ERQ: Emotion Regulation Questionnaire; GBI: General Behavior Inventory; HPS: Hypomanic Personality Scale; MASQ: Mood and Anxiety Symptom Questionnaire; MDQ: Mood Disorder Questionnaire; PANAS: Positive and Negative Affect Scale; PTQ: Perseverative Thinking Questionnaire; RPA: Response to Positive Affect; RPA-C: Response to Positive Affect Questionnaire for Children; RSQ: The Response Styles Questionnaire; RSS: Ruminative Response Scale; RTQ: Repetitive Thinking Questionnaire; SBI: Savouring Beliefs Inventory; YMRS: Young Mania Rating Scale.

3.4 Results

3.4.1 Study and Sample Characteristics

Table 3.1 summarises study and sample characteristics. Table 3.2 displays associations between mania risk and emotion regulation strategies within correlational designs ($n = 11$). Table 3.3 details case-control studies comparing tendencies to use emotion regulation strategies in those at familial risk and non-clinical controls ($n = 4$). Table 3.3 also displays studies comparing those at behavioural high risk and controls who do not meet risk criteria ($n = 1$). In 69% of studies, the sample population was university students. Two studies included participants under the age of 18. On the basis of the quality assessments outlined above, correlational designs were rated as medium and case-control designs were considered high quality.

Table 3.2: Associations Between Behavioural Mania Risk and Emotion Regulation Strategies

	Positive	Null
Regulating Positive Affect		
Dampening	1, 2, 3, 4, 5, 7, 9	--
Positive Rumination	1, 2, 3, 4, 5	--
Emotion-focused	1, 2, 3, 4, 5	9
Self-focused	1, 2, 3, 4, 5	9
Positive urgency	6	--
Savouring	--	1
Regulating Negative Affect		
Acceptance	--	10
Active coping	--	4
Adaptive coping	8	--
Brooding	2	--
Catastrophizing	--	10
Dangerous activities	4, 11	--
Distraction	11	--
Other-blaming	--	10
Planning for the future	--	10
Positive Refocusing	--	10
Putting into perspective	--	10
Reappraisal	10	--
Reflection	2	--
Risk-taking	8, 11	--
Rumination	2, 8, 10, 11	4
Self-blame	--	10

1 - Carver & Johnson, 2008; 2 - Dempsey, Gooding & Jones, 2011; 3 - Feldman, Joormann & Jonson, 2008; 4 - Fisk, Dodd & Collins, 2015; 5 - Fulford, Johnson & Carver, 2008; 6 - Giovanelli, Hoerger, Johnson & Gruber, 2013; 7 - Johnson & Jones, 2009; 8 - Knowles, Tai, Christensen & Bentall, 2005; 9 - Raes, Daems, Feldman, Johnson & Gucht, 2009; 10 - Steel, 2015; 11 - Thomas & Bentall, 2002.

Table 3.3: Emotion Regulation Strategies in Case-control Studies

	BD>UR	BD>HC	BD>UR>HC	BD=UR=HC	BD=UR	BD<UR	UR<HC	CBP>CC	CBP=CC	CBP<CC	Other
Acceptance	--	--	--	1, 3	--	--	--	--	--	--	--
Active coping	--	--	--	--	--	--	--	--	--	4	--
Catastrophizing	1, 3	1	--	--	--	--	--	--	--	--	--
Distraction	--	--	--	--	--	--	--	--	--	--	2*
Other-blaming	--	--	--	1, 3	--	--	--	--	--	--	--
Positive reappraisal	--	--	--	1	3	--	3	--	--	--	2**
Positive refocusing	--	--	--	1, 3	--	--	--	--	--	--	--
Putting into perspective	--	--	--	3	--	1	--	--	--	--	--
Refocus on planning	--	--	--	1, 3	--	--	--	--	--	--	--
Risk-taking	--	--	--	--	--	--	--	5	4	--	--
Rumination	3	--	1	--	--	--	--	--	4	5	--
Self-blame	3	--	1	--	--	--	--	--	--	--	--

* HR displayed more activation in the left inferior parietal cortex than LR ** HR displayed more amygdala activation than LR group.

BD = Bipolar, UR = Unaffected Relative, HC = Healthy Control; CBP = Children of Bipolar Parents, CC = Control Children.

1 - Green, Lino, Hwang, Sparks, James & Mitchell, 2011; 2 - Heissler, Kanske, Schonfeld & Wessa 2013; 3 - Kanske, Schonfelder, Forneck & Wessa, 2015; 4 - Pavlickova, Turnbull, & Bentall, 2014; 5 - Pavlickova, Turnbull, Myin-Germeys & Bentall, 2015

3.4.2 How does mania risk relate to the reported use of emotion regulation strategies?

Strategies used to regulate positive affect were only investigated in behavioural high-risk studies. Of these strategies, dampening was most commonly investigated ($n = 7$, see Table 3.2), and was consistently related to mania risk within these cross-sectional designs, with small to medium effects. Positive rumination (including emotion-focused and self-focused subscales) was also frequently associated with higher mania risk ($n = 5$; small to medium effects), however, one study also reported no correlation between these variables (Raes, Daems, Feldman, Johnsons, & Van Gucht, 2009). This contradictory finding may be the result of including individuals from a wider age range (18 to 76), whereas the other studies to investigate this relationship typically included samples of participants closer to the peak age of onset (i.e., 18 to 25; Scott et al., 2016). This highlights the potential influence of the developmental stage of the sample. Linked to positive rumination, another amplifying response to positive emotion, mood-based rash action (positive urgency) was positively associated with mania risk, with a medium to large effect size (Giovanelli, Hoerger, Johnson, & Gruber, 2013), while savouring positive emotion (a more adaptive response to positive emotion) did not relate to risk (Carver & Johnson, 2009).

Of strategies used to regulate negative affect, rumination was most often investigated. Within behavioural high-risk designs, four cross-sectional studies reported positive associations with measures of mania risk (small to medium effects), with just one null finding (Fisk, Dodd, & Collins, 2015). Brooding and reflection, more passive forms of rumination, were also associated with risk, with small to medium effects (Dempsey, Gooding, & Jones, 2011). Rumination was

also frequently assessed within familial risk studies. Unaffected relatives (children of people with bipolar disorder who did not themselves have a diagnosis of a mood disorder) reported using rumination more often than healthy controls (large effects), but did not endorse rumination as highly as people who had a diagnosis of bipolar disorder (Green et al., 2011; Kanske, Schönfelder, Forneck, & Wessa, 2015). These studies were in adult offspring of people with bipolar disorder, and findings in adolescents (ages 13 to 19) were more variable. A prospective study found that children of parents with bipolar disorder reported using rumination less often than controls (small effect; Pavlickova, Turnbull, Myin-Germeys, & Bentall, 2015), while a cross-sectional study found no group difference; however, affected children of parents with bipolar disorder (i.e., those who met diagnostic criteria for mood disorder) reported greater rumination than unaffected children (Pavlickova, Turnbull, & Bentall, 2014). This highlights the importance of controlling for current symptoms, and for looking at other risk indicators over and above family history.

Of putatively maladaptive strategies, risk-taking and tendencies to engage in dangerous activities in response to low mood were positively related to mania risk in all four behavioural studies to investigate these associations, with medium to large effects (see Table 3.2). Within familial risk designs, risk-taking produced mixed findings, with one prospective study finding children of bipolar parents reported greater risk-taking than control children (medium effect; Pavlickova et al., 2015), while a cross-sectional study (Pavlickova et al., 2014) found no difference between these groups. These differences between risk groups may suggest that risk-taking and tendencies to engage in dangerous activities are more relevant to the personality traits that characterize behavioural risk (i.e., hypomanic personality) than genetic risk factors.

Catastrophising was not associated with behavioural mania risk; however, this was only assessed in one study (Steel, 2016). Within familial designs, participants with bipolar disorder reported greater catastrophizing than unaffected relatives, with medium and large effects (as well as healthy controls and large effect; Green et al., 2011), but unaffected relatives were similar to controls (Green et al., 2011; Kanske et al., 2015). Self-blame was also not associated with behavioural risk but was again only investigated in one study (Steel, 2016). However, familial risk was associated with this response to negative affect, with two studies suggesting that those with diagnosed bipolar disorder reported more self-blame than unaffected relatives (medium and large effects; Green et al., 2011; Kanske et al., 2015), and unaffected relatives reported more than controls (medium effect; Green et al., 2011). Blaming others was not related to behavioural (Steel, 2016) or familial (Green et al., 2011) measures of risk.

Of putatively adaptive strategies for regulating negative emotion, distraction was assessed across study designs investigating associations with behavioural risk, with consistent findings. One cross-sectional study found distraction positively correlated with mania risk (medium to large effect; Thomas & Bentall, 2002), while a study using fMRI data to assess distraction during an experimental task found high-risk participants displayed greater activation in the left inferior parietal cortex than the low-risk group (large effect; Heissler, Kanske, Schoenfelder, & Wessa, 2014). This suggests that distracting attention away from positive stimuli is more difficult for those at greater mania risk. There was also a reappraisal condition within this study, and high-risk participants demonstrated less successful downregulation of amygdala activity compared with low-risk participants when using reappraisal in response to negative stimuli, suggesting that reappraisal is more effortful for those at higher risk (large effect; Heissler et

al., 2014). Particular credence should be given to the strength of the evidence provided by this study, given the triangulation of data from experimental paradigms and behavioural self-report of the use of these strategies. Mania risk was also positively associated with self-reported tendencies towards using reappraisal in a further study (medium effect; Steel, 2016). Two familial risk studies also assessed use of reappraisal, with both finding no difference between participants with bipolar disorder and unaffected relatives (Green et al., 2011; Kanske et al., 2015); one study suggested that unaffected relatives report less positive reappraisal than controls (small effect; Kanske et al., 2015), while the other, found no difference (Green et al., 2011).

Across two studies looking at adaptive coping, one reported a positive association with mania risk (small effect; Knowles, Tai, Christensen, & Bentall, 2005), whereas the other did not find any association between these constructs (Fisk et al., 2015). In relation to familial risk, children of parents with bipolar disorder reported less adaptive coping than controls (medium effect; Pavlickova et al., 2014), however, this was only investigated in one study. Putting into perspective was not associated with behavioural risk but this was only assessed in one study (Steel, 2016). Within two familial studies to investigate this strategy, one suggested unaffected relatives endorsed putting into perspective less often than people with diagnosed bipolar disorder (small to medium effect; Green et al., 2011), while unaffected relatives and controls did not differ (Green et al., 2011; Kanske et al., 2015). Acceptance was not associated with behavioural (Steel, 2016) or familial risk (Green et al., 2011; Kanske et al., 2015). Planning for the future and positive refocussing were not related to behavioural risk but were also only investigated in one study (Steel, 2016). Positive refocusing and

refocussing on planning were not associated with familial risk (Green et al., 2011; Kanske et al., 2015).

3.5 Discussion

This review aimed to present a systematic account of associations between emotion regulation strategies and mania risk. Overall, mania risk was associated with increased tendencies to engage in emotion regulation strategies, particularly purported maladaptive strategies.

Strategies used to regulate positive affect were only investigated within behavioural studies. Dampening was consistently associated with risk across all studies that assessed this relationship. Positive rumination was also typically associated with risk, while savouring was not. Research with at-risk groups helps address a major limitation of literature examining emotion regulation in individuals with bipolar disorder in delineating whether the tendency to endorse less adaptive regulation strategies is the result of experiencing clinically significant mood episodes, or if these mood instabilities occur as a consequence of maladaptive emotion regulation. These findings tentatively suggest the latter, in that positive regulation strategies that are typically considered to be problematic for individuals with bipolar disorder (due to experiences with excessively highly activated mood states) are also related to mania risk, whereas more adaptive responses to elevated mood (i.e., savouring) are not related to mania risk. Given the theoretical significance of these responses to positive affect, further research, particularly using familial risk is warranted.

A number of strategies were examined in both behavioural and familial risk studies. Rumination was most commonly investigated, with a similar pattern of findings across risk paradigms. Both present mostly positive associations, with

medium to large effects, consistent with the Response Styles Theory (Nolen-Hoeksema, 1991) which suggests that ruminating on negative affect exacerbates depression. Within case-control studies, individuals with bipolar disorder reported greatest endorsement of rumination, followed by those considered to be at risk, with controls being least likely to report the use of this strategy. Children of bipolar parents who themselves also met diagnostic criteria for a mood disorder also reported greater rumination than those who did not. This may suggest that a greater tendency to ruminate in response to negative affect is related to mania risk and becomes more frequent as individuals transition to experiencing a first clinically significant mood episode and thereafter a diagnosis of bipolar disorder. Similarly, an interesting pattern of findings was present for catastrophizing as individuals with diagnosed bipolar disorder reported significantly higher instances than unaffected relatives and controls, but relatives did not differ from controls. Tentatively this may suggest that some strategies may be more apparent when an individual has a history of clinically significant mood episodes. Mixed findings were also apparent for risk-taking and tendencies to engage in dangerous activities, with mostly positive associations across both risk paradigms, with medium to large effect size. A medium to large effect was also reported for positive urgency (i.e., mood-based rash action in response to elevated positive affect, which is conceptually similar to both risk-taking and other amplifying strategies such as positive rumination). This is of particular relevance to mania risk as investigations of the consequences of manic episodes frequently cite impulsivity and engagement in risky behaviour (e.g., Thomas, Knowles, Tai, & Bentall, 2007). Large effects were also reported for other maladaptive strategies, such as catastrophizing, while effect sizes for purportedly adaptive strategies, such as adaptive coping, were typically small to medium.

A number of strategies were only investigated in one study; it is therefore not possible to synthesize findings and draw firm conclusions about the associations between mania risk and strategies such as savouring and more adaptive strategies (e.g., reflection).

3.5.1 Limitations and Future Directions

Overall, case-control designs were considered to be of high quality whereas correlational designs were rated as a medium; however, the pattern of findings was relatively consistent across studies, regardless of quality scores. Within case-control designs, conditions were generally well-matched for age and gender. Only one study (Pavlickova et al., 2015) reported controlling for current symptoms, however, given the mixed findings present across the literature, this is an important factor to consider.

With the exception of one of the prospective studies, all studies were cross-sectional. The pattern of findings was relatively consistent across these study designs, with the two main exceptions; within the prospective study at risk participants reported more risk-taking and less rumination than controls over time (Pavlickova et al., 2015), but these differences were not present cross-sectionally (Pavlickova et al., 2014). While this study provides insight into which emotion regulation strategies relate to bipolar disorder, and which may also be precursors to its development, it does not allow for inference about the direction of causality between mania risk and emotion regulation difficulties. In addition, as trait measures of risk also capture mood lability, it is difficult to address this with cross-sectional research. There remains a substantial need for well-controlled longitudinal studies investigating whether endorsement of emotion regulation strategies predicts mania risk and if the interaction between emotion regulation

and mania risk predicts poorer mood outcomes, including the transition to the first clinically significant episode of mania; this would provide the most definitive evidence. Only one study (Pavlickova et al., 2015) used an Experience Sampling Methods (ESM). ESM is a structured diary method in which participants provide “systematic self-reports at random occasions during normal daily life” (Larson & Csikszentmihalyi, 2014). This format allows for easy collection of multiple snapshots of rich data, commonly including reports of mood and symptoms, as well as contextual information. ESM has successfully been used in numerous studies to assess mood patterns in both clinical (e.g., Myin-Germeys et al., 2003) and nonclinical samples (e.g., Sperry & Kwapil, 2017). It is suggested that particular credence should be given to findings from ESM studies as they are generally considered to be higher in ecological validity, allowing for investigation of “real life” regulation processes, as emotional experiences are recorded within naturally occurring everyday contexts (Gruber et al., 2013). ESM would also allow for the identification of possible discrepancies between trait and state measures of emotion regulation, as well as an assessment of emotion regulation repertoires and regulatory flexibility across contexts.

With the exception of two fMRI investigations (Heissler et al., 2014; Kanske et al., 2015), all studies relied exclusively on self-report accounts of affect and regulatory attempts. While this allows for assessment of perceived experiences, findings rely on the assumption that participants can recognize and articulate these processes (while emotion regulation can be automatic; e.g., Gao, Chen, Long, Yang, & Yuan, 2018). However, deficits in ability to identify and label emotions are common across a range of psychological disorders, including bipolar disorder (Flynn & Rudolph, 2010). It is, therefore, possible that mixed findings present between studies are a reflection of difficulties in reporting mood

and regulatory attempts rather than actual deficits in mood control, raising questions as to the overall validity of self-reported emotion regulation within this population.

In some instances, familial risk studies relied on self-reported parental diagnosis and behavioural studies used self-reported trait vulnerability measures, with all but one study using the HPS. Although this demonstrates some level of consistency, and these methods do have their strengths, there remains a need for better operationalization of risk criteria and the exploration of potential risk factors within groups who meet these criteria. Using staging models as a framework, various criteria are being established that combine a range of clinically relevant factors (e.g., being at the peak age of onset for bipolar disorder [i.e., 18 to 25], cyclothymia co-occurring with depression, subthreshold mania, and depression co-occurring with a familial history of bipolar disorder; Scott et al., 2016). However, to date, studies on emotion regulation have considered singular examples of risk (e.g., family history of bipolar disorder or personality traits associated with the characteristics of mania) and future studies should aim to use these enhanced criteria to explore longitudinal risk factors. In addition, more clearly defined risk criteria would allow for more meaningful comparisons with groups at risk for other psychological disorders to distinguish which (if any) emotion regulation strategies, or combinations of strategies, are specifically related to mania. As acknowledged by Duffy, Jones, Goodday, and Bentall, (2016), these mechanisms could be considered as additional early risk factors in combination with emerging criteria from staging models and are, therefore, a potential area for intervention.

Given that bipolar disorder is characterized by both high and low mood episodes, and both positive and negative emotion regulation strategies appear to

be elevated within at-risk groups, future research should investigate whether greater tendencies to engage in maladaptive regulation strategies in response to both positive and negative affect is important in this group. To the authors' knowledge, this has yet to be investigated within risk groups, however, investigation with individuals with bipolar disorder found that both extremely positive and negative appraisals of activated mood states discriminated this sample from those with depression and healthy controls (Kelly et al., 2011).

In addition to the methodological limitations discussed above, findings were also limited by a lack of consideration for key moderating or mediating factors. Most notable was the consistent lack of consideration of the role of context. Given that emotions are dynamic and reactive in response to both external and internal triggers, the tendency to assess them in isolation of the contexts in which they occur significantly reduces the ecological validity of findings and limits insight into "real life" emotion regulation processes (Aldao, 2013). Previous literature has identified several contexts that may be of particular relevance when investigating emotion control and mania risk. For example, Gruber and Johnson (2009) found that individuals high in hypomanic personality traits reported elevated levels of positive affect in response to goal attainment and reward, but displayed deficits in socially relevant positive emotions. Assessment of context also allows for insight into repertoires of emotion regulation (i.e., the range of strategies available to an individual; Dixon-Gordon, Aldao, & De Los Reyes, 2015a) and willingness and ability to switch between these strategies (i.e., regulatory flexibility). One study that investigated these factors across a range of disorders identified detailed "regulation profiles" based on self-reported use of strategies in response to high and moderate-intensity emotions in a range of contexts (Dixon-Gordon, Aldao, & De Los Reyes, 2015b).

This approach offers the most holistic view of emotion regulation of those presented throughout the literature but, to date, has not been applied to the investigation of emotion regulation in people at heightened risk of mania.

It may also be beneficial to consider the desired outcome and perceived effectiveness of regulatory attempts. For example, an inability to recognize where emotion regulation has been successful in modifying affect in an intended way may lead to further exaggerated use of the same, or additional, strategies, which may change the mood in a way that is not in line with the original intention of the emotion regulation attempt. Consideration of intention is of particular relevance when attributing adaptive or maladaptive value to certain emotion regulation strategies. When the emotional response is appropriate and proportional to the stimuli, unnecessary attempts to alter the mood state may lead to feelings of incongruence and the development of maladaptive response patterns. Gross (1998, p. 232) states that unrealistic appraisals may lead to the denial of important features of the environment. This is particularly apparent in bipolar disorder and mania risk. For example, the integrative cognitive model (Mansell et al., 2007) suggests that extremely positive and negative appraisals of changes in mood states trigger disproportionate regulation attempts, leading to the development and maintenance of mood swings, which are characteristic of bipolar disorder. Ability to evaluate the appropriateness of emotional responses and regulate accordingly is, therefore, vital for the maintenance of healthy mood patterns. Assessment of these belief systems and desired outcomes concurrently provides valuable insight into the motivations behind engagement, or lack thereof, in regulatory strategies in response to mood changes and may provide an explanation of why some individuals report less use of emotion regulation strategies than others.

3.5.2 Clinical Implications

Findings from this literature contribute to the knowledge about processes underlying the development of the bipolar disorder and provide evidence that strategies such as dampening and negative rumination may be related to mania risk. However, further work is needed, particularly well-controlled longitudinal studies predicting transition to bipolar disorder in high-risk groups, to disentangle which strategies are transdiagnostic (e.g., rumination) and which specifically relate to mania risk, such as positive rumination. This would allow for the development of targeted interventions for individuals displaying early indications of problematic mood regulation tailored to emotion regulation difficulties associated with the development of the bipolar disorder. Such interventions are vital for long-term outcomes, particularly within the population of young adults. A prospective examination of bipolar disorder by Post et al. (2010) found that earlier onset was associated with delays in the first instance of treatment, which also predicted symptom severity and duration of future mood episodes, a trend which could be alleviated by development of appropriate interventions for initial mood control difficulties. This would also be advanced with the use of more clearly operationalized risk criteria, as has been done with risk for other disorders (e.g., psychosis).

3.5.3 Conclusion

Mania risk was typically associated with reported use of putatively maladaptive emotion regulation strategies such as dampening and rumination, with similar patterns of findings present across both behavioural and familial studies. However, the overall quality of findings is confounded by a number of key limitations apparent throughout the literature, most notably the lack of

consideration of context and reliance of cross-sectional self-report designs and measures of trait-like emotion regulation strategies rather than real world use of these strategies. In addition, there remains a need for further assessment of positive emotion regulation across both behavioural and familial designs, given their theoretical and clinical significance. Future research should aim to address these limitations with the inclusion of assessments of contextual factors (e.g., within ESM designs) and additional objective measures of both positive and negative affect regulation to provide the most holistic view of emotion regulation processes possible.

Chapter 4:

Emotion Regulation in Context

4.1 The fallacy of uniform efficacy

Throughout the literature, there is a tendency to conceptualise emotion regulation strategies as either adaptive and helpful or maladaptive and unhelpful (see Section 2.1). However, the validity of this distinction has been questioned, with many suggesting that individual strategies may not *always* be adaptive or maladaptive, and that factors such as the intended outcome of the regulation attempt should be considered before assigning such value to a strategy (e.g., Aldao, 2013; Mansell et al., 2007). For example, when trying to reduce elevated affective states such as excitement to improve concentration, engaging in strategies that further upregulate positive affect would be maladaptive, as the resulting increase in excitement would be contrary to what was intended, whereas use of strategies that downregulate positive affect would be considered adaptive (yet are generally considered to be maladaptive; e.g. dampening is associated with negative affective outcomes and poor well-being; e.g., Wood et al., 2003). It may therefore be more appropriate to delineate adaptive and maladaptive regulation attempts to use strategies, rather than delineate the strategies themselves into helpful versus unhelpful categories. This would acknowledge that some strategies may be both helpful and unhelpful at different times, depending on the context in which they are being applied. Bonanno and Burton (2013) described this delineation into maladaptive and adaptive strategies as the *fallacy of uniform efficacy*. For example, reappraisal in response to negative affect is generally considered adaptive and is associated with better well-being outcomes

(e.g., Gross & John, 2003). However, research suggests that the adaptive value of reappraisal may be dependent on factors such as the amount of control the person has over the situation that is eliciting negative affect. When used in response to less controllable stressors, reappraisal is negatively associated with anxiety, depression and stress, conversely, when the stressor is controllable, reappraisal is positively associated with these affective outcomes (Haines et al., 2016; Troy, Shallcross, & Mauss, 2013).

4.2 Potential Contextual Moderator of Emotion Regulation and Outcomes

Much of the literature presented in previous sections provides mixed findings between use of emotion regulation strategies and affective outcomes, particularly in relation to mania risk. It is suggested that these mixed findings may be the result of a general lack of consideration of contextual factors which could potentially moderate the relationships between emotion regulation strategies and affective outcomes. The importance of contextual factors is highlighted by Gross's description of emotion as 'input-output processes', such that emotions often arise in response to external triggers in the environment (inputs), and that expression of emotions (outputs) may also result in changes to the environment (Gross, 1998; 2015). Additionally, Aldao (2013) suggests that as one of the main aims of emotion regulation is to facilitate appropriate responses to situational demands, attempting to assess emotion in isolation of the environments in which they occur substantially reduces the ecological validity of findings and limits understanding of 'real life' emotion regulation processes. Further, Gratz and Roemer (2004) state that "knowledge of the specific emotion regulation strategies used by an individuals, in the absence of information about the contexts in which

they are used, may provide little information about the individual's ability to regulate her or his emotions effectively" (p.42).

Contextual factors are also important considerations when assigning meaning to affective states. For example, when assessing if an emotion is appropriate for the current situation (e.g., feeling sad at a funeral would be viewed as appropriate whereas feelings of excitement would not) and proportionate (e.g., moderate anxiety before public speaking would be proportionate and helpful for engaging the speaker, however if anxiety is too high, this may impair performance). Together these factors may help individuals decide if they need to engage in emotion regulation strategies to modify their current affect, and if so, how.

Similarly, context informs whether use of emotion regulation strategies is adaptive or maladaptive. For example, in situations where it would be useful to upregulate mood, use of dampening would be considered maladaptive as the resulting decrease in positive affect would be contrary to what was intended. Further, in an experimental study by van't Wout and colleagues, participants who were instructed to engage in reappraisal accepted more unfair offers in an ultimatum game than those who were instructed to suppress emotions and participants who received no specific instructions to regulate (van't Wout, Chang, & Sanfey, 2010). These findings highlight how strategies assumed to be adaptive, such as reappraisal, may be associated with detrimental outcomes, and could therefore be considered maladaptive, depending on the context in which they are being used. It may therefore be more appropriate to assess individual regulatory attempts in relation to specific contextual factors and affective outcomes to gain a more nuanced understanding of *when* some strategies may be more or less

(mal)adaptive, rather than an adaptive-maladaptive distinction between strategies.

A number of contextual factors have been highlighted as being relevant to emotion regulation, specifically relating to mania risk. For example, the Integrative Cognitive Model (ICM; Mansell et al., 2007), which is often used to explain how mood swings characteristic of bipolar disorder and mania risk arise and are maintained, emphasises factors such as beliefs about affect, changes in affect, and current environment, as influential in the selection and implementation of emotion regulation strategies.

4.2.1 Beliefs about emotions

One contextual factor of interest is the beliefs individuals endorse about their emotions. Previous research suggests that individuals differ in these beliefs, with some viewing emotions as malleable and dynamic experiences that can be changed with regulatory effort (incremental theorists) while others perceive emotions as fixed and outside of regulatory control (entity theorists; Tamir, John, Srivastava, & Gross, 2007). Endorsement of fixed or entity beliefs about emotion is associated with decreased well-being (e.g., reduced self-esteem and satisfaction with life, less frequently reported positive affect, and more frequent negative affect), greater clinical indicators of anxiety and depression, and increased feelings of isolation from peers, both cross-sectionally and longitudinally (De Castella et al., 2013; Manser, Cooper, & Trefusis, 2012; Tamir et al., 2007). It is suggested that these relationships are explained by feelings of disengagement and perceived weakness that arise in responses to emotional challenges when individuals feel that these factors are outside of their control

(e.g., Hong, Chiu, Dweck, Lin, & Wan, 1999; Ommundsen, Haugen, & Lund, 2005; Rhodewalt, 1994).

The extent to which individuals believe that factors such as emotions are malleable has been found to predict the attributions they make about their ability to regulate, and the motivations they display to engage in regulatory processes. For example, endorsement of malleability beliefs is predictive of greater trait tendencies to engage in reappraisal in response to negative affect (Manser et al., 2012; Tamir et al., 2007). Manipulation of emotion malleability beliefs have also been explored experimentally. In a study by Kneeland and colleagues, participants were assigned to one of two conditions where beliefs were primed towards emotions being malleable (malleable condition) or emotions being fixed (fixed condition) before completion of a public speaking stress induction task. Findings supported those of previous correlational investigations, such that participants in the malleable condition reported greater use of reappraisal during the speaking task in response to negative affect than those in the fixed condition. Additionally, use of reappraisal in the fixed condition was associated with a greater decrease in positive affect following the speaking task, while use of expressive suppression during the task was associated with increased negative affect, regardless of condition (Kneeland, Nolen-Hoeksema, Dovidio, & Gruber, 2016).

Investigations of malleability beliefs about other factors, such as intelligence, have found that beliefs individuals endorse relating to their personal ability to control these attributes are more predictive of goals, motivations, and engagement in effortful regulatory behaviours than the beliefs they hold about the malleability of these factors in general (Bandura, 1997, 2006; De Castella & Byrne, 2015). It was therefore posited that investigating the personally relevant

beliefs individuals hold about emotion malleability would be a more reliable predictor of their likelihood to engage in effortful emotion regulation than their general beliefs. In order to address this hypothesis, De Castella and colleagues developed a measure of personal beliefs about emotion malleability, adapting existing items from the Intrinsic Beliefs about Emotion Malleability scale (Tamir et al., 2007), e.g. *'Everyone can learn to control their emotions'* became *'I can learn to control my emotions'* (De Castella et al., 2013). Findings support this hypothesis, with scores on the personal measure of emotion malleability beliefs being more strongly correlated with well-being outcomes and trait tendencies to engage in reappraisal than those on the general scale.

To date, the relationships between malleability beliefs and use of emotion regulation strategies has focused on responses to negative affect. However, as the literature has begun to acknowledge the relevance of positive affect dysregulation to the development of mood difficulties, particularly in relation to mania risk, it is suggested that understanding how these beliefs may influence responses to positive affect is of theoretical importance. Additionally, insight into how beliefs may moderate associations between mania risk and use of positive emotion regulation strategies may highlight possible areas for early intervention. Associations between emotion malleability beliefs, mania risk, and trait tendencies to engage in positive rumination, dampening, and savouring are explored in Study 1 (Chapter 6).

4.2.2 Affect intensity

The intensity of the affective state being regulated may also be influential in the selection, implementation, and outcomes of emotion regulation strategies. Previous findings suggest that more intense emotions require greater regulatory

effort (e.g. Barrett, Gross, Christensen, & Benvenuto, 2001). Additionally, individuals display tendencies to engage in purportedly maladaptive emotion regulation strategies, such as distraction, in response to higher intensity affective states while regulation of less intense mood states is more often associated more adaptive responses, such as reappraisal (e.g., Dixon-Gordon et al., 2015a; Sheppes et al., 2014). These findings highlight how abilities to evaluate the intensity of affective states and modify regulatory responses accordingly may be important for effective mood control. For example, disproportionate regulatory efforts have been associated with development of mood swings (ICM).

Research relating to how affective intensity may influence responses to positive affect is lacking. However, as mania risk is often characterised by elevated positive affect, it is suggested that such insight is important to further identify how positive affect dysregulation occurs. Relationships between mania risk, emotion regulation and positive affect intensity are explored in Study 1 (Chapter 6).

4.2.3 Social Context

Social contexts have been shown to influence the emotions individuals experience and the strategies they select to regulate these emotions. For example, Srivastava and colleagues found that use of suppression increased as individuals entered non-familiar social environments (Srivastava, Tamir, McGonigal, John, & Gross, 2009). Similarly, findings from English and colleagues suggest that individuals engage in suppression more when in the company of non-close others than when with close others and reported least use of suppression when alone. Use of reappraisal and distraction was also lower in the company of close others than when with non-close others or alone (English, Lee,

John, & Gross, 2017). The social context of the source of emotional triggers also appears to influence subsequent use of emotion regulation strategies, with suppression being used more frequently in response to anger that was elicited by other people than when the source was non-social (Kashdan, Goodman, Mallard, & DeWall, 2016).

In the context of the current research, social factors have been identified as relevant to affect experience and regulation for individuals at risk of mania and those with bipolar disorder. For example, previous findings suggest that bipolar disorder and mania risk are associated with increased social stress in the company of others (Bentall et al., 2011). Research by Gruber and Johnson (2009) also found that hypomanic personality traits were more strongly associated with self-focused positive affect (i.e., joy and pride) than experiences of pro-social positive affect (i.e., compassion and love). Additionally, current mania symptoms were negatively associated with love and compassion. The potential influence of social contexts on the implementation of emotion regulation strategies in response to positive affect have not yet been explored, however, such insight would further contribute to models of positive affect dysregulation. Moreover, understanding of how social contexts may moderate associations between mania risk, use of emotion regulation strategies and affect outcomes may help to identify contexts in which use of specific strategies may be more problematic (i.e., associated with greater mood symptoms) for individuals higher in mania risk. Relationships between use of emotion regulation strategies in social contexts, mania risk, and affect outcomes are explored in Studies 2 and 3 (Chapters 7 and 8).

4.2.4 Situational Context

Situational contexts may also be an important factor to consider. Situations relating to goal-striving and reward attainment are highlighted as having particular theoretical relevance to bipolar disorder and mania risk. The BAS model posits that bipolar disorder is associated with increased sensitivity of neurocognitive systems (i.e., the behavioural activation system) that regulates reward seeking (Depue, Krauss, & Spont, 1987; Johnson, Edge, Holmes, & Carver, 2012). A number of studies have found that individuals with bipolar disorder and those high in mania risk demonstrate overambitious goal-setting and increased drive towards achievement (e.g., Carver & White, 1994; Meyer, Johnson, & Carver, 1999; Meyer, Johnson, & Winters, 2001). Further, engagement in goal-striving has been found to predict mania symptoms (e.g., Lozano & Johnson, 2001) and increased goal-oriented activity is a diagnostic feature of manic episodes (American Psychological Association, 2013). Mania risk is also associated increased self confidence in response to success feedback (Johnson, Ruggero, & Carver, 2005) and increased goal-striving in relation to fame and wealth, but not pro-social goal relating to friends or family (Gruber & Johnson, 2009).

Despite a wealth of evidence that suggests that goal-oriented contexts are associated with problematic high mood outcomes for individuals at risk of mania, research relating to how these situational factors may influence ability to regulate mood is lacking. It is suggested that understanding of how use of emotion regulation strategies within these contexts may moderate associations between mania risk and affect outcomes would further help to delineate when strategies may be more or less (mal)adaptive, and highlight additional areas for intervention. For example, as goal-focused contexts are related to both mania risk and elevated positive affect and high mood, use of upregulating strategies (i.e.,

positive rumination) in these contexts may be particularly problematic for people at higher mania risk. These associations are explored in Studies 2, 3 and 4 (Chapters 7 to 9).

4.2.5 Summary

In summary, the literature outlined within this section highlights the importance of considering contextual factors when investigating emotion regulation processes. Understanding the potential moderating influence of context on associations between use of emotion regulation strategies and affective outcomes would help to further knowledge of when certain strategies may be more or less (mal)adaptive, particularly for those prone to mood fluctuations, (e.g., within mania risk). Such insight would be useful in informing theory and future research on transition to bipolar disorder.

Chapter 5:

General Methods and Research Aims

5.1 Rationale

The primary objective of this thesis was to advance knowledge of the relationships between mania risk, positive emotion regulation and affect outcomes. As discussed in Chapter 3, many previous investigations have produced mixed findings and it is suggested that this may be the result of reliance on trait measures of emotion regulation such as the Response to Positive Affect scale (RPA: Feldman et al., 2008). Also, there has been a lack of consideration of contextual moderators throughout the literature (Chapter 4). Therefore, the studies within this thesis aimed to explore a range of contextual factors, including beliefs about emotion malleability, state use of emotion regulation strategies in situational contexts identified as having theoretical relevance to mania risk (i.e., goal-oriented and social situations), and different affect intensities. It is suggested that such insight could be useful in informing theory and contribute to models of mania risk to help to better identify individuals experiencing affect regulation difficulties which may promote transition to clinically significant mood experiences.

5.2 Methodological approaches

A range of methodological approaches were used throughout this thesis to address hypotheses outlined below. Detailed descriptions of the methods used within each study are provided in empirical Chapters 6 to 9. The studies included in this thesis are presented in alternative format to facilitate publication of this

research. The systematic review presented in Chapter 3 was accepted for publication in the Journal of Clinical Psychology (McGrogan et al., 2019), and Study 2 (Chapter 7) was accepted for publication in Behavioural and Cognitive Psychotherapies (McGrogan et al., 2020). Both chapters are presented as published.

5.2.1 Rationale for Non-clinical Samples

Throughout this thesis, data was collected from non-clinical samples. Use of non-clinical, or analogue, samples is common in clinical psychology literature however, it is important to acknowledge the limitations associated with this population. Firstly, risk for psychopathology (e.g., levels of hypomanic personality) is typically low within the general population, limiting insight into the associations between relevant factors across the full continuum of risk. Secondly, these samples are usually homogenous, with many studies relying on samples of psychology undergraduates, thus limiting the generalisability of findings to other populations.

Despite these limitations, non-clinical samples also present a number of key advantages which justify their use in this research. Firstly, in order to understand which factors may be precursors to disorders such as bipolar, they must be investigated in populations who do not already have a diagnosis. Assessment of factors believed to be relevant to the development of psychological disorders within non-clinical populations is central to informing staging models that predict transition to disorder. Staging models are well established means of assessing risk for physical illness, such as diabetes, using a number of biological, behavioural, and social markers to create cumulative risk profiles. However, it is also suggested that clinical staging models may also be

useful in identifying risk for psychopathology (Scott et al., 2013). The use of staging for psychosis has proved particularly beneficial for detection of people at ultra-high risk of transition, as well as the development of targeted and tailored interventions, (e.g., Yung et al., 2010). Similar models have been developed for risk of bipolar disorder. The Bipolar At-Risk (BAR: Scott et al., 2016) highlights a number of key criteria, including age, emerging mood symptoms, and familial and behavioural indices, that contribute to risk of transition to bipolar disorder, see Section 2.2. Additionally, work by Duffy and colleagues highlights the need for consideration of psychological processes, such as maladaptive coping mechanisms including emotion regulation difficulties, as pathways for which vulnerability described by staging models is expressed (Duffy et al., 2016).

Secondly, the Hypomanic Personality Scale (Eckblad & Chapman, 1986) was developed in analogue populations as an indices of mania risk, and depression and mania symptoms exist on a continuum from normal to clinically significant mood experiences. Non-clinical samples are also less likely to be confounded by current or previous psychological or pharmacological interventions, or experience of significant mood episodes.

The age range of participants was also an important consideration, with inclusion of adults aged 18 to 25 allowing for assessment of key vulnerability markers for bipolar disorder (i.e., hypomanic personality traits, responses to positive affect, and affect outcomes) at a critical period for onset (Scott, et al., 2016).

5.2.2 Measures of Mania Risk

Investigations of mania risk typically use one of two methods to define at-risk samples: familial risk or behavioural risk.

5.2.2.1 Familial Risk

People are considered to be at familial mania risk if they have a first degree relative with a diagnosis of bipolar disorder. Throughout the literature, family history is considered one of the most robust predictors of future transition to bipolar disorder (Duffy et al., 2014; Zechner & Gill, 2016), with heritability estimated as high as 80%, (Logotheti et al., 2019; McGuffin et al., 2003).

Having a parent with bipolar disorder is also associated with greater general risk of psychopathology, as well as a specific heightened risk of mood disorder, comparative to offspring of parents without bipolar disorder. These findings were highlighted in a meta-analytic review of studies which assessed prevalence of psychological disorders in offspring of parents with bipolar disorder, aged between 7 and 25 (Lapalme, Hodgins, & LaRoche, 1997). Findings suggest that 52% of offspring of BD diagnosed parents met criteria for psychopathology compared with 29% of controls (i.e., offspring of parents without a bipolar diagnosis). 26% of BD offspring met criteria for diagnosis of a mood disorder compared with 8.3% of controls, and 5.4% of BD offspring also met criteria for diagnosis of bipolar disorder compared to 0% of controls.

A study by Green et al. (2011), found that while both groups differed significantly, with participants diagnosed with bipolar disorder reporting greater symptoms than unaffected relatives (UR), both BD and UR participants reported significantly more symptoms of depression, anxiety, and stress than controls. These findings have also been replicated in samples of children and adolescents

(aged 7 to 19), with offspring of bipolar parents reporting significantly greater symptoms of depression, hypomania, panic disorder, and posttraumatic stress than age matched controls (Pavlickova, et al., 2015).

Familial risk is usually indicated by self-report of a relative's diagnosis, sometimes confirmed by a clinical interview. Participants are typically then grouped as at-risk (i.e., those with a relative with bipolar disorder) or not at risk (i.e., controls). Although this distinction allows for clear comparison between groups, it relies on a single factor of risk (e.g., family history of bipolar disorder) and does not account for individual differences between participants within each group, such as personality styles or emerging mood symptoms, which exists on a continuum of experience and are also highlighted as indicative of risk. Further, most relatives of people with bipolar disorder do not go on to develop bipolar disorder themselves.

5.2.2.2 Behavioural Risk

Behavioural conceptualisations are the most commonly used indices of mania risk throughout the literature. Behavioural high-risk is frequently quantified using measures such as the General Behaviour Inventory (GBI: Depue et al., 1989), and the Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986). Although originally developed as a screening tool for undetected bipolar disorder in individuals seeking help, rather than a measure of mania risk, the Mood Disorder Questionnaire (MDQ: Hirschfeld et al., 2000) is also sometimes used in this way in non-clinical samples. These measures assess both emerging traits associated with hypomania, such as energetic behaviour and grandiosity, and previous experience of (hypo)mania or depression.

A review by Waugh and colleagues explored the use of these measures within populations considered to be at the peak age of onset for mania risk (i.e., 15 to 25 years). Findings suggest that while these measures are useful within this age range, performance differs to that seen in older samples. It was therefore suggested that established scoring systems and cut-off points, which are typically based on these older samples, should be modified for use with younger populations. Of the measures reviewed, scales that assess previous mood experiences, such as the MDQ, performed less well in non-clinical samples than in clinical settings. However, trait measures of risk, such as the GBI and HPS performed better in non-clinical samples, suggesting they are the most appropriate tools for detecting mania risk in samples of young adults without history of significant mood disturbance (Waugh et al., 2014).

Evidence was most convincing for the GBI, however, as the original scale comprises 73 items, it is less appropriate for use within surveys that include multiple other scales. The HPS was also found to be a reliable indicator of mania risk and future transition to bipolar disorder (Kwapil et al., 2000), with 25% of participants in a high scoring group experiencing at least one episode of mania within the 12-year follow-up period compared to 0% of controls (i.e., low HPS) and 36% experiencing a major depressive episode compared with 10% of controls. Elevated HPS is also typically associated with increased positive and negative affect (e.g., Knowles et al., 2005), as well as greater fluctuations in mood and social stress (e.g., Bentall et al., 2011). Additionally, hypomanic personality is predictive of greater use of maladaptive emotion regulation strategies, evidence for which is reviewed in Chapter 3. The original 48-item scale was developed and validated within student samples, however, a shortened 20-item scale (HPS-20: Meads & Bentall, 2008) is also validated for use in this age range

and is therefore suggested as the most appropriate means of quantifying mania risk within the current research given its psychometric properties, use throughout the extant literature, and relative brevity.

In summary, while familial risk is a reliable index of mania risk, this method of grouping participants into at-risk or control groups according to family history does not account for individual differences or mood difficulties experienced by participants. Behavioural risk measures account for these potential mood disturbances as well as relevant personality traits that exist on a continuum in general and clinical populations and allow for insight into relationships between factors such as emotion regulation relative to different levels of risk.

5.2.3 Use of cross-sectional design

Much of the literature relating to emotion regulation in mania risk is reliant upon cross-sectional designs. A key limitation of these designs is that they do not allow for inferences on the direction of causation between factors (e.g., within correlational designs) or insight into timeframes over which effects occur (e.g., how long positive affect is experienced following a mood induction task). Despite this, cross-sectional designs are also considered useful for a number of reasons.

Most notably, these designs are advantageous as they facilitate assessment of relationships between multiple variables within a single data collection points that usually involves minimal burden to participants. Cross-sectional designs are particularly useful for examining stable trait-like measures, such as hypomanic personality, which generally do not fluctuate. Additionally, cross-sectional designs also present a useful starting point for exploratory investigations of relationships between variables. Cross-sectional designs are used in Studies 1 and 2 (Chapters 6 and 7). In order to address the limitations

associated with cross-sectional designs, the current programme of research also used prospective designs.

5.2.4 Use of prospective designs

Prospective designs involve data collection over a longer period, either in multiple snapshots closely grouped within a shorter time frame (i.e., experience sampling methods) or with follow-up points spread across weeks or months. Prospective designs generally allow for clearer identification of the direction of causation between variables, addressing some of the methodological limitations presented by cross-sectional investigations.

Experience sampling methods (ESM) are structured diary methods which involve multiple brief systematic self-reports throughout the course of normal daily life (Csikszentmihalyi & Larson, 2014). ESM recordings are typically made according to one of three main sampling protocols: event-contingent sampling, interval-contingent sampling, and signal-contingent sampling.

Within event-contingent sampling, participants make recordings each time a specific predetermined event occurs (e.g., driving a car). This method of sampling is useful when events of interest occur fairly infrequently, however, this also means that it is difficult for researchers to predict the number of recordings each participant will provide. Events of interest must also be clearly defined to ensure participants understand when recordings should be made. Interval-contingent sampling requires participants to record entries at fixed, predetermined times (e.g., morning, afternoon, and evening), however, detail of potential points of interest that occur between these time points are not recorded. Signal-contingent sampling requires participants to record entries in response to prompts sent by the researcher at pseudo random time-points within a

predetermined window (e.g., between 10 a.m. and 10 p.m.). This method is useful for gaining representative insight into behaviours and events that occur within participants' daily lives and is beneficial for reducing recall bias, as participants cannot predict when prompts will be sent. As the current research aimed to explore use of strategies across different contexts and proximal affective experiences, signal-contingent sampling was the most appropriate method for providing a varied overview of these processes. ESM has been used in previous research to investigate the course of mood symptoms, and use of emotion regulation strategies with people with bipolar disorder and those at mania risk (e.g., Gruber et al., 2013; Myin-Germeys et al., 2003; Sperry & Kwapil, 2017).

ESM is not without limitation. As prospective designs represent a greater commitment from participants, particularly in relation to ESM which requires multiple entries, they often suffer high attrition which can lead to biases within the final sample, and smaller sample sizes than typically seen in other designs. However, researchers are working to integrate participant-owned technologies, such as mobile phones (e.g., Bopp et al., 2010), as a means of data collection in place of more traditional formats, such as pen-and-paper diaries or palm-pilot devices to reduce participant burden. In Study 3 (Chapter 8), participants could choose to record their responses electronically, via their mobile phone, or in pen-and-paper format to allow for maximum flexibility for participants in an attempt to reduce attrition. Additionally, data analysis techniques commonly used with ESM data, such as multilevel modelling, can typically accommodate a moderate degree of missing data. Guidance recommends that each participant included in analysis should provide a minimum of 20 usable entries (Palmier-Claus et al., 2011), and a minimum of 835 entries across the total sample (Gabriel et al.,

2019). Despite these limitations, ESM is considered advantageous for a number of reasons.

The main strength of ESM is that findings are usually based on rich datasets, with multiple entries from each participant which allow for identification of potential patterns of behaviours. Additionally, ESM is considered to be high in ecological validity as measures of affect are situated within the contexts in which they occur. As entries are tied to specific time points, this also reduced the need for participants to recall specific events, a common limitation of cross-sectional investigations of emotion regulation and affect. ESM measures are used in study 2 to investigate how beliefs about emotion malleability relate to mania risk and mean use of emotion regulation strategies across a six-day period, and in Study 3 to explore how different social and situational contexts may influence associations between mania risk, use of strategies and momentary affect. Study 4 is an experimental study that features a short-term (1 week) and longer term (4 week) follow-up of affective outcomes.

In order to address some of the limitations posed by correlational designs, both cross-sectional and prospectively, the current research also utilised an experimental paradigm.

5.2.5 Experimental designs

Assessment of affective outcomes often relies on self-reports of naturally occurring mood states, however, it is also beneficial to be able to manipulate mood within experimental designs. Stimuli such as affective imagery (e.g., International Affective Picture System: Lang, Bradley, & Cuthbert, 1997) or film clips are frequently used to induce both positive and negative affect (e.g., Gruber et al., 2008). However, given the theoretical relevance of self-focused positive

affect to mania risk, the use of these mood induction tools, which are typically other-focused, is questioned. Efforts have been made to explore more immersive, self-focused means of influencing affect, for example, Ajaya and colleagues used a video game to induce anger relative to goal-frustration (Ajaya, Peckham, & Johnson, 2016). However, positive mood induction has not been explored in this way.

In Study 4, use of positive writing paradigms were explored as a tool to induce positive affect. Although originally developed as a well-being intervention (Pennebaker & Beall, 1986), positive writing paradigms have been shown to result in both immediate and longer-term increases in positive affect, suggesting potential utility as a mood induction paradigm. Additionally, as participants are typically prompted to writing about positive event they have experienced, they may be particularly useful for inducing self-focused positive affect. The prompts attached to writing tasks also offer an opportunity to explore contextual factors by manipulating the types of positive experiences participants are asked to write about. It is suggested that these factors make positive writing paradigms a potentially useful mood induction tool, particularly in the context of mania risk.

5.2.6 Online data collection

Throughout the thesis, data was collected online via Qualtrics surveys. Online data collection is increasingly common throughout the literature; however, it is associated with a number of limitations. Firstly, online studies typically experience a high number of incomplete responses, either because participants accidentally miss items, or they become bored and click away from the survey before completion. In order to reduce this, it is beneficial for researchers to use brief measures where possible and include features such as status bars so

participants can see how far they have progressed through the survey. Secondly, as researchers are not present, it is important that all scale items and instructions are presented clearly to avoid any potential confusion or ambiguity, which may reduce validity of responses. Despite these limitations, online data collection is also advantageous in a number of ways.

Firstly, online surveys are usually low cost to implement and allow for collection of a large volume of data within a relatively short period of time. Secondly, providing data online is typically more convenient for participants as they are able to complete online measures on their own devices at a time and place of their choosing, without the need to attend face-to-face sessions with researchers. This lack of face-to-face contact with researchers also means that data collection is generally anonymous which is beneficial when collecting potentially sensitive data, such as mood symptoms, and may help to reduce demand characteristic. Thirdly, online data collection is useful for reducing attrition, particularly in prospective designs involving multiple follow-up points. As researchers can immediately access data as it is provided, they can also identify where follow-ups may not have been completed and send participants reminder prompts to maximise response rate.

Finally, within ESM research, online methods may be useful in reducing participant burden. Typically, participants in ESM study complete entries via pen-and-paper diaries or palm pilot devices provided by researcher. However, recent efforts have been made to integrate participant owned technology (e.g., mobile phones) as a means of data collection. A feasibility study conducted by Bopp and colleagues (Bopp et al., 2010) assessed the use of text messaging as a means of collecting symptoms data from a sample of participants with bipolar disorder. Findings were comparable to those of more traditional ESM methods, with high

adherence to protocol across a 36-week period, supporting use of text messaging within ESM designs. Additionally, online positive writing interventions have been found to show comparable outcomes to traditional pen-and-paper formats (Allen, Wetherell, & Smith, 2020). Given these strengths, use of online data collection is justified within the current research.

5.3 Measures

5.3.1 Mania Risk

5.3.1.1 Hypomanic Personality Scale

Throughout all four empirical chapters (Chapter 6 to 9) behavioural mania risk was quantified using the Hypomanic Personality Scale. The original scale, developed by Eckblad and Chapman (1986), comprises 48 items scored as true (1) or false (0). Possible scores ranged from 0 to 48, with higher scores reflecting greater levels of hypomanic personality traits. Scores can be used to group with participants according to risk, with those scoring in the top decile being considered high-risk relative to the sample, and those scoring outside of this range being grouped as low-risk. However, through the literature it is typical for HPS scores to be used as a continuous variable. HPS is a reliable indicator of risk in young adults at the critical age of onset for bipolar disorder (i.e., 18 to 25; Waugh et al., 2014, see Section 5.2.2.2).

The current research made use of a brief 20-item measure of hypomanic personality (Appendix A) developed by Meads and Bentall (2008). Items such as *'I frequently find that my thoughts are racing'* and *'When I feel an emotion, I usually feel it with extreme intensity'* are scored using the same true-false dichotomy, with possible scores ranging from 0 to 20. This scale is valid for use

with young adults as a useful indicator of mania risk and had demonstrated good internal reliability ($\alpha = .80$; Meads & Bentall, 2008).

5.3.2 Emotion Regulation

5.3.2.1 Response to Positive Affect Scale

Tendencies to use of emotion regulation strategies was quantified using items from the Response to Positive Affect scale (RPA: Feldman et al., 2008). The scale was used throughout this programme of research as it was developed in the context of mania risk and bipolar disorder to explore use of strategies to both upregulate and downregulate positive affect. The original scale included 17 items, such as '*...think about how happy you feel*' and '*...think you don't deserve this*', rated on a 4-point scale from 1 (*almost never*) to 4 (*almost always*) based upon how frequently participants believe they respond to positive emotions in this way.

The RPA comprises of 3 subscales; Dampening (e.g., *think "I don't deserve this"*), Emotion-Focused Rumination (e.g., *think about how happy you feel*), and Self-Focused Rumination (e.g., *think about how proud you are of yourself*). Further factor analysis by Nelis et al. (2016) recommended combining emotion-focused and self-focused subscales into a single construct of positive rumination, resulting in a two-dimensional measure of positive affect regulation. The scale is valid and has demonstrated acceptable internal consistency ($\alpha = .69-.79$; Feldman et al., 2008).

In order to minimise participant burden as RPA items were administered multiple times in some instances (i.e., Studies 2 and 3) the number of items in the measure was reduced. Following recommendations for the minimum number of items per subscale (Hair, Anderson, Babin, & Black, 2010), the top 3 loading

items for each subscale (Feldman et al., 2008) were used, resulting in a 6-item composite measure of positive rumination and a 3-item measure of dampening, Appendix B. Subscales were totalled separately. Possible scores ranged from 6 to 24 for positive rumination, and 3 to 12 for dampening, with higher scores indicating greater use of those emotion regulation strategies.

In Study 2 (Chapter 7; McGrogan, Dodd, & Smith, 2020), scale instructions were adapted to reflect state use of these strategies in relation to situational contexts participants had briefly described. Although the RPA is typically a trait measure of emotion regulation, there is precedent of adapted versions of such measures being used to assess state use of strategies (e.g., Egloff, Schmukle, Burns, & Schwerdtfeger, 2006). In Study 3 (Chapter 8), RPA items were adapted to assess state use of emotion regulation strategies. Scoring labels were amended as 1 (*Not at all*), 2 (*A little*), 3 (*Quite a bit*) and 4 (*A lot*) to reflect the extent to which participants were currently using these strategies in response to momentary positive affect.

5.3.2.2 Ways Of Savoring Checklist

Chapters 4 to 6 include a measure of savouring as a more adaptive response to positive affect. Items were adapted from the Ways Of Savoring Checklist (WOSC: Bryant & Veroff, 2017). The top loading item was taken from three subscales which represent the most passive form of savouring positive events; Absorption (*I thought only about the present – got absorbed in the moment*), Counting blessings (*I reminded myself how lucky I was to have this good thing happen to me*), and Self-congratulating (*I thought about what a good time I was having*), resulting in a 3-item measure of savouring (Appendix C). Items were scored on a 5-item scale from 0 (Strongly disagree) to 4 (Strongly agree) based upon the extent to which participants felt that they responded to

positive emotions in this way. Possible scores range from 0 to 12, with higher scores indicating greater use of savouring.

As with the RPA, Studies 2 and 3 (Chapters 7 and 8) included a state measure of savouring. Scoring labels were amended to 0 (*Not at all*), 1 (*A little*), 2 (*Moderately*), 3 (*Quite a bit*) and 4 (*A lot*) to reflect the extent to which participants were currently savouring momentary positive affect.

5.3.3 Affect Outcomes

5.3.3.1 International Positive And Negative Affect Schedule – Short Form

Current affect was measured throughout using the 10-item international Positive and Negative Affect Schedule – short form (i-PANAS-sf: Thompson, 2007; *appendix D*). 5 positive affect words (e.g., *inspired* and *determined*) and 5 negative affect words (e.g., *upset* and *afraid*) are rated on a 5-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*) based upon the extent to which participants have experienced each emotion within the past few hours. Scores for the positive and negative subscales are totalled separately, with higher scores indicating higher levels of positive and negative affect.

Both subscales have been shown to have adequate internal reliability (positive affect $\alpha = .78$, negative affect $\alpha = .76$) and the whole measure shows good test-retest reliability ($\alpha = .84$; Thompson, 2007).

5.3.3.2 Altman Self-Rating Mania Scale

High mood symptoms were quantified throughout using the 5-item Altman Self-Rating Mania scale (ASRM: Altman, Hedeker, Peterson, & Davis, 1997; *Appendix E*). Symptoms are rated on a 5-point scale from 0 (e.g., I do not feel more self-confident than usual) to 4 (e.g., I feel extremely self-confident all of the

time) based upon participant's experience over the previous week. Possible scores range from 0 to 20, with scores of 6 or higher indicating high probability of manic or hypomanic states. ASRM is also widely used to assess high mood symptoms in young, healthy adults (e.g., Fisk et al., 2015; McEvoy et al., 2018). The scale has demonstrated good validity and test-retest reliability (Altman et al., 1997).

5.3.3.3 Centre for Epidemiological Studies – Depression Scale

Low mood symptoms were recorded in chapters 4 to 6 using the Centre for Epidemiological Studies – Depression scale (CES-D: Radloff, 1977, Appendix F). 20 items, such as '*I couldn't get "going"*' and '*I was bothered by things that don't usually bother me*' are rated on a 4-point scale from 0 (*Rarely or none of the time – less than 1 day*) to 3 (*Most or all of the time – 5-7 days*) based on the extent to which participants have experienced these symptoms over the past week. Possible scores range from 0 to 60, with higher scores indicating greater levels of low mood symptoms.

The scale is a reliable measure in populations with diagnosed depression ($\alpha = .64$; Radloff, 1977) and is appropriate for use with young, healthy adults (Radloff, 1991; Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

5.4 General Research Aims

5.4.1 Aim 1: Examine the potential moderating influence of use of emotion regulation strategies on the associations between mania risk and affective outcomes.

As discussed in Chapter 3 (McGrogan et al., 2019), previous research has identified associations between a) mania risk and use of emotion regulation strategies, b) mania risk and affective outcomes, and c) use of emotion regulation strategies and affective outcomes. However, the potential moderating effect of use of emotion regulation strategies on the relationship between mania risk and affect outcomes is widely under researched. It is suggested that such insight may help to further delineate if use of specific strategies is more problematic (i.e., associated with lower positive affect, higher negative affect, and subsyndromal high and low mood symptoms) for people higher in mania risk. This will help to identify cumulative risk factors that exacerbate mood difficulties, and therefore may be important for transition to first clinically significant mood episode, which in turn can inform the future development of early interventions for individuals experiencing mood difficulties.

In Study 2 (Chapter 7; McGrogan et al, 2020), these associations were explored cross-sectionally using trait measures of responses to positive affect, as well as novel state measures of positive rumination, dampening and savouring. These asked about use of strategies during real-life events participants recalled. Study 3 (Chapter 8) used an Experience Sampling Method to prospectively investigate associations between mean use of these emotion regulation strategies across a 6-day period with high and low mood symptoms on day 7, and momentary use of strategies with current positive and negative affect. Study

4 (Chapter 9) also used a prospective design to investigate relationships between trait tendencies to engage in positive rumination and dampening and changes in affective outcomes, using an experimental positive writing mood induction task. Change in positive and negative affect, and high mood from baseline were assessed at 1- and 4-week follow-up points.

It was expected that use of maladaptive responses to positive affect (i.e., positive rumination and dampening) would moderate the relationships between mania risk and affect outcomes, such that greater use of positive rumination would strengthen the positive associations between mania risk, positive affect and high mood symptoms, and the negative associations between mania risk, negative affect and low mood symptoms, while greater use of dampening would also strengthen the negative associations between mania risk, negative affect and low mood symptoms. It was also anticipated that use of adaptive strategies (i.e., savouring) would not be associated with mania risk and would therefore not moderate this relationship.

5.4.2 Aim 2: Explore associations between emotion malleability beliefs, mania risk, and use of positive emotion regulation strategies.

Previous research has suggested that endorsement of beliefs that emotions are malleable predicts use of adaptive responses to negative affect (e.g., De Castella et al., 2013; Tamir et al., 2007). However, in the context of psychopathology, these beliefs are also associated with maladaptive emotion regulation (Kneeland et al., 2016). Insight into how these beliefs relate to regulation of positive affect, specifically in the context of mania risk, is lacking. These associations were explored in Study 1 (Chapter 6) using a) a cross-sectional online survey to assess mania risk, general and personal beliefs about

emotion malleability, and trait tendencies to use positive rumination, savouring, and dampening, and b) a prospective design to investigate these factors in relation to state use of strategies across a six-day period.

It was anticipated that general and personal emotion malleability beliefs would be associated with greater use of positive rumination and savouring, both of which are considered adaptive in the general population, and less use of dampening. It was also expected that these beliefs would moderate the relationship between mania risk and use of emotion regulation strategies, such that endorsement of malleability beliefs would strengthen positive associations between mania risk and use of positive rumination and dampening, but not use of savouring.

5.4.3 Aim 3: Investigate the influence of using emotion regulation strategies in different social contexts on the relationships between mania risk and affect outcomes.

As outlined in section 4.2.3, social context has been found to influence the strategies people use in response to negative affect, and the affective outcomes associated with these, however regulation of positive affect has not yet been investigated in relation to different social contexts. Further, bipolar disorder and mania risk are also associated with less pro-social positive emotions when in the company of others (Bentall et al., 2011). It is therefore suggested that social context may be of particular relevance to regulation of positive affect for people at mania risk.

Associations between use of positive rumination, dampening, and savouring in different social contexts, and affective outcomes were investigated cross-sectionally in Study 2 (Chapter 7). Participants completed novel state

measures of tendencies to use these strategies in two self-selected social scenarios in which they experienced moderate or high intensity positive affect. In Study 3 (Chapter 8), a prospective experience sampling method (ESM) was used to explore relationships between use of strategies in social and non-social contexts, and momentary affect.

It was expected that social context would further moderate the associations between mania risk, emotion regulation, and affect, such that use of positive rumination and dampening, but not savouring, in non-social contexts would strengthen associations between mania risk and affect outcomes more than when used in social contexts.

5.4.4 Aim 4: Investigate the influence of using emotion regulation strategies in different situational contexts on the relationships between mania risk and affect outcomes.

Situational contexts have also been found to influence the implementation of emotion regulation strategies, see Section 4.2.4. Additionally, activating situations, particularly those pertaining to goal-attainment have been highlighted as relevant to bipolar disorder and mania risk, and are associated with persistence and elevated levels of positive affect, see Sections 2.3.2 and 2.3.3. It is therefore suggested that situational contexts may also be an important consideration when investigating emotion regulation and mania risk. Associations between use of positive rumination, dampening, and savouring were assessed cross-sectionally using an online survey in Study 2 (Chapter 7). Participants completed novel measures of state use of strategies (dampening, positive rumination, and savouring) in two goal-oriented scenarios in which they experienced moderate or high intensity positive affect. In Study 3 (Chapter 8),

associations between use of these strategies and momentary affect in active and passive situational contexts were explored using an ESM design. In Study 4 (Chapter 9), context-specific (i.e., goal-oriented) instructions were provided to participants in the experimental condition, to explore whether writing about specific contexts (goal-oriented positive events versus control positive events not related to goal-attainment) was more strongly associated with affective outcomes.

It was anticipated that use of positive rumination and dampening, but not savouring, in active or goal-oriented contexts would further moderate the relationships between mania risk and affect. It was expected that use of these strategies in goal-oriented contexts would strengthen associations between mania risk affective outcomes.

5.4.5 Exploratory Aims

5.4.5.1 Aim 5: Investigate associations between mania risk and use of language variables.

Previous research has identified links between personality traits, such as neuroticism, use of singular first-person pronouns, positive and negative emotion words in writing extracts, and outcomes. However, relationships between language variables and affect in the context of mania risk has yet to be explored. In Study 3 (Chapter 9), Linguistic Inquiry and Word Count analysis (Pennebaker, Francis, & Booth, 2001) was conducted on writing extracts produced by participants to assess associations between mania risk and these language variables. It was predicted that mania risk would be associated with greater use of singular first-person pronouns, and positive and negative affect words.

Chapter 6:

Study 1:

Are beliefs about emotion malleability
associated with mania risk and use of
positive emotion regulation strategies?

6.1 Abstract

Background: Endorsement of beliefs that emotions are malleable has been found to predict more adaptive regulation of negative affect and better well-being. However, in the context of psychopathology, emotion malleability beliefs are also related to greater maladaptive emotion regulation. Associations between beliefs and responses to positive affect have not yet been explored. Given the relevance of difficulties with positive emotion regulation to mania risk, it is suggested that investigating how beliefs may inform adaptive and maladaptive use of strategies (i.e., positive rumination, dampening, and savouring), in this context is warranted.

Aims: The current study therefore aimed to investigate if 1) general and personally relevant emotion malleability beliefs were associated with a) hypomanic personality and b) tendencies to use positive emotion regulation strategies, and 2) beliefs about emotion malleability moderate the relationships between hypomanic personality and use of emotion regulation strategies.

Study A: ($N = 255$, mean age = 20.98, $SD = 2.33$) explored associations between mania risk trait use of strategies, using a cross-sectional online survey. Hypomanic personality was not associated with emotion malleability beliefs. Both general and personal measures were positively associated with positive rumination and negatively associated with dampening. General beliefs were also positively correlated with savouring. However, these associations were not maintained when controlling for current affect.

Study B: ($N = 45$) investigated these associations with trait and state use of strategies, using a prospective Experience Sampling Method. Hypomanic personality was not associated with emotion malleability beliefs. Both general

and personal beliefs were positive associated with trait and state use of positive rumination, general beliefs were also positively correlated with state savouring. However, these associations were not maintained when controlling for baseline affect.

Discussion: Findings extend previous work on regulation of negative affect. Further work is needed to explore these associations, and their relationships with well-being, prospectively.

6.2 Introduction

The ability to effectively regulate mood is essential for emotional well-being, with affect dysregulation being a prominent feature of a number of conditions such as anxiety disorders, depression, and bipolar disorder, see Section 1.2.3. Much of the literature on emotion regulation has predominantly focused on responses to negative affect and their associations with low mood symptoms (e.g., Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010; Martin & Dahlen, 2005). Of the strategies commonly used in response to negative affect, those considered to be maladaptive, such as rumination (i.e., excessive and persistent thoughts about negative consequences of current mood state or personal situation), catastrophising (i.e., thoughts that amplify the most negative aspects of a situation) and risk-taking, are often strongly associated with low mood (e.g., Dempsey et al., 2011; Thomas & Bentall, 2002; see Section 1.2.1). Conversely, strategies believed to be adaptive, such as reappraisal (i.e., changing the manner of thinking about a situation to alter its emotional impact; Gross & Thompson, 2007) and problem solving, are often negatively associated with measures of low mood (e.g., Knowles et al., 2005).

More recently, attention has also been directed towards the strategies used to regulate positive affect and consequences that may arise from difficulties with this (Section 1.2.2). One particular area of interest is positive affect regulation in the context of mood disorders, such as bipolar disorder, where excessive positive affect may be problematic and give rise to increased high mood symptoms (Section 2.3; Gruber, 2011; Johnson, 2005a). Similar to those used in response to negative affect, positive emotion regulation strategies are also often conceptualised as being adaptive or maladaptive (Section 4.1). In non-clinical samples, use of positive rumination, a strategy used to actively upregulate and

intensify positive feelings by focusing on positive personal attributes and situational factors, is generally considered adaptive and is associated with greater well-being (i.e., greater positive affect, and less anxiety and depression symptoms; Li, Starr, & Hershenberg, 2017; Li et al., 2014; Ma, Bryant, & Hou, 2020). In this way, it is similar to savouring, a more passive means of attending to and appreciating positive affect without efforts to modify it, which is also associated with increased well-being (e.g., greater life-satisfaction, happiness, and self-esteem, and lower depression; Bryant, 2003; Section 1.2.2). However, in the context of bipolar disorder, use of positive rumination is often considered maladaptive and is associated with increased mood symptoms (e.g., Johnson, McKenzie, & McMurrich, 2008; Section 2.3), and savouring has not been investigated. Use of dampening, a cognitive emotion regulation strategy to reduce duration and intensity of positive mood states, is also purportedly maladaptive and predicts mood symptoms in individuals with bipolar disorder, while more adaptive strategies, such as cognitive reappraisal, typically do not (see Dodd et al., 2019 for a review of emotion regulation in bipolar disorder).

A similar pattern of positive affect dysregulation is seen in those considered to be at risk of developing bipolar disorder (see Chapter 3 for a systematic review of associations between emotion regulation and mania risk; McGrogan et al., 2019). Staging models of mania risk (e.g., Scott et al., 2016) highlight a number of factors which contribute to cumulative risk including age (peak age of on-set is between 18 and 25 years), genetic factors such as having a first-degree relative with diagnosed bipolar disorder, and behavioural factors such as elevated hypomanic personality traits, characterised by extremes of confidence and energetic behaviours, and emerging symptoms. Much of the literature on mania risk utilises behavioural measures of mania risk such as the

Hypomanic Personality Scale (Eckblad & Chapman, 1986; Section 5.3.2.2). Findings for relationships between emotion regulation, mania risk, and subclinical mood outcomes are often mixed. For example, a number of studies have found that tendencies to dampen positive affect are positively associated with high mood symptoms (e.g., Kelly et al., 2016; Olofsson et al., 2014), whereas others have found a negative association with high mood (e.g., Feldman et al., 2008). Similarly, research has found that use of positive rumination is associated with mania risk (e.g., Dempsey et al., 2011, Steel, 2016), while other findings suggest no association between these measures (e.g., Raes, et al., 2009). Low mood symptoms are also positively associated with use of dampening and negatively associated with positive rumination within non-clinical populations (e.g., Olofsson et al, 2014).

The distinction between emotion regulation strategies being either adaptive and helpful, or maladaptive and unhelpful, has been challenged, with some suggesting that most strategies cannot be clearly defined as always (mal)adaptive (e.g., Aldao, 2013; Bonanno & Burton, 2013). Mixed findings regarding the effect of certain emotion regulation strategies on current affect, mood symptoms and mania risk may be explained by a lack of consideration of moderators of the association between emotion regulation strategy use and mania risk, rather than a maladaptive-adaptive distinction between strategies, see Section 4.1. One such factor that has been identified as a potential moderator is the beliefs individuals hold about their ability to control their emotions (e.g., Gross & Thompson, 2007). The Integrative Cognitive Model of mood swings (ICM: Mansell et al., 2007; Section 2.3.4) also highlights beliefs about emotions as a factor to be considered when assessing responses to emotion-eliciting triggers. The model suggests that an individual's underlying beliefs about their

internal states, including level of arousal and affect, inform whether they appraise changes to affect as either positive or problematic. This in turn influences subsequent ways of regulating affect, including emotion regulation strategies. The interaction between appraisals and cognitive or behavioural responses is central to understanding the development of mood dysregulation, characteristic of bipolar disorder and mania risk. A body of research has found links between appraisals, use of emotion regulation strategies, and mood symptoms in populations with bipolar disorder and those at mania risk (see Kelly et al., 2017 for a review).

Beliefs about emotion malleability, also referred to as implicit theories or beliefs (Dweck, 1999), are the attitudes that individuals hold regarding the extent to which they believe mood states can be modified. It is suggested that implicit beliefs about emotions are predictive of the attributions individuals make about their ability to regulate, and the motivation they display to engage in effortful self-regulating behaviours when faced with challenging situations (Section 4.2.1). These beliefs are typically delineated into two categories; those that suggest that emotions are dynamic and changeable (incremental theories) and those that suggest emotions are fixed (entity theories; Tamir et al., 2007). Incremental theories relate to greater endorsement of beliefs that emotions are malleable, while entity theories reflect less of these beliefs. Less endorsement of emotion malleability beliefs has been associated with decreased well-being, greater anxiety and depression symptoms, and increased feelings of isolation from peers, both cross-sectionally and longitudinally in student samples (Manser et al., 2012; Tamir et al., 2007; De Castella et al., 2013). It has been suggested that links between lower emotion malleability beliefs and low mood are a result of feelings of disengagement and perceived weakness in response to feelings that emotions

are outside of an individual's control and cannot be improved (Hong et al., 1999; Ommundsen et al., 2005; Rhodewalt, 1994).

A review by Kneeland and colleagues also highlighted links between emotion malleability beliefs and psychopathology (Kneeland et al., 2016). It is suggested that greater endorsement of beliefs that emotions are fixed, and therefore uncontrollable, is associated with the development and maintenance of disorders such as depression and social anxiety disorder (e.g., Hofmann & Barlow, 2002; Leahy, 2002). However, greater malleability beliefs may also be detrimental for some, for example in the context of general anxiety disorder, which is characterised by fear of loss of control over emotions (e.g., Mennin, Heimberg, Turk, & Fresco, 2005; Roemer, Salters, Raffa, & Orsillo, 2005); beliefs that emotions are malleable are also associated with greater attempts to control mood. Given the relevance of fluctuations in affect, the same associations may also be apparent for people at risk of mania. Emotion malleability beliefs are also influential in the efficacy of therapeutic interventions for psychopathology. For example, cognitive behavioural therapy (CBT) for social anxiety disorder promotes adoption of beliefs that emotions can be controlled. Greater endorsement of these beliefs is also associated with better treatment outcomes following CBT, both immediately and at a 12-month follow-up (De Castella et al., 2014).

The role of emotion malleability beliefs in emotion regulation has also been investigated. It is proposed that individuals who hold beliefs that emotions are malleable engage in greater use of antecedent emotion regulation strategies, such as reappraisal, which are typically associated with better well-being, while individuals who believe emotions are fixed typically engage in response-focused strategies, such as rumination or suppression (Gross, 2008; Tamir et al., 2007).

This hypothesis has been supported by research findings that lower emotion malleability beliefs were associated with less engagement in reappraisal in response to negative affect, which in turn partially explained the relationship between malleability beliefs and reduced well-being (De Castella et al., 2013). In experimental designs that manipulated emotion malleability beliefs prior to negative mood inductions, those in the malleable conditions reported greater use of both purportedly adaptive strategies (e.g., reappraisal) and maladaptive strategies, such as self-blame, than those in fixed conditions (Kneeland et al., 2016a; Kneeland et al., 2016b). Additionally, greater use of reappraisal in the fixed condition was associated with a greater decrease in positive affect, suggesting that malleability beliefs may moderate the relationships between use of emotion regulation strategies and affect (Kneeland, et al., 2016a). Taken together, these studies suggest that greater malleability beliefs can be linked to greater engagement in maladaptive emotion regulation strategies as well as adaptive strategies, but that the combination of greater malleability beliefs and adaptive emotion regulation has a positive influence on well-being. In the context of psychopathology, lower emotion malleability beliefs are associated with greater use of maladaptive, response-focused emotion regulation strategies. Use of these strategies is also typically associated with reduced well-being and mood difficulties, further perpetuating beliefs that emotions are outside of the persons control (e.g., Leahy, 2002).

Theory suggests that personally-relevant beliefs individuals hold about emotion malleability (i.e., to what extent they believe their *own* emotions are malleable) would be a more reliable predictor of their likelihood to engage in effortful emotion regulation than their beliefs about how malleable emotions are more generally (i.e., to what extent they believe *everyone's* emotions are

malleable; Tamir et al., 2007). In support of this hypothesis, lower endorsement of personal emotion malleability beliefs was more strongly associated with lower use of reappraisal and negative well-being outcomes than general emotion malleability beliefs (De Castella et al., 2013).

To date, most of the research regarding beliefs about emotions has focused on responses to negative affect. However, a recent study found that beliefs that *positive* emotions downregulate on their own were negatively associated with maladaptive responses to positive affect (i.e., dampening), high mood symptoms, and mania risk (Dodd, Gilbert, & Gruber, 2020). As emotion malleability beliefs are related to adaptive regulation of negative affect, it is possible that a similar association may be evident for responses to positive affect, such that beliefs that emotions are malleable would be associated with greater use of purportedly adaptive strategies (i.e., positive rumination and savouring) and less use of maladaptive responses, such as dampening. Given the relevance of beliefs about emotion malleability to the development of mood dysregulation, as highlighted by the ICM (Mansell et al., 2007), these beliefs may moderate the association between positive emotion regulation strategies and mania risk. It may therefore be the case that for individuals higher in mania risk, who typically experience greater emotion dysregulation, malleability beliefs may be associated with increased use of maladaptive strategies. In the context of mania risk, positive rumination would be considered maladaptive and is associated with high mood symptoms (e.g., Johnson et al., 2008), whereas in the general population it is considered adaptive and associated with improved well-being (Olofsson et al., 2014). Further, as the ICM (Mansell et al., 2007) emphasises *personally-relevant* beliefs about internal states, personal emotion malleability beliefs would be expected to be more pertinent than general emotion malleability beliefs.

Investigating these associations could contribute to psychological models that identify factors linked to mood difficulties in high-risk groups, and could inform early intervention for individuals for whom positive affect regulation may be problematic.

In line with research aim 2 (Section 5.4.2) the current study set out to investigate if 1) general and personally relevant emotion malleability beliefs were associated with a) hypomanic personality and b) tendencies to use positive emotion regulation strategies, and 2) beliefs about emotion malleability moderate the relationships between hypomanic personality and use of emotion regulation strategies. Study A assessed these relationships with measures of trait tendencies to engage in these strategies, while Study B included state use of strategies across a six-day period.

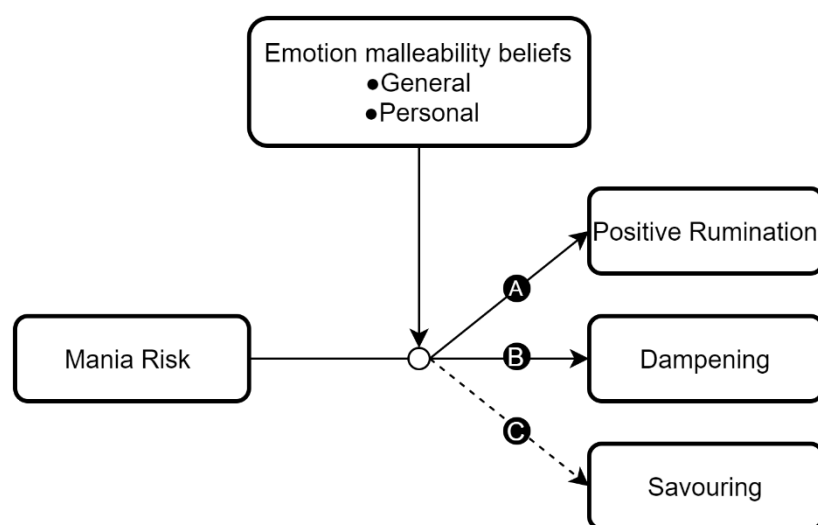


Figure 6.1: Predicted Moderations between Mania Risk, Emotion Malleability Beliefs, and Use of Emotion Regulation Strategies

It was hypothesised that general and personal emotion malleability beliefs would moderate the relationship between hypomanic personality and use of emotion regulation strategies, such that greater endorsement of these beliefs when hypomanic personality is high would be positively associated with a) positive rumination, b) dampening, but not c) savouring (Figure 6.1).

6.3 Study A

6.3.1 Method

6.3.1.1 Participants

Participants were recruited as part of a larger study (Study 2, Chapter 7) and were obtained from a self-selected sample of respondents to social media advertisements and recruitment posters displayed around Northumbria University campus. Recruitment posts stated the following inclusion criteria: aged 18 to 25 years, no current diagnosis of mood disorder, and good understanding of written English. Psychology undergraduate students received course credits as compensation for their time and all participants were entered into a prize draw.

Three hundred and nine participants accessed the survey, 54 were removed due to incomplete responses. A sample of 255 participants (mean age = 20.98, SD = 2.33) provided sufficient data for analysis. Of this sample 78.8% reported their gender as female, 20% male, 0.4% as other, and 0.8% preferred not to say. 88.2% described their ethnicity as white, 1.6% as Black, 7.1% as Asian, 2.4% as mixed, and 0.8% as other. 84% were students (2.4% part-time), 14.1% were employed (6.7% part-time) and 2% unemployed.

6.3.1.2 Materials

6.3.1.2.1 *Demographics*

Demographic information (age, gender, occupation, and ethnicity) was recorded using an in-house questionnaire.

6.3.1.2.2 *Mania Risk*

Hypomanic Personality Scale

Mania risk was quantified using the 20-item Hypomanic Personality Scale (HPS-20: Meads & Bentall, 2008; Appendix A).

6.3.1.2.3 *Emotion Malleability Beliefs*

General beliefs about emotion malleability were measured using the Implicit Beliefs about Emotion Scale (IBEM: Tamir et al., 2007; Appendix G). The scale contains two items measuring incremental beliefs – *‘If they want to, people can change the emotions that they have’* and *‘Everyone can learn to control their emotions’* and two items measuring entity beliefs – *‘No matter how hard they try, people can’t really change the emotions that they have’* and *‘The truth is, people have very little control over their emotions’*. Items were rated on a 5-point scale from 5 (*strongly agree*) to 1 (*Strongly disagree*). Entity theory items were reverse scored, and the scale averaged, with higher scores reflecting greater endorsement of incremental beliefs and lower scores indicating entity beliefs of emotions.

Personal beliefs about emotion malleability were assessed using an adapted version of the original scale (De Castella et al., 2013; Appendix H). Items are revised to reflect personally relevant views about the extent to which emotions can be controlled. The scale comprises two items measuring personal incremental beliefs – *‘I can learn to control my emotions’* and *‘If I want to, I can change the emotions that I have’* and two items measuring personal entity beliefs – *‘No matter how hard I try, I can’t really change the emotions that I have’* and *‘The trust is, I have very little control over my emotions’*. Items were rated on a 5-point scale from 5 (*Strongly agree*) to 1 (*Strongly disagree*). Personal entity theory items were reverse scored, and the scale averaged. With higher scores reflecting

greater endorsement of personal incremental beliefs and lower scores indicating personal entity beliefs. Personal views have been found to be more indicative of emotion regulation deficits than general views.

Both scales were used as continuous variables, consistent with previous research (e.g., De Castella et al., 2013, Tamir et al., 2007, Robins & Pals, 2002). Throughout, greater malleability beliefs refer to greater endorsement of incremental beliefs (i.e., beliefs that emotions are malleable), while lower malleability beliefs refer to endorsement of entity beliefs (i.e., emotions are not malleable), either general (Tamir et al., 2007) or personal (De Castella et al., 2013).

6.3.1.2.4 *Emotion regulation strategies*

Response to Positive Affect Scale

Use of emotion regulation strategies was measured using 9 items from the Response to Positive Affect Scale (RPA: Feldman et al., 2008; see Chapter 3 and Appendix B).

Ways of Savouring Checklist

Use of savouring was quantified using 3 items adapted from the Ways of Savoring Checklist (WOSC: Bryant & Veroff, 2017; Appendix C).

6.3.1.2.5 *Affective measures*

Positive and Negative Affect Scale

Current affect was measured using the 10-item International Positive and Negative Affect Schedule – Short Form (i-PANAS-sf: Thompson, 2007; Appendix D)

Altman Self-Rating Mania Scale

Current high mood symptoms were recorded using the 5-item Altman Self-Rating Mania Scale (ASRM: Altman et al., 1997; Appendix E).

Center for Epidemiological Studies – Depression Scale

Current low mood symptoms were recorded using the 20-item Center for Epidemiological Studies – Depression Scale (CES-D: Radloff, 1977; Appendix F).

6.3.1.3 Procedure

Ethical approval was obtained from the Department of Psychology at Northumbria University. Data was collected between May 2018 and February 2019. The survey was accessible on any internet-enabled device via direct links contained in recruitment adverts. Informed consent was obtained electronically, and participants were required to generate a unique code word which was then associated with their individual data set in place of any identifying information to ensure confidentiality. The survey also contained measures not included in this analysis (presented in Study 2, Chapter 7). Upon completion of the survey, participants were fully debriefed.

6.3.1.4 Design and Analysis

Using a cross-sectional correlational design, this study explored relationships between general and personal emotion malleability beliefs and tendencies to use positive emotion regulation strategies, while controlling for current affect as a potential confound.

Power calculation was based on 9 predictors. These were hypomanic personality (HP), personal and general beliefs about emotion malleability (IBEM), and interaction terms HP x general IBEM, and HP x personal IBEM. Affective

outcomes (positive and negative affect, low and high mood symptoms) were also included as potential confounds. To detect a medium effect, G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) recommended a minimum sample size of $N = 114$.

Data were analysed using IBM SPSS Statistics 25. In instances where participants had two or fewer values missing on the HPS or CES-D, expectation maximisation was used to impute values. Participants with missing data on other scales were removed from analysis.

Pearson's correlations were conducted to investigate relationships between hypomanic personality, beliefs about emotion malleability, affective outcomes, and use of emotion regulation strategies.

A series of multiple regressions were conducted, using 1000 sample bootstrapping, to assess if hypomanic personality, general and personal beliefs about emotion malleability, and the two-way interactions between these variables predicted use of emotion regulation strategies, while controlling for affective measures. Separate analyses were performed for each emotion regulation strategy (positive rumination, dampening, and savouring). Variables were added as potential predictors if they were significantly correlated with the outcome being tested in that model. For each model, the assumption of no multicollinearity was satisfied, all tolerance statistics were $>.02$ and variance inflation factors were not substantially >1 (Field, 2013).

6.3.2 Results

Before analysis, the distributions of all scales were examined. HPS (skewness statistic = .20, SE = .15), ASRM (skewness statistic = .54, SE = .15) and CES-D (skewness statistic = .76, SE = .15) were positively skewed. As the

distribution of these variables reflected the expected population level distribution (i.e., few participants from a non-clinical sample would be likely to score highly on measures of mania risk and exhibit both clinically significant levels of high and low mood) and correlational analyses are robust with respect to skew, variables were not transformed prior to analysis.

Descriptive statistics are displayed in Table 6.1.

Table 6.1: Descriptive Statistics for Mania Risk, Mood Symptoms, Emotion Malleability Beliefs and Emotion Regulation Strategies from Study A.

	Mean	SD	Min	Max	α
Hypomanic Personality	8.12	4.03	0	18	.76
Positive Affect	13.63	4.54	5	25	.78
Negative Affect	9.12	4.09	5	25	.77
High Mood (ASRM)	5.45	3.53	0	16	.78
Low Mood (CES-D)	20.57	11.67	0	54	.90
General Emotion Malleability Beliefs	3.28	0.85	1	5	.78
Personal Emotion Malleability Beliefs	3.33	0.90	1	5	.85
Positive Rumination	14.08	3.75	6	24	.79
Dampening	6.60	2.33	3	12	.67
Savouring	8.12	2.24	1	12	.50

6.3.2.2 Associations between hypomanic personality, beliefs about emotion malleability, affect, and use of emotion regulation strategies.

Hypomanic personality was positively correlated with positive and negative affect, and low and high mood symptoms, but was not associated with either general or personal emotion malleability beliefs.

Table 6.2 displays further Pearson's correlations between emotion regulation strategies and hypomanic personality, beliefs about emotion malleability, and affect measures.

Table 6.2: Correlations between Mania Risk, Affective Measures, Emotion Malleability Beliefs and Emotion Regulation Strategies from Study A.

	Positive Rumination	Dampening	Savouring
	<i>r</i>	<i>r</i>	<i>r</i>
Hypomanic Personality	.20**	.28**	.11
Positive Affect	.42**	-.03	.14*
Negative Affect	.04	.43**	.01
High Mood	.34**	-.001	.12
Low Mood	-.14*	.48**	-.10
General Emotion Malleability Beliefs	.17**	-.19**	.13*
Personal Emotion Malleability Beliefs	.14*	-.31**	.10
Positive Rumination	--	-.08	.39**
Dampening	--	--	-.07

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

6.3.2.2.1 *Positive Rumination*

Tendencies to use positive rumination were positively associated with hypomanic personality, current positive affect, and high mood. Use of positive rumination was also positively correlated with low mood.

Table 6.3 displays regression analysis between hypomanic personality, beliefs about emotion malleability, affect measures and emotion regulation strategies. Within regression analysis, hypomanic personality and both general and personal emotion malleability beliefs were entered as potential predictors, while controlling for positive affect, and high and low mood, as these were all correlated with positive rumination. Current positive affect ($\beta = .28$, $p < .001$) and high mood symptoms ($\beta = .19$, $p = .01$) were significant positive predictors of positive rumination. Low mood, mania risk, and emotion malleability beliefs were not significant within the model. As hypomanic personality and emotion

malleability beliefs were not both uniquely associated with positive rumination when controlling for current affect, moderation analysis was not conducted.

Table 6.3: Regression Analysis for Mania Risk, Affective Measures, Emotion Malleability Beliefs, and Emotion Regulation Strategies from Study A

<u>Predictor</u>	Positive Rumination			Dampening			Savouring		
	β	SE	<i>t</i>	β	SE	<i>t</i>	β	SE	<i>t</i>
Hypomanic Personality	.07	.06	1.17	.09*	.03	2.71	--	--	--
Positive affect	.28**	.05	5.32	--	--	--	.06	.03	1.97
Negative affect	--	--	--	.12*	.04	3.07	--	--	--
High mood	.19*	.07	2.69	--	--	--	--	--	--
Low mood	-.01	.02	-0.23	.05**	.01	3.72	--	--	--
General Emotion Malleability Beliefs	.71	.41	1.73	.04	.24	0.19	.26	.17	1.60
Personal Emotion Malleability Beliefs	-.47	.42	-1.14	-.30	.24	-1.22	--	--	--

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

6.3.2.2.2 *Dampening*

Tendencies to dampen positive affect were positively correlated with hypomanic personality, current negative affect, and low mood. Dampening was negatively associated with general and personal emotion malleability beliefs.

Within regression analysis, hypomanic personality, and general and personal emotion malleability beliefs were entered as potential predictors, while controlling for negative affect and low mood. Hypomanic personality ($\beta = .09$, $p = .01$) and low mood symptoms ($\beta = .05$, $p < .01$) were significant positive predictors of use of dampening. Negative affect and emotion malleability beliefs were not significant within the model. As hypomanic personality and emotion malleability beliefs were not both uniquely associated with dampening when controlling for affect, moderation analysis was not conducted.

6.3.2.2.3 *Savouring*

Tendencies to savour positive affect were positively correlated with current positive affect and general emotion malleability beliefs.

Within regression analysis, current positive affect and general emotion malleability beliefs were entered as potential predictors. The relationship between positive affect and use of savouring was approaching significance ($\beta = .06$, $p = .05$). General emotion malleability beliefs were also not significant within the model.

6.3.3 Study A Discussion

In line with expectations, hypomanic personality was positively associated with positive rumination and dampening, and not associated with savouring. These findings support literature which suggests that mania risk is related to maladaptive emotion regulation, but not use of adaptive strategies, such as savouring (e.g., Steel, 2016).

In relations to emotion malleability beliefs, both general and personal measures were positively associated with positive rumination and negatively associated with dampening. General beliefs were also positively correlated with savouring. These findings are in line with research relating to regulation of negative affect, which suggests that greater endorsement of beliefs that emotions are malleable positively predicts use of adaptive strategies, and negatively predicts maladaptive emotion regulation. Previous research also suggests that personal beliefs are more indicative of regulatory behaviours than general measures (De Castella et al., 2013). While this was true for dampening, general beliefs were more strongly correlated with positive rumination than personal beliefs were. However, associations between beliefs and use of strategies were not maintained when controlling for current affect. Additionally, as mania risk and emotion malleability beliefs were not associated with use of these strategies when

controlling for current affect, the potential moderating relationship between these factors were not explored.

6.4 Study B

6.4.1 Method

6.4.1.1 Participants

Participants were recruited as part of an Experience Sampling Methods (ESM) study (Study 3, Chapter 8) using social media advertisements and recruitment posters displayed around Northumbria University campus. Recruitment posts stated the following inclusion criteria: aged 18 to 25, no current diagnosis of mood disorders, good understanding of written English, and access to an internet enabled smart phone. Participants were compensated with £10 in Amazon vouchers.

A self-selected sample of 45 participants (mean age = 20.31, SD = 2.19) provided sufficient data for analysis. Of this sample, 66.7% described their gender as female, and 33.3% as male. 80% describes their ethnicity as White, 2.2% as Black, 4.4% as Asian, 8.9% as Mixed, and 4.4% as Other. 88.9% were student (2.2% part-time) and 11.1% were employed (6.7% part-time).

6.4.1.2 Materials

This study comprised of an initial online survey and a 6-day ESM diary, hosted by Qualtrics. HPS, IBEM, PANAS, ASRM, and CES-D were the same as Study A.

6.4.1.2.1 *Emotion Regulation*

Trait use of strategies was recorded using the same 9 items from the RPA and 3 items from the WOSC as in Study A. State emotion regulation was also

measured using these items in a 6-day ESM diary, in which participants reported the extent to which they were using each strategy in the moment.

6.4.1.3 Procedure

Ethical approval was obtained from the Department of Psychology at Northumbria University. Data was collected between October 2018 and November 2019. Participants accessed an initial survey, comprising demographic information, hypomanic personality scale, general and person emotion malleability beliefs scales, and trait emotion regulation. Following the initial survey, participants completed a 6-day ESM diary, in which they were prompted via text message to recording current use of emotion regulation strategies, in either pen-and-paper or online diaries. Text message prompts, containing direct links to online diaries, were sent at 6 pseudo random time points between 10 a.m. and 10 p.m., with a minimum of 1 hour and maximum of 4 hours between each alert. Participants were instructed to complete entries within 15 minutes of receiving the text alert. Each entry also contained measures not included in this analysis (presented in Chapter 8). Participants were debriefed following completion.

6.4.1.4 Design and Analysis

Using a prospective design, this study investigated if baseline emotion malleability beliefs and hypomanic personality predict use of positive emotion regulation strategies over time, while controlling for baseline affect. This study was based on exploratory analysis of data collected within Study 3 (Chapter 8). State use of each emotion regulation strategy was averaged across the ESM period to create mean state scores for positive rumination, dampening, and savouring.

Pearson's correlations were conducted to explore associations between hypomanic personality, beliefs, affective outcomes, and trait and state use of emotion regulation strategies. Similar to Study A, a series of multiple regressions were conducted, using 1000 sample bootstrapping. Separate analyses were conducted for trait and state measures of each strategy (positive rumination, dampening, and savouring). Hypomanic personality and emotion malleability beliefs and affective outcomes were entered as potential predictors if there were significantly correlated with the outcome being tested in that model.

6.4.2 Results

Descriptive statistics are displayed in Table 6.4.

Table 6.4: Descriptive Statistics for Mania Risk, Mood Symptoms, Emotion Malleability Beliefs and Emotion Regulation Strategies from Study B

	Mean	SD	Min	Max	α
Hypomanic Personality	7.29	4.49	0	16	.80
Positive Affect	14.58	4.20	5	22	.84
Negative Affect	7.69	2.87	5	17	.66
High Mood	4.84	3.48	0	12	.70
Low Mood	16.04	9.89	1	42	.91
General Emotion Malleability Beliefs	3.39	0.95	1.50	5	.82
Personal Emotion Malleability Beliefs	3.59	0.84	1.75	5	.84
Trait Positive Rumination	13.58	3.82	6	23	.84
Trait Dampening	6.13	2.15	3	12	.69
Trait Savouring	7.87	2.26	2	12	.42
State Positive Rumination	10.47	2.72	6.20	17.65	
State Dampening	4.29	0.90	3.07	6.21	
State Savouring	4.13	2.22	0.17	9.29	

6.4.2.1 Associations between hypomanic personality, beliefs about emotions malleability, affect, and use of emotion regulation strategies.

Hypomanic personality was positively correlated with baseline negative affect and low mood, but not associated with general or personal emotion malleability beliefs. Table 6.5 displays Pearson's correlations between hypomanic personality, emotion malleability beliefs, emotion regulation strategies (trait and state use across time) and affect measures.

Table 6.5: Correlations between Mania Risk, Affective Measures, Emotion Malleability Beliefs and Emotion Regulation Strategies from Study B

	Trait Positive Rumination <i>r</i>	Trait Dampening <i>r</i>	Trait Savouring <i>r</i>	State Positive Rumination <i>r</i>	State Dampening <i>r</i>	State Savouring <i>r</i>
Hypomanic Personality	.31 [*]	.44 ^{**}	.28	.32 [*]	.27	.22
Positive Affect	.34 [*]	-.05	.38 ^{**}	.39 ^{**}	.12	.39 ^{**}
Negative Affect	.17	.37 [*]	.01	.15	.33 [*]	.17
High Mood	.42 ^{**}	.11	.30 [*]	.34 [*]	.31 [*]	.38 ^{**}
Low Mood	-.09	.52 ^{**}	-.12	.01	.25	.07
General EMB	.35 [*]	-.17	.19	.41 ^{**}	.01	.34 [*]
Personal EMB	.31 [*]	-.23	.24	.32 [*]	-.07	.26
Trait Positive Rumination	--	-.08	.60 ^{**}	.67 ^{**}	.34 [*]	.58 ^{**}
Trait Dampening	--	--	-.07	-.15	.31 [*]	-.17
Trait Savouring	--	--	--	.45 ^{**}	.21	.50 ^{**}
State Positive Rumination	--	--	--	--	.42 ^{**}	.85 ^{**}
State Dampening	--	--	--	--	--	.40 ^{**}

EMB = Emotion Malleability Beliefs

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

6.4.2.1.1 Positive Rumination

Trait tendencies to engage in positive rumination were positively associated with hypomanic personality, baseline positive affect and high mood. Positive rumination was also positively correlated with general and personal emotion malleability beliefs.

Table 6.6 displays regression analysis between hypomanic personality, beliefs about emotion malleability, baseline affect measures, and use of emotion regulation strategies.

Table 6.6: Regression Analysis for Mania Risk, Affective Measures, Emotion Malleability Beliefs, and Emotion Regulation Strategies from Study B.

Predictor	Trait Positive Rumination			State Positive Rumination			State Savouring		
	β	SE	t	β	SE	t	β	SE	t
Hypomanic Personality	.19	.12	1.67	.13	.06	1.57	--	--	--
Positive Affect	.16	.13	1.23	.15	.09	1.63	.16*	.07	2.23
High Mood	.40*	.15	2.62	.19	.11	1.70	.18	.09	2.06
General Emotion Malleability Beliefs	.13	.89	0.15	.63	.64	0.98	.46	.32	1.42
Personal Emotion Malleability Beliefs	.85	.98	0.87	.17	.70	0.24	--	--	--

* $p < .05$

Within regression analysis, hypomanic personality, and general and personal emotion malleability beliefs were entered as potential predictors, while controlling for positive affect and high mood. High mood symptoms were the only significant positive predictor of trait positive rumination, $\beta = .40$, $p = .01$. As hypomanic personality and emotion malleability beliefs were not both uniquely associated with positive rumination when controlling for affect, moderation analysis was not conducted.

State use of positive rumination was also positively correlated with hypomania personality, baseline positive affect and high mood, and general and personal emotion malleability beliefs.

Within regression analysis, hypomanic personality, and general and personal emotion malleability beliefs were entered as potential predictors, while controlling for positive affect and high mood. None of these factors were significant predictors of state use of positive rumination. As hypomanic personality and emotion malleability beliefs were not uniquely associated with positive rumination when controlling for affect, moderation analysis was not conducted.

6.4.2.1.2 Dampening

Trait tendencies to dampen were positively correlated with hypomanic personality, baseline negative affect and low mood. State use of dampening was

positively correlated with baseline negative affect and high mood. As neither of these outcomes were associated with emotion malleability beliefs, follow-up regression analyses were not conducted.

6.4.2.1.3 *Savouring*

Trait tendencies to savour were positively correlated with baseline positive affect and high mood. As trait savouring was not associated with emotion malleability beliefs, follow-up regression analysis was not conducted for this outcome.

State use of savouring was positively correlated with baseline positive affect and high mood, and general emotion malleability beliefs.

Within regression analysis, general emotion malleability beliefs were entered as a potential predictor, while controlling for positive affect and high mood. Positive affect was a significant predictor ($\beta = .16, p = .03$), the relationship between high mood and state use of savouring was also approaching significance, $\beta = .18, p = .05$. General emotion malleability beliefs were not significant within the model.

6.4.3 Study B Discussion

Within this study, hypomanic personality was positively associated with trait positive ruminations and dampening, and not associated with savouring. Hypomanic personality was also positively correlated with state positive rumination, but not state dampening. While it was anticipated that state dampening would also be correlated with mania risk, this null finding may be the result of a small sample, previous literature suggests effect sizes for associations between mania risk and positive rumination are generally larger than those for

dampening (e.g., McGrogan et al., 2019), therefore the sample in this study may not have been sufficient to detect these smaller effects.

Greater endorsement of general and personal emotion malleability beliefs were positively related to both trait and state positive rumination. General beliefs were also positively correlated with state use of savouring; however these associations were not maintained when controlling for affect. As mania risk and beliefs were not associated with use of strategies when controlling for affect, moderations were not explored.

6.5 Discussion

Beliefs about emotion malleability have been found to be associated with greater use of both adaptive and maladaptive responses to negative affect and subsequent well-being outcomes (e.g., Tamir et al., 2007; De Castella et al., 2013; Kneeland et al., 2016b). However, research in the context of responses to positive affect is lacking, despite the theoretical relevance of positive affect dysregulation to well-being and psychopathology, such as risk of bipolar disorder. The current studies therefore aimed to investigate 1) associations between general and personal emotion malleability beliefs and use of positive emotion regulation strategies, and 2) if emotion malleability beliefs moderated the relationships between mania risk and use of these strategies.

Firstly, in support of previous findings mania risk was positively associated with greater propensity to engage in positive rumination and dampening, and not related to use of savouring in both studies (e.g., Feldman et al., 2008; Steel, 2016). In Study B, mania risk was also positively associated with state positive rumination, but not state dampening. However, as discussed above, this may be the result of a small sample.

This study is the first to consider the relationship between emotion malleability beliefs and responses to positive affect. As anticipated, greater endorsement of emotion malleability beliefs was associated with greater propensity to engage in trait and state savouring and positive rumination. Also, as expected, beliefs were negatively associated with tendencies to dampen positive affect in Study A. This association was not observed in Study B, but this may also be a function of a small sample. These findings are in line with previous research relating to regulation of negative affect, which suggests that endorsement of malleability beliefs related to greater use of adaptive strategies to upregulate mood, such as cognitive reappraisal, which are also associated with increased positive affect (e.g., Andreotti et al., 2013).

Similarly, lower endorsement of malleability beliefs is related to psychopathology, including anxiety and depression (Manser et al., 2012), and these outcomes are also associated with tendencies to dampen positive emotion (e.g., Raes, Smets, Nelis, & Schoofs, 2012). However, in this study, emotion malleability beliefs were not associated with mania risk, and as there were no emotion regulation strategies with significant relationships with both mania risk and emotion malleability beliefs, this suggests there was no moderating influence of emotion malleability beliefs on the association between mania risk and tendencies to use dampening, positive rumination, or savouring.

Additionally, previous research suggests that personally-relevant malleability beliefs are more strongly associated with use of emotion regulation strategies than general beliefs (De Castella, 2013), however findings within the current study were mixed. Tendencies to dampen were more strongly associated with personal than general beliefs, while the opposite was observed for trait and state use of positive rumination, with general beliefs being more strongly related

to these strategies than general. Savouring was only associated with measures of general beliefs. These findings suggest that use of maladaptive positive affect regulation strategies may be more strongly associated with personal beliefs, while use of adaptive responses may be more strongly related to beliefs about emotions more generally. Findings from this study support and extend those of previous research, however, emotion malleability beliefs were no longer associated with use of emotion regulation strategies when controlling for current affect and mood symptoms.

A key strength of the current study was inclusion of both trait and prospective measures of emotion regulation. Previous research typically relies on either trait measures of emotion regulation, assuming that people are able to accurately recall these processes, or single instances of state use of strategies in response to laboratory mood inductions, which may reduce the ecological validity of findings. Although analysis for Study B, which included these prospective measures, was underpowered, the pattern of findings was in line with Study A which was adequately powered. This study is also not without limitations.

6.5.1 Limitations and future directions

Firstly, the measures used to quantify emotion malleability beliefs relate to theories about *all* mood states. However, previous research has highlighted that the valence and intensity of moods inform the amount of effort required to regulate (Sheppes et al., 2014), these factors may also influence the beliefs individuals hold regarding different mood states. It is therefore suggested that future research should incorporate valence specific measures (e.g., Beliefs about Automatic Mood Regulation -Negative: Hutchison & Gunthert, 2013), and Beliefs about Automatic Mood Regulation -Positive Emotion Downregulation: Dodd et

al., 2020) and consideration of intensity of mood states. Findings from such research may help to identify possible break points at which individuals believe they are no longer able to regulate their mood states depending on valence and intensity of emotions, and may further disentangle different associations between use of emotion regulation strategies with general and personal beliefs measures present in the current study. Additionally, beliefs measures related to perceived ability to control emotions rather than the beliefs that emotion should be regulated. Previous research has found that the appraisals people make about their moods (i.e., good for me or bad for me) are associated with mania risk, use of emotion regulation strategies and mood symptoms (e.g., Dodd, Mansell, Bentall, & Tai, 2011; Kelly, Smith, Leigh, & Mansell, 2016). Future research exploring the potential moderating relationship between beliefs about emotions and mania risk may benefit from inclusion of measures of these appraisals, developed in the context of bipolar disorder and mania risk (i.e., Hypomanic Attitudes & Positive Predictions Inventory: Mansell, 2006).

Linked to this, hypomanic personality traits are generally low in a non-clinical sample, and patterns and strengths of associations between these measures may differ in people high in hypomanic personality traits, as use of both positive rumination and dampening are both typically considered maladaptive in this context (e.g., Johnson et al., 2008). Future research may therefore benefit from assessing how emotion malleability beliefs relate to responses to positive affect in high-risk samples and clinical samples of individuals with bipolar disorder to gain insight into how these beliefs may predict patterns of dysregulation which may contribute to the development and recurrence of clinically significant mood experiences.

Additionally, as outlined above, the sample for Study B was small. Future research should aim to further explore how beliefs about emotion malleability relate to the emotion regulation strategies individuals report using within their daily life in response to naturally occurring mood states. Such research would help to identify possible patterns of associations between beliefs and emotion regulation use, such as repertoires of strategies and regulatory flexibility (i.e., use of different strategies in different contexts), and how these relate to affect outcomes. Further, prospective research may provide insight into the direction of causality between malleability beliefs and responses to positive affect and help identify possible areas for targeted interventions for individuals experiencing mood regulation difficulties.

Finally, the study was limited by sample characteristics. The sample comprised predominantly of White, female students, many of whom were likely to be psychology undergraduates. Although previous literature has found no gender differences in endorsement of emotion malleability beliefs (e.g., Tamir et al., 2017; Kneeland et al., 2016), these factors limit the generalisability of findings to other populations.

6.5.2 Conclusion

In conclusion, findings from the current study further extend existing research relating to beliefs about emotion malleability and regulation of negative affect. Malleability beliefs were associated with greater use of strategies to upregulate positive affect, and less use of dampening to downregulate mood, while mania risk was associated with greater use of dampening. There was no evidence that emotion malleability beliefs influence the association between mania risk and selection of emotion regulation strategies. Further prospective

research is needed to explore the direction of causality between beliefs and use of emotion regulation strategies to determine if the beliefs that individuals hold regarding the malleability of their emotions present a possible area for early intervention for individuals experiencing mood regulation difficulties.

Chapter 7:

Study 2:

Are context-specific measures of positive emotion regulation more predictive of mania risk and mood symptoms than trait measures?

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7.1 Abstract

Background: A number of strategies used to regulate positive affect (i.e., dampening and positive rumination) have been identified as having particular relevance to hypomanic personality (a proxy measure of mania risk). However, previous findings have been mixed and it is suggested that this may be the result of lack of consideration of the context in which emotion regulation (ER) is occurring.

Aims: This study aimed to investigate (a) if use of specific ER strategies predicts mood across social- and goal-related contexts, and (b) if the relationship between hypomanic personality and mood is moderated by greater use of ER strategies.

Method: One hundred and seventy-four participants (mean age 20.77 years, $SD = 2.2$) completed an online survey assessing (i) hypomanic personality, (ii) self-reported tendencies to use ER strategies for positive emotion, (iii) tendencies to use these strategies in response to both high- and moderate intensity positive affect in personally generated social- and goal-related contexts, and (iv) current affect.

Results: Trait use of ER strategies was more predictive of hypomanic personality and mood symptoms than context-specific measures; however, this relationship did not hold up for hypomanic personality and mood symptoms when accounting for current affect. Trait dampening was predictive of low mood symptoms but did not moderate the relationship between hypomanic personality and low mood.

Discussion: While trait measures of ER were more predictive of mania risk and mood symptoms than context-specific measures, further work is needed using experience sampling methods in order to capture the regulatory processes individuals are using in particular contexts, in real-time.

7.2 Introduction

Emotion regulation strategies are defined as ‘processes individuals engage in to initiate, maintain, intensify, or eliminate mood states’ (Gross, 1998b, p. 275). Inability to effectively regulate mood is a common deficit present among individuals at high risk for developing affective disorders, such as bipolar disorder (Critchley, 2003; Section 1.2.3). Staging models of mania risk (risk of developing bipolar disorder; e.g., Scott et al., 2016) highlight a number of cumulative risk factors. These include genetic factors (having a first-degree relative with bipolar disorder), age (peak age of onset for bipolar disorder is 18 to 25 years) and behavioural indices, such as emerging symptoms or elevated hypomanic personality traits (Section 2.2). Hypomanic personality traits are characterised by extremes of confidence and energetic behaviours, frequently resulting in feelings of grandiosity and euphoria. Much of the literature investigating mania risk in non-clinical populations utilises behavioural measures of trait mania risk, such as the Hypomanic Personality Scale (HPS: Eckblad & Chapman, 1986; Section 5.2.2.2).

Psychological models of mood swings and bipolar disorder (e.g., the integrative cognitive model: Mansell et al., 2007; Section 2.3.4) posit that the disturbances in mood regulation central to mania risk and bipolar disorder are exacerbated by the ways in which people think about and respond to how they are feeling (i.e., how they regulate their emotions). The link between putatively maladaptive emotion regulation strategies and both mania risk and bipolar disorder have been supported by research (for reviews of emotion regulation in mania risk and bipolar disorder, see Dodd et al., 2019; McGrogan et al., 2019, Chapter 3). Emotion regulation strategies are often conceptualised as being either adaptive or maladaptive, in light of the association between the latter and psychopathology (not just bipolar disorder; Aldao, 2013). However, this

distinction has been questioned in recent literature, with some suggesting that the (mal)adaptive value of a given strategy is dependent upon several potential moderating or mediating factors, such as situational demands (e.g., Aldao, 2013) and the desired outcomes and motivations behind a regulatory attempt (e.g., Mansell et al., 2007). Bonanno and Burton (2013) describe the tendency to categorise emotion regulation strategies as adaptive or maladaptive as the *fallacy of uniform efficacy*, see Section 4.1.

To date, research investigating emotion regulation strategies and mania risk continues to produce mixed findings, particularly in relation to regulation of positive affect. For example, numerous studies with non-clinical samples have suggested that tendencies to dampen positive affect (i.e., engaging in mental strategies to reduce the duration and intensity of positive mood states; Feldman et al., 2008) are positively associated with high mood symptoms (e.g. increased feelings of happiness and elevated self-confidence; Kelly et al., 2016; Olofsson et al., 2014; Verstraeten et al., 2012), whereas others have found a negative association (e.g. Feldman et al., 2008). Similarly, a number of studies have identified strong associations between positive rumination, defined as recurrent thoughts about positive self-qualities, affect experiences and favourable life circumstances (Feldman et al., 2008) and hypomanic personality (e.g., Dempsey et al., 2011; Steel, 2016) while others have found no association (Raes et al., 2009). Dampening and positive rumination are also positively related to low mood symptoms (e.g., feelings of sadness and loss of interest) within non-clinical populations (e.g., Olofsson et al., 2014; Thomas and Bentall, 2002).

Contextual factors could explain mixed findings. Given that emotions are dynamic and often occur in response to external triggers, attempting to assess them in isolation of the contexts in which they occur significantly reduces the

ecological validity of findings and limits understanding of 'real life' regulation processes (Aldao, 2013). Gratz and Roemer (2004) also state that 'knowledge of the specific emotion regulation strategies used by an individual, in the absence of information about the contexts in which they are used, may provide little information about the individual's ability to regulate her or his emotions effectively' (p. 42). The integrative cognitive model of mood swings (Mansell et al., 2007), often applied to mania risk and bipolar disorder, suggests that factors such as life experiences influence how people respond to their internal states, this could also include an individual's current environment. Several contextual factors have been highlighted as relevant to emotion regulation, such as the situational (e.g., what they are doing, Section 4.2.4) and social (e.g., who they are with; Section 4.2.3) settings an individual is in. The type and intensity of the emotion should also be considered as an influential factor in both the selection of the emotion regulation strategy (e.g., purportedly adaptive strategies are generally employed in response to less intense emotions while maladaptive strategies are typically used in response to more intense emotions; Sheppes et al., 2014) and the regulatory effort required, i.e., more intense emotions require more effort to regulate than less intense emotions (e.g., Barrett et al., 2001), see Section 4.2.2. A study by Dixon-Gordon et al. (2015a) assessed the use of emotion regulation strategies in response to high- and moderate intensity negative emotions (i.e., sadness, anger, and anxiety) across a range of stressful situations. Findings suggest that higher intensity emotions were associated with greater overall emotion regulation efforts, as well as greater endorsement of putatively maladaptive strategies, although this has yet to be explored in relation to the regulation of positive affect. Context should also be a key consideration when attributing adaptive and maladaptive value to emotion regulation strategies. For example, engaging in

positive rumination may be considered appropriate and adaptive in situations where the desired effect is to increase positive emotions; however, where it would be more appropriate to downregulate mood (e.g., when attending a funeral or other sombre occasion), use of this strategy would be considered maladaptive.

A number of contexts have been highlighted as having particular relevance to bipolar disorder and mania risk. For example, heightened goal pursuit has been found to predict high mood symptoms in individuals with diagnosed bipolar disorder (Lozano & Johnson, 2001). Gruber and Johnson (2009) also found that individuals high in hypomanic personality traits reported elevated levels of positive affect in relation to reward and goal attainment but displayed deficits in socially relevant positive emotions. This could suggest that individuals engage in different types of emotion regulation, depending on situational demands. It is therefore anticipated that use of purportedly maladaptive emotion regulation strategies in these contexts would be predictive of greater mood symptoms in those higher in mania risk.

Similarly, as mania risk is characterised by more intense positive and negative emotions, it is unsurprising that individuals with greater hypomanic personality traits report greater use of maladaptive strategies to upregulate (e.g., positive rumination) and downregulate (e.g., dampening) positive affect, whereas more passive and purportedly adaptive strategies such as savouring (i.e., attending to and appreciating positive experiences; Bryant & Veroff, 2017) are less often reported. It is of particular theoretical relevance to assess this range of strategies as the negative emotion regulation literature frequently investigates use of both putatively adaptive (e.g., reappraisal) and maladaptive (e.g., catastrophising) strategies. However, the strategies used to regulate positive

affect, particularly in relation to mania risk, are typically considered maladaptive, while savouring offers a more adaptive alternative, see Section 2.3.

To date, the associations between emotion regulation and context remains widely under-researched, despite suggestions that investigating them together offers the most valid insight into everyday emotion regulation processes (Aldao, 2013). Greater consideration of context could be useful in delineating if mood difficulties arise as a result of trait tendencies to use maladaptive emotion regulation strategies or if use of certain strategies in specific contexts are more unhelpful for those at risk. Such insight could be beneficial for informing theory and models to help identify targeted areas for early intervention for individuals experiencing mood regulation difficulties. Therefore, in line with research aims 1 and 3 and 4 (Section 5.4.1, 5.4.3, & 5.4.4), the current study set out to explore whether (a) tendencies to use specific emotion regulation strategies in response to moderate and high intensities of positive affect across different contexts (i.e., social and goal-related) were associated with mood symptoms (see Figure 7.1), and (b) whether tendencies to engage in these emotion regulation strategies across different contexts moderates the associations between mania risk and mood symptoms. To do this, this moderating role was tested for where both mania risk and trait use of emotion regulation strategies or context-specific use of strategies were related to mood outcomes.

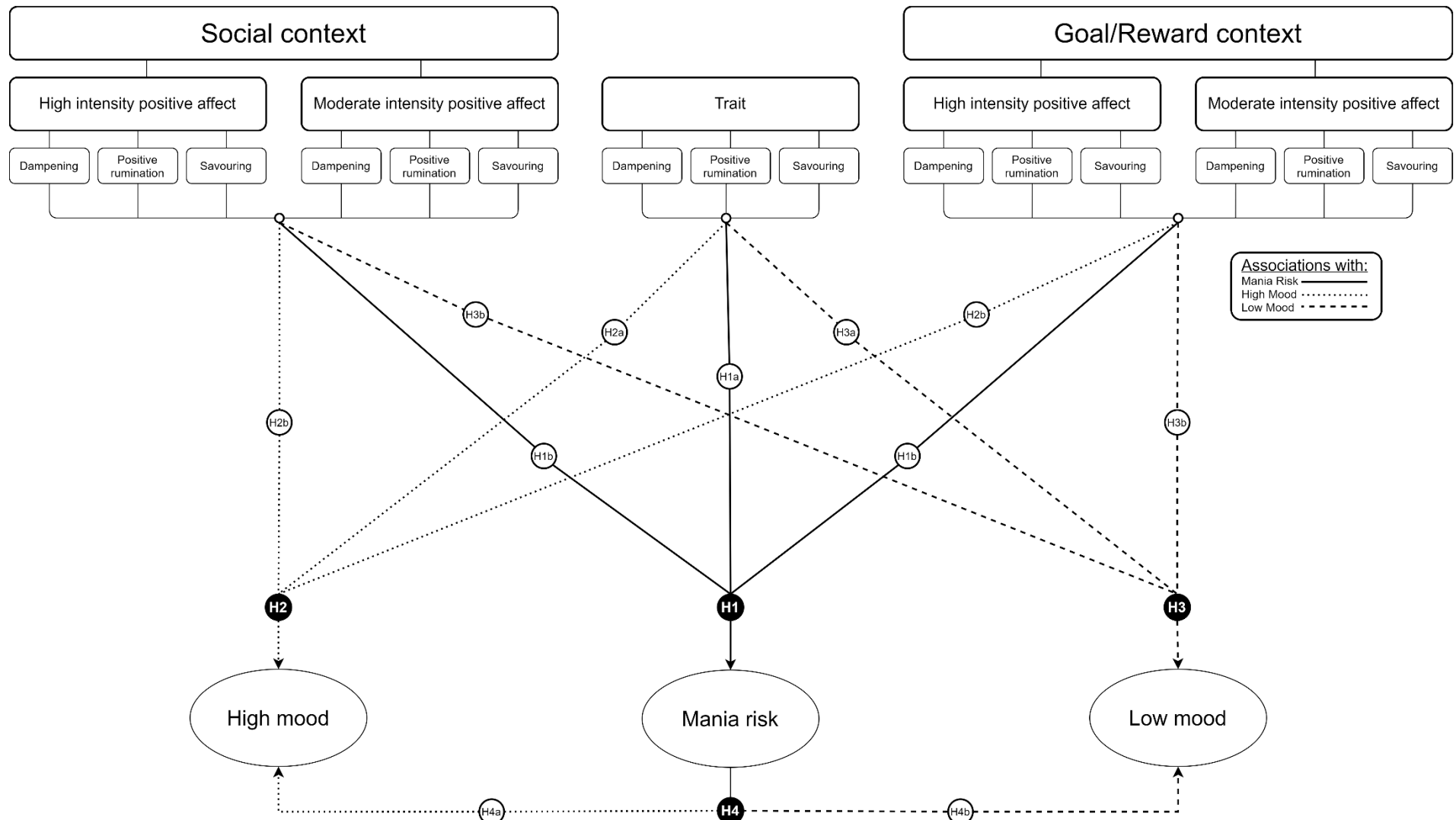


Figure 7.1: Predicted Moderations Between Mania Risk, Emotion Regulation, Context, and Affect Outcome

It was hypothesised that (H1) hypomanic personality would be positively associated with (a) trait-like and (b) context-specific tendencies to use maladaptive emotion regulation strategies (i.e. dampening and positive rumination) and not associated with use of adaptive strategies (i.e. savouring), (H2) high mood symptoms would be positively associated with (a) trait-like and (b) context-specific tendencies to engage in dampening and positive rumination but not savouring, (H3) low mood symptoms would be positively associated with (a) trait-like and (b) context-specific tendencies to engage in dampening and positive rumination but not savouring, (H4) hypomanic personality would be positively associated with (a) high mood symptoms and (b) low mood symptoms, and (H5) tendencies to use positive rumination and dampening would moderate the associations between hypomanic personality and mood, such that greater use of these strategies would strengthen associations between mania risk and mood symptoms. The moderating role of dampening and positive rumination on the association between hypomanic personality and mood outcomes were tested for trait use of these emotion regulation strategies plus their self-reported use in the each of the four contexts.

7.3 Method

7.3.1 Participants

Based on 20 predictor variables (including hypomanic personality, mood symptoms and repeated administration of emotion regulation strategy use in different contexts), G*Power (Faul et al., 2007) recommended a minimum sample size of $N = 157$ to detect a medium effect with an alpha level of .05. This sample size also surpassed the minimum requirement for sufficient power for moderation analysis ($n = 77$). Participants were drawn from a self-selected sample of

respondents to social media advertisements and recruitment posters displayed around Northumbria University campus stating the following inclusion criteria: aged 18 to 25 years, no current diagnosis of mood disorder, and good understanding of written English. Psychology undergraduate students received course credits as compensation for their time and all participants were entered into a prize draw.

Three hundred and nine participants accessed the survey, and 135 participants were removed due to incomplete responses; 174 participants (mean age 20.77 years, SD = 2.2) provided sufficient data for analysis. Of this sample, 80.5% reported their gender as female, 18.4% male, 0.6% as other, and 0.6% preferred not to say. 81% were students (151 full time, 4 part time), 10.4% were employed and 0.6% unemployed. 80% of the sample described their ethnicity as White (n = 153), 1% as Black, 13% as Asian, 4% as mixed, and 2% as other.

7.3.2 Materials

An online survey, hosted by Qualtrics, included the following self-report measures.

7.3.2.1 Demographics

Demographic information (age, gender, ethnicity, and occupation) was recorded using an in-house questionnaire.

7.3.2.2 Mania Risk

7.3.2.2.1 *Hypomanic Personality Scale*

Mania risk was quantified using the 20-item Hypomanic Personality Scale (HPS-20: Meads & Bentall, 2008; Appendix A).

7.3.2.3 Emotion Regulation in Context

7.3.2.3.1 *Responses to Positive Affect Scale*

Use of positive affect regulation strategies (positive rumination and dampening) was measured using 9 items from the Response to Positive Affect Scale (RPA: Feldman et al., 2008; Appendix B)

7.3.2.3.2 *Ways of Savoring Checklist*

Savouring was quantified using 3 items from the Ways of Savoring Checklist (WOSC: Bryant & Vernoff, 2017; Appendix C).

Participants were then asked to provide brief descriptions of real-life social- and goal-relevant instances according to the following instructions:

Social context – ‘*Please describe a time when you were in a social situation (e.g., with friends) and you felt moderate levels of positive emotion (e.g., happy, excited or enthused)*’

Goal-relevant context – ‘*Please describe a time when you were trying to achieve a goal or reward (e.g., pass a test) and you felt moderate levels of positive emotion (e.g., happy, excited or enthused)*’

These instructions were also repeated for high-intensity positive affect in both contexts. Each combination of context and affect intensity were presented in a counter-balanced order. The same emotion regulation items from the RPA and WOSC were repeated for each of the four *contexts thinking about the situation [you] described above*, resulting in scores for dampening, positive rumination, and savouring in each context (high-intensity positive affect in a social situation, moderate-intensity positive affect in a social situation, high-intensity positive affect in a goal-focused situation, and moderate-intensity positive affect in a goal-focused situation).

7.3.2.4 Affect Measures

7.3.2.4.1 *Positive and Negative Affect Scale*

Current affect was measured using the 10-item International Positive and Negative Schedule – Short Form (i-PANAS-sf: Thompson, 2007; Appendix D).

7.3.2.4.2 *Altman Self-Rating Mania Scale*

Current high mood symptoms were recorded using the 5-item Altman Self-Rating Mania Scale (ASRM: Altman et al., 1997, Appendix E).

7.3.2.4.3 *Center for Epidemiological Studies – Depression Scale*

Current low mood symptoms were recorded using the 20-item Center for Epidemiological Studies – Depression Scale (CES-D: Radloff, 1977, Appendix F).

7.3.3 Procedure

Ethical approval was obtained from the Department of Psychology at Northumbria University. Data was collected between May 2018 and February 2019. The survey was accessible on any internet-enabled device via a link contained in the recruitment adverts. Informed consent was obtained via an electronic consent form before participants were able to proceed with the survey. In order to ensure confidentiality, all participants were required to generate a unique code word, which was associated with their individual data set in place of any identifying information. Upon completion, participants were fully debriefed. Participants who completed the survey were able to enter a prize draw for one of four £25 Amazon vouchers and undergraduate psychology students received participant credits as compensation for their time.

7.3.4 Design and Analysis

This study employed a correlational design, collecting data via an online self-report survey. Predictor variables include hypomanic personality and measures of emotion regulation in context (social- and goal-focused scenarios where participants have experienced moderate or high levels of positive affect). Outcome variables include current affect, and high and low mood symptoms.

Data were analysed using IBM SPSS Statistics 25. In instances where participants had two or fewer values missing on the HPS or CES-D, expectation maximisation was used to impute values. Participants with missing data on any other scale were removed. Pearson's correlations were conducted to investigate relationships between hypomanic personality, affect, mood symptoms and emotion regulation strategies.

A series of hierarchical multiple regressions were conducted using 1000 sample bootstrapping to assess whether predictor variables made unique contributions to outcome variables (i.e., high mood and low mood symptoms). Variables were added as potential predictors if they were significantly associated with the outcome being tested in that model (see Figure 7.1). Context-specific emotion regulation strategies were entered into Step 1, trait measures of emotion regulation and hypomanic personality were entered into Step 2, and current affect and mood symptoms were entered into Step 3 to assess whether context-specific and trait emotion regulation still predicted outcomes when controlling for these measures. For each model, the assumption of no multi-collinearity was satisfied, all tolerance statistics were $>.02$ and variance inflation factors were not substantially >1 (Field, 2013).

Where hypomanic personality and an emotion regulation strategy were both uniquely associated with high or low mood symptoms, moderation analyses were conducted using PROCESS (Hayes, 2012) model 1 to investigate if use of emotion regulation strategies moderate the relationship between mania risk and mood symptoms (see Figure 7.2).

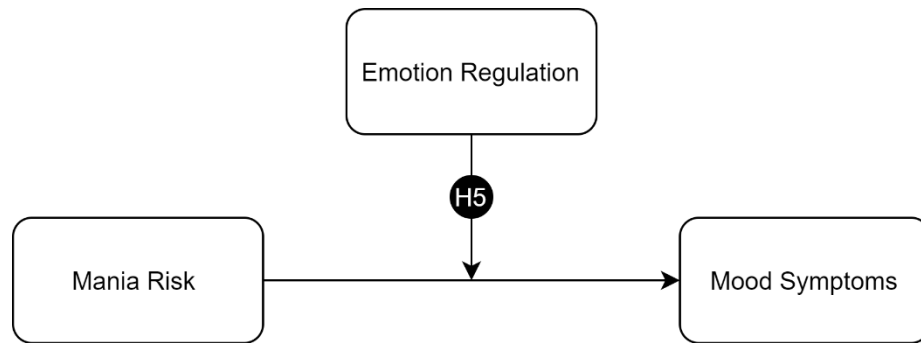


Figure 7.2: Predicted Moderation between Mania Risk, Emotion Regulation, and Mood Symptoms

7.4 Results

Table 7.1: Descriptive Statistics for Mania Risk, Emotion Regulation, and Affect Outcomes

	Mean	SD	Min	Max	α
Hypomanic Personality	7.65	3.82	0	17	.76
Positive Affect	13.50	4.18	5	24	.78
Negative Affect	8.49	3.71	5	22	.77
High Mood	5.20	3.26	0	16	.78
Low Mood	19.04	10.14	0	54	.90
Trait					
Dampening	6.34	2.20	3	12	.67
Positive Rumination	14.05	3.56	6	24	.79
Savouring	8.07	2.11	1	12	.50
Moderate Social					
Dampening	4.43	1.87	3	12	.73
Positive Rumination	14.14	4.39	6	24	.85
Savouring	9.13	2.27	0	12	.60
High Social					
Dampening	4.89	2.20	3	12	.78
Positive Rumination	16.18	4.55	6	24	.84
Savouring	9.98	2.00	3	12	.55
Moderate Goal					
Dampening	5.59	2.10	3	12	.63
Positive Rumination	15.71	4.35	6	24	.85
Savouring	6.80	2.83	0	12	.67
High Goal					
Dampening	5.57	2.14	3	12	.64
Positive Rumination	18.26	4.15	6	24	.85
Savouring	8.33	2.61	1	12	.61

Before analysis, the distributions of all scales were examined. All outcome variables were positively skewed: HPS (skewness statistic = .25, $SE = .18$), ASRM (skewness statistic = .53, $SE = .18$) and CES-D (skewness statistic = .89, $SE = .18$). This is consistent with expectation, as few participants from a non-clinical sample would be likely to be at high risk of mania, or exhibit clinically significant levels of both mania and depression symptoms. As the distribution of these variables reflected the expected population level distribution and correlational analyses are robust with respect to skew, variables were not transformed prior to analysis. Descriptive statistics are shown in Table 7.1 ($N = 174$).

7.4.1 Associations between hypomanic personality, affect, mood symptoms and emotion regulation strategies.

Table 7.2: Correlations between Hypomanic Personality, Emotion Regulation Strategies, and Current Affect.

	Hypomanic Personality <i>r</i>	High Mood <i>r</i>	Low Mood <i>r</i>	Trait Dampening <i>r</i>	Trait Positive Rumination <i>r</i>	Trait Savouring <i>r</i>
Hypomanic Personality	--	.34**	.23**	--	--	--
Positive Affect	.07	.36**	-.38**	-.02	.28**	.06
Negative Affect	.14	-.15*	.51**	.31**	-.03	-.06
High Mood	.34**	--	--	--	--	--
Low Mood	.23**	-.26**	--	--	--	--
Trait						
Dampening	.22**	.04	.34**	--	--	--
Positive Rumination	.17*	.25**	-.13	-.13	--	--
Savouring	.10	.08	-.07	-.06	.39**	--
Moderate Social						
Dampening	.13	-.01	.29**	.53**	-.11	.06
Positive Rumination	.21**	.23**	-.02	.03	.50**	.47**
Savouring	.14	.03	.08	-.05	.24**	.35**
High Social						
Dampening	.14	.01	.31**	.48**	-.06	-.01
Positive Rumination	.20**	.24**	-.09	.01	.40**	.46**
Savouring	.10	.07	-.05	.10	.11	.38**
Moderate Goal						
Dampening	-.01	-.03	.11	.41**	-.04	.17*
Positive Rumination	.18*	.16*	-.15*	.01	.40**	.33**
Savouring	.08	.04	-.05	.03	.27**	.31**
High Goal						
Dampening	-.00	-.05	.12	.37**	-.04	.07
Positive Rumination	.18*	.15	-.17*	-.07	.41**	.39**
Savouring	.22**	.04	-.02	.01	.31**	.40**

* $p < .05$ ** $p < .001$

Table 7.2 displays Pearson's correlations for hypomanic personality, affect, mood symptoms and emotion regulation strategies.

Hypomanic personality was positively associated with both current high and low mood symptoms. HPS was also positively related to trait dampening and savouring of high-intensity positive affect goal-focused contexts. Positive rumination was related to hypomanic personality across trait and all context measures.

Current high mood symptoms were positively associated with positive affect, and negatively associated with current negative affect and low mood symptoms. High mood symptoms were also associated with trait positive rumination as well as positive rumination on moderate- and high-intensity positive affect in social contexts and moderate intensity positive affect in goal-focused contexts.

Current low mood symptoms were negatively associated with positive affect and positively associated with negative affect. Low mood symptoms were also positively related to trait dampening and dampening high- and moderate-intensity positive affect in social contexts. A negative correlation was present between low mood symptoms and positive rumination on both high- and moderate-intensity positive affect in goal-focused contexts.

Trait dampening was positively associated with use of dampening across all contexts. Trait positive rumination was positively associated with use of positive rumination across all context measures, as well as trait savouring and savouring of moderate-intensity positive affect in social contexts and high- and moderate-intensity positive affect in goal-focused contexts. Trait savouring was positively associated with use of savouring and positive rumination across all

contexts, and dampening of moderate-intensity positive affect in goal-focused contexts.

Table 7.3: Regression Analyses between Hypomanic Personality, Emotion Regulation Strategies and Current Affect

Predictor	Mania Risk			High Mood			Low Mood		
	β	SE	t	β	SE	t	β	SE	t
Step 1									
MS Dampening	--	--	--	--	--	--	.76	.50	1.52
MS Pos Rumination	.07	.10	0.71	.07	.08	0.85	--	--	--
MS Savouring	--	--	--	--	--	--	--	--	--
HS Dampening	--	--	--	--	--	--	1.04*	.43	2.44
HS Pos Rumination	.04	.10	0.42	.12	.07	1.58	--	--	--
HS Savouring	--	--	--	--	--	--	--	--	--
MG Dampening	--	--	--	--	--	--	--	--	--
MG Pos Rumination	.06	.09	0.69	.02	.07	0.32	-.20	.19	-1.06
MG Savouring	--	--	--	--	--	--	--	--	--
HG Dampening	--	--	--	--	--	--	--	--	--
HG Pos Rumination	-.02	.10	-0.21	--	--	--	-.31	.20	-1.52
HG Savouring	.23	0.14	1.60	--	--	--	--	--	--
Step 2									
MS Dampening	--	--	--	--	--	--	.30	.51	0.60
MS Pos Rumination	.03	.10	0.34	.01	.08	0.10	--	--	--
MS Savouring	--	--	--	--	--	--	--	--	--
HS Dampening	--	--	--	--	--	--	.75	.42	1.78
HS Pos Rumination	.03	.10	0.35	.09	.07	1.23	--	--	--
HS Savouring	--	--	--	--	--	--	--	--	--
MG Dampening	--	--	--	--	--	--	--	--	--
MG Pos Rumination	.04	.08	0.51	-.01	.07	-0.20	-.28	.19	-1.53
MG Savouring	--	--	--	--	--	--	--	--	--
HG Dampening	--	--	--	--	--	--	--	--	--
HG Pos Rumination	-.004	.10	-0.04	--	--	--	-.32	.20	-1.63
HG Savouring	.21	.14	1.46	--	--	--	--	--	--
HPS				.25**	.06	4.05	.53*	.19	2.78
T Dampening	.40*	.13	3.11				.84*	.39	2.15
T Pos Rumination	.11	.10	1.12	.15	.08	1.93	--	--	--
Trait Savouring	--	--	--	--	--	--	--	--	--
Step 3									
MS Dampening	--	--	--	--	--	--	-.22	.43	-0.51
MS Pos Rumination	-.03	.09	-0.29	.04	.08	.54	--	--	--
MS Savouring	--	--	--	--	--	--	--	--	--
HS Dampening	--	--	--	--	--	--	.53	.35	1.50
HS Pos Rumination	-.01	.09	-0.05	.04	.07	.62	--	--	--
HS Savouring	--	--	--	--	--	--	--	--	--
MG Dampening	--	--	--	--	--	--	--	--	--
MG Pos Rumination	.09	.08	1.14	-.05	.06	-.87	-.11	.16	-0.73
MG Savouring	--	--	--	--	--	--	--	--	--
HG Dampening	--	--	--	--	--	--	--	--	--
HG Pos Rumination	.02	.09	0.26	--	--	--	-.18	.17	-1.10
HG Savouring	.25	.13	1.9	--	--	--	--	--	--
HPS	--	--	--	.31**	.06	5.23	.64**	.17	3.77
T Dampening	.18	.13	1.4	--	--	--	.68*	.33	2.07
T Pos Rumination	.04	.09	0.43	.08	.07	1.07	--	--	--
T Savouring	--	--	--	--	--	--	--	--	--
Positive Affect	--	--	--	.15*	.06	2.65	-.62**	.15	-4.07
Negative Affect	--	--	--	-.05	.07	-0.77	.94**	.18	5.33
High Mood	.46**	.09	5.47	--	--	--	-.60*	.21	-2.88
Low Mood	.12**	.03	4.29	-.08*	.03	-2.73	--	--	--

HPS = Hypomanic Personality Scale MS = Moderate Social; HS = High Social; MG = Moderate Goal; HG = High Goal; T = Trait.

HPS $R^2 = .069^*$ for Step 1, $\Delta R^2 = .053^*$ for Step 2, $\Delta R^2 = .166^{**}$ for Step 3; ASRM $R^2 = .066^*$ for Step 1, $\Delta R^2 = .104^{**}$ for Step 2, $\Delta R^2 = .133^{**}$ for Step 3, CES-D $R^2 = .144^{**}$ for Step 1, $\Delta R^2 = .071^*$ for Step 2, $\Delta R^2 = .254^{**}$ for Step 3

* $p < .05$ ** $p < .001$

7.4.2 Is mania risk associated with trait and context-specific use of emotion regulation strategies and mood symptoms?

Table 7.3 displays regression analysis between emotion regulation strategies, mania risk and mood symptoms.

Hypomanic personality was entered as the outcome variable. Positive rumination on moderate-and high-intensity positive affect in social and goal-focused contexts and savouring high-intensity positive affect in goal-focused contexts were entered in Step 1 to test their unique association with mania risk prior to adding in trait dampening and positive rumination in Step 2. To control for current mood, high and low mood symptoms were entered in Step 3.

Step 1 produced a significant model ($F(5,168) = 2.51, p = .03$), accounting for 6.9% of variance in mania risk. Within this model, none of the context-specific emotion regulation strategies was a significant predictor. The model retained significance when trait measures of emotion regulation were added ($F(7,166) = 3.31, p < .003$) and accounted for a further 5.3% of variance, $p = .008$. In this model, trait dampening was the only significant positive predictor. Significance was also retained when controlling for mood symptoms ($F(9,164) = 7.39, p < .001$) and accounted for an additional 16.6% of variance, $p < .001$. In this model, current high and low mood symptoms were the only significant predictors, both of which were positively related with mania.

7.4.3 Does trait and context-specific use of emotion regulation strategies predict mood outcomes?

7.4.3.1 High Mood

High mood symptoms were entered as the outcome variable. Positive rumination on moderate-and high-intensity positive affect in social contexts, and moderate-intensity positive affect in goal-focused contexts were entered into Step 1. Hypomanic personality and trait positive rumination were entered as predictors in Step 2. Current affect and low mood symptoms were entered into Step 3.

Step 1 produced a significant model ($F(3,170) = 3.40, p = .009$), accounting for 6.6% of variance in high mood symptoms. Within this model, none of the context-specific emotion regulation strategies was a significant predictor. The model retained significance when trait emotion regulation strategies and hypomanic personality were added ($F(5,168) = 6.89, p < .001$) and accounted for an additional 10.4% of variance, $p < .001$. In this model, hypomanic personality was the only significant positive predictor. Significance was also retained when accounting for current affect and low mood ($F(8,165) = 8.88, p < .001$), accounting for a further 13.3% of variance in high mood symptoms, $p < .001$. Within this model, hypomanic personality and positive affect were significant positive predictors, and low mood symptoms were significant negative predictors of high mood symptoms. As emotion regulation strategies were not significant predictors of high mood symptoms in this model, follow-up moderation analysis was not conducted.

7.4.3.2 Low Mood

Low mood symptoms were entered as the outcome variable. Dampening of moderate- and high-intensity positive affect in social contexts, and positive

rumination on moderate- and high-intensity positive affect in goal-focused contexts were entered as predictors in Step 1. Hypomanic personality and trait dampening were entered as predictors in Step 2. Current affect and high mood symptoms were entered as predictors in Step 3.

Step 1 analysis produced a significant model ($F(4,169) = 7.11, p < .001$), accounting for 14.4% of variation in low mood symptoms. Within this model, ruminating on high-intensity positive affect in social contexts was the only significant predictor and was positively associated with low mood. The model retained significance when trait emotion regulation strategies and hypomanic personality were added ($F(4,167) = 7.61, p < .001$) and accounted for a further 7.1% of variation in low mood symptoms, $p = .001$. Within this model, both hypomanic personality and trait dampening were significant positive predictors. Significance was also retained when controlling for current affect and high mood symptoms ($F(9,164) = 16.05, p < .001$), accounting for an additional 25.4% of variation in low mood symptoms, $p < .001$. Within this model, hypomanic personality, negative affect, and trait dampening were significant positive predictors, while positive affect and high mood symptoms were significant negative predictors. As positive rumination was not a significant predictor of low mood in this model, follow-up moderation analysis was not conducted for this strategy.

7.4.3 Does use of emotion regulation strategies moderate between mania risk and mood symptoms?

7.4.3.1 Trait dampening

Table 7.4 displays moderation analysis between trait dampening, mania risk and low mood symptoms.

Table 7.4: Moderation Analysis between Mania Risk, Trait Dampening, and Low Mood Symptoms.

Predictor	Low Mood			
	β	$SE \beta$	t	p
Hypomanic Personality	.44 [.06, .82]	.19	2.26	.03
Trait Dampening	1.37 [.71, .2.03]	.34	4.07	< .001
HPS x Trait Dampening	.10 [-.61, .26]	.08	1.22	.22

HPS = Hypomanic Personality Scale

Trait dampening was investigated as a moderator between hypomanic personality and low mood symptoms (Figure 7.3). Both hypomanic personality ($t(3,170) = 2.27, p = .03$) and trait dampening ($t(3,170) = 4.07, p < .001$) were significant positive predictors of low mood symptoms. The interaction between hypomanic personality and trait dampening was nonsignificant ($t(3,170) = 1.22, p = .22$), suggesting that the relationship between mania risk and low mood symptoms is not moderated by trait use of dampening.

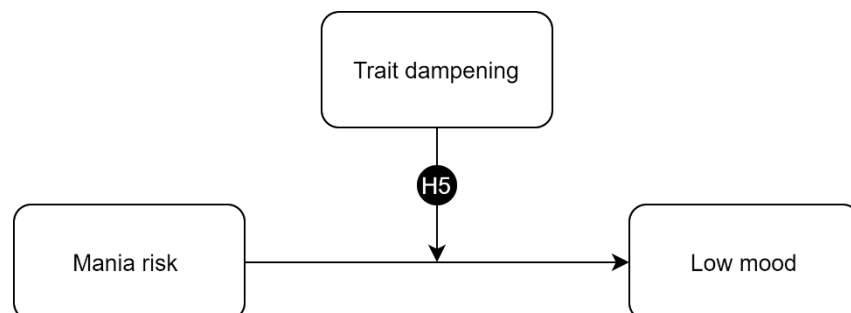


Figure 7.3: Predicted Moderation between Mania Risk, Trait Dampening, and Low Mood

7.5 Discussion

Investigations of emotion regulation in relation to mania risk have frequently examined only trait use of strategies, omitting the potential influence of context. This study aimed to examine whether (a) tendencies to use specific emotion regulation strategies across situational contexts predict mood symptoms and (b) use of emotion regulation strategies moderate the relationship between mania risk and mood symptoms.

Correlations mostly displayed anticipated relationships between use of emotion regulation strategies, mania risk and mood symptoms. For example, use of positive rumination positively correlated with both mania risk and current high mood symptoms, providing further support for conclusions drawn by Feldman et al. (2008) that individuals higher in hypomanic personality traits show tendencies to amplify positive affect, which in turn is also linked with increased high mood symptoms. Trait dampening was associated with both mania risk and low mood symptoms, consistent with previous research that has attributed dampening to the development of both high and low valence mood symptoms (e.g., Olofsson et al., 2014). Also in line with previous findings, savouring, a more adaptive response to positive affect, was not associated with mania risk or mood symptoms. This was true for tendencies to use emotion regulation in general, as well as tendencies to use these strategies in response to differing intensities of positive emotion elicited in social and goal-relevant situational contexts.

Within regression analyses, mania risk and mood symptoms were predicted by trait measures of emotion regulation over and above context specific measures. However, for mania risk and high mood symptoms, trait emotion regulation strategies were no longer significant predictors of these outcomes when accounting for current affect and mood symptoms, contrary to H1 and H2. In partial support of H3, trait dampening remained a significant predictor for low mood symptoms, along with mania risk, current affect and high mood symptoms. Furthermore, in partial support of H4, mania risk was positively associated with both high and low mood symptoms. The relationship between mania risk and low mood symptoms was not moderated by trait dampening, contrary to H5, suggesting that both of these trait variables (personality style and propensity to use dampening) are potentially separate pathways to low mood.

This study is the first to consider the role of context and emotional intensity when investigating use of positive emotion regulation strategies in relation to mania risk and mood. Many of the anticipated relationships were not observed, potentially as a result of methodological limitations outlined below; for example, positive rumination was not a significant predictor of mania risk or mood symptoms, contrary to much of the literature which has found strong associations between use of positive rumination and these outcomes (e.g., Carver & Johnson, 2009; Dempsey et al., 2011; Feldman et al., 2008). Additionally, contextual factors did not add to the prediction of mood outcomes, as observed in other studies (e.g., Dixon-Gordon et al., 2015; Johnson & Jones, 2009).

7.5.1 Limitations and Future Directions

Although the assessment of emotion regulation in personally relevant contexts should be considered a strength of the design, as acknowledged by Dixon-Gordon et al. (2015), this study is not without limitations. Firstly, the sample consisted primarily of White, female students, many of whom were likely to be psychology undergraduates given the participation incentives available to this cohort, and may therefore have been familiar with some of the measures used and biased towards recognising the purpose of the study. These factors limit the generalisability of findings to other populations. Previous research has also reported gender differences in use of emotion regulation strategies. For example, females have shown greater tendencies to engage in rumination in response to negative affect compared with males (e.g., Zlomke & Hahn, 2010) and use of rumination has been linked to more low mood symptoms in females than males (Nolen-Hoeksema, 2012). Future research should consider the potential confounding effects of gender differences when investigating responses to both negative and positive affect.

Additionally, the cross-sectional design limits insight into which strategies in which contexts predict subsequent mood symptoms. It also does not allow for inference about the direction of causality of the relationship between mania risk and emotion regulation difficulties. Furthermore, the retrospective recall of emotional situations and the strategies used in these situations relies on the assumption that individuals can accurately recognise and articulate these processes (while emotion regulation can also be automatic; e.g., Gao et al., 2018). However, as no time frame was suggested for the scenarios that participants described (e.g., within the past month), it is possible that responses to the emotion regulation measures associated with each context were more similar to trait-like responses rather than an accurate reflection of the strategies used in each situation. Similarly, the associations between use of regulation strategies and affect were based upon measures of how individuals were currently feeling. It is therefore unsurprising that there were no associations between these variables as the scenarios recalled are removed from the participant's current experiences. For these reasons, future research should employ experience sampling methods (ESM) that capture 'real-time' emotion regulation in situations while they are happening, and the direct influence on subsequent mood. ESM would identify if there are discrepancies between the strategies individuals believe they use in response to positive emotion, and those they actually report using. This would remove the need to remember past scenarios and accurately recall the strategies used, as the individual is stating how they are regulating their emotions in that moment. This can determine whether emotion regulation strategies are problematic (or not) across the board (i.e., they are maladaptive), or whether their influence on mood depends on the context the person is in. Future research should also aim to investigate how

combinations of factors, such as how individuals appraise their current mood, and the situational context they are in may influence the desired outcome of a regulation attempt (e.g., to sustain, upregulate or downregulate current affect) and the strategies they choose to achieve this.

Findings from this study and recommended future research could contribute to the development of targeted interventions for individuals experiencing difficulties with positive affect regulation. Given that staging models include a range of criteria to identify those who are bipolar-at-risk (including age, genetic risk, emerging mood symptoms, etc.), it is suggested that preventative interventions that recognise emotion regulation (and dysregulation) as universal experiences and promote better emotion regulation would offer non-pathologizing ways of supporting individuals experiencing these difficulties, whereas interventions for those with bipolar disorder are typically relapse-prevention focused and therefore not appropriate for use with individuals who have not yet experienced a clinically significant mood episode. Additionally, these findings provide further support for use of transdiagnostic interventions that emphasise emotion regulation (e.g., the Unified Protocol; Barlow et al., 2017) as well as highlighting that emotion regulation difficulties, particularly relating to use of dampening and low mood, can be problematic for mental well-being outside of diagnostic boundaries.

7.5.2 Conclusion

In conclusion, trait measures of emotion regulation were more predictive of mania risk and mood symptoms than context-specific measures, although this relationship was no longer apparent for mania risk and high mood symptoms when controlling for current affect and mood symptoms. Low mood symptoms

were also predicted by trait dampening in response to positive affect, but the relationship between mania risk and low mood symptoms was not moderated by trait dampening. Contextual factors did not add to the prediction of mania risk and mood symptoms; however, the possible influence of context should not be discounted due to a number of methodological limitations present within this study. Further research is needed using more ecologically valid assessments to test theoretically based predictions about relationships between mania risk, mood and emotion regulation strategies.

Chapter 8:

Study 3:

Do social and situational contexts influence
relationships between mania risk,
use of positive emotion regulation
strategies and affect?

An Experience Sampling Methods study.

8.1 Abstract

Background: Difficulties with positive affect regulation are central to mania risk, although findings relating to use of specific strategies (i.e., positive rumination, dampening, and savouring) are often mixed. Social and situational contexts are also highlighted as having possible relevance to use of these strategies and their influence on affect, however, previous investigations of these relationships are often limited by methodological constraints associated with cross-sectional designs.

Aims: the current study therefore used an experience sampling method to investigate 1) if associations between mania risk and affective outcomes are moderated by use of emotion regulation strategies, and 2) if these associations are further moderated by social and situational contexts.

Method: Forty-five participants (mean age = 20.31, SD = 2.19) completed a baseline measure of hypomanic personality, followed by a 6-day mood diary. Diary entries included measures of momentary affect, use of positive emotion regulation strategies and brief descriptions of social and situational contexts.

Results: Momentary positive affect was positively associated with use of positive rumination, savouring and dampening. Negative affect was positively correlated with dampening, and negatively associated with positive rumination and savouring. Social context moderated the relationship between positive rumination and positive affect, while situational context moderated between mania risk, dampening and negative affect.

Discussion: Findings further knowledge by exploring relationships between mania risk, emotion regulation and affect prospectively, and highlight instances where social and situational contexts may be important. Further work is needed to explore dynamic associations between contextual factors.

8.2 Introduction

Difficulties with regulating emotion are common among individuals with diagnosed mood disorders, such as bipolar disorder. Previous research has found that individuals with bipolar disorder show greater tendencies to engage in maladaptive responses to negative affect, such as rumination (i.e., excessive thought about the negative consequences of low mood) and risk-taking (e.g., Pavlickova et al., 2014; see Section 1.2.1). Maladaptive responses are also frequently used in response to positive affect, such as dampening (a cognitive strategy used to downregulate mood, reducing intensity and duration of positive affect, Section 1.2.2) and positive rumination (excessive thoughts about positive attributes of the self and current circumstances which further amplify positive affect; Johnson et al., 2016). A recent review of emotion regulation in bipolar disorder (Dodd et al., 2019) found that overall individuals with bipolar disorder tend to use these emotion regulation strategies more often, particularly those considered to be maladaptive, in comparison to controls.

Similar emotion regulation difficulties are apparent among individuals considered to be at risk of developing bipolar disorder. Staging models of mania risk (e.g., Scott et al., 2016) highlight a number of factors which contribute to risk, including age (peak age of on-set is considered to be between 18 and 25 years) and genetic factors (i.e., first degree relative with diagnosed bipolar disorder). There is also evidence for a bipolar phenotype characterised by behavioural factors or traits, such as hypomanic personality style (e.g., extremes of confidence and energetic behaviour), and/or emerging mood symptoms (Section 2.2). Investigations of emotion regulation in relation to mania risk suggest that individuals at greater mania risk also report greater use of maladaptive emotion regulation strategies and subsequent mood symptoms, while strategies

considered to be adaptive (e.g., savouring and acceptance; Carver & Johnson, 2009; Steel, 2016) are typically not associated with measures of risk or mood symptoms, (see Chapter 3 for review; McGrogan, et al., 2019). However, findings for some individual strategies, particularly those used in response to positive affect, are mixed. For example, tendencies to dampen positive affect have been found to both positively (e.g., Kelly et al., 2016) and negatively (e.g., Feldman et al., 2008) predict high mood symptoms. Similarly, some findings suggest strong associations between use of positive rumination and mania risk (e.g., Dempsey et al., 2011), while others have found no relationship between these measures (e.g., Raes et al., 2009). Use of dampening and positive rumination have also been found to predict negative affective outcomes within non-clinical populations (e.g., Thomas & Bentall, 2002; Olofsson et al., 2014).

These mixed findings may result from lack of consideration of potential moderators of associations between mania risk, emotion regulation and affect, and methodological limitations frequently seen throughout the literature. For example, assessments of emotion regulation typically rely on trait measures of tendencies to use specific strategies when experiencing negative or positive affect. As a result, detail of the contexts in which these strategies are being used is often lost. However, as emotions often occur in response to environmental triggers, and may also influence subsequent changes in the environment, it has been suggested that assessing how they are regulated in isolation of the contexts in which they occur reduces insight into 'real life' regulatory processes (Aldao, 2013) and limits understanding of how effective regulation attempts are (Gratz & Roemer, 2004; Section 4.1). Evaluating an individual's use of emotion regulation strategies and subsequent mood changes in relation to situational (e.g., what they are doing) and social (e.g., who they are with) factors may also contribute to

further understanding of when specific strategies may be more or less (mal)adaptive. Previous research suggests that contextual factors influence use of emotion regulation strategies. For example, people report greater use of suppression in unfamiliar environments or when in the company of others (Srivastava et al., 2009; English et al., 2017), and greater use of reappraisal and distraction when alone (English et al., 2017). Additionally, context is influential on the outcomes associated with use of strategies. For example, reappraisal is generally considered to be adaptive and associated with better well-being (e.g., Gross & John, 2003), however, when used in response to controllable stressors (i.e., situations that individuals are able to modify) use of reappraisal is associated with increased depression symptoms (Troy et al., 2013; see Section 4.2.3 & 4.2.4).

Models of mood swings, such as the Integrative Cognitive Model (ICM: Mansell et al., 2007), also highlight the relevance of context to mood difficulties (see Section 2.3.4). The ICM posits that contextual factors influence the way individuals appraise changes in their mood and the strategies they use in response to these changes. For example, in some settings positive affect may be perceived as beneficial, and positive rumination may be used to further intensify this, whereas in other situations positive affect may be viewed as problematic and dampening may be used to downregulate. Mood difficulties may arise when use of strategies do not match the intended outcome (e.g., engaging in positive rumination when it would be more appropriate to downregulate mood). Given the relevance of mood swings to mania risk, it is suggested that investigating the interaction between use of emotion regulation strategies and context is essential to understanding mood difficulties and would allow for identification of scenarios

where use of certain strategies may be more problematic for individuals at mania risk.

Some contexts have been identified as having specific relevance to high mood and positive affect in bipolar disorder, and may influence the strategies individuals choose to regulate mood and how these strategies alter affect. For example, individuals with diagnosed bipolar disorder and those considered to be high in mania risk have been found to experience increased high mood symptoms and elevated positive affect in situations relating to goal-pursuits (Lozano & Johnson, 2001; Gruber & Johnson, 2009; see Section 4.2.4). These findings further support the Behavioural Activation System (BAS) theory of bipolar disorder (Depue & Iacono, 1989) which posits that individuals with bipolar disorder demonstrate increases positive affect in activating situations (i.e., those relating to goal-attainment) compared to more passive situations (see Section 2.3.2). Bipolar disorder and mania risk have also been found to be associated with reduced positive affect and difficulties with emotion regulation in social situations (Gruber & Johnson, 2009; Goldstein, Miklowitz, & Mullen, 2006; see Section 4.2.3).

In Study 2 (Chapter 7; McGrogan et al., 2020), findings suggest that mood outcomes were associated with trait use of positive rumination and dampening, but not with context-specific use of these strategies (in goal-oriented or social contexts of varying affect intensity). However, it is suggested that these findings were limited by the cross-sectional design of the study, which presents a number of methodological constraints (Section 5.2.3). Firstly, use of cross-sectional designs do not allow for inferences of the direction of causation between use of emotion regulation strategies and mood difficulties. Secondly, the ecological validity of findings is limited by the need for participants to retrospectively recall

emotional events and the strategies used in response. Previous research has suggested that individuals often display inaccuracies in recalling the frequency and intensity of emotions, particularly in relation to positive affect (Thomas & Diener, 1990). Similar difficulties may be apparent in recalling emotion regulation processes. Much of the existing research on use of emotion regulation strategies in the context of mania risk is based on cross-sectional measures. For example, 15 of the 16 studies reviewed in Chapter 3 were cross-sectional, compared with only one prospective design. Further use of prospective designs, such as Experience Sampling Methods (ESM), may help to address these methodological limitations (Section 5.2.4).

ESM is a structured diary method in which participants provide ‘systematic self-reports at random occasions during normal daily life’ (Csikszentmihalyi & Larson, 2014.) Recordings often include thoughts, feelings, and affective outcomes, as well as information about the context the person is in at that time (e.g., location, company, activity), and their appraisals of that context (Myin-Germeys et al., 2009). Findings from ESM research are generally considered to have strong ecological validity as assessments of experiences, including emotion, are situated within naturally occurring everyday contexts (Gruber et al., 2013) and are of greater personal relevance to participants. Results from an ESM study using text messaging as prompts to collect data on mood symptoms from participants with bipolar disorder found this method to be comparable to more traditional techniques. Use of text messaging was also well-received by participants, as evidenced by high adherence (Bopp et al., 2010).

A small number of studies have used ESM to investigate the course of mood symptoms in bipolar disorder, however, findings are mixed. For example, in research by Myin-Germeys et al. (2003) participants with remitted bipolar

disorder reported lower positive affect but no difference in negative affect relative to controls, whereas others have found that individuals with diagnosed bipolar disorder report greater negative affect than controls (Havermans, Nicolson, Berkhof, & deVries, 2010). ESM research has also explored mood patterns in populations considered to be at risk for developing bipolar disorder. Findings suggest that higher mania risk is associated with greater levels of both positive and negative affect (Sperry & Kwapil, 2017) and greater variations in mood across the course of a day compared to individuals low in mania risk (Kwapil et al., 2011).

Gruber and colleague also used ESM to explore use of emotion regulation strategies by individuals with bipolar disorder. Findings suggest that those with bipolar disorder used emotion regulation strategies more often than healthy controls, and experienced greater levels of positive affect compared to participants with unipolar depression and healthy controls (Gruber et al., 2013). However, whether emotion regulation strategies influence associations between mania risk and subsequent affect, has not been investigated. Further, whether the influence of emotion regulation strategies on affect, when combined with mania risk, differs based on the situation the person is in at the time, has not been explored. Consequently, there remains a need for prospective investigation of the potential moderating influence of use of emotion regulation strategies in different contexts on the relationships between mania risk and affect. Exploratory assessment of emotion regulation in active situational contexts, which are associated with increased positive affect for individuals at mania risk, and social contexts, which are also relevant to mania risk but in the opposite direction (i.e., related to reduced levels of positive affect; Gruber & Johnson, 2009), would allow for insight into whether associations between these factors, which are

predominantly based on cross-sectional research, are apparent in momentary assessment of use of strategies and affect outcomes. Such insight would further help to delineate when use of certain strategies may be more unhelpful for individuals at risk of mania and mood difficulties.

In order to address limitations of previous research outlined above, and in line with research aims 1, 3 and 4 (Section 5.4.1, 5.4.3 & 5.4.4), the current study used an ESM approach to investigate 1) if associations between mania risk and affective outcomes are moderated by use of emotion regulation strategies, and 2) if these associations are further moderated by social and situational contexts.

It was hypothesised that:

1. Associations between hypomanic personality and affect outcomes would be moderated by use of emotion regulation strategies, such that a) greater use of positive rumination would strengthen the positive association between mania risk and positive affect and the negative association between mania risk and negative affect, and b) greater use of dampening would strengthen the negative association between mania risk and negative affect. It was not anticipated that savouring would moderate these relationships.
2. Social and situational contexts would moderate the relationships between hypomanic personality, emotion regulation and affect outcomes, such that greater use of these strategies in a) active, and b) non-social contexts

would strengthen associations between mania risk and affect, whereas passive and social contexts would not influence these relationships.

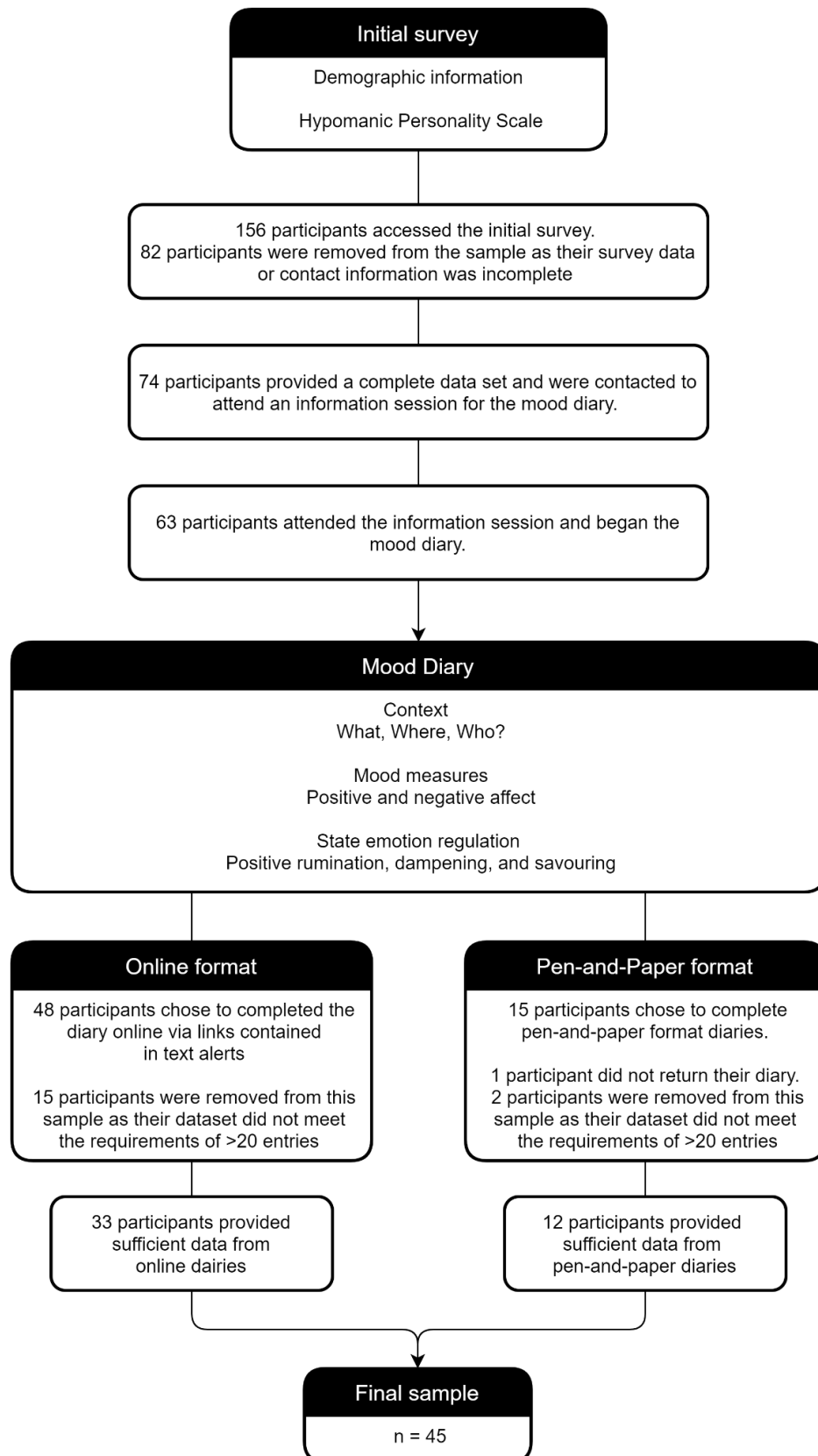


Figure 8.1: Procedure and Attrition

8.3 Method

8.3.1 Participants

Participants were recruited via social media advertisements and recruitment posters displayed around Northumbria University campus stating the following inclusion criteria: aged 18 to 25, no current diagnosis of mood disorders, good understanding of written English, and access to an internet enabled smart phone.

Figure 8.1 details attrition across the study. The final sample comprised 45 participants (33 online, 12 pen-and-paper). The mean age of this sample was 20.31 year (SD 2.19), 66.7% described their gender as female, and 33.3% as male. 60% described their ethnicity as White, 2.2% as Black, 4.4% as Asian, 8.9% as Mixed, and 4.4% as Other. 88.9% were students (2.2% part-time) and 11.11% were employed (6.7% part-time).

8.3.2 Materials

The study comprised of an online initial survey (demographics and hypomanic personality) and a 6-day ESM mood diary, hosted by Qualtrics. Data collection also included beliefs about emotion malleability, presented in Chapter 6 (Study 1).

8.3.2.1 Demographics

Demographic information (age, gender, ethnicity, and occupation) was recorded using an in-house questionnaire.

8.3.2.2 Mania Risk

8.3.2.2.1 *Hypomanic Personality Scale*

Mania risk was quantified using the 20-item Hypomanic Personality Scale (HPS-20: Meads & Bentall, 2008; Appendix A).

8.3.2.3 Emotion Regulation

8.3.2.3.1 *Response to Positive Affect Scale*

State use of positive affect regulation strategies (positive rumination and dampening) was measured using 9 items from the Response to Positive Affect Scale (RPA: Feldman et al., 2008; Appendix B)

8.3.2.3.2 *Ways of Savouring Checklist*

Savouring was quantified using 3 items from the Ways of Savoring Checklist (WOSC; Bryant & Vernoff, 2017: Appendix C).

8.3.2.4 Affect

8.3.2.4.1 *Positive and Negative Affect Scale*

Current affect was measured using the 10-item international Positive and Negative Schedule – Short Form (i-PANAS-sf: Thompson, 2007; Appendix D).

8.3.4.5 Mood diary

Each diary entry comprised of the following items (Appendix I).

- Current situational context - participants were asked to provide a brief description of where they were and the main thing that they were doing at the time they received the prompt,
- Current social context - participants were asked to state who they were with at the time of the prompt (i.e., alone, with friends, with family, with strangers, or other.)

- Current affect (i-PANAS-sf)
- State use of emotion regulation strategies (brief items from RPA and WOSC)

Diary entries were completed either online, via links contained in the text prompts sent to participants, or in pen-and-paper format in diaries provided to participants, according to their preference. It was estimated that each diary entry would take approximately 2 minutes to complete.

8.3.3 Procedure

Ethical approval for this study was obtained from the Department of Psychology at Northumbria University. Data was collected between October 2018 and November 2019. The initial survey was accessible on any internet-enabled device via a direct link contained in recruitment adverts. Informed consent was obtained electronically before participants proceeded with the initial survey. Completion of the initial survey was estimated to take approximately 5 minutes. Participants who provided contact details were then invited to a one-on-one information session about the mood diary, where they could choose between an online or pen-and-paper format.

During the ESM portion of the study, participants received text message alerts to complete each diary entry at 6 pseudo random time points for a period of 6 days, resulting a total number of 36 possible entry points. Prompts were sent to all participants between 10 a.m. and 10 p.m., with a minimum of 1 hour and a maximum of 4 hours between each alert. Participants were instructed to complete each entry within 15 minutes of receiving the prompt. The text message prompts for those completing online entries included direct links to surveys. Participants completing pen-and-paper diaries were asked to record the time they completed

each entry; this information was automatically recorded for online entries. Following the 6-day mood diary, participants were fully debriefed. All participants who completed the study received a £10 Amazon voucher and psychology undergraduate students received course credit as compensation for their time.

8.3.4 Design and Analysis

This study employed a prospective design, using online self-report surveys and an ESM emotion regulation and mood diary. A sample of 45 participants, who could each provide a maximum of 36 entries, resulted in a maximum number of 1,620 total possible entries, which surpassed the recommended threshold of 835 (Gabriel et al., 2019). Entries recorded more than 15 minutes after the prompt was sent were excluded from the data set. Participants were included in analysis if they provided a sufficient number of ESM entries (a minimum of 20, following guidance from (Palmier-Claus et al., 2011), resulting in a final total 1288 entries included in analysis.

From ESM data, situational contexts were independently coded by two researchers, with both coding a 25% sample of the data to calculate agreement ($k = .76$). Situational contexts were coded as nothing (e.g., lying in bed), work and study (e.g., writing lab report), active leisure (e.g., at the gym), passive leisure (e.g., watching TV), or mundane activities and chores (e.g., washing dishes). Codes were developed based on the descriptions of situations provided by participants. Situational and social codes were then collapsed into categories, displayed in Table 8.1.

Table 8.1: Context Codes and Categories

Situational Contexts		Social Context	
Passive (1)	Active (2)	Non-Social (1)	Social (2)
Nothing	Work and study	Alone	With friends
Mundane activities and chores	Active leisure	With strangers	With family
Passive leisure			Other

ESM data were analysed using Multilevel modelling conducted in R. Outcome and predictor variables were transformed using grand mean centring. To assess whether hypomanic personality and state use of emotion regulation strategies (positive rumination, dampening, and savouring) predicted momentary affect, four separate linear mixed models were conducted for each outcome (positive affect and negative affect) using lmer package and adjusting for participant and day-level random effects. To test hypothesis 1, an additional nine models were conducted for each outcome to assess two-way interactions between hypomanic personality, situational code, and social codes with each emotion regulation strategy. To test hypothesis 2, six final models were conducted for each outcome to explore three-way interactions between hypomanic personality, situational code, and social code with each emotion regulation strategy, see Table 8.2. Data was plotted for four participants, selected using random number generation, to illustrate significant two- and three-way interactions.

Table 8.2: Summary of Interaction Terms

Interaction Terms	Tested Moderations
HPS * Positive Rumination	Does use of positive rumination moderate the relationship between hypomanic personality and affect outcomes?
HPS * Dampening	Does use of dampening moderate the relationship between hypomanic personality and affect outcomes?
HPS*Savouring	Does use of savouring moderate the relationship between hypomanic personality and affect outcomes?
<u>Situational context models</u>	
Situational Code * Positive Rumination	Does situational context moderate the relationship between use of positive rumination and affect outcomes?
Situational Code * Dampening	Does situational context moderate the relationship between use of dampening and affect outcomes?
Situational Code * Savouring	Does situational context moderate the relationship between use of savouring and affect outcomes?
HPS * Situational Code * Positive Rumination	Does situational context further moderate the associations between hypomanic personality, use of positive rumination and affect outcomes?
HPS * Situational Code * Dampening	Does situational context further moderate the associations between hypomanic personality, use of damping and affect outcomes?
HPS * Situational Code * Savouring	Does situational context further moderate the associations between hypomanic personality, use of savouring and affect outcomes?
<u>Social context models</u>	
Social Code * Positive Rumination	Does social context moderate the relationship between use of positive rumination and affect outcomes?
Social Code * Dampening	Does social context moderate the relationship between use of dampening and affect outcomes?
Social Code * Savouring	Does social context moderate the relationship between use of savouring and affect outcomes?
HPS * Social Code * Positive Rumination	Does social context further moderate the associations between hypomanic personality, use of positive rumination and affect outcomes?
HPS * Social Code * Dampening	Does social context further moderate the associations between hypomanic personality, use of damping and affect outcomes?
HPS * Social Code * Savouring	Does social context further moderate the associations between hypomanic personality, use of savouring and affect outcomes?
HPS = Hypomanic Personality Scale	

8.4 Results

8.4.1 Associations between hypomanic personality, emotion regulation strategies and affect.

8.4.1.1 Positive affect

Multilevel model analysis between mania risk, use of emotion regulation strategies, and affect are presented in Table 8.3. Use of positive rumination ($\beta = .63$, $p < .001$), dampening ($\beta = .40$, $p < .001$) and savouring ($\beta = .42$, $p < .001$) positively predicted momentary positive affect. Hypomanic personality was not a significant predictor of positive affect.

Table 8.3: Multilevel Model Analysis between Mania Risk, Emotion Regulation, Context, and Affect

Predictor	Positive Affect			Negative Affect		
	β	SE	<i>t</i>	β	SE	<i>t</i>
HPS	.16	.09	1.82	.03	.02	1.56
Positive Rumination	.63**	.03	20.83	-.09**	.01	-7.93
Dampening	.40**	.09	4.61	.38**	.03	13.99
Savouring	.42**	.04	10.91	-.14**	.01	-10.67
HPS*Positive Rumination	.01	.01	1.18	-.004*	.003	-1.39
HPS*Dampening	-.003	.02	-0.15	.01	.01	-1.26
HPS*Savouring	.01	.01	1.11	-.01	.003	-1.63
Situation*Positive Rumination	.07	.04	1.68	.003	.02	0.15
Situation*Dampening	.04	.13	0.30	-.06	.45	-1.35
Situation* Savouring	-.04	.05	-.84	-.01	.02	-0.44
Social* Positive Rumination	-.14*	.05	-2.93	-.01	.02	-0.56
Social* Dampening	-.18	.15	-1.25	-.003	.05	-0.08
Social* Savouring	-.15	.06	-2.28	.04	.02	-1.99
HPS*Situation* Positive Rumination	.01	.01	0.74	-.000	.004	-0.04
HPS*Situation* Dampening	-.06	.03	-1.79	-.03*	.01	-3.05
HPS*Situation* Savouring	-.01	.01	-0.94	.01	.01	1.26
HPS*Social* Positive Rumination	.01	.01	0.70	-.01	.004	-1.96
HPS*Social* Dampening	.01	.04	0.19	.01	.01	0.49
HPS*Social* Savouring	-.02	.02	-1.19	-.01	.01	-2.15

HPS = Hypomanic Personality

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

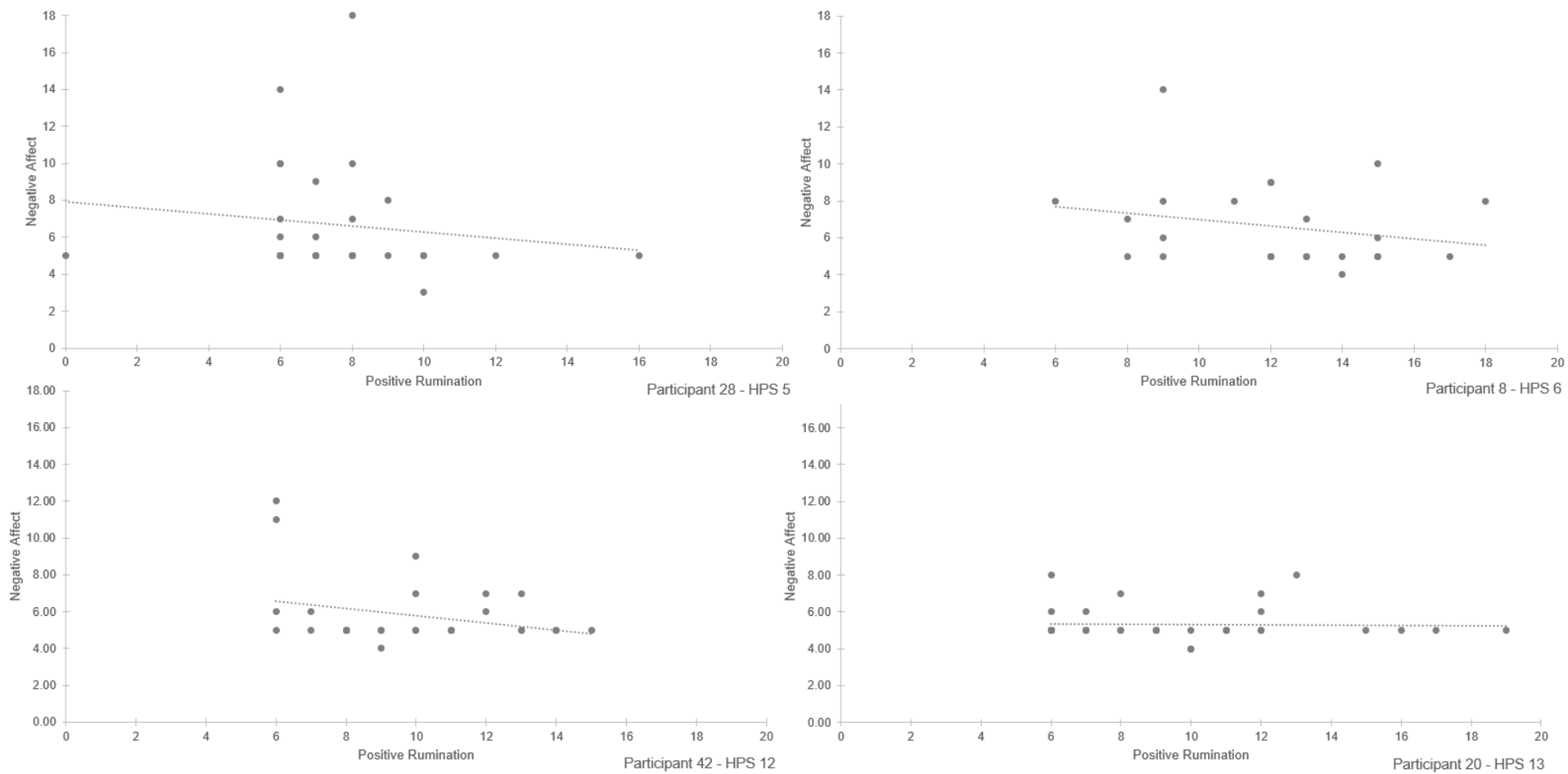


Figure 8.2: Two-Way Interaction between Mania Risk and Positive Rumination on Negative Affect

8.4.1.2 Negative affect

Use of dampening positively predicted momentary negative affect ($\beta = .38$, $p < .001$), while use of positive rumination ($\beta = -.09$, $p < .001$) and savouring ($\beta = -.14$, $p < .001$) negatively predicted negative affect. Hypomanic personality did not significantly predict negative affect.

The two-way interaction between hypomanic personality and use of positive rumination significantly predicted momentary negative affect, $\beta = -.004$, $p = .01$. Use of positive rumination was negatively associated with negative affect, this relationship was most pronounced when hypomanic personality was low, Figure 8.2. Other interaction terms were not associated with negative affect.

8.4.2 Do social or situational contexts moderate relationships between hypomanic personality, emotion regulation and affect?

8.4.2.1 Positive affect

The two-way interaction between social context and use of positive rumination significantly predicted momentary positive affect, $\beta = -.14$, $p = .03$. Use of positive rumination in both social and non-social contexts was positively associated with positive affect, however this relationship was more pronounced in non-social contexts, Figure 8.3. Other interaction terms were not associated with positive affect. Three-way interaction terms were not significant predictors of positive affect.

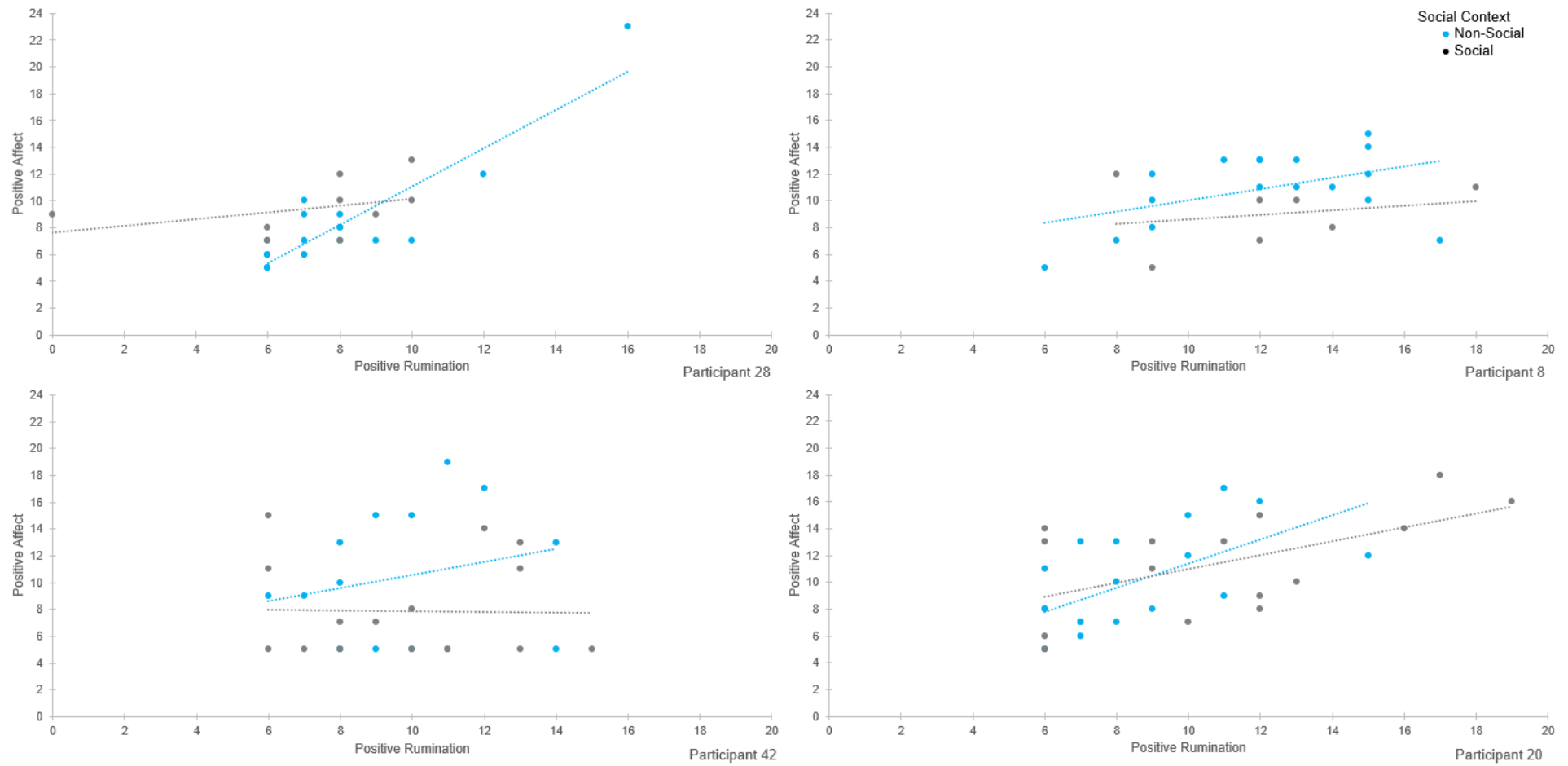


Figure 8.3: Two-Way Interaction between Social Context and Positive Rumination on Positive Affect

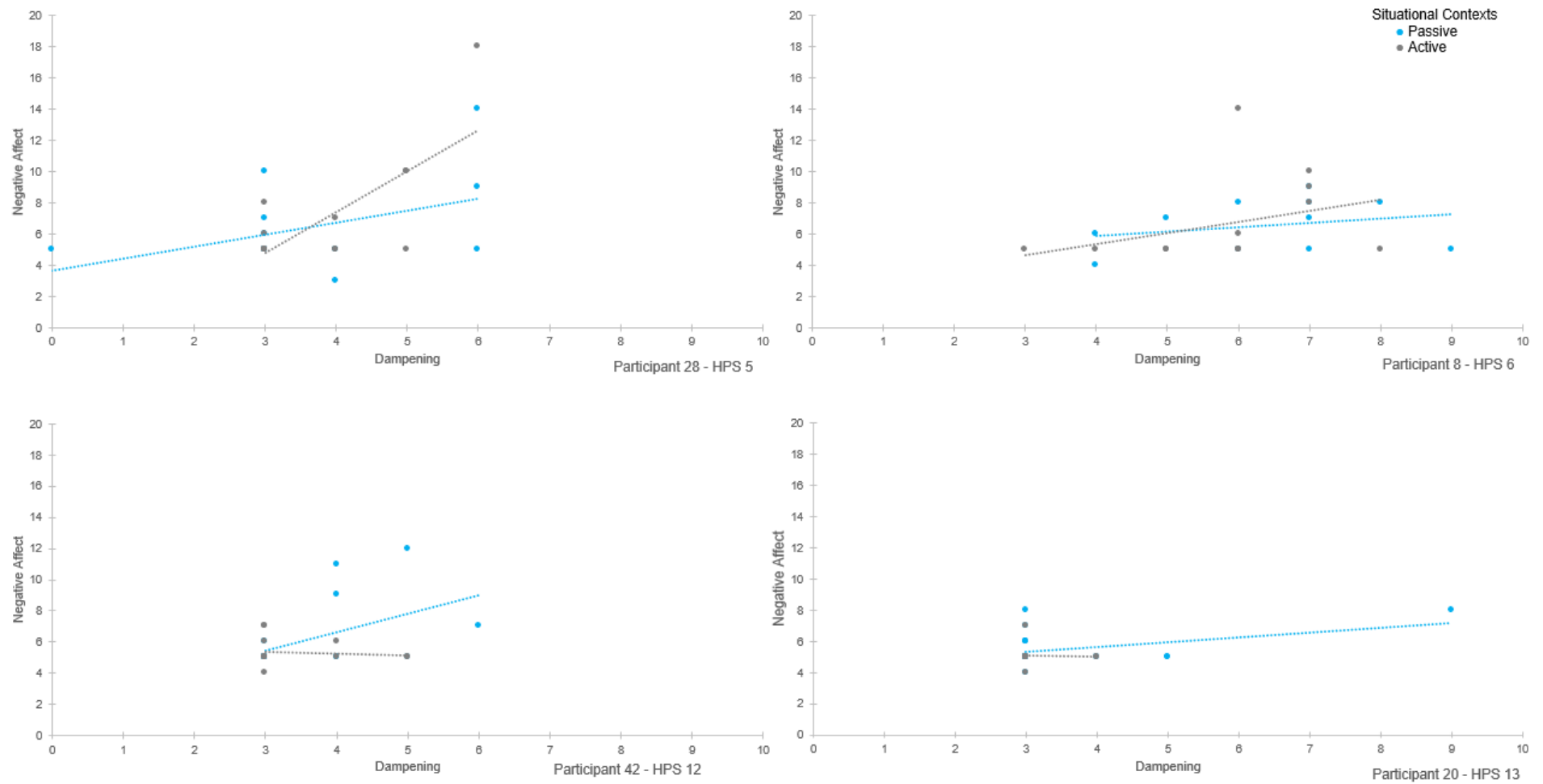


Figure 8.4: Three-Way Interaction between Mania Risk, Situational Context and Dampening on Negative Affect

8.4.2.2 Negative affect

Negative affect was significantly predicted by the three-way interaction between hypomanic personality, situational context, and use of dampening, $\beta = -.03$, $p = .03$. Significance was retained when the model was conducted using 1000 sample bootstrapping and robust error estimations. Use of dampening in passive situational contexts was positively associated with negative affect, regardless of hypomanic personality scores. When Hypomanic personality was low, use of dampening in active situational contexts was also positively associated with negative affect. This relationship was more pronounced in active contexts than passive contexts. However, when hypomanic personality was higher, use of dampening in active situational contexts was associated with lower negative affect, Figure 8.4. Other interaction terms were not associated with negative affect.

8.5 Discussion

Previous research has highlighted emotion regulation strategies as influential to the development of mood difficulties, and they are associated with mania risk. However, many of the cross-sectional investigations of relationships between tendencies to use particular emotion regulation strategies, mania risk and affective outcomes have produced mixed findings (Chapter 3). These mixed findings may result from lack of consideration of potential contextual moderators of the associations between mania risk, emotion regulation strategies, and affect (Chapter 4). The current study therefore used a prospective Experience Sampling Method to address methodological limitations of previous research and investigate responses to positive affect across different social and situational contexts.

The first aim of this study was to investigate if associations between mania risk and affect outcomes are moderated by use of emotion regulation strategies. Mania risk did not predict positive or negative affect over time. This finding is contrary to previous literature that suggests that mania risk is associated with elevated levels of positive and negative affect (e.g., Sperry & Kwapill, 2017) however, this relationship may not have been observed in the current study as mania risk is typically lower in the general population. Relationships between emotion regulation strategies and affect were as expected. Positive rumination and savouring were positively associated with positive affect and negatively associated with negative affect over time, in line with previous research (e.g., Olofsson et al., 2014; Jose et al., 2012). Use of dampening was positively related to both positive and negative affect, these findings are also in line with previous research which has suggested that dampening positive affect is associated with both positive and negative affective outcomes (e.g., Olofsson et al., 2014).

In relation to hypothesis 1, neither dampening or savouring moderated the relationship between hypomanic personality and affect. This suggests that emotion regulation influences affect over and above mania risk and that pathways between use of these strategies and affect outcomes are not influenced by mania risk. The association between hypomanic personality and negative affect was moderated by use of positive rumination, such that the negative correlation between positive rumination and negative affect was strongest when hypomanic personality was also lower. This was opposite to the prediction that this relationship would be strongest when mania risk was higher; however, positive rumination is associated with reduced negative affect in general populations where mania risk is typically low (e.g., Feldman et al., 2008). Further, as positive rumination is considered maladaptive in the context of mania risk, it may be less

likely to lead to successful downregulation of negative affect, meaning that the negative association between these variables is less pronounced for people at higher mania risk.

The second aim of this study was to assess if social and situational contexts further moderate the relationships between hypomanic personality, use of emotion regulation strategies, and affect. In relation to hypothesis 2, social context did not moderate relationships between dampening or savouring and affect. This suggests that the associations between use of these strategies and affect outcomes are not influenced by whether or not people are alone or in company. The three-way interactions between use of these strategies, social context and hypomanic personality were also not significant predictors of affect, suggesting that these associations are not influenced by mania risk.

However, the relationship between positive rumination and positive affect was moderated by social context, such that use of positive rumination in non-social contexts was associated with greater positive affect. These findings support previous work which has found positive rumination to be related to increased positive affect (e.g., Raes, et al., 2009; Olofsson et al., 2014), a tentative explanation for this is that people may be better able to engage in positive rumination, which involves self-focused and emotion focused thoughts, when alone. The three-way interactions between hypomanic personality, social contexts, suggesting that this association is not influenced by mania risk.

Situational contexts did not moderate the associations between use of emotion regulation strategies and affect, suggesting that these associations are not related to what people are doing in the moment. Situational context did however moderate the relationship between hypomanic personality, dampening

and negative affect such that use of dampening in active contexts was associated with greater negative affect, however when hypomanic personality was high, this relationship was reversed. The direction of this relationship was opposite to what was anticipated and possibly presents a context in which dampening may be considered adaptive for individuals at mania risk. Tentatively, these findings suggest that active situations could buffer against negative affective outcomes typically associated with use of dampening for individuals higher in mania risk. However, people at greater mania risk may also be prone to overestimating use of emotion regulation strategies.

This study is the first to consider the potential moderating influence of use of positive emotion regulation strategies in different contexts on the associations between mania risk and affect, within a prospective design. The use of experience sampling methods is a strength of the current research, as assessment of emotion regulation are situated in naturally occurring contexts, increasing ecological validity. Additionally, momentary recordings of affect and use of regulation strategies addresses some limitations associated with cross-sectional designs, such as reliance on prospective recall of emotional events (e.g., Study 2, Chapter 7). Use of online data collection methods is also considered a strength. Participants were given a choice of modality, with 73% opting for online format, suggesting this is a method of data collection that is readily accepted by participants, particularly samples of young adults. It should be noted that the number of participants with insufficient datasets removed from the online sample was 10% higher than those removed from the pen-and-paper sample. However, this may be a function of the 15-minute cut-off point for usable entries as the time of completion was automatically recorded for online entries, while participants completing paper diaries were asked to provide this

information. As there is no way of assessing the validity of these times, it is possible that a number of these entry times were recorded inaccurately in order to present increased compliance to protocol, further suggesting that online data collection methods may be useful for ESM designs. This study is also not without limitation.

8.5.1 Limitations and Future Direction

Firstly, the sample comprised largely of White, female, students, many of whom likely to be psychology undergraduates, limiting generalisability of findings. Additionally, grouping participants into high- and low-risk groups according to mania risk would have allowed for direct comparison. However, as hypomanic personality traits exist on a continuum and are typically low within the general population, there are difficulties obtaining a large enough high-risk sample, therefore use of the Hypomanic Personality Scale (Eckblad & Chapman, 1986) as a continuous variable is justified and is common throughout the literature. Future research may benefit from investigating the potential moderating influence of context on associations between emotion regulation and affect outcomes in non-clinical high-risk groups, and clinical samples of individuals diagnosed with bipolar disorder, in comparison to non-clinical controls who are not at risk.

Additionally, context categories were broad. Comparisons were made between any entries in which participants said they were in the company of others and when they stated they were alone. However, previous findings suggest that the nature of the relationships may influence use of emotion regulation strategies in social settings (English et al., 2017). Similarly, comparisons were made between active and passive situational contexts. Given the relevance of personal goal-attainment to mania risk (e.g., Gruber & Johnson, 2009), it may be useful to

further delineate active situations into goal- versus non-goal-oriented contexts. Future research may benefit from more nuanced assessment of these factors and how they influence emotion regulation. Use of experimental paradigms may also be useful for controlled manipulation of contextual factors.

Finally, as situational and social contexts were recorded in relation to the same time points, future research should aim to investigate interactions between different social and situational factors to provide a more holistic representation of real life, dynamic events. For example, comparing individual (non-social) and collaborative (social) goal attainment to provide further insight into specific contexts in which use responses to positive affect may be more or less (mal)adaptive for those at risk of mania.

8.5.2 Conclusion

In conclusion, mania risk was not related to affect. Momentary positive affect was positively associated with use of positive rumination, dampening, and savouring, while negative affect was negatively associated with positive rumination and savouring, and positively correlated with dampening. The relationship between positive rumination and positive affect was moderated by social context, while the relationship between mania risk, dampening and negative affect was moderated by situational context. Findings from this study further knowledge of relationships between mania risk, emotion regulation, and affect by exploring them prospectively, and highlight instances where they may be influenced by context. Further work is needed to explore dynamic associations between social and situational factors and their influence on affective outcomes. Experimental manipulation of contextual factors would also be beneficial.

Chapter 9:

Study 4:

Are positive writing outcomes influenced by
mania risk, emotion regulation and
context?

9.1 Abstract

Background: Positive writing interventions have been associated with beneficial affective outcomes (e.g., increased positive affect and reduced negative affect, and improved well-being) in individuals prone to low mood. These paradigms could also be used to offer insights into the influence of focusing on and thinking about positive experiences in contexts where elevated positive affect may be problematic, e.g., mania risk. Mania risk has also been linked to disturbances in positive emotion regulation. Previous investigations have not considered how trait tendencies to regulate emotions may moderate the affective outcomes associated with positive writing interventions. Additionally, the writing instructions provided to participants offer an opportunity to further explore situational context, such as goal-oriented events, that have been associated with problematic positive affect for individuals at mania risk in a personally-relevant way.

Aims: The current study therefore aimed to assess 1) if mania risk or tendencies to use positive emotion regulation strategies predict affective outcomes associated with positive writing, and 2) if these relationships are moderated by writing about goal-oriented events.

Method: 133 participants (mean age = 20.93, SD = 1.89) completed self-report measures of mania risk, trait propensity to use positive emotion regulation strategies and baseline positive and negative affect, and high mood symptoms, before completing either online goal-oriented positive writing, or non-goal oriented positive writing, for 20 minutes per day on three consecutive days. Positive and negative affect were measured immediately before and after each writing session, and follow-up measures of positive and negative affect and high

mood symptoms were completed one and four weeks after completion of the writing sessions.

Results: Mania risk was associated with an immediate increase in positive affect and decrease in negative affect following the writing sessions. However, mania risk was also associated with a decrease in positive affect at week-1 follow-up. Tendencies to dampen were predictive of increased high mood symptoms at week-1 follow-up. Week-1 high mood change was also associated with the interaction between mania risk, trait tendencies to dampen, and writing condition, while week-1 negative affect change was associated with the interaction between mania risk and positive rumination. Writing condition was not related to affective outcomes.

Discussion: Findings suggest that positive writing interventions are an effective means of inducing immediate increases in individuals at mania risk, however this effect was not maintained at follow-up points. Additional work is needed to explore how these immediate changes in mood influence subsequent use of emotion regulation strategies, as well as further exploring the role of context-specific writing prompts.

9.2 Introduction

Emotion regulation strategies are defined as “*processes individuals engage in to initiate, maintain, intensify, or eliminate mood states*” (Gross, 1998b), and are often delineated as adaptive (e.g., reappraisal) or maladaptive (e.g., rumination), see Section 1.2. Bipolar disorder is characterised by extremes of high and low mood, and mood dysregulation over time (Section 2.3). There are links between these experiences and tendencies to engage in unhelpful strategies for regulating positive and negative affect (Dodd et al., 2019). While much of the literature on emotion regulation in bipolar disorder has focused on response to negative affect, attention has recently been directed towards disturbances in positive affect regulation. Individuals with bipolar disorder have been found to report greater use of dampening (i.e., tendencies to engage in thoughts that reduce the intensity and duration of positive mood states), positive rumination (i.e., excessive thoughts about positive aspects of the situation; e.g., Johnson et al., 2016) and positive urgency (mood-based rash action; Muhtadie, Johnson, Carver, Gotlib, & Ketter, 2014). Links have also been identified between endorsement of maladaptive emotion regulation strategies and high mood symptoms (e.g., Green et al., 2011).

In people at risk for mania there is a similar pattern of emotion dysregulation as in diagnosed bipolar disorder (see Chapter 3 for a review; McGrogan et al., 2019). Mania risk is characterised by cumulative risk factors, including family history of bipolar disorder, being at the peak age of onset for bipolar disorder (i.e., 18 to 25), and behavioural indices (Scott, et al., 2016). One such behavioural indicator are hypomanic personality traits, characterised by extremes of confidence, gregariousness, and energetic behaviours, and has been linked to excessive and prolonged positive affect as well as tendencies to

engage in positive rumination and dampening (Dempsey et al., 2011; Fisk et al., 2015; Section 2.2).

However, this research has mixed findings, and is confounded by a lack of consideration of moderating factors such as context (e.g., the situation the person is in, or how they want to feel at that moment), limiting understanding of real-life emotion regulation (Aldao, 2013). These moderators may explain the mixed findings, rather than a clear distinction between adaptive and maladaptive strategies (Bonnano & Burton, 2013; Section 4.1). A number of contexts have been identified as having particular relevance to both bipolar disorder and mania risk, such as overambitious goal setting, excessive pursuit of rewards and reward sensitivity (e.g., Alloy, Reilly-Harrington, Fresco, & Flannery-Schroeder, 2005; Johnson, 2005b; Johnson et al., 2005). Goal-relevant contexts may influence emotion regulation in bipolar disorder and mania risk. For example, individuals with diagnosed bipolar disorder have also been found to display elevated positive affect when anticipating and receiving rewards (e.g., Berridge & Kringelbach, 2008; Meyer et al., 2001). Research has found that individuals at increased mania risk reported deficits in socially relevant positive emotions and elevated levels of positive affect in relation to the pursuit of rewards and goal attainment (Gruber & Johnson, 2009; Johnson, 2005; see Sections 4.2.3 and 4.2.4). Understanding associations between mania risk and emotion regulation, and the influence of relevant contexts, is important for understanding more about potential precursors to the clinically significant mood dysregulation seen in bipolar disorder.

Mood induction paradigms have been used to investigate emotion regulation and reactivity in mania risk and bipolar disorder. For example, individuals at risk of mania and those with diagnosed bipolar disorder have been shown to experience increased emotion reactivity in response to positive mood

induction stimuli (e.g., positive film clips; Gruber et al., 2009; Gruber et al., 2008) compared with controls. Elevated positive affect is also often associated with increased high mood symptoms (e.g., pressured speech, decreased need for sleep, and engagement in risky or impulsive behaviours) in at-risk groups (e.g., Gruber et al., 2008). Given this, the association between how people regulate positive emotion and affective outcomes, and influence of specific situational contexts on this relationship, is worthy of further investigation. However, traditional mood induction paradigms typically use stimuli such as positive film clips or photos, which are often other-focussed and not ecologically valid. Utilising paradigms that are more personally meaningful and focus on real-life emotive experiences is one way to address this challenge.

While not developed as mood induction paradigms, expressive writing interventions have been shown to influence affective outcomes. For example, they improve well-being both physically (e.g., immune functioning; Petrie, Booth, & Davison, 1995) and psychologically (e.g., reduced depression symptoms; Krpan et al., 2013). Original paradigms primarily focused on the cathartic effects of writing about feelings associated with traumatic, stressful or negative emotional events (Pennebaker & Beall, 1986). Findings from such studies suggest that engagement in short-term expressive writing interventions (typically 15 to 20 minutes of pen-and-paper based writing on between three and five consecutive days) result in marked physical and psychological health benefits (Pennebaker, 1997). More recent investigations have also assessed the benefits of writing about positive events to further promote well-being. Within these studies, participants are typically prompted to write about *“the most wonderful experience or experiences in [their] life, happiest moments, ecstatic moments, moments of repute”* (Burton & King, 2004). A study by Smith and colleagues

(2018) explored positive writing paradigms with individuals high in Type D personality traits. Type D personality is characterised by high levels of negative affect and social inhibition, and is associated with a number of negative physical and psychological health outcomes, and reduced quality of life (Mols & Denollet, 2010). Findings from this study show that participants in the positive writing condition reported greater reductions in anxiety and perceived stress at a 4-week follow up point than individuals in a control condition who completed neutral writing tasks, regardless of Type D traits (Smith, Thompson, Hall, Allen, & Wetherell, 2018). This suggests that individuals high in Type D experience the same beneficial outcomes from positive writing interventions as those who are not Type D. Similar improvements in well-being have also been found in online positive writing interventions as in traditional pen-and-paper based formats, suggesting that this is a suitable method of delivery (Allen et al., 2020).

The potential moderating effect of emotion regulation has been explored in the evaluation of writing interventions. In healthy participants, higher trait suppression (i.e., tendencies to inhibit emotional experiences and expression that are generally viewed as maladaptive) at baseline were associated with a greater reduction in depression symptoms following a written emotional disclosure intervention (i.e., writing about thoughts and feelings about difficult or emotional events). Outcomes were also mediated by a reduction in brooding, a purportedly maladaptive ruminative response to negative affect (i.e., excessive negative thoughts), but not reflection (a more adaptive form of rumination with some focus on problem-solving) across the writing period (Gortner, Rude, & Pennebaker, 2006). These findings highlight the potential significance of maladaptive responses to negative affect and suggest that individuals with greater tendencies to engage in maladaptive emotion regulation strategies (e.g., suppression) show

improved well-being following expressive writing, potentially via a reduction in use of maladaptive responses to negative affect. However, previous research has also not yet considered how trait tendencies to use maladaptive emotion regulation strategies in response to positive affect, namely dampening and positive rumination, may predict outcomes associated with positive writing interventions.

Writing interventions have also been explored as a simple intervention tool to enhance well-being in individuals with mood disorders. Baikie, Geerligs, and Wilhelm (2012) compared the effects of trauma-focused writing and positive writing with a control (neutral) condition in participants with a range of mood disorders, including depression, anxiety, and bipolar disorder. Results showed that the pooled expressive writing groups (i.e., trauma-focused and positive conditions) reported significantly lower depression, anxiety and stress levels at all time points compared to the control writing condition, however there were no differences between trauma-focused, positive and control conditions when compared separately.

Taking this together, writing interventions are typically explored in the context of negative affect and low mood symptoms (e.g., depression and Type D personality), with the aim of increasing positive affect and well-being. However, elevated positive affect may be problematic in contexts where positive emotion regulation is disrupted (e.g., mania risk). Additionally, as mania is often characterised by increases in self-focused positive affect and less prosocial positive emotion (e.g., Gruber & Johnson, 2009), it is suggested that positive writing paradigms, which often ask participants to produce writing extracts relating to their own real-life experiences, may offer a novel, ecologically valid and personally-relevant means of inducing positive affect, and investigating

whether changes to affective outcomes are more pronounced at higher levels of mania risk. This paradigm can be used to explore the influence of positive emotion regulation strategies on affective outcomes, and whether use of particular emotion regulation strategies influences the association between mania risk and change in affect. The writing prompts provided to participants also present an opportunity to explore the effects of context by manipulating the focus of the writing in order to assess how writing about situations which have been identified as having particular relevance to bipolar disorder and mania risk (i.e., goal/reward attainment) may influence associations between mania risk, trait use of emotion regulation strategies and change in affective outcomes.

Additionally, use of writing paradigms allows for insight into possible associations between hypomanic personality and language use. Research has suggested that word choice may be related to a range of personality traits. For example, higher neuroticism is predictive of greater use of negative emotion words and less use of positive emotion words, while extroversion is associated with greater use of positive emotion words (Pennebaker & King, 1999). Similarly, greater use of first-person singular pronouns is indicative of lack of social integration and personal relationships and is related to low mood and suicidality (Pennebaker, Mehl, & Niederhoffer, 2003; Rude, Gortner, & Pennebaker, 2004; Stirman & Pennebaker, 2001). However, these associations have yet to be explored in relation to hypomanic personality and given the theoretical relevance of elevated positive and negative affect states to mania risk, it is suggested that such investigation is warranted.

As such, and in line with research aims 1 and 4 (Section 5.4.1 & 5.4.4) the current study used a positive writing paradigm as a tool to induce positive affect and address two main research questions. Firstly, does mania risk or

endorsement of specific emotion regulation strategies (or an interaction between these factors) predict change in affective outcomes after positive writing interventions? Secondly, are these associations moderated by writing about specific contexts (i.e., goal-oriented versus positive experiences unrelated to goal attainment as a control group)?

In line with previous findings for associations between mania risk, emotion regulation and affective outcomes, it was hypothesised that:

1. Greater increases in positive affect after the positive writing tasks would be associated with a) higher hypomanic personality scores, b) greater trait use of positive rumination, c) lower trait use of dampening, and d) a goal-oriented rather than general positive (control) writing task.

It was also hypothesised that:

2. There would be a two-way interaction between emotion regulation strategies and hypomanic personality. It was predicted that tendencies to use dampening and positive rumination would moderate the relationship between hypomanic personality and positive affect change, such that greater use of positive rumination and lower use of dampening would be associated with greater increases in positive affect following the positive writing tasks, when hypomanic personality scores are high.
3. There would be a three-way interaction between emotion regulation strategies, hypomanic personality, and writing condition on positive affect. It was predicted that use of emotion regulation strategies would moderate the relationship between hypomanic personality and positive affect, such that greater use of positive rumination and lower use of dampening would

be associated with greater increases in positive affect following goal-oriented writing when hypomanic personality is high.

Secondary analyses also explored these associations, with negative affect and high mood symptoms as outcome variables in place of the primary outcome variable positive affect. The pattern of associations for high mood symptoms were anticipated to be the same as those for positive affect. For negative affect as the outcome, the pattern of associations was anticipated to be reversed such that *decreases* in negative affect after positive writing would be negatively associated with mania risk and positive rumination, positively associated with dampening, and more pronounced in the goal-oriented rather than general positive (control) writing task. As with positive affect, for both negative affect and high mood symptoms, the moderating influence of emotion regulation on affect change was investigated, as was the moderating influence of writing condition.

Hypotheses were pre-registered on the Open Science Framework (osf.io/tgwa8).

Further, secondary quantitative analysis was conducted on the content of the writing extracts to examine the use of positive and negative words and self-focused language. It was hypothesised that:

4. Hypomanic personality would be associated with greater use of a) singular first-person pronouns, b) positive affect words, and c) negative affect words.

9.3 Method

9.3.1 Participants

Participants were drawn from a self-selected sample of respondents to social media advertisements, recruitment posters and emails sent to students at Northumbria University, and randomly assigned to a writing condition. Advertisements stated the following inclusion criteria: aged 18 to 25, good understanding of written English, access to an internet enabled computer, and no current diagnosis of a mood disorder (e.g., bipolar disorder or depression).

283 individuals accessed the initial survey and were invited to begin the writing sessions. 164 participants began the writing sessions, with 113 (57 control condition, 56 goal-oriented condition) completing all three writing sessions and at least one follow-up survey, providing sufficient data for meaningful analysis, Figure 9.1. The mean age of these participants was 20.94 (SD 1.89), 73.9% described their gender as female, 25.2% as male, and 0.9% as Other. 86% of participants described their ethnicity as White, 0.9% as Black, 7.1% as Asian, 2.6% as Mixed, and 1.8% as Other. 7.1% of participants were employed (1.8% part-time), 87.9% were students (0.9% part-time), and 2.6% were unemployed.

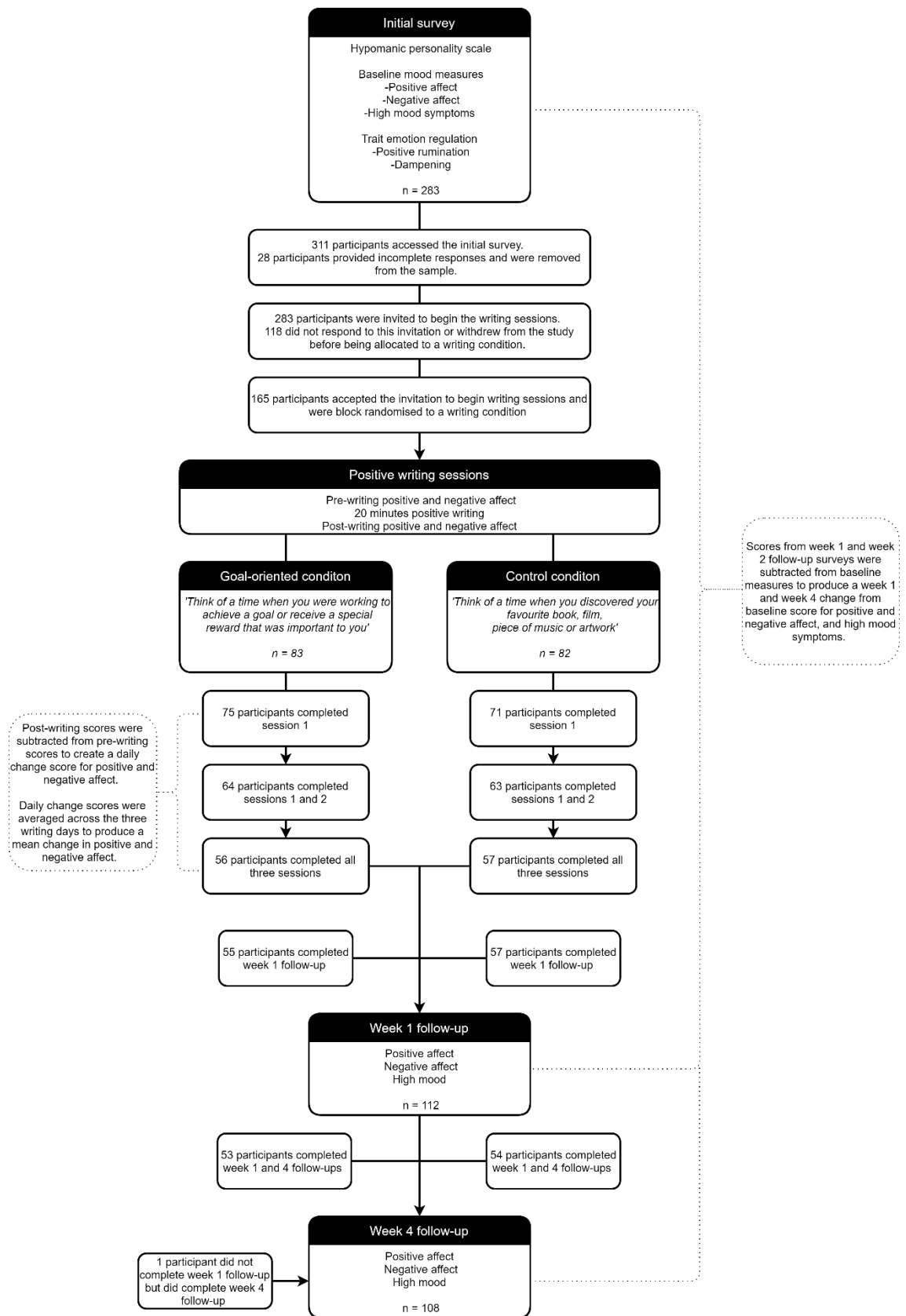


Figure 9.1: Study Procedure and Attrition

9.3.2 Materials

Materials consisted of an initial online survey comprising five questionnaires, three online writing sessions, and two follow up surveys comprising two questionnaires, hosted by Qualtrics.

9.3.2.1 Demographics

An in-house demographics questionnaire was used to record participants' age and gender as potential confounds, and occupation and ethnicity to describe the sample.

9.3.2.2 Individual Differences Measures

Hypomanic Personality Scale

Mania risk was measured using the 20-item Hypomanic Personality Scale (HPS-20: Meads & Bentall, 2008; Appendix A).

9.3.2.3 Emotion Regulation

Response to Positive Affect Scale

Trait tendencies to use positive emotion regulation strategies were measured using the 17-item from the Response to Positive Affect Scale (RPA: Feldman et al., 2008; Appendix J).

9.3.2.4 Affective Measures

Positive and Negative Affect Scale

Current mood was measured using the 10-item international Positive and Negative Affect Schedule – Short Form (i-PANAS-sf; Thompson, 2007: Appendix D).

Altman Self-Rating Mania Scale

Current high mood symptoms were recorded using the 5-items Altman Self-Rating Mania Scale (ASRM: Altman et al., 1997; Appendix E).

9.3.2.5 Positive writing task

In order to assess the influence of achievement related contexts on positive affect, instructions for the writing tasks were *‘Think of a time when you were working to achieve a goal or received a special reward that was important to you’ (goal/reward condition)* or *‘Think of a time when you discovered your favourite book, film, piece of music or art work’ (control condition)*, followed by the standard text for positive writing tasks (Burton & King, 2004, based on Maslow, 1971) *‘Try to imagine yourself at that moment, including all the happiness, excitement, good feelings and emotions associated with the experience, Now write about the experience in as much detail as possible, trying to include the feelings, thoughts and emotions that were present at the time. Please try your best to re-experience the emotions involved. Don’t worry about spelling grammar or sentence structure, the important thing is that once you begin writing, you continue until the time is up.’*

Instruction for the second and third day of writing also included *“You may either write about the same experience as yesterday, or you may choose a new one.”* Full instructions are included in Appendix K.

9.3.3 Procedure

Ethical approval was granted from the Psychology Department of Northumbria University. Data was collected between October 2019 and June 2020. Informed consent was obtained electronically from all participants before they proceeded with the initial survey, comprising a demographic questionnaire,

HPS-20, i-PANAS-sf, ASRM and RPA. The survey was accessible on any internet enabled device via a link contained in recruitment posts, and was not subject to time constraints, however it was estimated that completion would take approximately 10 minutes. Following the initial survey, participants were invited by email to begin the writing portion of the study. Writing sessions were completed online on three consecutive days via direct links sent to participants. Within each session, participants first completed a pre-writing measure of affect (i-PANAS-sf) and were then prompted to write continuously for 20 minutes about either a goal or reward related scenario (goal-oriented condition) or the discovery of their favourite book, piece of music etc. (control condition), according to their condition instructions. Finally, participants completed a post-writing measure of affect (i-PANAS-sf). For ease of writing, it was recommended that writing sessions were completed on a laptop or desktop computer. Following the writing portion of the study, participants were contacted by email exactly 1-week and 4-weeks after the final writing session to complete the first and second follow-up surveys respectively, and provided with a full debrief. Further detail of this procedure is presented in Figure 9.1. Participants who completed all phases of the study received £10 Amazon voucher as compensation for their time, and undergraduate psychology students from Northumbria University also received course credits.

9.3.4 Design and Analysis

This study employed a single-blind correlational design, with participants randomly assigned to one of two writing conditions (goal-oriented or control) using block randomisation. Data was collected via online self-report surveys and writing tasks. Predictor variables included writing condition, hypomanic personality, and trait emotion regulation (dampening and positive rumination).

The primary outcome variable was change in positive affect between pre-and post-measures. The secondary outcomes were change in negative affect and high mood symptoms, use of first-person singular pronouns, and positive and negative emotion words.

Power calculation was based on seven predictors. These were emotion regulation strategies (ER; dampening and positive rumination), writing condition (goal-oriented versus control), hypomanic personality (HP), and the following interaction terms to test moderation effects; HP x ER, HP x condition (goal-oriented versus control), ER x condition (goal-oriented versus control), and HP x ER x condition (goal-oriented versus control). Separate models were conducted for positive rumination and dampening, Table 9.1. To detect a medium effect, G*Power (Faul et al., 2007) a minimum total sample size of $n = 103$ was recommended.

Table 9.1: Summary of Regression Models

Model 1	Model 2	Primary Outcomes	Secondary Outcomes
Condition	Condition	Mean Positive Affect Change	Mean Negative Affect Change
HPS	HPS		
Positive Rumination	Dampening	Week-1 Positive Affect Change	Week-1 Negative Affect Change
HPS x Condition	HPS x Condition	Week-4 Positive Affect Change	Week-4 Negative Affect Change
HPS x Positive Rumination	HPS x Dampening		
Positive rumination x Condition	Dampening x Condition		Week-1 High Mood Change
HPS x Positive Rumination x Condition	HPS x Dampening x Condition		Week-4 High Mood Change
			Singular First-Person Pronouns
			Positive Affect Words
			Negative Affect Words

HPS = Hypomanic Personality Scale

For each day participants completed the writing task, pre-writing positive affect scores were subtracted from post-writing positive affect scores to produce a daily change in positive affect score. Positive change scores indicated that positive affect increased following the writing task while negative scores show a decrease in positive affect between pre-and post-writing measures. Higher scores in both directions represent a greater magnitude of change. Change scores were averaged across the three days on which the writing tasks were completed to produce a mean daily change positive affect score. Baseline positive affect scores were also subtracted from follow-up positive affect scores to create week-1 and week-4 change scores. The same procedure was conducted on negative affect scores. Similarly, baseline high mood symptom scores were subtracted from follow-up high mood symptom scores to produce week-1 and week-4 change in high mood symptom scores for each participant.

Writing conditions were dummy coded as control = -1 and goal-oriented = 1.

Data were analysed using a series of multiple regressions, following the procedure outlined by West and colleagues for analysing categorical (condition) by continuous (hypomanic personality and emotion regulation) variable interactions (West, Aiken, & Krull, 1996). Hypomanic personality, dampening and positive rumination were mean centred. For each outcome variable, separate analyses were conducted with positive rumination and dampening as moderators. Relevant interaction terms, summarised in Table 9.2, were also entered into each model.

Table 9.2: Summary of Interaction Terms

Interaction Terms	Tested Moderation
HPS x Condition	Are associations between hypomanic personality and change score outcomes moderated by writing condition?
<u>Model 1</u>	
HPS x Positive Rumination	Are associations between hypomanic personality and change score outcomes moderated by trait use of positive rumination?
Positive Rumination x Condition	Are associations between trait use of positive rumination and change score outcomes moderated by writing condition?
HPS x Positive Rumination x Condition	Is the interaction between hypomanic personality and trait use of positive rumination on mood change outcomes moderated by writing condition?
<u>Model 2</u>	
HPS x Dampening	Are associations between hypomanic personality and change score outcomes moderated by trait use of dampening?
Dampening x Condition	Are associations between trait use of dampening and change score outcomes moderated by writing condition?
HPS x Dampening x Condition	Is the interaction between hypomanic personality and trait use of dampening on mood change outcomes moderated by writing condition?
HPS = Hypomanic Personality Scale	

9.4 Results

Descriptive statistics are displayed in Table 9.3. There were no significant differences in age ($p = .16$), HPS ($p = .72$), trait positive rumination ($p = .16$) and dampening ($p = .86$), or scores on baseline measures of high mood ($p = .27$), positive ($p = .24$) and negative affect ($p = .37$) between participants randomly assigned to the goal-oriented or control positive writing conditions. Correlations are reported in Appendix L.

Table 9.3: Descriptive Statistics for Age, Mania Risk, Emotion Regulation Strategies, Affect, and Language Variables

	Goal-Oriented Condition						Control Condition					
	<i>N</i>	Mean	<i>SD</i>	Min	Max	α	<i>N</i>	Mean	<i>SD</i>	Min	Max	α
Initial Survey	56						57					
Age		21.19	1.91	18	25			20.67	1.85	18	25	
HPS		7.82	3.65	2	19	.72		8.07	3.83	1	18	.73
Positive Affect		13.68	3.95	6	21	.72		12.79	3.97	5	23	.72
Negative Affect		8.04	3.16	5	18	.74		8.60	3.40	5	18	.61
High Mood		5.38	3.85	0	16	.71		4.67	2.85	0	13	.59
Positive Rumination		20.93	4.94	11	32	.77		22.23	4.82	12	35	.80
Dampening		16.55	5.17	8	29	.81		16.37	6	8	31	.86
Pre/Post Writing Mean Change												
Positive Affect		1.47	2.34	-3.33	9			1.92	2.53	-6.33	6.67	
Negative Affect		-0.93	1.54	-4.33	2			-1.10	1.50	-4.67	1.67	
LIWC												
Personal Pronouns		10.81	2.28	3.64	14.38			9.36	2.44	5.43	18.92	
Positive Affect Words		5.01	1.34	2.45	8.84			5.44	1.57	2.41	9.18	
Negative Affect Words		1.62	.80	0.32	4.34			1.40	0.72	0	3.44	
Week-1 Follow-up	55						57					
Positive Affect		13.38	4.56	5	24	.85		12.09	4.20	5	21	.78
Negative Affect		7.71	3.34	5	16	.85		8.25	4.11	5	24	.90
High Mood		6	3.86	0	17	.74		16	3.53	0	16	.76
Change from Baseline												
Positive Affect		-0.22	5.46	-9	14			-0.70	4.47	-10	8	
Negative Affect		-0.31	3.71	-10	10			-0.35	4.13	-13	15	
High Mood		1.15	4.04	-7	16			1.16	3.39	-7	9	
Week-4 Follow-up	54						54					
Positive Affect		13.38	4.56	5	24	.84		12.89	4.08	5	22	.76
Negative Affect		7.71	3.34	5	16	.74		9.24	3.93	5	21	.80
High Mood		5.91	4.53	0	18	.80		4.39	3.76	0	16	.78
Change from Baseline												
Positive Affect		-1.28	5.85	-16	12			0.35	4.76	-11	12	
Negative Affect		0.65	3.78	-10	10			1.04	3.87	-6	14	
High Mood		0.50	4.81	-10	15			-0.13	3.50	-7	9	

HPS = Hypomanic Personality Scale

Table 9.4 displays regression analysis for hypomanic personality, emotion regulation strategies, condition, and positive affect outcomes.

Table 2.4: Regression Analyses for Mania Risk, Emotion Regulation, and Positive Affect Outcomes

Predictor	Mean Daily PA Change			Week-1 PA Change			Week-4 PA Change		
	β	SE	t	β	SE	t	β	SE	t
Model 1									
Condition	-.20	.23	-0.84	.20	.49	0.40	-.76	.54	-1.42
HPS	.19*	.06	2.99	-.26	.13	-1.95	-.05	.15	-0.33
Positive Rumination	-.08	.05	-1.72	.05	.10	0.51	.13	.11	1.15
HPS*Condition	.09	.06	1.47	-.06	.13	-0.45	-.03	.15	-0.21
PosR*Condition	-.04	.05	-0.86	.03	.10	0.33	.000	.11	0.004
HPS*PosR	.003	.01	0.21	-.04	.03	-1.59	-.04	.03	-1.23
HPS*PosR*Condition	-.01	.01	0.31	-.002	.03	-0.07	-.003	.03	-0.09
Model 2									
Condition	-.20	.23	-0.86	.20	.47	0.42	-.95	.53	-1.79
HPS	.19*	.06	2.60	-.30*	.13	-2.28	-.06	.15	-0.37
Dampening	-.01	.04	-0.25	.11	.09	1.30	.01	.10	0.06
HPS*Condition	.08	.06	1.16	-.09	.13	-0.66	-.02	.15	-0.11
Dampening*Condition	.01	.04	0.34	.06	.09	0.74	-.10	.10	-1.01
HPS*Dampening	.004	.01	0.37	-.03	.02	-1.16	-.05	.03	-1.83
HPS*Dampening*Condition	.001	.01	0.06	-.02	.02	-0.90	-.003	.03	-0.09

HPS = Hypomanic personality scale, PA = Positive affect, PosR = Positive rumination

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

9.4.1 Positive Affect

9.4.1.1 Mean Daily Change

When accounting for the effects of positive rumination in model 1, hypomanic personality was a significant predictor of mean daily change in positive affect, $\beta = .19$, $p = .003$, with higher hypomanic personality predicting a greater increase in positive affect, Figure 9.2. No other predictor variables or interactions were associated with the mean daily change in positive affect.

In model 2, when accounting for the effects of dampening, hypomanic personality was also the only significant positive predictor of mean daily change in positive affect, $\beta = .17$, $p = .01$.

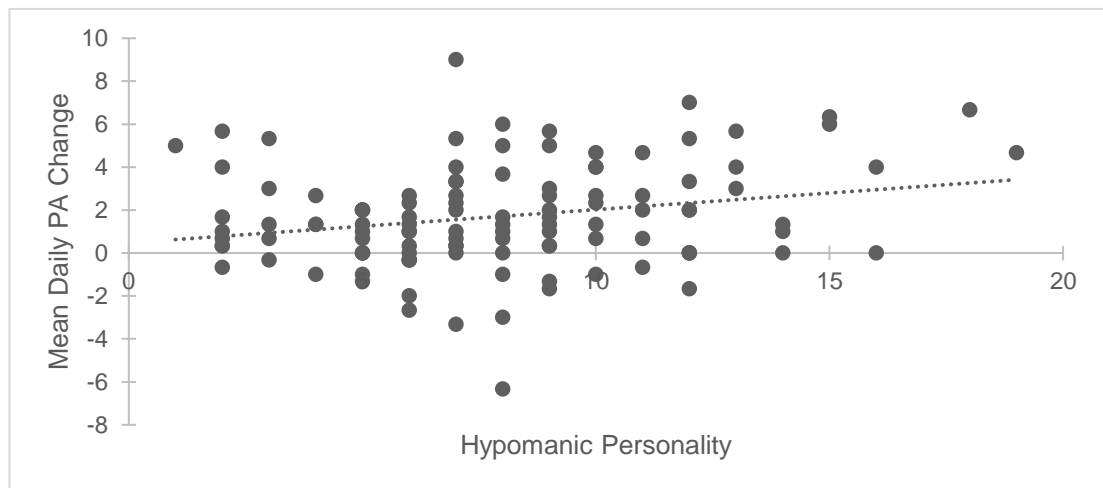


Figure 9.2: Regression between Mania Risk and Mean Daily Change in Positive Affect

9.4.1.2 Week-1 Change

When accounting for the effect of positive rumination in model 1, there were no associations between any predictor variables or interactions with the week-1 change in positive affect.

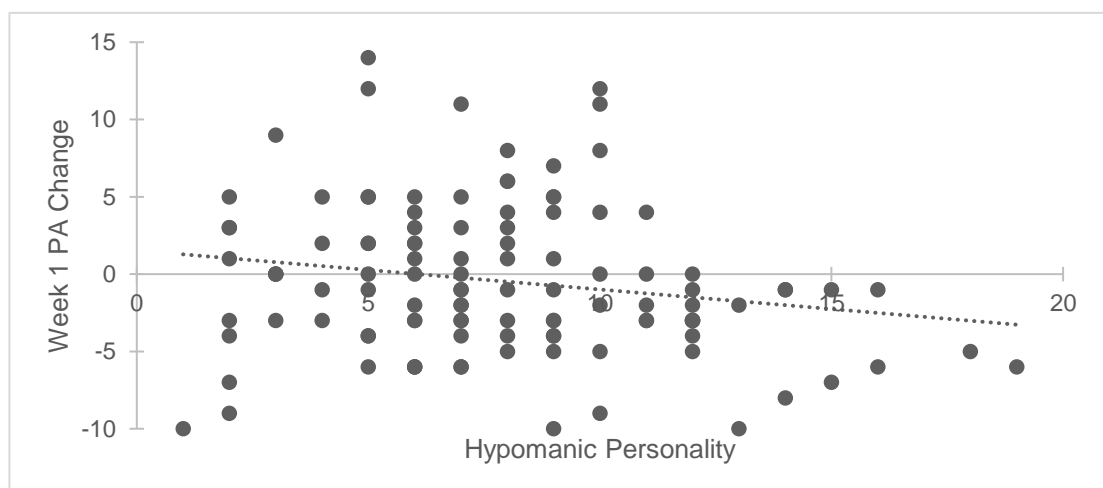


Figure 9.3: Regression between Mania Risk and Week 1 Change in Positive Affect

In model 2, when accounting for the effects of dampening, hypomanic personality was a significant negative predictor of week-1 change in positive affect, $\beta = -.30$, $p = .03$. As displayed in Figure 9.3, lower hypomanic personality was associated with a greater increase in positive affect, while higher hypomanic personality was associated with greater decrease in positive affect. No other predictor variables or interactions were associated with week-1 change in positive affect.

9.4.1.3 Week-4 Change

There were no associations between any predictor variables or interactions and week-4 change in positive affect.

9.4.2 Negative Affect

Table 9.5 displays regression analysis for hypomanic personality, emotion regulation strategies, condition, and negative affect.

Table 9.5: Regression Analyses for Mania Risk, Emotion Regulation, and Negative Affect Outcomes

<u>Predictor</u>	Mean Daily			Week-1 NA			Week-4 NA		
	NA Change			Change			Change		
	β	SE	<i>t</i>	β	SE	<i>t</i>	β	SE	<i>t</i>
Model 1									
Condition	.53	.15	0.37	-.03	.38	-0.07	-.15	.37	-0.39
HPS	-.08*	.04	-2.02	.05	.11	0.51	-.10	.11	-0.98
Positive Rumination	.04	.03	1.22	-.06	.08	-0.78	.19*	.08	2.47
HPS*Condition	-.08	.04	-1.91	.03	.11	0.25	-.06	.11	-0.55
PosR*Condition	.54	.03	1.76	.09	.08	1.11	-.05	.08	-0.64
HPS*PosR	-.001	.01	-0.15	-.05*	.02	-2.33	-.03	.02	-1.44
HPS*PosR*Cond	.01	.01	1.09	-.01	.02	-0.29	.01	.02	0.28
Model 2									
Condition	.09	.14	0.62	.04	.39	0.09	-.21	.38	-0.55
HPS	-.05	.04	-1.30	.04	.11	0.33	-.01	.11	-0.10
Dampening	-.02	.03	-0.80	-.06	.07	-0.89	.05	.07	0.72
HPS*Condition	-.07	.04	-1.70	.03	.11	0.25	-.14	.11	-1.27
Dampen*Cond	.03	.03	1.08	.02	.07	0.30	.11	.07	1.57
HPS*Dampen	.004	.01	0.57	.01	.02	0.31	.01	.02	0.50
HPS*Dampen*Cond	.000	.01	0.06	.01	.02	0.23	.01	.02	0.31

HPS = Hypomanic personality scale, NA = Negative affect, PosR = Positive rumination, Dampen = Dampening,

Cond = Condition

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

9.4.2.1 Mean Daily Change

When accounting for the effects of positive rumination, hypomanic personality was a negative predictor of mean daily change in negative affect, $\beta = -.08$, $p = .05$, an effect which was approaching significance, with higher

hypomanic personality predicting a greater decrease in negative affect, Figure 9.4. Other predictor variables and interactions were not associated with mean daily change in negative affect.

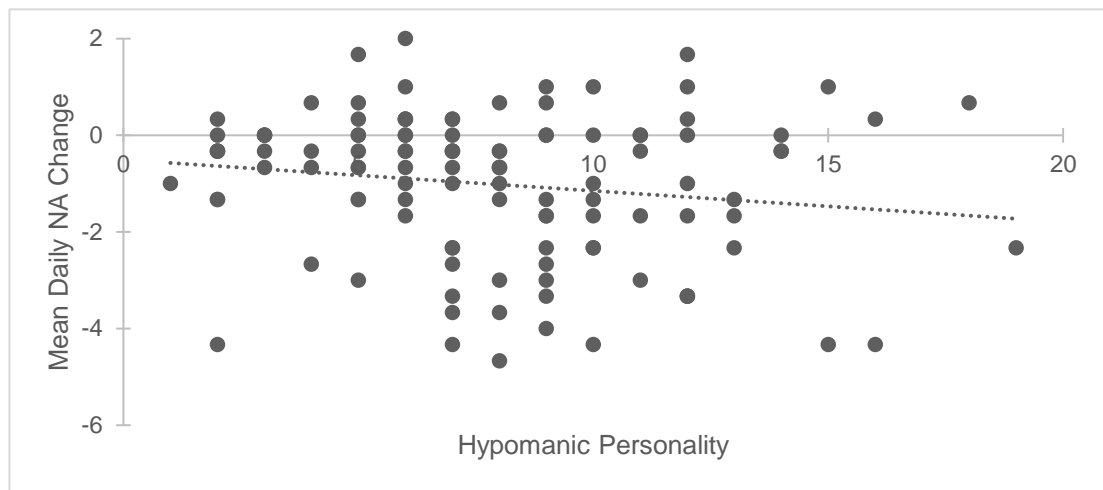


Figure 9.4: Regression between Mania Risk and Mean Daily Change in Negative Affect

When accounting for the effects of dampening, there were no associations between mean daily change in negative affect and any of the predictor variables.

9.4.2.2 Week-1 Change

In model 1, the interaction between hypomanic personality and positive rumination significantly predicted the week-1 change in negative affect, $\beta = -.05$, $p = .02$. Simple slopes analysis (Figure 9.5) revealed a significant slope for low positive rumination $t = 2.86$, $p = .01$. Where positive rumination is low, lower levels of hypomanic personality were associated with a decrease in negative affect between baseline and one-week post-writing, whereas higher levels of hypomanic personality were associated with an increase in negative affect between baseline and one-week post-writing. For high positive rumination the opposite pattern was observed, in that lower levels of hypomanic personality were associated with an increase in negative affect between baseline and one-week post-writing, whereas higher levels of hypomanic personality were associated with a decrease in negative affect between baseline and one-week post-writing.

However, the slope for high positive rumination was nonsignificant, $t = -1.84$, $p = .07$. Other predictor variables and interactions were not associated with the week-1 change in negative affect.

When accounting for the effects of dampening in model 2, there were no associations between any predictor variables or interactions and week-1 change in negative affect.

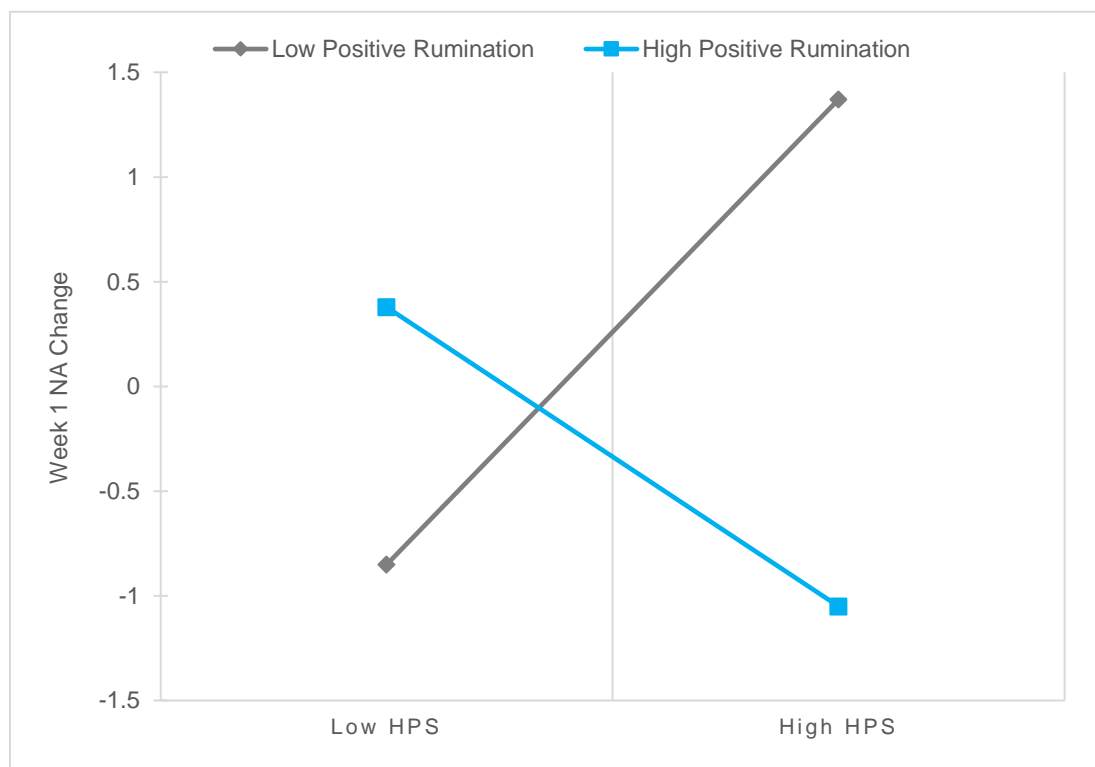


Figure 9.5: Simple Slopes Analysis for Two-Way Interaction Between Mania Risk and Positive Rumination On Week 1 Change in Negative Affect

9.4.2.3 Week-4 Change

In model 1, positive rumination was a significant positive predictor of week-4 change in negative affect, $\beta = .19$, $p = .02$. As displayed in Figure 9.6, lower use of positive rumination was associated with a greater decrease in negative affect, while higher use of positive rumination was associated with a greater increase in negative affect. No other predictors or interactions were associated with week-4 change in negative affect.

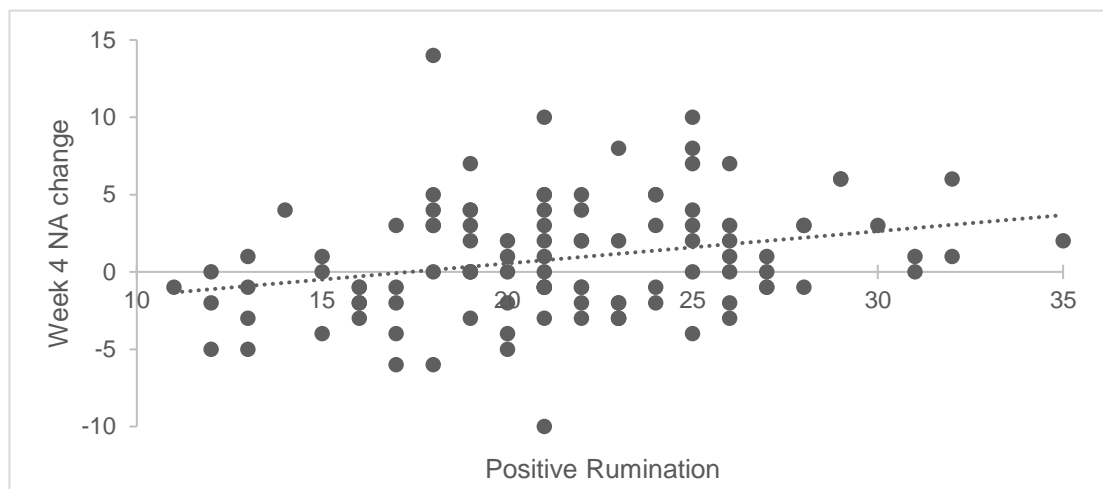


Figure 9.6: Regression between Positive Rumination and Week 4 Change in Negative Affect

When accounting for the effects of dampening in model 2, there were no associations between any predictor variables or interaction with week-4 change in negative affect.

9.4.3 High Mood

9.4.3.1 Week-1 Change

Table 9.6 displays regression analysis for hypomanic personality, emotion regulation strategies, condition, and high mood. When accounting for the effects of positive rumination in model 1, there were no associations between any predictor variables and the week-1 change in high mood symptoms.

Table 9.6: Regression Analyses for Mania Risk, Emotion Regulation, and High Mood Outcomes

Predictor	ASRM Week-1			ASRM Week-4		
	Change			Change		
	β	SE	t	β	SE	t
Model 1						
Condition	.004	.37	0.01	.26	.42	0.62
HPS	.19	.10	1.88	.01	.12	0.05
Positive Rumination	-.01	.08	-0.15	-.01	.09	-0.10
HPS*Condition	-.11	.10	-1.14	-.16	.12	-1.37
PosR*Condition	.01	.08	0.07	-.05	.09	-0.50
HPS*PosR	.02	.02	1.09	.03	.03	1.05
HPS*PosR*Cond	.01	.02	0.31	.01	.03	0.32
Model 2						
Condition	.09	.34	0.25	.19	.42	0.44
HPS	.16	.10	1.61	-.02	.12	-0.17
Dampening	.13*	.06	2.12	-.02	.08	-0.25
HPS*Condition	-.13	.10	-1.35	-.16	.12	-1.32
Dampen*Cond	-.01	.06	-0.23	.05	.08	0.69
HPS*Dampen	-.02	.02	-0.93	-.03	.02	-1.17
HPS*Dampen*Cond	-.04*	.02	-2.16	.01	.02	0.59

HPS = Hypomanic personality scale, ASRM = High mood,

PosR = Positive rumination, Dampen = Dampening, Cond = Condition

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

In model 2, dampening was a significant positive predictor of week-1 change in high mood symptoms, $\beta = .13$, $p = .04$. As displayed in Figure 9.7, lower use of dampening was associated with a greater decrease in high mood, while greater use of dampening was associated with a greater increase in high mood. The interaction between HPS, dampening and condition was also significant in predicting high mood change at this follow-up point, $\beta = -.04$, $p = .003$. Simple slopes analysis for this interaction (Figure 9.8) revealed a significant slope for high hypomanic personality-high dampening, with participants in the control condition experiencing a greater magnitude of increase in high mood symptoms from baseline to week 1 follow-up than those in the goal-oriented condition, $t = -2.23$, $p = .03$. Slopes for high hypomanic personality-low

dampening ($t = 0.74$, $p = .47$), low hypomanic personality-high dampening ($t = 1.91$, $p = .06$) and low hypomanic personality-low dampening ($t = -0.34$, $p = .74$) were non-significant.

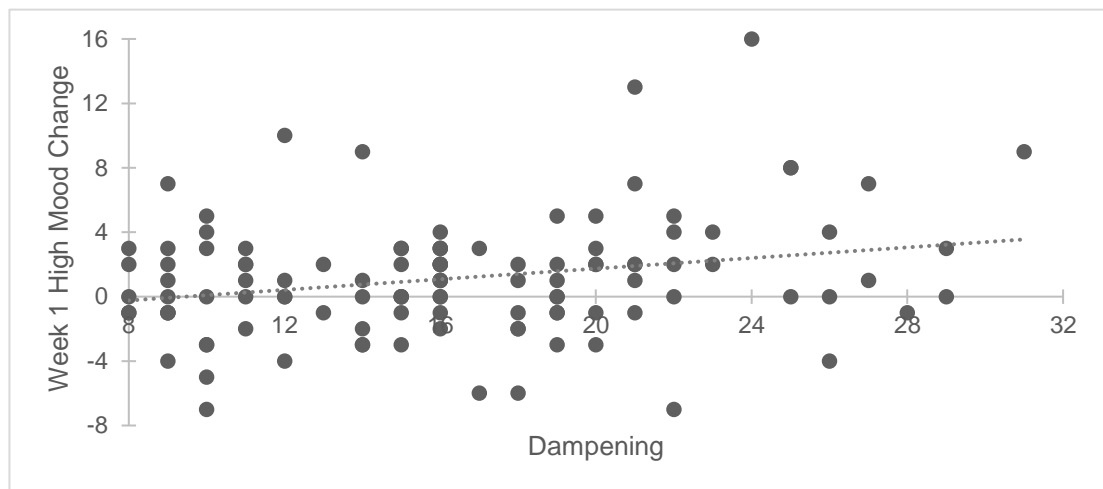


Figure 9.7: Regression between Dampening and Week 1 Change in High Mood

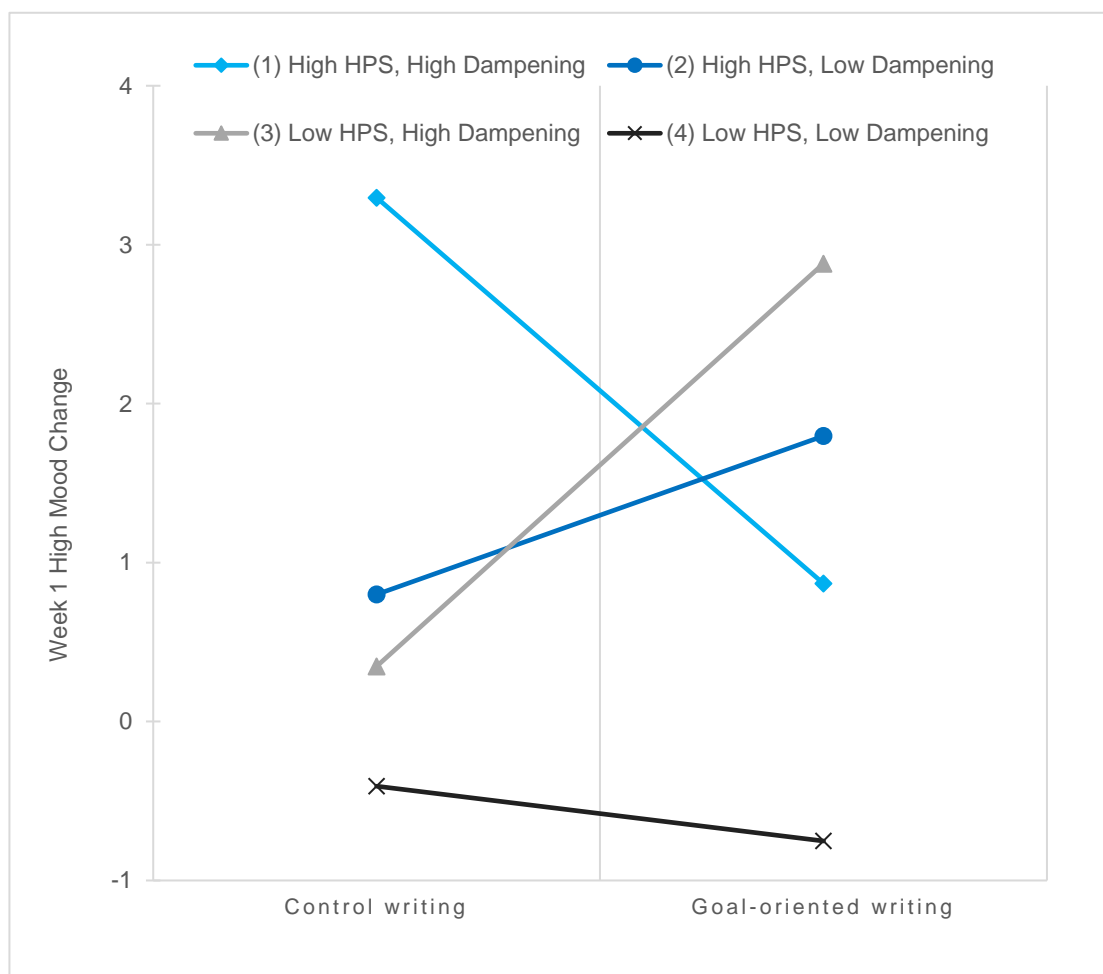


Figure 9.8: Simple Slopes Analysis for Three-Way Interaction Between Mania Risk, Dampening and Writing Condition on Week 1 Change in High Mood

There was a significant difference between slopes for high hypomanic personality-high dampening and low hypomanic personality-high dampening, $t = -3.53$, $p < .001$. Where hypomanic personality is low and dampening is high, the pattern is observed in the opposite direction to that seen when both of these predictors are high. Participants in the goal-oriented condition experienced a greater magnitude of increase of high mood symptoms from baseline to week-1 follow-up than those in the control condition. The greatest difference between these slopes is seen in the control condition. Similarly, there was a significant difference between the slopes for high hypomanic personality-high dampening and high hypomanic personality-low dampening, $t = -2.24$, $p = .03$. Where hypomanic personality is high and dampening is low, the pattern observed for high hypomanic personality-high dampening is reversed with participants in the goal-oriented condition reporting a greater increase in high mood symptoms between baseline to week-1 follow-up than those in the control condition. The greatest difference between these slopes was seen in the control condition. There was also a significant difference in the slopes for low hypomanic personality-high dampening and low hypomanic personality-low dampening, $t = 2.23$, $p = .03$. Where hypomanic personality is low and dampening is high, participants in both conditions experienced an increase in high mood symptoms from baseline, with the greatest magnitude of increase in the goal-oriented condition. However, when both hypomanic personality and dampening are low, both conditions resulted in a decrease in high mood symptoms from baseline, with the greatest magnitude of decrease in the goal-oriented condition. Comparisons between slopes for high hypomanic personality-high dampening and low hypomanic personality-low dampening ($t = -1.15$, $p = .25$), high hypomanic personality-low dampening and low hypomanic personality-high dampening ($t = -0.71$, $p = .48$), and high

hypomanic personality-low dampening and low hypomanic personality-low dampening ($t = 0.96$, $p = .34$) were non-significant. The three-way interactions between hypomanic personality, dampening and condition on week-1 high mood change are summarised in Table 9.8.

Table 9.8: Summary of Three-Way Interaction between Mania Risk, Dampening and Condition on Change in High Mood Symptoms from Baseline to Week-1 Follow-Up

	Goal-Oriented Condition		Control Condition	
	High HPS	Low HPS	High HPS	Low HPS
High Dampening	Increased high mood symptoms.	Increased high mood symptoms. <i>Magnitude of increase greater than in control condition.</i>	Increased high mood symptoms. <i>*Magnitude of increase significantly greater than in goal-oriented condition.</i>	Increase in high mood symptoms.
Low Dampening	Increased high mood symptoms. <i>Magnitude of increase greater than in control condition.</i>	Decrease in high mood symptoms. <i>Magnitude of decrease greater than in control condition.</i>	Increase in high mood symptoms.	Decrease in high mood symptoms.

HPS = Hypomanic personality scale

* $p < .05$

9.4.3.2 Week-4 Change

Week-4 change in high mood symptoms was not associated with any predictor variables.

9.4.4 LIWC Variables

Table 9.9 displays regression analysis for hypomanic personality, emotion regulation strategies, condition, and negative affect and LIWC variables.

9.4.4.1 Personal Pronouns

There was a significant effect of condition on the mean use of singular first-person pronouns across the three writing sessions when accounting for use of both positive rumination ($\beta = .74$, $p = .002$) and dampening ($\beta = .70$, $p = .003$),

with participants in the goal-oriented condition including significantly more singular first-person pronouns than those in the control condition.

9.4.4.2 Positive and Negative Affect Words

Mean use of positive and negative affect words across the three writing sessions was not associated with any of the predictor variables.

Table 9.9: Regression Analyses for Mania risk, Emotion Regulation, and LIWC Variables

<u>Predictor</u>	First-Person			Positive			Negative Emotion		
	Pronouns			Emotion Words			Words		
	β	SE	t	β	SE	t	β	SE	t
Model 1									
Condition	.74*	.23	3.17	-.17	.14	-1.21	.12	.08	1.57
HPS	.05	.06	.85	.07	.04	1.89	.001	.02	.03
Positive Rumination	.04	.05	.78	-.002	.03	-.06	.01	.02	.33
HPS*Condition	-.04	.06	-.59	.05	.04	1.26	-.03	.02	-1.40
PosR*Condition	.08	.05	1.55	.02	.03	.78	.004	.02	.27
HPS*PosR	.001	.01	.09	.004	.01	.50	-.004	.004	-1.01
HPS*PosR*Condition	.004	.01	.23	-.01	.01	-.81	-.002	.004	-.39
Model 2									
Condition	.70*	.23	3.063	-.18	.14	-1.30	.10	.07	1.42
HPS	.06	.06	.958	.07	.04	1.87	-.01	.02	-.37
Dampening	.01	.04	.222	.02	.03	.90	.02	.01	1.80
HPS*Condition	.01	.06	.169	.04	.04	1.10	-.02	.02	-1.07
Dampening*Condition	-.04	.04	-.908	.03	.03	1.19	-.02	.01	-1.39
HPS*Dampening	.01	.01	.575	.000	.01	-.03	.000	.00	.01
HPS*Dampening*Condition	.01	.01	.992	-.01	.01	-1.03	.001	.00	.21

HPS = Hypomanic personality scale,

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

9.5 Discussion

Positive writing paradigms have widely been used as a well-being intervention and have frequently been associated with beneficial mood outcomes, such as increased positive affect and decreased negative affect, both immediately and at subsequent follow-up points. However, much of this research is conducted in the context of elevated negative affect (e.g., depression and stress), and little is understood about the application of positive writing paradigms in contexts where low mood is commonly experienced yet elevated positive affect may be problematic, for example for individuals at risk of mania. It is also suggested that positive writing paradigms may be an effective tool for inducing positive affect and exploring use of emotion regulation strategies. Within the current study, the instructions provided with the writing tasks were also manipulated to investigate if the context in which positive affect was experienced (i.e., goal-oriented contexts) influenced changes in affective outcomes. The first aim of this study was to investigate the potential moderating effects of trait emotion regulation strategies on the relationships between mania risk and affect outcomes typically associated with positive writing paradigms. As hypothesised, mania risk was associated with an immediate increase in positive affect and a reduction in negative affect following the writing sessions across both conditions. This is consistent with previous research that has found that participants report greater positive affect immediately after engaging in positive writing (e.g., Burton & King, 2009; Lewandowski, 2009). These findings are also in line with evidence that suggests that individuals higher in mania risk show greater reactivity to mood induction stimuli (e.g., Gruber et al., 2008) and suggest that positive writing paradigms may be used as an effective means of positive mood induction within this population.

The lasting effects of positive writing were minimal. Hypotheses relating to mania risk and change scores for both week-1 and week-4 negative affect and high mood, and week-4 positive affect were not supported. However, at the week-1 follow-up, those higher in mania risk experienced a greater decrease in positive affect. This change was opposite to the anticipated relationship and suggests that the immediate increases in positive affect experienced following the writing sessions are not maintained for those at higher mania risk. One potential explanation for this is the manner in which individuals at mania risk may appraise and respond to increased positive affect. For example, the integrative cognitive model of mood swings (Mansell et al., 2007) posits that negative appraisals of a perceived change in affect (e.g., an appraisal that increased positive affect will lead to further high mood symptoms) triggers exaggerated attempts to regulate mood, often resulting in a greater change in mood than originally intended. In this instance, where individuals at greater mania risk appraised the initial increase in positive affect as unfavourable, this may have prompted greater use of downregulation strategies (including dampening), and resulted in the reduction in positive affect from baseline observed at this follow-up point.

Looking at the relationships between emotion regulation strategies and affective outcomes, positive rumination was associated with negative affect change at the week-4 follow-up, however the direction of this relationship was opposite to what was anticipated, with higher positive rumination predicting a greater increase in negative affect. This suggests that the purported beneficial outcomes of positive writing interventions may be short-term for individuals prone to engaging in positive rumination. Dampening was associated with an increase in high mood symptoms from baseline to week-1 follow-up. Although it was

hypothesised that this relationship would be observed in the opposite direction, this finding supports previous literature which has suggested that dampening positive affect may contribute to both high and low mood symptoms (e.g., Olofsson et al., 2014).

The second aim of this study was to assess whether associations between mania risk, emotion regulation strategies and mood outcomes are moderated by context-specific writing prompts. Hypotheses relating to the effects of writing condition were not supported, such that change scores were not associated with writing condition, despite it being anticipated that goal-oriented writing would result in greater increased positive affect in line with previous research that has linked goal-related activities to elevated mood (e.g., Gruber & Johnson, 2009). These findings may be the result of both writing conditions being positively focused, as typically, investigations of the effects of positive writing also include a neutral control condition (e.g., prompting participants to write in detail about their shoes or bedroom; Burton & King, 2004). Additionally, it may also be possible that individuals in the control condition produced writing extracts that were inherently positive, while some participants in the goal-oriented condition may have also included negative elements to their writing such as failure or frustrations, framed in the wider context of successful goal attainment (e.g., initial failure leading to a positive outcome). Previous findings suggest that individuals often show propensity to compare significant positive events with previous negative experiences (e.g., Smith et al., 2018). Additionally, goal-frustration has been associated with negative affective outcomes, such as anger (e.g., Edge, Lwi, & Johnson, 2015), which may serve to limit the additional increases in positive affect which may otherwise occur as a result of recalling goal-oriented positive events compared to non-goal oriented positive events. There is some

evidence that negative life events predict increased high mood symptoms in individuals with diagnosed bipolar disorder (e.g., Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999).

Hypotheses relating to the interaction between mania risk and emotion regulation strategies were partially supported. The interaction between mania risk and positive rumination was associated with negative affect change at the week-1 follow-up. When tendencies to engage in positive rumination were low, mania risk was associated with an increase in negative affect at this follow-up point, whereas when positive rumination was high, the relationship was reversed. These findings are consistent with previous literature that has found associations between positive rumination and reduced low mood (e.g., Feldman et al., 2008). This work extends these findings by suggesting that positive rumination can be protective and reduce negative affect, even in the context of high mania risk.

This study also aimed to explore three-way interactions between mania risk, emotion regulation strategies, and writing condition, on the basis that the change to affective outcomes could be different depending on different combinations of these factors, as the focus of this thesis is on moderators of the influence of emotion regulation strategies on affective outcomes, specifically within the context of mania risk. Given the theoretical relevance of positive rumination and goal-oriented contexts to mania risk and associated affect, it is surprising that the three-way interaction between high mania risk, greater use of positive rumination, and goal-oriented writing was not a significant predictor of any affective outcomes. The only significant three-way interaction was between mania risk, dampening and writing condition when change in high mood symptoms from baseline to week-1 follow-up was the outcome. The effect of condition was not always in the anticipated direction. For example, where mania

risk and dampening were both high, a greater increase in high mood was experienced in the control condition than the goal-oriented condition, although it was predicted that this effect would be observed in the opposite direction. Additionally, it was anticipated that the use of dampening would be associated with a decrease in high mood symptoms, even when hypomanic personality was high, although previous research has also provided evidence that dampening is related to high mood (e.g., Olofsson et al., 2014). However, when either mania risk or dampening were low, this pattern was observed in the hypothesised direction, with participants in the goal-oriented condition reporting a greater increase in high mood symptoms at this follow-up point. Where both mania risk and dampening were low, participants experienced a decrease in high mood symptoms in both conditions, with a greater magnitude of decrease observed in the goal-oriented condition. As mania risk and dampening are both typically considered risk factors for mood difficulties, it follows that high mood would 'improve' by decreasing when both are low. That this decrease is greater in the goal-oriented condition than the control condition is surprising, but as outlined above, this task may not have been sufficiently activating of the excessive goal-pursuit related to mania risk.

This study also explored language used by participants throughout the writing tasks, assessing mean use of singular first-person pronouns, and positive and negative affect words. Writing condition was associated with use of singular first-person pronouns (e.g., I, me, my), with participants in the goal-oriented condition including significantly more of these words than those in the control condition. Use of these pronouns have been found to predict a number of negative outcomes, including reduced well-being (e.g., Pennebaker et al., 2003), social inhibition (Allen et al., 2019), and suicidality (Stirman & Pennebaker, 2001).

However, in the current study it is probably that the goal-oriented events that participants were prompted to write about were more personally-relevant, and were therefore more pertinent to the use of first-person pronouns, than general non-goal oriented positive events described in the control condition. Hypotheses relating to mania risk and use of these language variables were not supported.

9.5.1 Limitations

In addition to methodological limitations identified above, such as lack of a neutral control condition, the study was also limited by characteristics of the sample. Participants were primarily White, female students, many of whom were likely to be psychology undergraduates and possibly more able to deduce the purpose of the writing task as a mood induction tool and therefore more likely to display demand characteristics when reporting on subsequent affect measures. These factors limit the generalisability of findings to other populations. Further, use of criteria to group participants according to mania risk would have allowed for direct comparison between low and high-risk groups, as seen in some previous studies (e.g., Heissler et al., 2014). However, given that hypomanic personality traits exist on a continuum and difficulties arise with determining meaningful cut-off points (typically scoring in the 90th percentile, meaning large screening samples would be required to obtain a sufficient 'high-risk' group; Eckblad & Chapman, 1986), use of hypomanic personality as a continuous variable is common throughout the literature.

9.5.2 Future Directions and Practical Implications

Given the relevance of appraisals of affective states to mania risk and emotion regulation outlined above, future investigation of the use of positive writing paradigms with individuals at risk of mania may benefit from including daily

state measures of appraisals of affect and emotion regulation in the period of time between completion of the writing sessions and follow-up points to assess if the patterns of strategies used in this time have an influence on subsequent affect change. Findings from such research would provide insight into whether the initial increases in positive affect that often result from positive writing interventions are beneficial for individuals at mania risk, or if they prompt unhelpful emotion regulation patterns.

Additionally, inclusion of a neutral control condition would allow future research to further disentangle the effects of context specific writing prompts and positive writing more generally on mood outcomes. Further, as some participants in the goal-oriented condition may have included detail of initial failures or frustrations in their extracts which may have influenced affect, future research may also benefit from investigating the effects of writing about negative goal-oriented events in the wider context of goal attainment in relation to affect outcomes.

This study added further evidence that writing interventions increase positive affect and reduce negative affect. Although there is evidence that writing interventions reduce negative affect in individuals with mood disorders (Baikie et al., 2012), comparisons were not made between diagnoses, limiting insight into whether there was an impact on affect specific to different diagnoses, or whether effects were transdiagnostic. As the writing paradigm employed in this study was used primarily as a mood induction tool rather than an intervention, questions remain as to whether positive writing about the self could actually be unhelpful in those with potentially problematic mood swings, associated with mania risk. In many ways, hypomanic personality traits could be considered the opposite to Type D personality traits (i.e., social inhibition and emotional suppression).

However, negative affectivity is common to both. As positive writing paradigms have been shown to result in both immediate and longer-term changes in mood (e.g., increased positive affect and decreased negative affect), they could be helpful as an early intervention tool to address negative affect in mania risk as in Type D personality. Similarly, within bipolar disorder itself, given the experience of both excessively high and low mood, writing interventions may be helpful for the latter, but may exacerbate the former. While beyond the scope of this study, there is potential for investigating writing interventions more thoroughly in relation to mood dysregulation. For example, writing interventions could support the development of effective positive emotion regulation strategies in mania risk and even in bipolar disorder, using approaches included in other interventions with this aim, such as encouraging savouring rather than over-amplifying positive emotion, and instructions to write about small attainable goals rather than extreme goal-setting (see Painter et al., 2019).

9.5.3 Conclusion

In conclusion, findings from this study show that people higher in mania risk experienced an immediate increase in positive affect following both writing conditions, providing support for positive writing paradigms as an effective tool for positive mood induction with this group. However, this increase in positive affect was not maintained at the week-1 follow-up. Use of dampening and positive rumination were associated with increased negative affect and high mood symptoms at follow-up points, suggesting that purported beneficial outcomes associated with positive writing interventions may also be short-term for individuals who demonstrate tendencies to use maladaptive responses to positive affect. Further research is required to disentangle the effects of contextual writing instructions, with the inclusion of a neutral condition.

Chapter 10:

General Discussion

10.1 Overview

Emotion regulation difficulties are apparent across psychopathology and are central to bipolar disorder. Systematic review findings (Chapter 3; McGrogan et al., 2019) suggest that individuals at risk of mania experience similar difficulties with emotion regulation as those with bipolar disorder. It is proposed that understanding how use of regulation strategies relate to affective outcomes may be useful in informing future research and theory on transition to bipolar disorder. Despite a wealth of literature highlighting the importance of positive affect regulation to well-being and psychopathology, particularly in relation to bipolar disorder and mania risk which are characterised by excessive positive affect and mood fluctuation, investigations of emotion regulation typically focus on responses to negative affect, while responses to positive affect are less extensively researched. Further, it is suggested that the context in which an emotion regulation strategy is being used, such as level of beliefs about emotion malleability, or the current situation someone is in at the time, may also be relevant. The purpose of this thesis was therefore to advance knowledge of the associations between mania risk, positive emotion regulation, and affect outcomes, and explore the influence of the context in which emotion regulation is occurring on these relationships.

Overall, findings relating to associations between mania risk and emotion regulation strategies were as expected, but were often not maintained when controlling for current affect. Relationships between use of strategies and affect

outcomes were mixed. Further, while use of positive rumination and dampening were associated with both mania risk and affect, they did not moderate relationships between mania risk and affect. This suggests that these pathways are separate. While there is some evidence that social and situational contexts may be influential, trait tendencies engage in emotion regulation appeared to be more relevant to mania risk and affect outcomes than state use of strategies.

There were several novel aspects to this thesis. Investigating the moderating role of emotion regulation strategies on the relationships between mania risk and affect outcomes is an important contribution to identifying which strategies may be more or less (mal)adaptive in the context of mania risk. Most research has investigated the unique associations between emotion regulation strategies and affect outcomes, or between emotion regulation strategies and mania risk, and between mania risk and affect outcomes, without exploring whether the latter relationship is moderated by use of certain emotion regulation strategies. Prospective, real-world investigations of these associations alongside novel application of positive writing paradigms address limitations of previous investigations, which are predominantly cross-sectional. These methods also really allowed integration of the role of the context in which emotion regulation is occurring. For example, if someone is regulating their positive affect when they are working towards, or thinking about, a goal-related activity, is the association with mania risk and affect outcomes the same as in non-goal-oriented contexts? This consideration of the potential moderating influence of use of different contexts on the impact of emotion regulation is innovative, particularly within the literature on mania risk, which usually assumes positive rumination and dampening are always maladaptive.

In this chapter, findings from Studies 1 to 4 are considered in relation to the general research aims defined in Chapter 5. Practical implications and methodological limitations of the current research are also discussed, as well as a number of recommendations for future directions.

10.2 Research Aims

10.2.1 Aim 1: Examine the potential moderating influence of use of emotion regulation strategies on the associations between mania risk and affective outcomes.

Based on findings presented in Chapter 3 and literature that has linked use of maladaptive emotion regulation with experience of mood symptoms (e.g., Feldman et al., 2008, Olofsson, et al., 2014), it was expected that use of these strategies would moderate the relationship between mania risk and affect, such that use of positive rumination would strengthen the positive associations between mania risk and positive affect and high mood, and the negative associations between mania risk and negative affect, while use of dampening would strengthen the negative associations between mania risk and negative affect and low mood. Savouring was not expected to moderate these relationships as it was not anticipated that savouring, as a more adaptive response to positive affect, would be associated with mania risk. Table 10.1 summarises associations between mania risk and use of strategies. Interactions between mania risk and emotion regulation and affect outcomes are summarised in Table 10.2.

Table 10.3: Summary of Associations between Mania Risk, Beliefs about Emotion Malleability and use of Emotion Regulation Strategies

	Positive		Dampening		Savouring	
	Rumination					
	+ive	+ive	Null	-ive	+ive	Null
Mania risk		Study 1a*				Study 1a
	Study 1a*	1a*				
	Study 1b* (trait and state)	Study 1b* (trait)	Study 1b (state)		--	Study 1b (trait and state)
	Study 2*					Study 2
		Study 2*				
General emotion malleability beliefs	Study 1a*		Study 1b (trait and state)	Study 1a*	Study 1a*	Study 1a
	Study 1b* (trait and state)	--			Study 1b (state)	Study 1b (trait)
Personal emotion malleability beliefs	Study 1a*		Study 1b (trait and state)	Study 1a*	--	Study 1b (trait and state)
	Study 1b* (trait and state)	--				

*Association not maintained when controlling for affect.

10.2.1.1 Mania Risk

Findings for associations between mania risk and affect outcomes were mixed. In Study 4, mania risk was associated with an increase in positive affect across writing days, a decrease in positive affect from baseline to week-1 follow-up, and not related to positive affect change at week-4. Mania risk was also not associated with positive affect cross-sectionally (Study 2) or over time (Study 3). Similarly, in relation to negative affect, mania risk was associated with a decrease in negative affect across writing days (Study 4), but not related to negative affect cross-sectionally, over time, or at later follow-up points (Studies 2, 3 and 4). Mania risk was positively associated with low and high mood cross sectionally

(Study 2) but not related to changes in high mood at follow-up points after the positive writing tasks (Study 4).

These findings are somewhat contradictory to those of previous research that suggests mania risk is associated with greater positive and negative affect outcomes cross-sectionally, and over time (e.g., Sperry & Kwapill, 2017), and greater reactivity following positive mood induction (Gruber et al., 2008). However, samples used throughout the current research were drawn from the general population, where mania risk is typically low, which may partially explain these mixed findings.

10.2.1.2 Positive Rumination

As anticipated, trait and state use of positive rumination was positively correlated with mania risk (Studies 1 and 2), however these associations were not maintained when controlling for current affect. These findings support those of previous work that has suggested that mania risk is related to greater use of strategies to upregulate positive affect (e.g., Feldman et al 2008; Olofsson, et al 2014), but also highlight that the way someone is currently feeling may be influential when assessing these associations.

In relation to affect outcomes, positive rumination was positively associated with positive affect over time, as expected (Study 3), but not cross-sectionally (Study 2) or with change in positive affect following the positive writing paradigms (Study 4). The two-way interaction between mania risk and positive rumination was also not associated with measures of positive affect (Studies 3 and 4), suggesting that pathways between mania risk and positive affect, and positive rumination and positive affect, are separate.

Positive rumination was associated with an increase in negative affect from baseline to week-4 follow-up after positive writing (Study 4), but not with daily change or week-1 change. Tendencies to engage in positive rumination were negatively related to negative affect over time, as expected (Study 3), but not cross-sectionally (Study 2). Positive rumination also moderated the relationships between mania risk and negative affect outcomes in Studies 3 and 4, however, the patterns of associations are mixed (Table 10.4). In Study 3, use of positive rumination when mania risk was lower was negatively associated with negative affect over time, whereas in Study 4, use of positive rumination when mania risk was higher was related to a decrease in negative affect from baseline to week-1 follow-up. These findings are consistent with those of previous work that suggests positive rumination is beneficial in the general population for reducing negative affect (e.g., Feldman et al., 2008), and imply that positive rumination may also be beneficial in this way in the context of mania risk. The interaction between mania risk and positive rumination was not associated with daily change or week-4 change in negative affect.

Positive rumination was also not associated with high or low mood symptoms and did not moderate the relationships between mania risk and these outcomes (Studies 2 and 4).

10.2.1.3 Dampening

As anticipated, trait dampening was positively correlated with mania risk cross-sectionally (Studies 1 and 2), however, this association was not maintained when controlling for current affect. State dampening (Study 1b, Section 6.4) was not associated with mania risk. These findings are also in line with research that suggests that mania risk is related to tendencies to downregulate positive affect (e.g., Feldman et al., 2004; Olofsson et al., 2014), but again imply that

investigation of these associations may be influenced by how people are currently feeling.

The same pattern of associations was seen between dampening and both positive and negative affect. In line with research that has linked dampening with both positive and negative affect outcomes (e.g., Olofsson et al., 2014), dampening was positively correlated with these outcomes over time (Study 3) but not cross-sectionally or following positive writing (Studies 2 and 4). The interaction between mania risk and dampening was also not associated with positive or negative affect outcomes in these studies, suggesting that pathways between mania risk and affect, and dampening and affect are separate.

Similarly, dampening was associated with an increase in high mood from baseline to week-1 follow-up but not with daily change or week-4 change in high mood following positive writing (Study 4). Dampening was also not associated with high mood cross-sectionally (Study 2) and did not moderate the relationship between mania risk and high mood symptoms (Study 4).

In relation to low mood, dampening was positively correlated with low mood cross-sectionally (Study 2) but did not moderate the relationship between mania risk and low mood symptoms. This suggests that these factors may be separate pathways to low mood.

10.2.1.4 Savouring

As anticipated, trait and state savouring were not associated with mania risk in any study that investigated these associations (Studies 1, 2 and 3). In relation to affect, savouring was positively associated with positive affect over time (Study 3) but not cross-sectionally (Study 2) and did not moderate the relationship between mania risk and positive affect (Study 3). Similarly, savouring

was negatively associated with negative affect over time (Study 3) but not cross-sectionally (Study 2) and did not moderate between mania risk and negative affect (Study 3).

Savouring was also not related to high or low mood symptoms (Study 2). These findings are consistent with literature that suggest savouring is associated with better well-being (e.g., higher positive affect and lower negative affect; Bryant, 2003) and that adaptive strategies, such as savouring, are not related to psychopathology (e.g., Sheppes et al., 2015).

Table 4: Summary of Study Results for Associations between Mania Risk, Emotion Regulation and Affect Outcomes

	Positive Affect			Negative Affect			High Mood		Low Mood	
	+ive	Null	-ive	+ive	Null	-ive	+ive	Null	+ive	Null
Mania risk (HPS)	Study 4 ^M	Study 2 Study 3	Study 4 ¹	--	Study 2 Study 3	Study 4 ^M	Study 2	Study 4	Study 2	--
Positive Rumination	Study 3	Study 2 Study 4	--	Study 4 ⁴	Study 2 Study 4 ^{M,1}	Study 3	--	Study 2 Study 4	--	Study 2
Dampening	Study 3	Study 2 Study 4	--	Study 3	Study 2 Study 4	--	Study 4 ¹	Study 2 Study 4 ⁴	Study 2	--
Savouring	Study 3	Study 2	--	--	Study 2	Study 3	--	Study 2	--	Study 2
HPS * Positive Rumination	--	Study 3 Study 4	--	--	Study 4 ^{M,4}	Study 3 Study 4 ¹	--	Study 4	--	--
HPS * Dampening	--	Study 3 Study 4	--	--	Study 3 Study 4	--	--	Study 4	--	Study 2
HPS * Savouring	--	Study 3	--	--	Study 3	--	--	--	--	--

^M Mean change, ¹ week-1 change, ⁴ week-4 change

10.2.1.5 Summary

Overall, findings relating to this hypothesis support previous work that has linked mania risk to greater use of maladaptive emotion regulation strategies (i.e., positive rumination and dampening), but not with use of more adaptive strategies (i.e., savouring). However, findings also highlight the importance of considering how people are feeling when reporting tendencies to use these strategies, as associations between mania risk and use of positive rumination and dampening, which are present throughout the literature, were no longer significant when controlling for current affect. Exploration of the potential moderating role of these strategies on the associations between mania risk and affect outcomes further this knowledge. Findings from Studies 3 and 4 support previous literature that has suggested positive rumination is beneficial in reducing negative affect outcomes (e.g., Feldman, et al., 2008), and provides some evidence that this beneficial effect may also be present in the context of higher mania risk. As anticipated, savouring did not moderate this relationship, further suggesting that savouring may not be pertinent to mania risk.

10.2.2 Aim 2: Explore associations between emotion malleability beliefs, mania risk, and use of positive emotion regulation strategies.

Previous research suggests that beliefs that emotion are malleable are associated with adaptive regulation of negative affect in the general population (e.g., Tamir et al., 2007; De Castella et al., 2013), however in the context of psychopathology, these beliefs have also been linked to use of maladaptive strategies (e.g., Kneeland et al., 2016). The influence of malleability beliefs on regulation of positive affect has not yet been explored. Associations between the extent to which people believe emotions are malleable and tendencies to use

positive rumination, dampening and savouring were explored cross-sectionally in Study 1a, and prospectively (across six days) in Study 1b, findings are summarised in Table 10.1.

Firstly, in line with research that has found positive relationships between malleability beliefs and use of adaptive responses to negative affect (Tamir et al., 2007; De Castella et al., 2013), it was anticipated that greater endorsement of general and personal emotion malleability beliefs would be associated with greater use of positive rumination and savouring (both considered adaptive in the general population), and negatively associated with tendencies to dampen (considered maladaptive).

In support of these predictions, greater endorsement of general and personal emotion malleability beliefs was positively correlated with positive rumination and negatively correlated with dampening in both samples. General beliefs were also positively correlated with use of savouring. Together these findings suggest that general beliefs about emotions may be more strongly associated with adaptive responses to positive affect, while personal beliefs may be more strongly related to use of maladaptive strategies, however these associations were not maintained when controlling for mania risk and current affect. As previously discussed, this highlights the importance of considering how people are currently feeling when investigating relationships between these factors.

It was also predicted that emotion malleability beliefs would moderate the relationship between mania risk and use of emotion regulation strategies, such that greater endorsement of beliefs that emotions are malleable, would strengthen associations between mania risk and use of positive rumination and

dampening, both of which are considered maladaptive in the context of mania risk, but not savouring. However, as mania risk and emotion malleability beliefs were not independently associated with use of emotion regulation strategies when controlling for affect, these moderations were not explored.

Table 5: Summary of Study Results for Interactions between Mania Risk, Emotion Regulation, Context and Affect Outcomes

	Positive Affect		Negative Affect		High Mood		Low Mood
	Null	-ive	Null	-ive	Null	-ive	Null
HPS * Situational	Study 4		Study 4		Study 4		
Social * Positive Rumination	Study 2	Study 3	Study 2 Study 3		Study 2		Study 2
Social * Dampening	Study 2 Study 3		Study 2 Study 3		Study 2		Study 2
Social * Savouring	Study 2 Study 3		Study 2 Study 3		Study 2		Study 2
Situational * PosR	Study 2 Study 3 Study 4		Study 2 Study 3 Study 4		Study 2 Study 4		Study 2
Situational * Damp	Study 2 Study 3 Study 4		Study 2 Study 3 Study 4		Study 2 Study 4		
Situational * Sav	Study 2 Study 3		Study 2 Study 3		Study 2		Study 2
HPS * Social * PosR	Study 3		Study 3				
HPS * Social * Damp	Study 3		Study 3				
HPS * Social * Sav	Study 3		Study 3				
HPS * Situational * PosR	Study 3 Study 4		Study 3 Study 4		Study 4		
HPS * Situational * Damp	Study 3 Study 4		Study 3 Study 4	Study 3	Study 4 ⁴	Study 4 ¹	
HPS * Situational * Sav	Study 3		Study 3				

^M Mean change, ¹ week-1 change, ⁴ week-4 change

10.2.3 Aim 3: Investigate the influence of using emotion regulation strategies in different social contexts on the relationships between mania risk and affect outcomes.

Based on previous findings that suggest social context influences use of emotion regulation strategies and resulting affect outcomes (e.g., Srivastava et al., 2009; English et al., 2017), and research that suggests mania risk is associated with lower pro-social positive affect (e.g., Gruber & Johnson, 2009), it was anticipated that use of positive rumination and dampening, but not savouring, in different social contexts would moderate the relationships between mania risk and affect outcomes. Specifically, that greater use of these strategies in non-social contexts would strengthen associations between mania risk and affect. These relationships were explored in Studies 2 and 3, findings are summarised in Table 10.3.

Relationships between use of emotion regulation strategies in social contexts and affective outcomes were explored cross-sectionally in Study 2 and prospectively in Study 3. Overall, use of strategies in different social contexts were not related to affect outcomes, suggesting that associations between emotion regulation and affect are not influenced by the presence of others. The only exception to this was in Study 3, where use of positive rumination in non-social contexts was associated with greater momentary positive affect. As outlined above, these findings support previous work that suggests positive rumination is beneficial in boosting positive affect in the general population (e.g., Feldman et al., 2008) and further implies that people may be better able to engage in positive rumination, which involves self-and emotion focused thoughts, when alone. In Study 2, use of positive rumination in social contexts was also associated with high mood

symptoms. However, this relationship was not maintained when controlling for mania risk, trait emotion regulation, and current affect. Use of emotion regulation strategies in social contexts did not moderate relationships between mania risk and affect outcomes in either study that explored these interactions (Studies 2 and 3), suggesting that these associations are not related to mania risk.

10.2.4 Aim 4: Investigate the influence of using emotion regulation strategies in different situational contexts on the relationships between mania risk and affect outcomes.

As goal-oriented contexts have been identified as particularly problematic for people at mania risk (e.g., Gruber & Johnson, 2009; Lozano & Johnson, 2001), it was anticipated that use of emotion regulation strategies in these situations would moderate the relationships between mania risk and affect outcomes, such that greater use of positive rumination and dampening, but not savouring, in active or goal-oriented contexts would strengthen associations between mania risk and affect. Using a range of methods, the influence of goal contexts on these associations were explored in Studies 2, 3 and 4, and are summarised in Table 10.3.

Use of strategies in different situational contexts were not associated with affect outcomes in any study. The only exception to this was in Study 2, where positive rumination in goal-oriented contexts was positively correlated with high mood and negatively correlated with low mood. However, these associations were not maintained when controlling for mania risk, trait emotion regulation, and current affect. These findings suggest that relationships between use of emotion regulation strategies and affective outcomes are not related to what people are

doing at the time regulation is taking place, although this study used a retrospective measure of situation-specific emotion regulation.

To address this methodological limitation, two prospective studies (Studies 3 and 4) explored the interaction between goal-oriented context and emotion regulation. Neither study found a significant moderating role of situational use of positive rumination and savouring on the relationships between mania risk and affective outcomes. Situational use of dampening also did not moderate between mania risk and positive affect. However, in Study 3, use of dampening in different situational contexts moderated the relationship between mania risk and negative affect (Table 10.4). Dampening in passive contexts was positively associated with negative affect, regardless of mania risk. However, when mania risk was higher, use of dampening in active situations was associated with lower negative affect. This relationship was reversed when mania risk was lower. These findings were unexpected and imply that use of dampening may be beneficial for individuals higher in mania risk when used in this context. It is tentatively suggested that the greater level of activation often experienced by people higher in mania risk in these situations may serve to buffer against negative affect outcomes that are typically associated with dampening. It may also be possible that people at greater mania risk overestimate their affect states and the extent to which they are engaging in emotion regulation.

Situational context also moderated the relationship between mania risk, dampening and high mood in Study 4. In partial support of predictions, when either mania risk or dampening were higher, participants in the goal-oriented writing condition experienced a greater increase in high mood symptoms from baseline to week one follow-up. However, when *both* mania risk and dampening were high, this relationship was observed in the opposite direction to what was

anticipated, with participants in the control condition (general positive writing) experiencing a greater increase in high mood from baseline than those in the goal-oriented condition. When both mania risk and dampening were low, both writing conditions resulted in a decrease in high mood at this follow-up, with the greatest decrease seen in the goal-oriented condition. As mania risk and dampening are both considered risk factors for mood difficulties, it follows that when these are lower high mood symptoms would be reduced. However, a greater reduction in high mood in the goal-oriented condition than the control condition was unexpected, in this instance, the goal-oriented writing task may not have been activating enough to see the associations between goal-pursuit in mania risk and high mood symptom seen in other studies (e.g., Gruber and Johnson, 2009).

10.2.5 Aim 5: Explore associations between mania risk and use of language variables.

As previous literature suggests that word choice may be influenced by personality traits and affect (Pennebaker & King, 1999; Pennebaker et al, 2003; Rude et al, 2004), it was predicted that mania risk would be associated with greater use of singular first-person pronouns, and positive and negative affect words in writing extracts. However, findings from Study 4 suggest that mania risk is not associated with these language variables.

Table 10.4: Summary of Significant Interactions between Mania Risk, Emotion Regulation, Context, and Affect Outcomes

	Positive Affect	Negative Affect	High Mood
		<u>Study 3</u> Positive rumination was negatively associated with negative affect, this association was strongest when mania risk was low	
		<u>Study 4</u> Higher positive rumination when mania risk higher was associated with decrease in negative affect. Higher positive rumination when mania risk was lower was associated with an increase in negative affect. Lower positive rumination when mania risk was higher was associated with an increase in negative affect Lower positive rumination when mania risk was lower was associated with a decrease in negative affect	
HPS * Positive Rumination	--		--
	<u>Study 3</u> Positive rumination was positively associated with positive affect in both social and non-social contexts, however this relationship was most pronounced in non-social contexts	--	--
		<u>Study 3</u> Dampening in passive situations was positively correlated with negative affect, regardless of mania risk. When mania risk was low, dampening in active contexts was positively associated with negative affect. When mania risk was high, dampening in active contexts was positively associated with negative affect.	<u>Study 4</u> Higher dampening when mania risk was higher was associated with an increase in high mood Goal < Control Lower dampening when mania risk was higher was associated with an increase in high mood symptoms Goal > Control Higher dampening when mania risk was lower was associated with an increase in high mood Goal > Control Lower dampening when mania risk was also lower was associated with a decrease in high mood symptoms Goal > Control
HPS * Situational context * Dampening	--		

10.3 Practical and Clinical implications

A key strength of this work is the range of methodological approaches used to assess relationships between mania risk, emotion regulation, and affect outcomes. Previous research investigating these associations are typically cross-sectional. While these designs are useful for initial investigation of relationships that have not explored before (e.g., Studies 1a and 2), they are also subject to a number of methodological limitations. Use of prospective designs, such as experience sampling methods (Studies 1b and 3) address some of these limitations by recording momentary use of strategies and proximal affect, negating the need for prospective recall of these process. Additionally, prospective follow-ups included in Study 4 allow for insight into the shorter- and longer-term effects of positive writing paradigms.

Novel application of positive writing paradigms as a positive mood induction tool is also an important contribution to the literature. Findings from Study 4 provide support for use of these paradigms in this way. Given that the writing instructions given with these paradigms are typically personally-relevant (i.e., participants write about events they have experienced), use of positive writing as a mood induction tool may be particularly beneficial in the context of mania risk, which is characterised by increased self-focused positive affect, while more traditional mood induction tools, such as video clips, are often other-focussed.

Exploration of the potential moderating influence of use of emotion regulation strategies on the relationships between mania risk and affect outcomes is also a key contribution. Findings highlight how use of certain

strategies, such as positive affect (Study 4) may be more or less beneficial depending on mania risk. Further, while both mania risk and dampening were both associated with low mood, dampening did not moderate the relationship between mania risk and low mood, suggesting that these are independent pathways. Such findings support the transdiagnostic utility of emotion regulation and may also be useful in informing well-being intervention that promote effective emotion regulation in a non-pathologizing way, outside of diagnostic boundaries. Additionally, despite many therapeutic interventions for mood dysregulation promoting use of adaptive strategies, savouring, as a more adaptive response to positive affect, has been less extensively investigated so further research in this area is beneficial. Findings from Studies, 1, 2, and 3 provide cross-sectional and prospective support for previous research that suggest that savouring is not associated with psychopathology and mood symptoms.

Further, consideration of the influence of contextual factors is central to gaining insight into 'real life' regulation processes and highlights circumstances in which use of certain strategies may be more or less helpful. For example, positive rumination when alone (Study 3) and dampening in passive contexts for people lower in mania risk. Findings from such research may be beneficial in informing the development of targeted intervention for individuals experiencing mood difficulties.

Finally, exploration of factors such as emotion malleability beliefs, that have previously only been investigated in relation to regulation of negative affect, is further knowledge on the influence of these variables. Given the importance of positive affect regulation to psychopathology and general well-being, a holistic view of how factors relate to both positive and negative emotion regulation and affect outcomes is beneficial.

10.4 Limitations / Future Directions

The research presented in this thesis is also not without limitations. Firstly, throughout all studies hypomanic personality was used as a continuous variable. Although this was justified (see section, 5.3.1.1), the lack of distinct groups made interpretation of interactions complex. Use of criteria to group participants according to mania risk would allow future research to make direct comparisons between low- and high-risk groups in order to draw firmer conclusions. Similarly, as hypomanic personality is typically lower in the general population, findings from the current research are likely not reflective of the full continuum of mania risk. Future research may therefore benefit from exploring these associations with groups identified as being high-risk, as well as those with diagnosed bipolar disorder, in order to better understand when use of these strategies in certain circumstances may be more or less mal(adaptive) in relation to mania risk, and identify potential tipping points. These comparisons would also allow for insight into the patterns of associations between factors and if they differ according to risk level and diagnostic status. Additionally, as many of the findings for associations between mania risk and emotion regulation were no longer significant when controlling for current affect, future investigations of these factors may benefit from considering how the way in which people are currently feeling may influence their evaluation of the ways in which they typically respond to different affect states.

Secondly, while consideration of contextual factors is a key strength of this research, it may be the case that the factors explored are not those most pertinent to mania risk, or the methods of defining contexts were not nuanced enough. For example, in relation to social context, in the two studies to explore these associations (Studies 2 and 3), contexts were defined as either social (i.e., with

others) or non-social. However, previous research suggests that the quality of the relationship (i.e., closeness) influences use of emotion regulation strategies (English et al., 2017). Additionally, the dynamic of the relationship may also be an important consideration. For example, people may behave and feel differently when with family members compared to when with friends. Future research may therefore benefit from exploring nuances associated with social contexts and their potential influence of use of emotion regulation strategies and affect outcomes.

Similarly, goal-oriented contexts may not have been activating enough to distinguish from more passive contexts. Future research manipulating affect using goal-oriented experimental paradigms may be beneficial to explore these association in a more controlled way. For example, Ajaya et al., (2015) used a video game paradigm to induce anger related to goal-thwarting. Similar tasks may be adapted and used to induce reward based positive affect, such as providing positive feedback on performance. Further, experimental paradigms also offer an opportunity to manipulate the use of emotion regulation strategies, either with explicit or implicit instruction. Additionally, the importance and immediacy of the goal to the person is a relevant factor to consider. For example, attainment of short-term goals may present different associations with emotion regulation and affect outcomes than pursuit of long-term goals. Further, in Study 3, all active situations were grouped and compared with all passive situations. However, exploring the nuance between active situations that are personally important (e.g., getting a promotion) and active situations that are less personally important (e.g., generic work tasks) may be central to identifying situations that influence emotion regulation. Finally, as social and situation factors occur concurrently, exploration of the dynamic associations between these variables would offer the most detailed insight into how different contexts (e.g., collaborative versus

individual goal-attainment) may relate to mania risk and influence use of emotion regulation strategies.

Further, nuance may also be needed when considering how beliefs about emotion influence use of regulation strategies. For example, in Study 1 belief measures relate to malleability of all emotions. However, research has suggested that different valences and intensities of emotion require different regulatory efforts (Sheppes et al., 2015). Exploration of how the valence and intensity of different emotion influence people's beliefs about may help to identify break-points at which different emotions are perceived as uncontrollable and potentially more problematic. Additionally, malleability beliefs relate to beliefs that emotions *can* be regulated but do not reflect beliefs that they *should* be. Research by Veilleux et al. (2020) found that beliefs that emotions are 'bad' or 'unfriendly' were associated with increased mood dysregulation. Assessing a wider range of beliefs about emotions would be beneficial in understanding which may be most influential for regulation of positive and negative affect. Further, investigating these beliefs in relation hypomanic personality would allow for insight into if these patterns differ according to mania risk.

10.5 Conclusion

The mixed findings presented throughout this thesis add to the mixed findings evident within the wider literature and highlight the complexities of emotion regulation, particularly in relation to mania risk. Overall, findings suggest that mania risk and emotion regulation share similar relationships with affect outcomes, however these associations appear to be independent pathways rather than moderated relationships. As links between use of strategies and affect were generally not related to mania risk, this work

provides further support for a transdiagnostic approach that considers mood control difficulties outside of diagnostic boundaries. Similarly, these findings also highlight affect difficulties as a universal experience and suggest that interventions that promote well-being and effective emotion regulation in a non-pathologizing way may be beneficial. Additionally, while there is some evidence that social and situational contexts are influential, trait regulation tendencies appear to be more important to affect outcomes than context-specific use of strategies. However, further work is needed to explore more nuanced elements of different contexts and dynamic associations between these factors that reflect 'real-life' regulation processes with high-risk groups.

References

- Abraham, K. (1911). and 1948. Notes on the psycho-analytic investigation and treatment of manic-depressive insanity and allied conditions. *Selected Papers*, 137.
- Ajaya, Y., Peckham, A. D., & Johnson, S. L. (2016). Emotion regulation and mania risk: Differential responses to implicit and explicit cues to regulate. *Journal of Behavior Therapy and Experimental Psychiatry*, 50, 283–288. <https://doi.org/10.1016/j.jbtep.2015.10.004>
- Aldao, A, Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30(2), 217–237. <https://doi.org/10.1016/j.cpr.2009.11.004>
- Aldao, Amelia. (2013). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science*, 8(2), 155–172.
- Allen, S. F., Wetherell, M. A., & Smith, M. A. (2020). Online writing about positive life experiences reduces depression and perceived stress reactivity in socially inhibited individuals. *Psychiatry Research*, 284, 112697.
- Alloy, L. B., Reilly-Harrington, N. A., Fresco, D. M., & Flannery-Schroeder, E. (2005). *Cognitive vulnerability to bipolar spectrum disorders. Cognitive Vulnerability to Emotional Disorders*. <https://doi.org/10.4324/9781410615787>
- Altman, E. G., Hedeker, D., Peterson, J. L., & Davis, J. M. (1997). The Altman self-rating mania scale. *Biological Psychiatry*, 42(10), 948–955.
- Altshuler, L. L., Kupka, R. W., Helleman, G., Frye, M. A., Sugar, C. A., McElroy, S. L., ... Keck, P. E. (2010). Gender and depressive symptoms in 711 patients with bipolar disorder evaluated prospectively in the Stanley Foundation bipolar treatment outcome network. *American Journal of Psychiatry*, 167(6), 708–715.
- American Psychological Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).
- Andreotti, C., Thigpen, J. E., Dunn, M. J., Watson, K., Potts, J., Reising, M. M., ... Luecken, L. (2013). Cognitive reappraisal and secondary control coping: associations with working memory, positive and negative affect, and symptoms of anxiety/depression. *Anxiety, Stress & Coping*, 26(1), 20–35.
- Baikie, K. A., Geerligs, L., & Wilhelm, K. (2012). Expressive writing and positive writing for participants with mood disorders: An online randomized controlled trial. *Journal of Affective Disorders*, 136(3), 310–319.
- Bandura, A. (1997). The anatomy of stages of change. *American Journal of Health Promotion: AJHP*, 12(1), 8–10.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-Efficacy Beliefs of Adolescents*, 5(1), 307–337.
- Barlow, D. H., Farchione, T. J., Sauer-Zavala, S., Latin, H. M., Ellard, K. K.,

- Bullis, J. R., ... Cassiello-Robbins, C. (2017). *Unified protocol for transdiagnostic treatment of emotional disorders: Therapist guide*. Oxford University Press.
- Barrett, L. F., Gross, J., Christensen, T. C., & Benvenuto, M. (2001). Knowing what you're feeling and knowing what to do about it: Mapping the relation between emotion differentiation and emotion regulation. *Cognition & Emotion*, 15(6), 713–724.
- Bechdolf, A., Nelson, B., Cotton, S. M., Chanen, A., Thompson, A., Kettle, J., ... Berk, M. (2010). A preliminary evaluation of the validity of at-risk criteria for bipolar disorders in help-seeking adolescents and young adults. *Journal of Affective Disorders*, 127(1–3), 316–320.
- Bentall, R. P., Myin-Germeys, I., Smith, A., Knowles, R., Jones, S. H., Smith, T., & Tai, S. J. (2011). Hypomanic Personality, Stability of Self-Esteem and Response Styles to Negative Mood. *Clinical Psychology and Psychotherapy*, 18(5, SI), 397–410. <https://doi.org/10.1002/cpp.780>
- Berk, M., Dodd, S., Kauer-Sant'Anna, M., Malhi, G. S., Bourin, M., Kapczinski, F., & Norman, T. (2007). Dopamine dysregulation syndrome: implications for a dopamine hypothesis of bipolar disorder. *Acta Psychiatrica Scandinavica*, 116(434), 41–49. <https://doi.org/10.1111/j.1600-0447.2007.01058.x>
- Berk, Michael, Hallam, K. T., & McGorry, P. D. (2007). The potential utility of a staging model as a course specifier: a bipolar disorder perspective. *Journal of Affective Disorders*, 100(1–3), 279–281.
- Berridge, K. C., & Kringelbach, M. L. (2008). Affective neuroscience of pleasure: reward in humans and animals. *Psychopharmacology*, 199(3), 457–480.
- Bonanno, G. A., & Burton, C. L. (2013). Regulatory Flexibility: An Individual Differences Perspective on Coping and Emotion Regulation. *Perspectives on Psychological Science*, 8(6), 591–612. <https://doi.org/10.1177/1745691613504116>
- Bopp, J. M., Miklowitz, D. J., Goodwin, G. M., Stevens, W., Rendell, J. M., & Geddes, J. R. (2010). The longitudinal course of bipolar disorder as revealed through weekly text messaging: a feasibility study. *Bipolar Disorders*, 12(3), 327–334.
- Bryant, F. (2003). Savoring Beliefs Inventory (SBI): A scale for measuring beliefs about savouring. *Journal of Mental Health*, 12(2), 175–196.
- Bryant, F. B., & Veroff, J. (2017). *Savoring: A new model of positive experience*. Psychology Press.
- Burton, C. M., & King, L. A. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality*, 38(2), 150–163.
- Burton, C. M., & King, L. A. (2009). The health benefits of writing about positive experiences: The role of broadened cognition. *Psychology and Health*, 24(8), 867–879.
- Calkins, A. W., Hearon, B. A., Capozzoli, M. C., & Otto, M. W. (2013).

- Psychosocial predictors of sleep dysfunction: the role of anxiety sensitivity, dysfunctional beliefs, and neuroticism. *Behavioral Sleep Medicine*, 11(2), 133–143.
- Carl, J. R., Soskin, D. P., Kerns, C., & Barlow, D. H. (2013). Positive emotion regulation in emotional disorders: A theoretical review. *Clinical Psychology Review*, 33(3), 343–360. <https://doi.org/10.1016/j.cpr.2013.01.003>
- 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(6), 552–569. <https://doi.org/http://dx.doi.org/10.1007/s10608-008-9213-y>
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67(2), 319–333. <https://doi.org/http://dx.doi.org/10.1037/0022-3514.67.2.319>
- Conus, P., Macneil, C., & McGorry, P. D. (2014). Public health significance of bipolar disorder: implications for early intervention and prevention. *Bipolar Disorders*, 16(5), 548–556.
- Correll, C. U., Penzner, J. B., Lencz, T., Auther, A., Smith, C. W., Malhotra, A. K., ... Cornblatt, B. A. (2007). Early identification and high-risk strategies for bipolar disorder. *Bipolar Disorders*, 9(4), 324–338.
- Critchley, H. (2003). Emotion and its disorders: Imaging in clinical neuroscience. *British Medical Bulletin*, 65(1), 35–47. <https://doi.org/10.1093/bmb/65.1.35>
- Crosson, B., & Hughes, C. W. (1987). Role of the Thalamus in Language: Is it Related to Schizophrenic Thought Disorder? *Schizophrenia Bulletin*, 13(4), 605–621. <https://doi.org/http://dx.doi.org/10.1093/schbul/13.4.605>
- Csikszentmihalyi, M., & Larson, R. (2014). Validity and reliability of the experience-sampling method. In *Flow and the foundations of positive psychology* (pp. 35–54). Springer.
- De Castella, K., & Byrne, D. (2015). My intelligence may be more malleable than yours: The revised implicit theories of intelligence (self-theory) scale is a better predictor of achievement, motivation, and student disengagement. *European Journal of Psychology of Education*, 30(3), 245–267.
- De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Dweck, C. S., & Gross, J. J. (2013). Beliefs about emotion: Links to emotion regulation, well-being, and psychological distress. *Basic and Applied Social Psychology*, 35(6), 497–505.
- De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Heimberg, R. G., & Gross, J. J. (2014). Emotion beliefs in social anxiety disorder: Associations with stress, anxiety, and well-being. *Australian Journal of Psychology*, 66(2), 139–148.
- Dempsey, R. C., Gooding, P. A., & Jones, S. H. (2011). Positive and negative cognitive style correlates of the vulnerability to hypomania. *Journal of Clinical Psychology*, 67(7), 673–690. <https://doi.org/10.1002/jclp.20789>
- Depue, R. A., Krauss, S. P., & Spoont, M. R. (1987). A two-dimensional threshold model of seasonal bipolar affective disorder.

- Depue, R. A., Krauss, S., Spoont, M. R., & Arbisi, P. (1989). General Behavior Inventory identification of unipolar and bipolar affective conditions in a nonclinical university population. *Journal of Abnormal Psychology*, 98(2), 117.
- Diagnostic and statistical manual of mental disorders, 4th ed.* (1994). *Diagnostic and statistical manual of mental disorders, 4th ed.* Arlington, VA, US: American Psychiatric Publishing, Inc.
- Diener, E., & Lucas, R. E. (1999). 11 personality and subjective well-being. *Well-Being: Foundations of Hedonic Psychology*, 213.
- Dixon-Gordon, K. L., Aldao, A., & De Los Reyes, A. (2015a). Emotion regulation in context: Examining the spontaneous use of strategies across emotional intensity and type of emotion. *Personality and Individual Differences*, 86, 271–276.
- Dixon-Gordon, K. L., Aldao, A., & De Los Reyes, A. (2015b). Repertoires of emotion regulation: A person-centered approach to assessing emotion regulation strategies and links to psychopathology. *Cognition and Emotion*, 29(7), 1314–1325.
- Dodd, A. L., Gilbert, K., & Gruber, J. (2020). Beliefs about the automaticity of positive mood regulation: examination of the BAMR-Positive Emotion Downregulation Scale in relation to emotion regulation strategies and mood symptoms. *Cognition and Emotion*, 34(2), 384–392.
- Dodd, A. L., Mansell, W., Bentall, R. P., & Tai, S. (2011). Do extreme beliefs about internal states predict mood swings in an analogue sample? *Cognitive Therapy and Research*, 35(6), 497–504.
- Dodd, A., Lockwood, E., Mansell, W., & Palmier-Claus, J. (2019). Emotion regulation strategies in bipolar disorder: A systematic and critical review. *Journal of Affective Disorders*, 246, 262–284.
- Duffy, A, Jones, S., Goodday, S., & Bentall, R. (2016). Candidate risks indicators for bipolar disorder: Early intervention opportunities in high-risk youth. *International Journal of Neuropsychopharmacology*, 19(1), 1–10. <https://doi.org/10.1093/ijnp/pyv071>
- Duffy, Anne, Horrocks, J., Doucette, S., Keown-Stoneman, C., McCloskey, S., & Grof, P. (2014). The developmental trajectory of bipolar disorder. *The British Journal of Psychiatry*, 204(2), 122–128.
- Dweck, C. (1999). Self-theories: Impact on motivation, personality and development. Philadelphia, PA: Taylor & Francis (Psychology Press).
- Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology*, 95(3), 214.
- Edge, M. D., Lwi, S. J., & Johnson, S. L. (2015). An assessment of emotional reactivity to frustration of goal pursuit in euthymic bipolar I disorder. *Clinical Psychological Science*, 3(6), 940–955. <https://doi.org/10.1177/2167702614555412>
- Egloff, B., Schmukle, S. C., Burns, L. R., & Schwerdtfeger, A. (2006). Spontaneous emotion regulation during evaluated speaking tasks:

- associations with negative affect, anxiety expression, memory, and physiological responding. *Emotion*, 6(3), 356.
- Ehring, T., Tuschen-Caffier, B., Schnülle, J., Fischer, S., & Gross, J. J. (2010). Emotion regulation and vulnerability to depression: Spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion*, 10(4), 563–572. <https://doi.org/http://dx.doi.org/10.1037/a0019010>
- English, T., Lee, I. A., John, O. P., & Gross, J. J. (2017). Emotion regulation strategy selection in daily life: The role of social context and goals. *Motivation and Emotion*, 41(2), 230–242.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191.
- 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. <https://doi.org/10.1007/s10608-006-9083-0>
- Ferrari, A. J., Stockings, E., Khoo, J., Erskine, H. E., Degenhardt, L., Vos, T., & Whiteford, H. A. (2016). The prevalence and burden of bipolar disorder: findings from the Global Burden of Disease Study 2013. *Bipolar Disorders*, 18(5), 440–450.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. sage.
- Fisk, C., Dodd, A. L., & Collins, A. (2015). Response styles, bipolar risk, and mood in students: The Behaviours Checklist. *Psychology and Psychotherapy-Theory Research and Practice*, 88(4), 412–426. <https://doi.org/10.1111/papt.12052>
- Fletcher, K., Parker, G., & Manicavasagar, V. (2014). The role of psychological factors in bipolar disorder: prospective relationships between cognitive style, coping style and symptom expression. *Acta Neuropsychiatrica*, 26(2), 81–95. <https://doi.org/10.1017/neu.2013.41>
- Flynn, M., & Rudolph, K. D. (2010). The contribution of deficits in emotional clarity to stress responses and depression. *Journal of Applied Developmental Psychology*, 31(4), 291–297.
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, 359(1449), 1367–1377.
- Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: A discussion of critical trends and considerations for scholarly advancement. *Organizational Research Methods*, 22(4), 969–1006.
- Gao, W., Chen, S., Long, Q., Yang, J., & Yuan, J. (2018). The progress of emotion regulation methods and paradigms: From voluntary emotion regulation to automatic emotion regulation. *Chinese Science Bulletin*, 63(4), 415–424.
- Garnefski, N., & Kraaij, V. (2007). The cognitive emotion regulation

- questionnaire. *European Journal of Psychological Assessment*, 23(3), 141–149.
- Gignac, A., McGirr, A., Lam, R. W., & Yatham, L. N. (2015). Course and outcome following a first episode of mania: Four-year prospective data from the Systematic Treatment Optimization Program (STOP-EM). *Journal of Affective Disorders*, 175, 411–417.
- Gilbert, K. E., Nolen-Hoeksema, S., & Gruber, J. (2013). Positive emotion dysregulation across mood disorders: how amplifying versus dampening predicts emotional reactivity and illness course. *Behaviour Research and Therapy*, 51(11), 736–741. <https://doi.org/10.1016/j.brat.2013.08.004>
- Giovanelli, A., Hoerger, M., Johnson, S. L., & Gruber, J. (2013). Impulsive responses to positive mood and reward are related to mania risk. *Cognition & Emotion*, 27(6), 1091–1104. <https://doi.org/10.1080/02699931.2013.772048>
- Goodwin, F. K., & Jamison, K. R. (2007). *Manic-depressive illness: bipolar disorders and recurrent depression* (Vol. 2). Oxford University Press.
- Gortner, E.-M., Rude, S. S., & Pennebaker, J. W. (2006). Benefits of expressive writing in lowering rumination and depressive symptoms. *Behavior Therapy*, 37(3), 292–303.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Green, M. J., Lino, B. J., Hwang, E.-J., Sparks, A., James, C., & Mitchell, P. B. (2011). Cognitive regulation of emotion in bipolar I disorder and unaffected biological relatives. *Acta Psychiatrica Scandinavica*, 124(4), 307–316. <https://doi.org/10.1111/j.1600-0447.2011.01718.x>
- Gross, J. J. (1998a). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74(1), 224–237. <https://doi.org/http://dx.doi.org/10.1037/0022-3514.74.1.224>
- Gross, J. J. (1998b). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(3), 271–299. <https://doi.org/http://dx.doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J. (2008). Emotion regulation. *Handbook of Emotions*, 3(3), 497–513.
- Gross, J. J. (2015a). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, 26(1), 1–26.
- Gross, J. J. (2015b). The extended process model of emotion regulation: Elaborations, applications, and future directions. *Psychological Inquiry*, 26(1), 130–137.
- Gross, J. J., & Thompson, R. A. (2007). Emotion Regulation: Conceptual foundations, Handbook of emotion regulation. *New York: Guilford*.
- Gruber, J. (2011). A Review and Synthesis of Positive Emotion and Reward Disturbance in Bipolar Disorder. *Clinical Psychology and Psychotherapy*,

- Gruber, J., Harvey, A. G., & Johnson, S. L. (2009). Reflective and ruminative processing of positive emotional memories in bipolar disorder and healthy controls. *Behaviour Research and Therapy*, 47(8), 697–704. <https://doi.org/10.1016/j.brat.2009.05.005>
- Gruber, June, & 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. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&AuthType=cookie,ip,shib,uid&db=cmedm&AN=20360995&site=ehost-live&scope=site>
- Gruber, June, Johnson, S. L., Oveis, C., & Keltner, D. (2008). Risk for mania and positive emotional responding: Too much of a good thing? *Emotion*, 8(1), 23–33. <https://doi.org/http://dx.doi.org/10.1037/1528-3542.8.1.23>
- Gruber, June, Kogan, A., Mennin, D., & Murray, G. (2013). Real-world emotion? An experience-sampling approach to emotion experience and regulation in bipolar I disorder. *Journal of Abnormal Psychology*, 122(4), 971–983. <https://doi.org/http://dx.doi.org/10.1037/a0034425>
- Haines, S. J., Gleeson, J., Kuppens, P., Hollenstein, T., Ciarrochi, J., Labuschagne, I., ... Koval, P. (2016). The wisdom to know the difference: Strategy-situation fit in emotion regulation in daily life is associated with well-being. *Psychological Science*, 27(12), 1651–1659.
- Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). Multivariate data analysis: A global perspective (Vol. 7). Upper Saddle River, NJ: Pearson.
- Harrington, R., & Loffredo, D. A. (2010). Insight, rumination, and self-reflection as predictors of well-being. *The Journal of Psychology*, 145(1), 39–57.
- Havermans, R., Nicolson, N. A., Berkhof, J., & deVries, M. W. (2010). Mood reactivity to daily events in patients with remitted bipolar disorder. *Psychiatry Research*, 179(1), 47–52.
- Hayes, A. F. (2012). Process: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. University of Kansas, KS.
- Heissler, J., Kanske, P., Schoenfelder, S., & Wessa, M. (2014). Inefficiency of emotion regulation as vulnerability marker for bipolar disorder: Evidence from healthy individuals with hypomanic personality. *Journal of Affective Disorders*, 152, 83–90. <https://doi.org/10.1016/j.jad.2013.05.001>
- Henry, C., Van den Bulke, D., Bellivier, F., Roy, I., Swendsen, J., M'Baïlara, K., ... Leboyer, M. (2008). Affective lability and affect intensity as core dimensions of bipolar disorders during euthymic period. *Psychiatry Research*, 159(1–2), 1–6.
- Hirschfeld, R., Lewis, L., & Vornik, L. A. (2003). Perceptions and impact of bipolar disorder: how far have we really come? Results of the national depressive and manic-depressive association 2000 survey of individuals with bipolar disorder. *The Journal of Clinical Psychiatry*.

- Hirschfeld, R. M. A., Williams, J. B. W., Spitzer, R. L., Calabrese, J. R., Flynn, L., Keck Jr, P. E., ... Rapoport, D. J. (2000). Development and validation of a screening instrument for bipolar spectrum disorder: the Mood Disorder Questionnaire. *American Journal of Psychiatry*, 157(11), 1873–1875.
- Hofmann, S. G., & Barlow, D. H. (2002). Social phobia (social anxiety disorder). *Anxiety and Its Disorders: The Nature and Treatment of Anxiety and Panic*, 2, 454–476.
- Hong, Y., Chiu, C., Dweck, C. S., Lin, D. M.-S., & Wan, W. (1999). Implicit theories, attributions, and coping: a meaning system approach. *Journal of Personality and Social Psychology*, 77(3), 588.
- Hutchison, J. A., & Gunthert, K. C. (2013). Measuring beliefs about automatic mood regulation: Development of a self-report scale. *Cognitive Therapy and Research*, 37(6), 1243–1256.
- Johnson, S L. (2005a). Life events in bipolar disorder: Towards more specific models. *Clinical Psychology Review*, 25(8), 1008–1027. <https://doi.org/10.1016/j.cpr.2005.06.004>
- Johnson, S L. (2005b). Mania and dysregulation in goal pursuit: A review. *Clinical Psychology Review*, 25(2), 241–262. <https://doi.org/10.1016/j.cpr.2004.11.002>
- Johnson, S L, Edge, M. D., Holmes, M. K., & Carver, C. S. (2012). The behavioral activation system and mania. *Annual Review of Clinical Psychology*, 8, 243–267. <https://doi.org/10.1146/annurev-clinpsy-032511-143148>
- Johnson, Sheri L, & Carver, C. S. (2006). Extreme goal setting and vulnerability to mania among undiagnosed young adults. *Cognitive Therapy and Research*, 30(3), 377–395.
- Johnson, Sheri L, Gruber, J., & Eisner, L. R. (2007). Emotion and Bipolar Disorder.
- Johnson, Sheri L, McKenzie, G., & McMurrich, S. (2008). Ruminative responses to negative and positive affect among students diagnosed with bipolar disorder and major depressive disorder. *Cognitive Therapy and Research*, 32(5), 702–713. <https://doi.org/10.1007/s10608-007-9158-6>
- Johnson, Sheri 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. Retrieved from <https://search.proquest.com/docview/224844897?accountid=12860>
- Jose, P. E., Lim, B. T., & Bryant, F. B. (2012). Does savoring increase happiness? A daily diary study. *The Journal of Positive Psychology*, 7(3), 176–187.
- Judd, L. L., Schettler, P. J., Solomon, D. A., Maser, J. D., Coryell, W., Endicott, J., & Akiskal, H. S. (2008). Psychosocial disability and work role function compared across the long-term course of bipolar I, bipolar II and unipolar major depressive disorders. *Journal of Affective Disorders*, 108(1–2), 49–58.

- Kanske, P., Schönfelder, S., Forneck, J., & Wessa, M. (2015). Impaired regulation of emotion: Neural correlates of reappraisal and distraction in bipolar disorder and unaffected relatives. *Translational Psychiatry*, 5(1). <https://doi.org/10.1038/tp.2014.137>
- Kashdan, T. B., Goodman, F. R., Mallard, T. T., & DeWall, C. N. (2016). What triggers anger in everyday life? Links to the intensity, control, and regulation of these emotions, and personality traits. *Journal of Personality*, 84(6), 737–749.
- Kelly, R. E., Dodd, A. L., & Mansell, W. (2017). "When my Moods Drive Upward There Is Nothing I Can Do about It": A Review of Extreme Appraisals of Internal States and the Bipolar Spectrum. *Frontiers in Psychology*, 8, 1235. <https://doi.org/10.3389/fpsyg.2017.01235>
- Kelly, R. E., Smith, P., Leigh, E., & Mansell, W. (2016). Appraisals of Internal States and their Consequences: Relationship to Adolescent Analogue Bipolar Symptoms. *Behavioural and Cognitive Psychotherapy*, 44(2), 214–224. <https://doi.org/http://dx.doi.org/10.1017/S1352465815000132>
- Kneeland, E. T., Nolen-Hoeksema, S., Dovidio, J. F., & Gruber, J. (2016). Emotion Malleability Beliefs Influence the Spontaneous Regulation of Social Anxiety. *Cognitive Therapy and Research*, 40(4), 496–509. <https://doi.org/10.1007/s10608-016-9765-1>
- 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(1), 99–112. <https://doi.org/10.1348/014466504X20062>
- Koenders, M. A., Dodd, A. L., Karl, A., Green, M. J., Elzinga, B. M., & Wright, K. (2020). Understanding bipolar disorder within a biopsychosocial emotion dysregulation framework. *Journal of Affective Disorders Reports*, 2, 100031. <https://doi.org/https://doi.org/10.1016/j.jadr.2020.100031>
- Krpan, K. M., Kross, E., Berman, M. G., Deldin, P. J., Askren, M. K., & Jonides, J. (2013). An everyday activity as a treatment for depression: the benefits of expressive writing for people diagnosed with major depressive disorder. *Journal of Affective Disorders*, 150(3), 1148–1151.
- Kwapil, T. R., Barrantes-Vidal, N., Armistead, M. S., Hope, G. A., Brown, L. H., Silvia, P. J., & Myin-Germeys, I. (2011). The expression of bipolar spectrum psychopathology in daily life. *Journal of Affective Disorders*, 130(1–2), 166–170.
- 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.
- Lam, D., Wright, K., & Smith, N. (2004). Dysfunctional assumptions in bipolar disorder. *Journal of Affective Disorders*, 79(1–3), 193–199.
- Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1997). International affective picture system (IAPS): Technical manual and affective ratings. *NIMH Center for the Study of Emotion and Attention*, 1, 39–58.

- Lapalme, M., Hodgins, S., & LaRoche, C. (1997). Children of parents with bipolar disorder: a metaanalysis of risk for mental disorders. *The Canadian Journal of Psychiatry*, 42(6), 623–631.
- Larsen, R. (2009). The contributions of positive and negative affect to emotional well-being. *Psihologijske Teme*, 18(2), 247–266.
- Larson, R., & Csikszentmihalyi, M. (2014). The experience sampling method. In *Flow and the foundations of positive psychology* (pp. 21–34). Springer.
- Lazarus, R. S. (1993). Coping theory and research: Past, present, and future. *Fifty Years of the Research and Theory of RS Lazarus: An Analysis of Historical and Perennial Issues*, 366–388.
- Leahy, R. L. (2002). A model of emotional schemas. *Cognitive and Behavioral Practice*, 9(3), 177–190.
- Lewandowski Jr, G. W. (2009). Promoting positive emotions following relationship dissolution through writing. *The Journal of Positive Psychology*, 4(1), 21–31.
- Li, Y. I., Starr, L. R., & Hershenberg, R. (2017). Responses to Positive Affect in Daily Life: Positive Rumination and Dampening Moderate the Association Between Daily Events and Depressive Symptoms. *Journal of Psychopathology and Behavioral Assessment*, 39(3), 412–425. <https://doi.org/http://dx.doi.org/10.1007/s10862-017-9593-y>
- Li, Y., Liu, C., Hou, W., Li, Y., Ma, J., Lin, K., ... Yao, L. (2014). Retrograde Ductal Administration of the Adenovirus-mediated NDRG2 Gene Leads to Improved Sialaden Hypofunction in Estrogen-deficient Rats. *MOLECULAR THERAPY*, 22(5), 908–918. <https://doi.org/10.1038/mt.2013.286>
- Logotheti, M., Chatziioannou, A., Venizelos, N., & Kolisis, F. (2019). Recent advancements in bipolar disorder studies through genomic, epigenomic and metagenomic approaches. *Journal of Psychiatry and Psychology Research*, 2(1), 56–66.
- Lozano, B. E., & Johnson, S. L. (2001). Can personality traits predict increases in manic and depressive symptoms? *Journal of Affective Disorders*, 63(1–3), 103–111.
- Lyubomirsky, S., Layous, K., Chancellor, J., & Nelson, S. K. (2015). Thinking about rumination: The scholarly contributions and intellectual legacy of Susan Nolen-Hoeksema. *Annual Review of Clinical Psychology*, 11, 1–22.
- Ma, T. W., Bryant, F. B., & Hou, W. K. (2020). Associations of trait positive emotion regulation with everyday emotions: An experience sampling approach. *International Journal of Psychology*, 55(5), 871–881.
- Mansell, W., & Pedley, R. (2008). The ascent into mania: A review of psychological processes associated with the development of manic symptoms. *Clinical Psychology Review*, 28(3), 494–520. <https://doi.org/10.1016/j.cpr.2007.07.010>
- Mansell, Warren. (2006). The Hypomanic Attitudes and Positive Predictions Inventory (HAPPI): A Pilot Study to Select Cognitions that are Elevated in Individuals with Bipolar Disorder Compared to Non-Clinical Controls.

Behavioural and Cognitive Psychotherapy, 34(4), 467–476. Retrieved from <https://search.proquest.com/docview/213112839?accountid=12860>

- Mansell, Warren, Morrison, A. P., Reid, G., Lowens, I., & Tai, S. (2007). The interpretation of, and responses to, changes in internal states: An integrative cognitive model of mood swings and bipolar disorders. *Behavioural and Cognitive Psychotherapy*, 35(5), 515–539. <https://doi.org/10.1017/S1352465807003827>
- Manser, R., Cooper, M., & Trefusis, J. (2012). Beliefs about emotions as a metacognitive construct: Initial development of a self-report questionnaire measure and preliminary investigation in relation to emotion regulation. *Clinical Psychology & Psychotherapy*, 19(3), 235–246.
- Martin, R. C., & Dahlen, E. R. (2005). Cognitive emotion regulation in the prediction of depression, anxiety, stress, and anger. *Personality and Individual Differences*, 39(7), 1249–1260.
- Mauss, I. B., Levenson, R. W., McCarter, L., Wilhelm, F. H., & Gross, J. J. (2005). The tie that binds? Coherence among emotion experience, behavior, and physiology. *Emotion*, 5(2), 175.
- Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition and Emotion*, 23(2), 209–237.
- Mayer, J. D., & Stevens, A. A. (1994). An emerging understanding of the reflective (meta-) experience of mood. *Journal of Research in Personality*, 28(3), 351–373.
- McEvoy, P. M., Hyett, M. P., Ehrling, T., Johnson, S. L., Samtani, S., Anderson, R., & Moulds, M. L. (2018). Transdiagnostic assessment of repetitive negative thinking and responses to positive affect: Structure and predictive utility for depression, anxiety, and mania symptoms. *Journal of Affective Disorders*, 232, 375–384. <https://doi.org/10.1016/j.jad.2018.02.072>
- McGorry, P. D., Nelson, B., Phillips, L. J., Yuen, H. P., Francey, S. M., Thampi, A., ... Kelly, D. (2013). Randomized controlled trial of interventions for young people at ultra-high risk of psychosis: twelve-month outcome. *The Journal of Clinical Psychiatry*.
- McGrogan, C. L., Dodd, A. L., & Smith, M. A. (2019). Emotion regulation strategies in mania risk: A systematic review. *Journal of Clinical Psychology*, 75(12), 2106–2118. <https://doi.org/10.1002/jclp.22841>
- McGrogan, C. L., Dodd, A. L., & Smith, M. A. (2020). Are context-specific measures of positive emotion regulation more predictive of mania risk and mood symptoms than trait measures? *Behavioural and Cognitive Psychotherapy*, 1–16.
- McGuffin, P., Rijdsdijk, 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(5), 497–502.
- Meads, D M, & Bentall, R. P. (2008). Rasch analysis and item reduction of the hypomanic personality scale. *Personality and Individual Differences*, 44(8), 1772–1783. <https://doi.org/10.1016/j.paid.2008.02.009>

- Meads, David M, & Bentall, R. P. (2008). Rasch analysis and item reduction of the hypomanic personality scale. *Personality and Individual Differences*, 44(8), 1772–1783.
- Mennin, D. S., Fresco, D. M., Ritter, M., & Heimberg, R. G. (2015). An open trial of emotion regulation therapy for generalized anxiety disorder and cooccurring depression. *Depression and Anxiety*, 32(8), 614–623.
- Mennin, D. S., Heimberg, R. G., Turk, C. L., & Fresco, D. M. (2005). Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy*, 43(10), 1281–1310.
- Mercer, L., & Becerra, R. (2013). A unique emotional processing profile of euthymic bipolar disorder? A critical review. *Journal of Affective Disorders*, 146(3), 295–309.
- 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.
<https://doi.org/10.1023/A:1022119414440>
- Meyer, Björn, 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.
- Mols, F., & Denollet, J. (2010). Type D personality in the general population: a systematic review of health status, mechanisms of disease, and work-related problems. *Health and Quality of Life Outcomes*, 8(1), 1–10.
- Muhtadie, L., Johnson, S. L., Carver, C. S., Gotlib, I. H., & Ketter, T. A. (2014). A profile approach to impulsivity in bipolar disorder: The key role of strong emotions. *Acta Psychiatrica Scandinavica*, 129(2), 100–108.
<https://doi.org/10.1111/acps.12136>
- Myin-Germeys, I., Oorschot, M., Collip, D., Lataster, J., Delespaul, P., & Van Os, J. (2009). Experience sampling research in psychopathology: Opening the black box of daily life. *Psychological Medicine*, 39(9), 1533–1547.
<https://doi.org/10.1017/S0033291708004947>
- Myin-Germeys, I., Peeters, F., Havermans, R., Nicolson, N. A., DeVries, M. W., Delespaul, P., & Van Os, J. (2003). Emotional reactivity to daily life stress in psychosis and affective disorder: an experience sampling study. *Acta Psychiatrica Scandinavica*, 107(2), 124–131.
- Neale, J. M. (1988). Defensive functions of manic episodes.
- Nelis, S., Luyckx, K., Feldman, G., Bastin, M., Raes, F., & Bijttebier, P. (2016). Assessing response styles to positive affect: One or two dimensions of positive rumination in the Responses to Positive Affect questionnaire? *Personality and Individual Differences*, 89, 40–46.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, 100(4), 569–582. <https://doi.org/http://dx.doi.org/10.1037/0021-843X.100.4.569>

- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, 109(3), 504.
- Nolen-Hoeksema, S. (2012). Emotion regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology*, 8, 161–187.
- Olofsson, M. E., Boersma, K., Engh, J., & Wurm, M. (2014). A psychometric evaluation of the Swedish version of the Responses to Positive Affect questionnaire. *Nordic Journal of Psychiatry*, 68(8), 588–593.
<https://doi.org/10.3109/08039488.2014.898792>
- Ommundsen, Y., Haugen, R., & Lund, T. (2005). Academic self-concept, implicit theories of ability, and self-regulation strategies. *Scandinavian Journal of Educational Research*, 49(5), 461–474.
- Painter, J. M., Mote, J., Peckham, A. D., Lee, E. H., Campellone, T. R., Pearlstein, J. G., ... Moskowitz, J. T. (2019). A positive emotion regulation intervention for bipolar I disorder: Treatment development and initial outcomes. *General Hospital Psychiatry*, 61, 96–103.
- Palmier-Claus, J. E., Myin-Germeys, I., Barkus, E., Bentley, L., Udachina, A., Delespaul, P., ... Dunn, G. (2011). Experience sampling research in individuals with mental illness: reflections and guidance. *Acta Psychiatrica Scandinavica*, 123(1), 12–20.
- Parrott, W. G. (1993). Beyond hedonism: Motives for inhibiting good moods and maintaining bad moods. In *Handbook of Mental Control* (pp. 278–308).
- Pavlickova, H, Turnbull, O. H., Myin-Germeys, I., & Bentall, R. P. (2015). The inter-relationship between mood, self-esteem and response styles in adolescent offspring of bipolar parents: An experience sampling study. *Psychiatry Research*, 225(3), 563–570.
<https://doi.org/10.1016/j.psychres.2014.11.046>
- Pavlickova, Hana, Turnbull, O., & Bentall, R. P. (2014). Cognitive vulnerability to bipolar disorder in offspring of parents with bipolar disorder. *BRITISH JOURNAL OF CLINICAL PSYCHOLOGY*, 53(4), 386–401.
<https://doi.org/10.1111/bjc.12051>
- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*, 8(3), 162–166.
- Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: toward an understanding of inhibition and disease. *Journal of Abnormal Psychology*, 95(3), 274.
- Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). Linguistic inquiry and word count: LIWC 2001. *Mahway: Lawrence Erlbaum Associates*, 71(2001), 2001.
- Pennebaker, J. W., & King, L. A. (1999). Linguistic styles: language use as an individual difference. *Journal of Personality and Social Psychology*, 77(6), 1296.
- Pennebaker, J. W., Mehl, M. R., & Niederhoffer, K. G. (2003). Psychological aspects of natural language use: Our words, our selves. *Annual Review of*

Psychology, 54(1), 547–577.

- Petrie, K. J., Booth, R. J., & Davison, K. P. (1995). Repression, disclosure, and immune function: Recent findings and methodological issues.
- Petticrew, M., & Roberts, H. (2008). *Systematic reviews in the social sciences: A practical guide*. John Wiley & Sons.
- Post, R. M., Leverich, G. S., Kupka, R. W., Keck Jr, P. E., McElroy, S. L., Altshuler, L. L., ... Grunze, H. (2010). Early-onset bipolar disorder and treatment delay are risk factors for poor outcome in adulthood. *The Journal of Clinical Psychiatry*, 71(7), 864–872.
- 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 Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence*, 20(2), 149–166.
- Raes, F., Daems, K., Feldman, G. C., Johnsons, S. L., & Van Gucht, D. (2009). A psychometric evaluation of the dutch version of the responses to positive affect questionnaire. *Psychologica Belgica*, 49(4), 293–310. Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-77953551554&partnerID=40&md5=cc1f60f0238d4f9905f4a18c112b6e79>
- Raes, Filip, Smets, J., Nelis, S., & Schoofs, H. (2012). Dampening of positive affect prospectively predicts depressive symptoms in non-clinical samples. *Cognition & Emotion*, 26(1), 75–82.
- Reilly-Harrington, N. A., Alloy, L. B., Fresco, D. M., & Whitehouse, W. G. (1999). Cognitive styles and life events interact to predict bipolar and unipolar symptomatology. *Journal of Abnormal Psychology*, 108(4), 567.
- Rhodewalt, F. (1994). Conceptions of ability, achievement goals, and individual differences in self-handicapping behavior: On the application of implicit theories. *Journal of Personality*, 62(1), 67–85.
- Robb, J. C., Young, L. T., Cooke, R. G., & Joffe, R. T. (1998). Gender differences in patients with bipolar disorder influence outcome in the medical outcomes survey (SF-20) subscale scores. *Journal of Affective Disorders*, 49(3), 189–193.
- Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity*, 1(4), 313–336.
- Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: Preliminary tests of a conceptual model. *Cognitive Therapy and Research*, 29(1), 71–88.
- Rude, S., Gortner, E.-M., & Pennebaker, J. (2004). Language use of depressed and depression-vulnerable college students. *Cognition & Emotion*, 18(8), 1121–1133.
- Ruhrmann, S., Schultze-Lutter, F., Salokangas, R. K. R., Heinimaa, M., Linszen, D., Dingemans, P., ... Heinz, A. (2010). Prediction of psychosis in

- adolescents and young adults at high risk: results from the prospective European prediction of psychosis study. *Archives of General Psychiatry*, 67(3), 241–251.
- Santor, D. A., Zuroff, D. C., Ramsay, J. O., Cervantes, P., & Palacios, J. (1995). Examining scale discriminability in the BDI and CES-D as a function of depressive severity. *Psychological Assessment*, 7(2), 131.
- Schoofs, H., Hermans, D., & Raes, F. (2010). Brooding and reflection as subtypes of rumination: Evidence from confirmatory factor analysis in nonclinical samples using the Dutch Ruminative Response Scale. *Journal of Psychopathology and Behavioral Assessment*, 32(4), 609–617.
- Scott, J., Leboyer, M., Hickie, I., Berk, M., Kapczinski, F., Frank, E., ... McGorry, P. (2013). Clinical staging in psychiatry: a cross-cutting model of diagnosis with heuristic and practical value. *The British Journal of Psychiatry*, 202(4), 243–245.
- Scott, J., Marwaha, S., Ratheesh, A., Macmillan, I., Yung, A. R., Morriss, R., ... Bechdolf, A. (2016). Bipolar At-Risk Criteria: An Examination of Which Clinical Features Have Optimal Utility for Identifying Youth at Risk of Early Transition From Depression to Bipolar Disorders. *Schizophrenia Bulletin*, 43(4), 737–744. <https://doi.org/10.1093/schbul/sbw154>
- Sheppes, G., Scheibe, S., Suri, G., Radu, P., Blechert, J., & Gross, J. J. (2014). Emotion regulation choice: A conceptual framework and supporting evidence. *Journal of Experimental Psychology: General*, 143(1), 163.
- Sheppes, G., Suri, G., & Gross, J. J. (2015). Emotion regulation and psychopathology. *Annual Review of Clinical Psychology*, 11, 379–405.
- Smith, M. A., Thompson, A., Hall, L. J., Allen, S. F., & Wetherell, M. A. (2018). The physical and psychological health benefits of positive emotional writing: Investigating the moderating role of Type D (distressed) personality. *British Journal of Health Psychology*, 23(4), 857–871.
- Spasojević, J., & Alloy, L. B. (2001). Rumination as a common mechanism relating depressive risk factors to depression. *Emotion*, 1(1), 25–37. <https://doi.org/http://dx.doi.org/10.1037/1528-3542.1.1.25>
- Sperry, S. H., & Kwapil, T. R. (2017). What can daily life assessment tell us about the bipolar spectrum? *Psychiatry Research*, 252, 51–56. <https://doi.org/10.1016/j.psychres.2017.02.045>
- Srivastava, S., Tamir, M., McGonigal, K. M., John, O. P., & Gross, J. J. (2009). The social costs of emotional suppression: A prospective study of the transition to college. *Journal of Personality and Social Psychology*, 96(4), 883.
- Steel, C. (2016a). Cognitive Emotion Regulation as a Mediator between Posttraumatic Stress Symptoms and Hypomanic Personality within a Non-Clinical Population. *Behavioural and Cognitive Psychotherapy*, 44(1), 104–111. <https://doi.org/http://dx.doi.org/10.1017/S1352465815000508>
- Steel, C. (2016b). Cognitive Emotion Regulation as a Mediator between Posttraumatic Stress Symptoms and Hypomanic Personality within a Non-Clinical Population. *Behavioural and Cognitive Psychotherapy*, 44(1), 104–

111. <https://doi.org/http://dx.doi.org/10.1017/S1352465815000508>

- Stirman, S. W., & Pennebaker, J. W. (2001). Word use in the poetry of suicidal and nonsuicidal poets. *Psychosomatic Medicine*, 63(4), 517–522.
- Suveg, C., Sood, E., Comer, J. S., & Kendall, P. C. (2009). Changes in emotion regulation following cognitive-behavioral therapy for anxious youth. *Journal of Clinical Child & Adolescent Psychology*, 38(3), 390–401.
- Tamir, M., John, O. P., Srivastava, S., & Gross, J. J. (2007). Implicit theories of emotion: affective and social outcomes across a major life transition. *Journal of Personality and Social Psychology*, 92(4), 731.
- Thomas, D. L., & Diener, E. (1990). Memory accuracy in the recall of emotions. *Journal of Personality and Social Psychology*, 59(2), 291.
- Thomas, J., & Bentall, R. P. (2002). Hypomanic traits and response styles to depression. *British Journal of Clinical Psychology*, 41(3), 309–313.
- Thomas, J., Knowles, R., Tai, S., & Bentall, R. P. (2007). Response styles to depressed mood in bipolar affective disorder. *Journal of Affective Disorders*, 100(1–3), 249–252. <https://doi.org/10.1016/j.jad.2006.10.017>
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the positive and negative affect schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38(2), 227–242.
- Thomsen, D. K., Mehlsen, M. Y., Hokland, M., Viidik, A., Olesen, F., Avlund, K., ... Zachariae, R. (2004). Negative thoughts and health: Associations among rumination, immunity, and health care utilization in a young and elderly sample. *Psychosomatic Medicine*, 66(3), 363–371.
- Townsend, J., & Altshuler, L. L. (2012). Emotion processing and regulation in bipolar disorder: a review. *BIPOLAR DISORDERS*, 14(4), 326–339. <https://doi.org/10.1111/j.1399-5618.2012.01021.x>
- Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, 27(3), 247–259.
- Troy, A. S., Shallcross, A. J., & Mauss, I. B. (2013). A person-by-situation approach to emotion regulation: Cognitive reappraisal can either help or hurt, depending on the context. *Psychological Science*, 24(12), 2505–2514.
- van't Wout, M., Chang, L. J., & Sanfey, A. G. (2010). The influence of emotion regulation on social interactive decision-making. *Emotion*, 10(6), 815.
- Veilleux, J. C., Pollert, G. A., Skinner, K. D., Chamberlain, K. D., Baker, D. E., & Hill, M. A. (2020). Individual beliefs about emotion and perceptions of belief stability are associated with symptoms of psychopathology and emotional processes. *Personality and Individual Differences*, 110541.
- Wahl, K., van den Hout, M., & Lieb, R. (2019). Rumination on unwanted intrusive thoughts affects the urge to neutralize in nonclinical individuals. *Journal of Obsessive-Compulsive and Related Disorders*, 20, 4–12.
- Watkins, E. R. (2009). Depressive rumination: investigating mechanisms to improve cognitive behavioural treatments. *Cognitive Behaviour Therapy*,

38(S1), 8–14.

- Waugh, M. J., Meyer, T. D., Youngstrom, E. A., & Scott, J. (2014). A review of self-rating instruments to identify young people at risk of bipolar spectrum disorders. *Journal of Affective Disorders*, 160, 113–121.
- West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality*, 64(1), 1–48.
- Wood, J. V., Heimpel, S. A., & Michela, J. L. (2003). Savoring versus dampening: self-esteem differences in regulating positive affect. *Journal of Personality and Social Psychology*, 85(3), 566.
- Yung, A. R., McGorry, P. D., McFarlane, C. A., Jackson, H. J., Patton, G. C., & Rakkar, A. (1996). Monitoring and care of young people at incipient risk of psychosis. *Schizophrenia Bulletin*, 22(2), 283–303.
- Yung, A. R., Phillips, L. J., Nelson, B., Francey, S. M., PanYuen, H., Simmons, M. B., ... Amminger, G. P. (2010). Randomized controlled trial of interventions for young people at ultra high risk for psychosis: 6-month analysis. *The Journal of Clinical Psychiatry*, 72(4), 430–440.
- Yung, A. R., Phillips, L. J., Yuen, H. P., Francey, S. M., McFarlane, C. A., Hallgren, M., & McGorry, P. D. (2003). Psychosis prediction: 12-month follow up of a high-risk (“prodromal”) group. *Schizophrenia Research*, 60(1), 21–32.
- Yung, A. R., Phillips, L. J., Yuen, H. P., & McGorry, P. D. (2004). Risk factors for psychosis in an ultra high-risk group: psychopathology and clinical features. *Schizophrenia Research*, 67(2–3), 131–142.
- Zechner, M. R., & Gill, K. J. (2016). Predictors of physical activity in persons with mental illness: Testing a social cognitive model. *Psychiatric Rehabilitation Journal*, 39(4), 321–327.
<https://doi.org/http://dx.doi.org/10.1037/prj0000191>
- Zlomke, K. R., & Hahn, K. S. (2010). Cognitive emotion regulation strategies: Gender differences and associations to worry. *Personality and Individual Differences*, 48(4), 408–413.

APPENDIX A:

Hypomanic Personality Scale - 20

This questionnaire consists of statements to which you can respond true or false. In each case, please record your answer by circling the appropriate response. Please answer honestly. There are no right or wrong answers and we expect there to be variation in the way different people respond to the items.

Thank you for your participation.

No.	Item	Please circle a response	
1.	I seem to have an uncommon ability to persuade and inspire others.	TRUE	FALSE
2.	I often get into moods where I feel like many of the rules of life don't apply to me.	TRUE	FALSE
3.	Sometimes ideas and insights come to me so fast that I cannot express them all.	TRUE	FALSE
4.	I seem to be a person whose mood goes up and down easily.	TRUE	FALSE
5.	There are often times when I am so restless that it is impossible for me to sit still.	TRUE	FALSE
6.	I often feel excited and happy for no apparent reason.	TRUE	FALSE
7.	I often have moods where I feel so energetic and optimistic that I feel I could outperform almost anyone at anything.	TRUE	FALSE
8.	In unfamiliar surroundings I am often so assertive and sociable that I surprise myself.	TRUE	FALSE
9.	I am frequently in such high spirits that I can't concentrate on any one thing for too long.	TRUE	FALSE
10.	I very frequently get into moods where I wish I could be everywhere and do everything at once.	TRUE	FALSE
11.	A hundred years after I'm dead, my achievements will probably have been forgotten.	TRUE	FALSE

12.	I am so good at controlling others that sometimes it scares me.	TRUE	FALSE
13.	I am usually in an average sort of mood, not too high and not too low.	TRUE	FALSE
14.	I do most of my best work during brief periods of intense inspiration.	TRUE	FALSE
15.	I am considered to be a kind of 'hyper' person.	TRUE	FALSE
16.	Many people would consider me to be amusing but kind of eccentric.	TRUE	FALSE
17.	I have often felt happy and irritable at the same time.	TRUE	FALSE
18.	I frequently find that my thoughts are racing.	TRUE	FALSE
19.	When I feel an emotion, I usually feel it with extreme intensity.	TRUE	FALSE
20.	I like to have others think of me as a normal kind of person.	TRUE	FALSE

APPENDIX B:

Response to Positive Affect scale (RPA; shortened scale)

People think and do many different things when they feel **happy**. Please read each of the following items and indicate how often you 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*.

Almost never	Sometimes	Often	Almost always
1	2	3	4

When you are feeling happy, how often do you...

- 1) ...*think about how you feel up for doing everything*
- 2) ...*think "I am living up to my potential"*
- 3) ...*think about how happy you feel*
- 4) ...*think about how strong you feel*
- 5) ...*think about things that could go wrong*
- 6) ...*think "I am achieving everything"*
- 7) ...*think "I don't deserve this"*
- 8) ...*think "My streak of luck is going to end soon"*
- 9) ...*think about how proud you are of yourself*

APPENDIX C:

Ways Of Savoring Checklist

(WOSC; shortened scale)

Please read each of the following items and indicate how often you think or do each one when you experience a positive event.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

- 1) I think only about the present – get absorbed in the moment
- 2) I remind myself how lucky I am to have this good thing happen to me
- 3) I think about what a good time I am having

APPENDIX D:

Positive And Negative Affect Scale

(i-PANAS-sf)

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 have felt like this in the past few hours. Use the following scale to record your answers.

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	2	3	4	5

1. Determined _____
2. Attentive _____
3. Alert _____
4. Inspired _____
5. Active _____
6. Afraid _____
7. Nervous _____
8. Upset _____
9. Ashamed _____
10. Hostile _____

APPENDIX E:

Altman Self-Rating Mania Scale (ASRM)

Instructions:

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

Question 1:

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

Question 2:

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

Question 3:

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

Question 4:

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

Question 5:

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

APPENDIX F:

Centre for Epidemiological Studies – Depression Scale (CES-D)

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

During the Past Week

	Rarely or none of the time (less than 1 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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I did not feel like eating; my appetite was poor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt that I could not shake off the blues even with help from my family or friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I felt I was just as good as other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I felt that everything I did was an effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I felt hopeful about the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I thought my life had been a failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I felt fearful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I was happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I talked less than usual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I felt lonely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. People were unfriendly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I enjoyed life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I had crying spells.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I felt sad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I felt that people dislike me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I could not get "going."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SCORING: zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.

APPENDIX G:

Intrinsic Beliefs about Emotion Malleability

Scale (IBEM)

Below are a list of general beliefs about emotions. Please indicate the extent to which you agree with each statement. Please answer honestly, there are no right or wrong answers.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
1. If they want to, people can change the emotions that they have					
2. Everyone can learn to control their emotions					
3. No matter how hard they try, people can't really change the emotions that they have					
4. The truth is, people have very little control over their emotions					

APPENDIX H:

Intrinsic Beliefs about Emotion Malleability

Scale – Personal (IBEM-P)

Below are a list of personal beliefs about emotions. Please indicate the extent to which you agree with each statement. Please answer honestly, there are no right or wrong answers.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
1. If I want to, I can change the emotions that I have					
2. I can learn to control my emotions					
3. No matter how hard I try, I can't really change the emotions that I have					
4. The truth is, I have very little control over my emotions					

APPENDIX I:

ESM Diary page example

Day 1: Entry 1

Date:_____ Time Beeped:_____ Time Completed:_____

As you were beeped.....

Where were you?

What was the MAIN thing you were doing?

Who were you with?

() Alone

() Friend(s) How many? _____

() Family member(s) How many? _____

() Strangers How many? _____

() Other _____

Choose the response on the scale below that indicates how well each of these adjective describes **your present mood**

	Extremely	Quite a bit	Moderately	A little	Very slightly or not at all
Upset					
Hostile					
Alert					
Ashamed					
Inspired					
Nervous					
Determined					
Attentive					
Afraid					
Active					

Overall, my mood is: (please circle one number)



Very Unpleasant

-5

-4

-3

-2

-1

0

1

2

3

4

5



Very Pleasant

I would like my mood to: () Go up () Stay the same () Go down

In response to **current positive feelings** (e.g. feeling happy, excited or enthused), to what extent are you thinking...

	A lot	Quite a bit	A little	Not at all
...about how you feel up for doing everything				
...'I am living up to my potential'				
...about how happy you feel				
...about how strong you feel				
...about how things could go wrong				
...'I'm achieving everything'				
...'I don't deserve this'				
...'my streak of luck is going to end soon'				
...about how proud you are of yourself				
Something else? (please describe)				

To what extent does each item describe how you are responding to **current positive events**?

	A lot	Quite a bit	Moderately	A little	Not at all
I am thinking only about the present – getting absorbed in the moment					
I am reminding myself how lucky I am to have this good thing happen to me					
I am thinking about what a good time I am having					
Something else? (please describe)					

In response to **current negative feelings** (e.g. feeling down, sad, or depressed), to what extent are you...

	A lot	Quite a bit	A little	Not at all
thinking 'I'm going to go out and have some fun'				
thinking 'I'm going to do something to make myself feel better'				
doing something enjoyable				
drinking alcohol excessively				
doing something reckless or dangerous				
isolating yourself and thinking about the reasons that you feel sad				
thinking about how alone you feel				
thinking about how sad you feel				
seeking out and engaging in casual sexual relationships				
Something else? (please describe)				

Overall, how effective do you feel that these strategies have been in altering your mood **in the intended way**?

()Extremely effective ()Very effective ()Moderately effective
()Slightly effective ()Not effective at all

APPENDIX J:

Response to Positive Affect

(RPA; full scale)

People think and do many different things when they feel **happy**. Please read each of the following items and indicate how often you 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*.

Almost never	Sometimes	Often	Almost always
1	2	3	4

When you are feeling happy, how often do you...

- 1) ...notice how you feel full of energy
- 2) ...savour this moment
- 3) ...think "I am getting everything done"
- 4) ...think about how you feel up for doing everything
- 5) ...think "I am living up to my potential"
- 6) ...think "It is too good to be true"
- 7) ...think about how happy you feel
- 8) ...think about how strong you feel
- 9) ...think about things that could go wrong
- 10) ...remind yourself that these feelings won't last
- 11) ...think "People will think I am bragging"
- 12) ...think about how hard it is to concentrate
- 13) ...think "I am achieving everything"
- 14) ...think "I don't deserve this"
- 15) ...think "My streak of luck is going to end soon"
- 16) ...think about how proud you are of yourself
- 17) ...think about the things that have not gone well for you.

APPENDIX K:

Positive writing instructions

You will now be asked to complete a 20 minute continuous writing task. The instructions for the task are displayed on the next page, along with a box for you to type into. It is advised that you complete this survey in a quite location where you are unlikely to be interrupted or distracted. The timer at the top of the page will begin counting down from 20 minutes, you will not be able to proceed to the next page of the survey until the 20 minutes is up.

Control condition

Think of a time when you discovered your favourite book, film, piece of music or artwork. Try to imagine yourself at that moment, including all the happiness, excitement, good feelings and emotions associated with the experience.

Now write about the experience in as much detail as possible, trying to include the feelings, thoughts and emotions that were present at the time. please try your best to re-experience the emotions involved, Don't worry about spelling, grammar or sentence structure, the important thing is that once you begin writing, you continue until the 20 minutes is up.

*You may write about the same experience as yesterday, or you may choose a new one.

Goal-focused condition

Think of a time when you were working to achieve a goal or received a special reward that was important to you. Try to imagine yourself at that moment, including all the happiness, excitement, good feelings and emotions associated with the experience.

Now write about the experience in as much detail as possible, trying to include the feelings, thoughts and emotions that were present at the time. Please try your best to re-experience the emotions involved. Don't worry about spelling grammar or sentence structure, the important thing is that once you begin writing, you continue until the 20 minutes is up.

*You may write about the same experience as yesterday, or you may choose a new one.

*included on days 2 and 3

APPENDIX L:

Study 4 Correlations

Hypomanic personality was positively correlated with positive rumination in the control condition.

Baseline positive affect was positively correlated with hypomanic personality in the goal-oriented condition, and positive rumination in the control condition. Positive affect at week 4 follow-up was positively correlated with hypomanic personality and baseline high mood symptoms in the goal-oriented condition, and positive rumination, dampening and baseline high mood symptoms in the control condition.

Baseline negative affect was positively correlated with hypomanic personality and dampening in the control condition. Negative affect at week 1 follow-up was positively correlated with baseline negative affect in both conditions. Negative affect at week 4 follow-up was positively correlated with dampening and baseline negative affect in the goal-oriented condition, and hypomanic personality, positive rumination, and baseline negative affect in the control condition.

Baseline high mood was positively correlated with hypomanic personality and positive rumination in the goal-oriented condition. High mood at week 1 follow-up was positively correlated with hypomanic personality, positive rumination, and baseline high mood in the goal-oriented condition, and positive rumination, dampening, baseline positive affect and high mood in the control condition. High mood at week 4 follow-up was positive correlated with baseline high mood in both conditions.

Correlations between Mania Risk, Emotion Regulation Strategies and Baseline and Follow-up Affect Measures.

	Baseline				Follow-up 1			Follow-up 2		
	HPS	Positive Affect	Negative Affect	High Mood	Positive Affect	Negative Affect	High Mood	Positive Affect	Negative Affect	High Mood
<u>Goal-Oriented Condition</u>										
HPS	--	.43**	.05	.31*	.10	.10	.33*	.29*	-.04	.18
Positive Rumination	.21	.07	-.09	.24*	.13	.03	.29*	.20	.15	.20
Dampening	.07	.04	.16	-.02	.24	.08	.05	-.02	.33*	.00
Baseline										
Positive Affect	--	--	--	--	.18	.12	-.06	.06	.03	.11
Negative Affect	--	.02	--	--	-.01	.35**	.11	.07	.37**	.13
High Mood	--	.43	.47	--	.18	.06	.65**	.38**	.08	.36**
<u>Control Condition</u>										
HPS	--	.24	.29*	.06	.06	.22	.26	.18	.30*	.18
Positive Rumination	.31*	.29*	.04	.12	.23	-.13	.28*	.38**	.32*	.16
Dampening	.23	.11	.04**	.19	.13	.21	.33*	.33*	.22	.08
Baseline										
Positive Affect	--	--	--	--	.40**	-.01	.41**	.27	.01	.03
Negative Affect	--	.02	--	--	-.09	.41**	.12	-.09	.39**	-.12
High Mood	--	.18	.06	--	.32*	.12	.56**	.37**	-.06	.46**

HPS = Hypomanic personality scale, follow-up 1 = 1-week post writing, follow-up 2 = 4-weeks post writing

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

