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Examining the Self-Schema within a Cognitive Vulnerability-Stress Framework of Mania

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Abstract

This dissertation aimed to inform a cognitive vulnerability-stress theory of mania, which addresses both the content and structure of the self-schema, along with the conditions under which these self-relevant cognitions are activated. Extant research on mania has primarily considered self-schema content, or an individual's actual beliefs (e.g., "I am incompetent"). Although these investigations have successfully identified maladaptive self-beliefs associated with bipolar disorder, this research has been prone to inconsistencies and limited in distinguishing between mania and related forms of psychopathology (e.g., unipolar depression). Furthermore, very little research on mania has considered the organization of self-schema beliefs, referred to here as self-schema structure. Accordingly, three studies of non-clinical samples examined self-schema structure, as well as content, in relation to mania risk (i.e., the Hypomanic Personality Scale). To address other assumptions of a cognitive vulnerability-stress model, the importance of mood priming and potential interactions between self-schema characteristics and life events were also explored. Results indicate that mania risk is associated with several types of self-schema content, including dysfunctional attitudes about achievement, multidimensional perfectionism, and obsessive passion. Some of these characteristics (e.g., cognitive distortions) showed greater relevance for depressive versus manic symptoms. Conversely, there was a distinct pattern of results for self-schema structure, in which mania risk and symptoms appear to correspond with highly interconnected, positive self-schema content. In particular, longitudinal findings suggest that positive self-schema structure predicts prospective increases in manic symptoms. Notably, mania risk also corresponded with greater temporal instability of self-schema structure. With

respect to life events, measures of self-schema structure, but not content, interacted with positive life events to predict the course of manic symptoms. Across the three studies, findings were mixed as to whether certain domains (i.e., achievement or interpersonal) of self-schema structure show distinct patterns in relation to mania. Further, mood priming did not appear to play a significant role in the examination of self-schema characteristics. Overall, the present findings suggest that the manic self-schema may contain a structural component that predicts the course of manic symptoms and shows meaningful interactions with life events. Future research directions and clinical implications are then discussed.

Keywords: mania, cognitive vulnerability-stress model, self-schema structure, self-schema content, life events, mood induction procedures.

Summary for Lay Audience

Researchers have long been interested in how self-beliefs play a role in the development and maintenance of psychological disorders. The cognitive vulnerability-stress model theorizes that sources of 'cognitive vulnerability' (e.g., negative beliefs about oneself) lead to psychological disorders (e.g., depression), when a person also experiences certain stressful life events (e.g., social rejection). Limited research, however, informs a cognitive vulnerability-stress model of mania (a feature of bipolar disorder). In particular, little is known about how beliefs about the self may be organized. For example, if an individual's negative beliefs were highly interconnected, a situation triggering a negative thought (e.g., failing an exam and thinking "I am stupid") would likely trigger a similar negative thought (e.g., "No one will ever love me"). Therefore, if beliefs are more highly interconnected, a larger emotional response would be triggered. Studying the organization of self-beliefs is important, since evidence suggests that, at least in cases of depression, this is associated with the severity of symptoms and occurrence of symptoms following negative life events. Thus, this project examined both the nature and organization of self-beliefs associated with mania, within community and university student samples. Participants fell along a continuum in terms of their 'risk for mania'; that is, whether they showed certain personality features/experiences that have strongly predicted future development of (hypo)manic episodes. Across three studies, it was found that individuals at higher risk for mania showed unhelpful beliefs about goal attainment (e.g., "I need to excel at everything I do"), perfectionistic attitudes, and obsessiveness regarding a valued activity. Notably, individuals at high mania risk also displayed highly interconnected, positive self-beliefs. This organizational pattern was associated with greater manic symptoms, particularly when

higher-risk individuals also experienced certain positive events (e.g., achievements). Conversely, their actual beliefs did not predict manic symptoms following these life events. Importantly, it appeared that the organization of self-beliefs among higher-risk individuals was subject to change over time, whereas this seemed stable among others. Overall, these findings allude to the problematic organization of self-beliefs among individuals at high risk for mania, which would correspond with unstable views and feelings about oneself.

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Chapter 1

General Introduction

Bipolar disorder is one of the deadliest (Eroglu et al., 2013; Goldstein et al., 2012) and most debilitating (Mitchell et al., 2004) mental disorders, costing individuals more years of life and productivity than heart attacks, epilepsy, dementia, and infectious disease (WHO, 2008). As one of the most heritable psychiatric conditions (Edvardsen et al., 2008), researchers and clinicians have historically emphasized the biological underpinnings of this disorder. However, in recent decades, numerous investigations have demonstrated that psychosocial factors play a role in the onset and maintenance of bipolar disorder (e.g., Alloy et al., 2005), and thus have important clinical implications. As one illustration, the development of an evidence-based treatment for bipolar disorder, family-focused therapy (FFT), was spurred by observations that unhelpful family dynamics are predictive of relapse (for a review, see Peris & Miklowitz, 2015).

An inherent challenge to studying psychological vulnerability factors in bipolar disorder is teasing apart features associated with mania, the hallmark of the illness, and depression, which is often a facet of the disorder. This is an important consideration since evidence suggests that vulnerability factors in depression and mania are separable, albeit correlated (e.g., genetic; McGuffin et al., 2003). Moreover, greater understanding of the vulnerability factors differentially associated with mania would be helpful from a treatment perspective. At present, psychological interventions in cases of bipolar disorder are typically biased towards depressive symptoms, and it is less understood how treatments might be beneficial for addressing manic symptoms (see Oud et al., 2016).

To further complicate the picture, expressions of mania can vary substantially across and within individuals. This may range from a severe manic episode involving psychotic symptoms and a need for hospitalization; to a hypomanic episode in which there is a clear change in an individual's mood and functioning without considerable impairment; to a display of manic symptoms (e.g.,

decreased need for sleep) or temperamental characteristics (e.g., hyper-confidence) that do not meet diagnostic criteria for a mood episode. As such, this introduction first reviews the common features and symptoms of mania, along with further considerations for operationalizing psychopathology, prior to examining extant research on psychological vulnerability to mania.

Common Features and Symptoms of Mania

The bipolar spectrum disorders include bipolar I disorder (BD-I), bipolar II disorder (BD-II), cyclothymic disorder, and subthreshold conditions (American Psychiatric Association [APA], 2013). In this dissertation, the term 'bipolar disorder' is used to refer broadly to this family of disorders. Diagnosis of a bipolar spectrum disorder hinges on the operationalization of manic and hypomanic episodes. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) has characterized (hypo)manic episodes as reflecting a time-limited change from an individual's usual level of functioning, highlighting the episodic nature of manic-depressive illness that scholars as early as Kraepelin (1921) have emphasized. Specifically, a manic episode is a discrete period of (i) elevated, expansive, or irritable mood, coupled with (ii) goal-directed activity or energy (APA, 2013). These cardinal symptoms are accompanied by feelings of grandiosity, flight of ideas, physical agitation, talkativeness/incomprehensibility, decreased need for sleep, and/or excessive engagement in risky behaviours. Symptoms persist for the majority of a week or lead to hospitalization, and cause individuals considerable distress or impairment. Hypomania, literally 'less than mania', is a milder variant in which the same symptoms are present but are not severe enough to *"markedly"* interfere with functioning (APA, 2013). There is also a lower threshold for the duration of hypomanic episodes (i.e., four days).

Individuals may experience manic symptoms with psychotic features, such as mood-congruent hallucinations or delusions (e.g., believing one is strong enough to lift a car over their head). In addition, certain diagnoses within the Bipolar and Related Disorders category of the DSM-5

also involve the presence of a major depressive episode (i.e., BD-II) or depressive symptoms (i.e., cyclothymic disorder). Thus, individuals who experience manic symptoms may also suffer episodes of depressed mood or decreased interest/pleasure, changes in weight or appetite, insomnia/hypersomnia, psychomotor agitation/retardation, decreased energy, feelings of worthlessness or guilt, difficulty concentrating or indecisiveness, and thoughts of death or suicidal behaviours (APA, 2013).

A Continuum of Manic Symptomatology

Milder expressions of mania strongly predict the development of more severe presentations (e.g., Alloy et al. 2012a, 2012b; Berk et al., 2007), providing evidence that manic tendencies exist along a spectrum of severity. Thus, examining diverse presentations of manic symptoms contributes to a greater understanding of bipolar disorder (see Alloy et al., 2015). Accordingly, several measures have been developed to assess risk for mania, including the Hypomanic Personality Scale (Eckblad & Chapman, 1986) and General Behaviour Inventory (Depue, 1987). Specifically, these measures evaluate tendencies towards subsyndromal manic symptoms and personality traits associated with bipolar disorder. For instance, a widely used measure of mania risk, the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986), assesses a constellation of attributes in which individuals appear gregarious, energetic, hyper-confident, intensely emotional, ambitious, and impulsive.

The validity of instruments assessing mania risk has been well supported by research indicating that high scores on these measures have been robustly associated with future onset of (hypo)manic episodes (Kwapil et al., 2000; Merikangas et al., 2007). To illustrate, one study found that 73% of individuals who met a high cut-off score on the HPS developed diagnosable symptoms of bipolar disorder over a 3-year follow-up period (Kwapil et al., 2000). Moreover, a burgeoning literature indicates that measures of mania risk show robust associations with psychosocial predictors of the course of manic symptoms (e.g., Alloy et al., 2008; Jones, Mansell & Waller, 2006; Mansell,

Rigby, Tai, & Lowe, 2008). The results of genetic research have also linked mania risk (as indexed by the HPS) to several candidate genes that have been implicated in the onset of bipolar disorder (Johnson, Carver, Joorman, & Cuccaro, 2015).

In addition, there are certain advantages to a sampling approach that utilizes mania risk, as opposed to remitted diagnostic status, when studying vulnerability factors associated with bipolar disorder (Johnson et al., 2015; Just, Abramson, & Alloy, 2001; Lewinsohn, Steinmetz, Larson, & Franklin, 1981). In particular, the utilization of measures of mania risk allows for the examination of vulnerability factors without confounding influences (e.g., physical health, lifestyle, medication) that likely accompany a serious history of mental disorder. Thus, mania risk is a valuable construct to examine, in order to advance knowledge concerning psychological vulnerability to bipolar disorder. As such, measures of mania risk have been heavily utilized in studies of mania, including the use of these measures to index risk for the future development of bipolar disorder while exploring potential vulnerability mechanisms (e.g. Devlin, Johnson, & Gruber, 2015; Kim, Kwon, & Meyer, 2017; Pornpattananangkul, Hu, & Nusslock, 2015).

Psychological Vulnerability Models of Mania

Extant psychological research on bipolar disorder has considered its relation to various constructs, such as cognitive styles, affective processes, and life events, to name a few (Gruber et al., 2008; Mann-Wrobel et al., 2011; Urošević et al., 2008). Within this area of study, the *reward sensitivity model* of mania (Alloy & Abramson, 2010; Johnson et al., 2012) has garnered substantial research support and posits that individuals at risk for mania display a hypersensitive reward system, also referred to as the behavioural activation system (BAS; Gray, 1970).

Reward Sensitivity and Bipolar Disorder

By definition, mania is a goal-driven state marked by increased energy, speed, and intense emotion (APA, 2013). Thus, it follows that individuals who experience mania may differ from those

who do not in systems that govern motivation and reward. Depue and Iacono (1989) were the first to draw a parallel between mania and the BAS when they observed that manic symptoms closely resemble the theorized outputs of this system. The BAS is a biologically-based system that governs 'approach' behaviour in response to rewarding stimuli in the environment (Gray, 1970, 1990). Thus, it has been described as a broadband system encompassing a number of cognitive and affective processes that promote goal-directed activity. As such, there is considerable overlap between the BAS and the trait of impulsivity (Corr, 2004; Gray, 1970). Reward-relevant stimuli or environmental cues of goal-directed behaviour constitute the inputs of this system, whereas the various outputs of this system include increased energy, activity, confidence, exploration, and interest in rewards (Depue & Iacono, 1989; Gray, 1970, 1990). The sensitivity of the BAS may differ across individuals, such that a hypersensitive BAS would reflect greater output given a certain level of input (Gray, 1970, 1990).

The results of cross-sectional and longitudinal studies utilizing self-report and/or behavioural measures (i.e., experimental paradigms) of BAS sensitivity indicate that levels are elevated amongst persons with bipolar disorder compared to healthy control participants (see Johnson et al., 2012, for a review). Within this area of study, most compelling are findings that demonstrate the prognostic value of BAS sensitivity. A number of longitudinal studies have indicated that BAS sensitivity predicts: (i) the onset of bipolar spectrum disorder (Alloy et al. 2012a, 2012b), (ii) a more severe course of bipolar disorder (Alloy et al., 2008, 2009; Meyer et al., 2001; Salavert et al., 2007), and (iii) the transition to a more severe form of disorder (cyclothymia to BD-I, and BD-II to BD-I; Alloy et al., 2012a, 2012b).

Related to BAS sensitivity is a more explicit discussion of goal-setting and attainment. Available evidence suggests that persons with a history of manic symptoms, along with their healthy family members, are overrepresented among highly accomplished, creative individuals (see Johnson,

2005, for a review). In particular, it appears that periods of subthreshold mania (e.g., hypomania, premorbid state in BD-I) are associated with high levels of functioning (e.g., greater creativity, enhanced interpersonal functioning, occupational success; e.g., Coryell et al., 1989; Jamison, 1996; Kutcher, Robertson & Bird, 1998). One possible explanation is that bipolar disorder is associated with a stable pattern of high goal-setting. Extremely optimistic life ambitions that are extrinsically motivated (e.g., related to wealth, fame) rather than intrinsically motivated (e.g., maintaining close relationships) have been noted among individuals with the disorder and those at risk for mania (Gruber & Johnson, 2009; Johnson & Carver, 2006; Johnson, Eisner, & Carver, 2009).

In addition, a number of studies have found that individuals with bipolar disorder exhibit a distinct pattern of responding to success. Evidence suggests that the majority of people in the general population exhibit 'coasting', or a short-term reduction in effort towards further goals once a goal has been attained (Carver & Scheier, 1998; Fulford et al., 2010). Among persons diagnosed with bipolar disorder, success has been associated with higher levels of activation and goal pursuit (Carver & Scheier, 1998; Fulford et al., 2010). It appears that this pattern generalizes to individuals at risk for bipolar disorder (Johnson 2005; Johnson et al., 2008b), and distinguishes between those with a high versus low lifetime frequency of manic episodes (Wright, Lam, & Brown, 2008). Increased engagement in goal pursuit has also prospectively predicted elevations in manic symptoms among patients with BD-I, BD-II and cyclothymia (Alloy et al., 2009; Francis-Raniere, Alloy, & Abramson, 2006; Johnson, Carver, & Gotlib, 2012b; Lee, Lam, Mansell, & Farmer, 2010).

These persuasive results implicating reward and motivational processes in the aetiology of bipolar disorder have frequently inspired research initiatives within different domains of study (e.g., Johnson, Carver, & Gotlib, 2012; Urošević et al., 2008). Of particular importance to the present dissertation, this has included the study of cognitive characteristics associated with mania. These relevant findings are described in more detail below.

Previous Research on Cognitive Vulnerability to Mania

Leahy and Beck (1988) originally posited that the 'manic' cognitive style would stand in direct opposition to depressogenic cognition, and would thereby be marked by positively-biased automatic thoughts, dysfunctional attitudes, and information processing. Studies that have examined thinking styles within the context of positive mood states lend some support for this theory. In particular, a history of (hypo)mania has been associated with high confidence in one's abilities following a success experience (e.g., Eisner et al., 2008) – a phenomenon referred to as 'positive overgeneralization'. Similarly, evidence suggests that individuals at a heightened risk for mania tend to respond to positive affect with positive, self-focused rumination (Feldman et al., 2008; Gruber et al., 2008b; Raes et al., 2010). This process describes personal reflection of one's accomplishments and aspirations, and has been prospectively related to a more severe course of manic symptoms (Lam, Wright, & Sham, 2005). Of note, it has been proposed that these state-dependent cognitions may reflect prodromal symptoms of (hypo)mania (e.g., Chen & Johnson, 2012; Fulford et al., 2009; Wright et al., 2005).

Despite these findings, a burgeoning literature indicates that a negative cognitive style underlies bipolar disorder, similar to unipolar depression. During depressive episodes, individuals with bipolar disorder and major depressive disorder show the same negative attitudes about the self (e.g., Hill et al., 1989, Rosenfarb et al., 1998). However, such a negative cognitive style is also apparent during euthymic states. Compared to healthy control participants, individuals with bipolar disorder in a euthymic state display biased recall of negative self-referent adjectives, more negative inferential styles, higher levels of rumination, greater dysfunctional attitudes, and relatively little positive self-referent information (e.g., Adams, Shapero, Pendergast, Alloy, & Abramson, 2014; Jones et al., 2005, Scott et al., 2000, Van der Gucht et al., 2009), similar to individuals with unipolar depression (e.g., Jones et al., 2005; Just & Alloy, 1997). Notably, research has demonstrated that

concurrent depressive symptoms only partially mediate negative cognitive biases observed during euthymic states, indicating that an underlying cognitive vulnerability exists in cases of bipolar disorder that cannot be fully explained by mood state (Adams et al., 2014).

Moreover, although individuals with bipolar disorder continue to show negative cognitive styles during (hypo)manic states (French et al., 1996), existing research suggests that certain forms of negative cognitive content may reflect an underlying vulnerability towards depressive symptoms, rather than manic symptoms, within the context of bipolar disorder. As one illustration, Johnson and Fingerhut (2004) found that negative automatic thoughts predicted future depressive symptoms, but not manic symptoms, over a 6-month follow-up.

Thus, within the bipolar disorder research literature, it is often unclear how cognitive characteristics may be differentially associated with vulnerability towards mania versus depression. One promising line of research has examined cognitive styles that may be prominent in light of the reward sensitivity model of mania (e.g., Alloy, Abramson, Walshaw, et al., 2009; Chen & Johnson, 2012). Just as negative beliefs are relevant for depression, researchers have considered the relevance of goal and achievement-related cognitions for mania. Indeed, evidence suggests that dysfunctional beliefs related to goal-striving are associated with bipolar disorder (Alloy et al., 2009; Chen & Johnson, 2012; Dodd et al., 2011a, 2011b; Lam et al., 2004; Lee et al., 2010). These include attitudes that emphasize perfectionism, ambitious goal-striving, the ability to excel at anything, and the importance of feeling positive and being active to avoid failure. Relatedly, dysfunctional attitudes that emphasize achievement also appear to be overrepresented and stably present among persons with bipolar disorder (Chen & Johnson, 2012; Lam et al., 2004; Lomax & Lam, 2010; Wright et al., 2005). For instance, these individuals highly endorse beliefs that achievement is critical for one's self-worth and it is necessary for achievement to be recognized by others (Lam et al., 2004). Notably, it has been demonstrated that dysfunctional attitudes about goal-striving and achievement are

apparent during euthymic states and among individuals at risk for mania (e.g., Lomax & Lam, 2010; Wright, Lam, & Newsom Davis, 2005). Dysfunctional beliefs about goal attainment have also distinguished individuals with bipolar disorder from those with unipolar depression during euthymic states (Lam et al., 2004).

Summary of Contemporary Research on Cognitive Vulnerability to Mania

As illustrated in the above review, the research to date on cognitive vulnerability factors associated with mania is somewhat disjointed and confusing, and at times even provides contradictory findings. In addition, much of this research has stemmed from investigations focused on other vulnerability factors associated with bipolar disorder, such as reward sensitivity. Although these findings are generally informative, still missing is a more comprehensive examination of how the cognitive constructs in this domain of research may operate in conjunction with other vulnerability factors to give rise to mood symptomatology. A promising theoretical framework for guiding this type of investigation is the cognitive vulnerability-stress model (e.g., Beck, 1967). This model, which forms the fundamental underlying conceptual framework for the present dissertation, is described in detail below.

The Cognitive Vulnerability-Stress Framework

The cognitive vulnerability-stress model is a prominent etiological framework that has had a profound impact on the understanding and treatment of various psychological disorders (e.g., Abramson, Seligman, & Teasdale, 1978; Beck, 1967; Dodge, 1986; Williams, Watts, MacLeod, & Matthews, 1988). The theories that utilize this approach posit that latent, maladaptive cognitive structures are activated by congruent environmental stressors, which, in turn, leads to the onset of symptoms of mental disorders (Beck et al., 1979). Ground breaking in the field has been Aaron Beck's (1967) cognitive model of depression positing that vulnerability to depression can largely be explained by a negative cognitive style, wherein schemas are an integral component. Specially,

schemas are understood as "enduring internal structures of stored generic or prototypical features of stimuli, ideas, or experiences that are used to organize new information" (Clark, Beck, & Alford, 1999, p. 79). The schema concept is centralized in Beck's theory, as schemas add an element of organization to cognitions, representing an existing structure that all people have for filtering incoming information. It is theorized that schemas originate in childhood, and become elaborated and refined over the course of development (Beck, 1967).

Schemas can be studied along two related dimensions – content and structure. Here, self-schema content represents an individual's actual beliefs (e.g., "I am incompetent"; Beck, 1967). Persuasive evidence links various types of negative content to risk for depression (see Lakdawalla, Hankin, & Mermelstein, 2007). By contrast, self-schema structure has been defined as the "architecture" or manner in which beliefs are "stored and organized" (Ingram, Miranda, & Segal, 1998; p. 15). Specifically, it is theorized that schemas vary in terms of the interconnectedness of their contents, such that ideas contained within schemas may be more or less related to one another (Dozois & Beck, 2008). If self-schema elements are tightly organized, they would theoretically become easily activated, since the activation of one component would spread to other components (Segal, 1988). Accordingly, events that activate schemas would ostensibly provoke a larger emotional response when elements are more closely rather than loosely interrelated (Bower, 1981). Although negative content diminishes following recovery from a depressive episode, certain structural aspects seem to persist (e.g., Dozois, 2007).

Examining Self-Schema Structure as a Vulnerability Factor for Mania

The vast majority of previous research in this area has examined self-schema content. However, as previously mentioned, self-schemas can also be studied in terms of their structural characteristics. Although traditional self-referent encoding and semantic priming tasks can provide information about the underlying self-structure (e.g., Segal et al., 2006), the Psychological Distance

Scaling Task (PDST; Dozois & Dobson, 2001b) has been designed explicitly for this purpose. During this task, participants are presented with a number of adjectives (e.g., "Capable", "Rejected") on a computer screen. They are asked to position each adjective within a four-quadrant grid based on the adjective's perceived self-descriptiveness (*x*-axis) and valence (*y*-axis). Over multiple iterations, the computer calculates the interstimulus distance between positive and negative rated adjectives, which theoretically provides an indication of self-schema interconnectedness or consolidation. The task has typically been used to examine the structural characteristics of two distinct forms of self-schema content, namely, beliefs about oneself within interpersonal and achievement domains.

The importance of examining self-schema structure in addition to self-schema content has been illustrated in cases of depression and other psychological disorders. Notably, Dozois and colleagues have demonstrated that the severity of depressive symptoms corresponds with greater interconnectedness of negative self-referent beliefs, along with reduced interconnectedness of positive self-referent information (e.g., Dozois & Dobson, 2001b; Dozois & Frewen, 2006). In addition, upon remission from a depressive episode, negative self-referent information appears to remain densely interconnected (Dozois, 2007; Dozois & Dobson, 2001a). As such, it has been proposed that this configuration is a vulnerability marker for depression, particularly for interpersonal, self-schema content (e.g., Dozois & Dobson, 2001b). Furthermore, the organization of positive and negative self-schema content within the interpersonal domain has been shown to interact with negative life events to predict the course of depressive symptoms (Seeds & Dozois, 2010).

Available evidence on cognitive structure in mania derives from research on the 'self-compartmentalization model' (Showers, 1992). This theory is concerned with how positive and negative information about the self is assimilated. The 'integrated self' characterizes an ability to incorporate differently valenced information into a single self-aspect, whereas the 'compartmentalized self' describes a segregation of information based on valence (either positive or

negative). A handful of studies have indicated that individuals with a history of bipolar disorder or unipolar depression exhibit a higher degree of self-compartmentalization compared to individuals without a disorder (Alatiq et al., 2010; Power, de Jong, & Lloyd, 2002; Taylor et al., 2007). These researchers postulate that this finding could help to explain mood swings in bipolar disorder, in that an environmental event may activate beliefs about the self that are almost exclusively positive or negative in nature. However, since similar features appear to characterize unipolar depression, it is still unclear how these cognitive factors may uniquely predispose individuals towards mania.

Life Events and Mania

The findings just reviewed suggest that any consideration of a cognitive vulnerability-stress framework needs to also consider the potential influence of life events on manic symptoms. Here, numerous studies of bipolar disorder have documented the importance of negative life events. Specifically, negative life events have been linked to future depressive symptoms, as well as longer time to recovery from depressive episodes (e.g., Johnson, 2005; Johnson & Miller, 1997). However, these patterns do not appear to hold for manic symptoms (e.g., Johnson et al., 1999, 2008a). As a result, the impact of different types of life events on mania has been investigated.

Goal Attainment and BAS-Activating Events. In line with a reward sensitivity model of mania, studies of bipolar disorder have examined events associated with goal-striving and achievement. Prospective research piloted by Johnson and colleagues (2000b, 2008b) has indicated that life events that reflect attainment of important goals (e.g., admission into graduate school, getting married) predict more severe manic, but not depressive, symptoms among individuals diagnosed with BD-I when statistically controlling for baseline symptoms. Similarly, events that involve striving towards important goals have also been implicated in the course of manic symptoms. In particular, a prospective study of students indicated that 42% of individuals diagnosed with BD-II

and cyclothymia developed a hypomanic episode following a goal-striving event (i.e., studying for final exams; Nusslock et al., 2007).

More precisely, BAS-activating events have been described as situations in which there is a clear reward or desired goal that one has an opportunity to pursue (e.g., starting a new job; meeting an attractive stranger to attain a partner). It is posited that relevant events lead to 'normal' levels of BAS activation in most people, but lead to over-activation of the BAS in persons vulnerable to bipolar disorder, which may in turn trigger (hypo)mania (Alloy & Abramson, 2010; Urošević et al., 2008). Conversely, it is posited that BAS-deactivating events constitute a loss or failure (e.g., losing a job; being rejected by a romantic interest). It is theorized that these events lead to extreme deactivation of the BAS in individuals prone to bipolar disorder, which in turn triggers depression. Data indicate that compared to healthy control participants, persons diagnosed with BD-II or cyclothymia experience more BAS-activating and deactivating life events, in general (Bender et al., 2010; Urošević et al., 2010).

The Interplay between Cognitive Content and Life Events

Thus far, only a small number of investigations have examined how certain forms of cognitive content may interact with life events to influence the course of mania (Alloy et al., 1999; Alloy et al., 2006). One study of individuals with a history of hypomania found that negative cognitive content did not predict manic symptoms within the context of life events (Alloy et al., 1999). Importantly, however, this study also found that a positive attributional style interacted with positive events to predict later fluctuations in manic symptoms (Alloy et al., 1999). A similar study reported that self-critical and perfectionistic attitudes interacted with negative and positive events to predict future increases in depressive and manic symptoms, respectively (Alloy et al., 2006).

The above results provide preliminary evidence that cognitive constructs interact with certain life events (i.e., positive) to predict the course of manic symptoms. Thus, this line of research is

promising regarding the potential viability of a cognitive vulnerability-stress model of mania. Notably, no known investigations of mania have provided a more detailed examination of interactions between life events and self-schema constructs, by considering the role of self-schema structure, in addition to content, within these interactions.

Mood Induction Procedures

Given the hypothesized role of life events within a cognitive vulnerability-stress framework, an important consideration is how Mood Induction Procedures (MIPs) may affect the general study of self-schema characteristics. Since it is theorized that maladaptive schemas remain dormant until activated by life stress, certain features would theoretically be imperceptible under ordinary circumstances. Therefore, one approach to accessing these beliefs in potentially vulnerable persons is to apply MIPs to mimic the effects of stressors and ostensibly activate an individual's cognitive network (e.g., Dozois & Backs-Dermott, 2000). Although mood priming may not be necessary to examine all aspects of the self-schema (e.g., schema structure; Dozois & Dobson, 2001a), research indicates that certain features cannot be identified without the use of priming, at least in cases of depression (e.g., Ingram et al., 1994).

No known investigations have directly assessed whether MIPs sensitize the examination of self-schema characteristics among individuals with a history of, or risk, for mania. Exploring this question would support the understanding of cognitive vulnerability mechanisms in bipolar disorder. Furthermore, determining whether MIPs are necessary for the study of self-schema constructs would help to inform future research in this area.

The Present Dissertation

To summarize, previous research has examined cognitive vulnerability factors in relation to mania, primarily considering aspects of self-schema content. Despite some mood congruent findings, existing evidence indicates that the manic self-schema is largely characterized by negative content.

Dysfunctional beliefs surrounding goal-striving and achievement may distinguish bipolar disorder from related conditions, in line with a reward sensitivity model. Also congruent with this model, existing evidence links goal attainment and BAS-activating events to the onset of manic symptoms.

Overall, a major gap in the current literature is research that teases apart the specific cognitive characteristics that are linked to mania, rather than related phenomena such as comorbid depressive symptoms and cases of unipolar depression. In particular, the current state of the research highlights more similarities than differences in cognitive vulnerability factors that characterize mania versus depression, particularly with reference to previously stated findings concerning negative cognitive style. In addition, much of this literature has relied on the reward sensitivity model to inform a cognitive vulnerability theory of mania. However, relying on a higher-level explanation does not necessarily clarify how self-schemas may dynamically operate in conjunction with other factors to predispose individuals toward mania.

Together, the above considerations further suggest that examining self-schema content alone may be insufficient for explicating the cognitive mechanisms involved in conferring vulnerability towards mania. In this regard, few available studies can speak to self-schema organization in relation to mania, with no known investigations utilizing the PDST to examine the interconnectedness of positive and negative beliefs within the self-schema. Further, when applying a cognitive vulnerability-stress framework, it has yet to be considered how both self-schema content and structure may interact with life events to potentially influence manic symptomatology. In addition, using measures of mania risk to index mania, rather than remitted diagnostic status, is a widespread approach to in the field. Yet, very few studies have employed this method to study cognitive vulnerability mechanisms. Finally, no known studies have utilized mood priming to sensitively examine self-schema components (content and structure) within the context of mania.

In summary, the current dissertation aims to integrate and advance previous research findings by examining both self-schema content and structure, and the conditions under which these self-schema components are activated (i.e., their interaction with life events and mood induction procedures). This research was conducted within non-clinical samples, using the hypomanic personality as an indicator of risk for developing future manic episodes. Overall, these research objectives serve to inform a more comprehensive, cognitive vulnerability-stress theory of mania that includes consideration of both self-schema components and life events. Furthering our understanding of mania in this manner is important, as it may ultimately help to improve the application of mental health interventions in cases of bipolar disorder.

Primary Objectives

The three main studies of this dissertation address the following broad research questions. Briefly, Study 1 serves as a cross-sectional examination, in which basic relations between self-schema components and mania are explored within a large, online community sample. Study 2 provides a longitudinal investigation, in which a range of potential effects among self-schema components, life events, and mood symptoms are examined within an online community sample. Finally, Study 3 serves as a cross-sectional replication of major findings within a different, non-clinical sample (i.e., a university student sample).

Subsumed under each of the following research questions are more specific sub-questions and hypotheses addressing a number of relevant issues, which will be discussed in greater detail within the chapters that address objectives for each of the three studies.

(i) *Research Question 1. Are there aspects of self-schema content and structure that characterize high mania risk?*

A central goal of this dissertation is to simply examine the self-schema constructs of content and structure that may be associated with heightened risk for mania, since limited evidence is thus far

available, particularly for self-schema structure. The initial cross-sectional study of this dissertation focuses on this research objective. Broadly, it was hypothesized in Study 1 that heightened mania risk would correspond with maladaptive self-schema content associated with goal-striving and achievement, in light of existing research on the reward sensitivity model (e.g., Johnson et al., 2012). Regarding self-schema structure, it was hypothesized that mania risk would be associated with highly interconnected positive, as well as negative, self-schema content. Such a pattern would help to explain the mood swings observed in bipolar disorder, and is consistent with preliminary findings on the self-concept in mania (Taylor et al., 2007).

(ii) *Research Question 2. How do mood induction procedures (MIPs) influence the examination of self-schema content among those at different levels of mania risk?*

Study 1 also includes a test of a positive MIP. The aim is to elucidate whether MIPs increase the sensitivity with which self-schema constructs can be identified in relation to mania, which is an important consideration for research conducted in this area.

(iii) *Research Question 3. Do self-schema components show utility in predicting the course of mood symptoms?*

The cross-sectional component in Study 1 also examines the degree to which self-schema characteristics (content and structure) may play a role in maladaptive and adaptive pathways leading towards mood symptoms. Moreover, a longitudinal component of this research (Study 2) permits a more rigorous examination of self-schema characteristics as potential predictors of the course of mood symptoms.

(iv) *Research Question 4. Do self-schema components interact with congruent life events to predict the course of mood symptoms among those at high risk for mania?*

Both Studies 2 and 3 investigate whether self-schema components interact with life events, as well as mania risk, to predict mood symptomatology. The longitudinal component in Study 2 permits examination of these patterns across time.

(v) Research Question 5. Can major findings regarding self-schema components and their relation to mania show replication?

Study 2 also examines whether cross-sectional findings from Study 1 can be replicated within the same sample type (i.e., an online, community sample), in a separate instance. In addition, Study 3 serves as a replication within an entirely different nonclinical sample (i.e., an online, university student sample), in order to clarify whether major findings can be generalized beyond one group of individuals.

Chapter 2

Study 1: An Initial Cross-Sectional Examination

The cross-sectional approach used in Study l primarily addresses the first and second research questions of this dissertation, but additionally informs the third research question. As such, Study 1 examines self-schema content and structure in relation to mania risk, as well as how these self-schema constructs may bear on manic symptomatology. In addition, this study assesses the impact of mood induction procedures (MIPs) on the activation of mania-related aspects of self-schema content and structure.

Research Question 1: Are there aspects of self-schema content and structure that characterize high mania risk?

Self-Schema Content. As described earlier, some limited prior research has implicated maladaptive beliefs and dysfunctional attitudes related to goal-striving and achievement among individuals with a history of mania (e.g., Chen & Johnson, 2012; Dodd et al., 2011a, 2011b; Lam et al., 2004; Lee et al., 2010). These findings, which are consistent with a reward sensitivity model (see Johnson et al., 2012), have been promising in terms of isolating self-schema content that differentiates between mania and other forms of psychopathology, such as unipolar depression. The present study builds on this prior research by examining self-schema content in a non-clinical sample, using the hypomanic personality as an indicator of mania risk. This involves studying a set of dysfunctional attitudes pertaining to goal attainment, which have been previously documented among individuals with a history of bipolar disorder and appear less relevant to depression (Lam et al., 2004). These attitudes include beliefs about success being central to self-worth and the importance of consistently feeling positive.

Study 1 further extends past research by examining constructs that appear to relate to goal-striving and achievement, but have yet to be studied in relation to mania. This includes examining the

presence of cognitive distortions (e.g., mind-reading, catastrophizing), which refer to errors in information processing that result in a negatively-biased view of a situation (Beck, Rush, Shaw, & Emery, 1979). In further elaboration of this line of research, the present study explores whether cognitive distortions are more apparent in achievement situations among those at high mania risk.

In addition, several past studies have linked bipolar disorder with high levels of perfectionism (e.g., Lam et al., 2004; Scott et al., 2000). In particular, research conducted by Hewitt and colleagues (e.g., Hewitt & Flett, 1990; Hewitt et al., 1991) has supported three main dimensions of perfectionism. These are as follows: perfectionistic behaviour that is directed towards oneself (i.e., Self-Oriented), perfectionism directed towards others (i.e., Other-Oriented), and perfectionism attributed to external sources (i.e., Socially-Prescribed). Limited prior research has considered mania in relation to these different dimensions of perfectionism. Two studies of mixed clinical samples have suggested that chronic manic symptoms are associated with high levels of socially-prescribed perfectionism, in particular (Hewitt et al., 1998; Corry et al., 2017). The present study builds on this work by examining associations between mania risk and these dimensions of perfectionism.

A further individual difference characteristic that may be relevant to manic self-schemas is obsessive passion (Vallerand et al., 2003). Obsessive passion describes an internal pressure to perform an activity due to strong internalization of the activity into one's identity, often resulting in other areas of life being adversely affected (Vallerand et al., 2003). As such, the construct of obsessive passion may also be relevant to the goal-striving aspects of mania. Consistent with this proposal, past research has shown significant associations between obsessive passion and negative indicators of well-being (e.g., high levels of negative affect; Vallerand et al., 2003).

In contrast, harmonious passion is described by Vallerand et al (2003) as being achieved when one can freely choose to engage in the activity, and it occupies a large but not disproportionate space in one's identity, allowing the activity to exist in harmony with other aspects of life. Taken

together, these characteristics suggest minimal impact of harmonious passion on mania risk and related symptoms. However, there is the potential for harmonious passion to serve as a protective factor, particularly when considering a reward sensitivity model of mania. Existing research on harmonious passion and its association with well-being indicators (e.g., positive affect; Vallerand et al., 2003) again supports this hypothesis.

Finally, self-referent beliefs about achievement that are adaptive in nature are also explored in Study 1 (e.g., " I expect strengths and weaknesses, ups and downs, but overall I am positive about myself"; Hillson, 1997). These beliefs derive from research on positive personality dimensions, and are thought to serve a protective function given their association with positive well-being indicators within non-clinical samples (Hillson, 1997). Study 1 provides an initial examination of whether these beliefs may serve a similar function among individuals at heightened risk for mania.

Self-Schema Content Hypotheses. It was hypothesized that the constructs addressing self-schema content would share significant, positive relations with mania risk. Specifically, it was predicted that high endorsement of maladaptive beliefs related to achievement (i.e., dysfunctional attitudes about goal attainment and cognitive distortions within achievement situations) would correspond with high levels of the hypomanic personality. It was also hypothesized that mania risk would be positively associated with aspects of perfectionism and obsessive passion. Finally, it was tentatively predicted that harmonious passion and adaptive self-referent beliefs about success would serve a protective function within the context of mania risk. This may or may not be reflected in direct associations between mania risk and these constructs. For example, these adaptive characteristics may instead moderate between the hypomanic personality and manic symptoms. This issue was explored under the second research question of the dissertation (see further below).

Self-Schema Structure. As previously described, this dissertation also examines self-schema structure, in order to consider how the organization of self-beliefs may be associated with mania risk.

Recall that a well-validated measure of self-schema structure, the PDST (Dozois & Dobson, 2001b), considers how positive and negative information about the self is organized, and also permits a more sensitive examination of content within specific domains (i.e., achievement and interpersonal).

Self-Schema Structure Hypotheses. A central hypothesis of this dissertation was that high risk for mania would have clear associations with aspects of self-schema structure, and that these findings would be distinct from structural aspects that characterize depression. As previously mentioned, depression is characterized by densely interconnected, negative self-schema content and loosely connected, positive self-schema content – especially for content within the interpersonal domain (Dozois & Dobson, 2001b; Seeds & Dozois, 2010). The present hypothesis was that, similar to depression, individuals at high risk for mania would exhibit tightly interconnected negative content. This prediction was informed by previous research indicating the presence of negative self-schema content within the context of bipolar disorder (e.g., Adams et al., 2014). Furthermore, in light of prior findings implicating dysfunctional attitudes related to goal-striving/achievement, a sub-hypothesis was that negative content in the achievement domain, in particular, would exhibit dense connectivity among participants at high risk for mania.

Importantly, it was further predicted that aspects of positive self-schema content would be tightly organized. This hypothesis is informed by the phenomenology of mania, in which grandiosity and inflated self-esteem are hallmark symptoms (APA, 2013). However, contrary to Leahy and Beck's (1988) original hypothesis, manic symptomatology cannot simply be explained by positive self-referent beliefs and cognitive biases, since previous research suggests that individuals with bipolar disorder display relatively little positive self-referent information (e.g., Adams et al., 2014; Pyle & Mansell, 2010). Thus, a plausible alternative explanation advanced in the present study is that mania involves the activation of a relatively small, but densely organized, subset of positive beliefs. Once activated, these beliefs would ostensibly provoke a large, momentary, positive response in

individuals, consistent with the phenomenology of manic episodes. A specific sub-hypothesis was that those at high risk for mania would display dense connectivity of positive self-schema content within the achievement domain, in particular.

Research Question 2. How do mood induction procedures (MIPs) influence the examination of self-schema content among those at different levels of mania risk?

As mentioned in the General Introduction, few known investigations on mania have utilized mood priming to examine self-schema components. However, such priming may be necessary to reveal important characteristics. Given existing research on bipolar disorder that implicates reward sensitivity as a vulnerability factor (see Johnson et al., 2012), it was predicted that positive mood priming that has a goal-striving theme would aid in the examination of self-schema content. Specifically, it was theorized that this MIP would activate a subset of self-referent beliefs associated with goal-striving and achievement, which may be particularly relevant to mania in light of the reward sensitivity model. This hypothesis was also informed by previous research indicating that positive mood states appear to be associated with certain changes in cognition (e.g., positive self-focused rumination) among those with a history of or risk for mania (Feldman et al., 2008; Gruber et al., 2008b; Raes et al., 2010). Notably, in the current study, effects of the MIP were only explored for self-schema content and not structure, since schema organization is theoretically a more stable characteristic and existing evidence indicates that mood priming may not be necessary for examining self-schema structure (Dozois & Dobson, 2001a).

Research Question 3. Do self-schema components show utility in predicting the course of mood symptoms?

The cross-sectional design of Study 1 also begins to address the third research question, by considering how self-schema components may function within pathways towards manic symptoms.

As described in more detail below, it was predicted that certain self-schema constructs would serve as mediators between mania risk and the occurrence of mood symptoms.

Maladaptive Pathways. It was predicted that self-schema components would help to explain the nature of potential relations between the hypomanic personality and mood symptoms. That is, it was theorized that self-schema constructs may function as a pathway through which mania risk leads to mood symptoms. As such, it was examined whether maladaptive self-schema content (i.e., dysfunctional attitudes about goal attainment, obsessive passion, perfectionism) mediate the relation between the hypomanic personality and manic symptoms. Similarly, aspects of self-schema structure that were hypothesized to be particularly relevant for mania (i.e., highly interconnected, positive self-schema content) were expected to be significant mediators in paths to manic symptoms. Finally, a sub-hypothesis was that negative self-schema structure and certain forms of self-schema content highly implicated in depression (e.g., cognitive distortions in the achievement domain) would also serve as a mediator, but between the hypomanic personality and depressive symptoms.

Adaptive Self-Schema Components. As previously alluded to, Study 1 further expands on the current research literature by considering adaptive self-schema constructs related to achievement and goal-striving (i.e., harmonious passion and adaptive self-referent beliefs about success). Here, it was tentatively hypothesized that these constructs may have a protective function within the context of mania. Since it was not anticipated that every individual with high mania risk may exhibit hypothesized protective factors, these self-schema constructs were best conceptualized as moderators rather than mediators. Specifically, it was hypothesized that individuals displaying high risk for mania may show little manic symptomatology at high levels of these protective factors.

Study 1 – Method

Participants

Participants were recruited through the Amazon Mechanical Turk (MTurk) program. This is an open access, online program that is utilized by over 100,000 people from more than 100 countries to complete paid computer tasks (Pontin, 2007). Existing evidence supports the use of this program for conducting psychological research, indicating that the quality of results obtained is comparable to traditional methods (Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012). The integrity of findings is supported particularly when MTurk users have a strong history of receiving approval for MTurk tasks (i.e., a high task-approval rating).

Only individuals from primarily English-speaking countries (i.e., Australia, Canada, the United Kingdom and United States) were permitted to complete the study. In addition, only individuals with an MTurk approval rating of 95% were able to sign-up for the task, indicating that at least 95% of their previously completed MTurk tasks had been approved. Seven careful responding questions were also incorporated into the study questionnaire to assess the attentiveness of participants (e.g., *I eat breakfast everyday at 4pm [True/False]; For this item, please select 'Slightly Disagree'*). The compensation rate for the current study was set at $1.50 on the MTurk website.

A total of 482 adults enrolled in the study; however, 23 participants were excluded from analyses due to incorrectly answering two or more careful responding questions. Notably, almost all of these excluded participants also appeared to discontinue their participation partway through the study. Thus, the final sample comprised of 459 participants (244 females, 215 males). Nine percent of participants were aged 18 to 24 years, 46% were 25 to 34 years, 26% were 35 to 44 years, 12% were 45 to 54 years, 7% were 55 to 64 years, and 2% were 65 to 74 years. Regarding ethnicity, 76% of participants identified as White, 9% as Black or African-American, 7% as Hispanic, 6% as Asian, and 2% as another ethnicity. The vast majority of participants reported living in the United States

(99%), whereas less than 1% of individuals were living in Canada (0.6%) or Australia (0.4%). Sixty-one percent of individuals reported an education level of post-secondary degree completion or higher. Regarding mental health history, 19% of participants reported a past diagnosis of mental disorder, with 7% endorsing more than one diagnosis and 15% reporting a current diagnosis. Commonly listed diagnoses included depression (10% of the total sample) and anxiety disorders (6%). In addition, a history of bipolar-related disorder was reported by 2.4% of participants.

Materials

The materials utilized in this study are described below. A summary of these measures is also provided in Table 1.1.

Risk for Mania. *Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986)*. As previously mentioned, the HPS is a self-report measure that has been used extensively to index risk for the future development of manic and hypomanic episodes. Specifically, this scale examines features of the hypomanic personality style, whereby individuals are "characterized as upbeat, gregarious, confident and energetic people who sometimes display these attributes to a maladaptive extreme, becoming euphoric, hypersociable, grandiose, and overactive" (Eckblad & Chapman, 1986, p. 216). As such, this construct reflects a temperamental risk factor for mania. The HPS is comprised of 48 true-false items (e.g., *I often have moods where I feel so energetic and optimistic that I feel I could outperform almost anyone at anything; When I feel an emotion, I usually feel it with extreme intensity*). High scores on this measure correspond with high psychological vulnerability towards mania. In this dissertation, mania risk is treated as a continuous variable, which has been one major approach in the literature (e.g., Johnson & Carver, 2006).

A large literature supports the reliability and validity of the HPS. Specifically, the HPS has demonstrated good internal consistency (e.g., Stanton, McArtor, & Watson, 2019) and convergent validity. In particular, numerous studies have demonstrated that HPS scores strongly predict

Table 1.1

Summary Table of Measures for Study 1

Category	Scale	Brief Description of Measure
Risk for Mania	Hypomanic Personality Scale	A commonly used and well-validated measure of mania risk. It assesses the extent to which individuals display temperamental characteristics associated with the future development of manic symptoms.
Mood Symptomatology	Altman Self-Rating Mania Scale	Examines self-perceived manic symptoms (i.e., heightened euphoria, activity, confidence, talkativeness and decreased need for sleep) over the previous week.
	DASS-21 – Depression subscale	Assesses the degree to which participants have experienced depressive symptoms over the previous week.
Self-Schema Structure	Psychological Distance Scaling Task	Examines the organization or consolidation of positive and negative self-beliefs within interpersonal and achievement domains.
Self-Schema Content	Belief Statements Questionnaire – Fulfillment subscale	This subscale assesses the extent to which individuals display adaptive self-referent beliefs related to achievement.
	Cognitive Distortions Scale	Examines the extent to which participants notice the presence of several cognitive distortions within achievement and interpersonal situations.
	DAS – Goal Attainment Subscale	Assesses the degree to which participants display dysfunctional attitudes related to goal attainment, which have been linked to mania.
	Multidimensional Perfectionism Scale	Three subscales examine participants' agreement with four perfectionistic tendencies, which relate to a strong desire for perfection that is directed towards oneself (Self-Oriented), others (Other-Oriented), or is attributed to others despite one's self-focus (Socially Prescribed).
	Passion Scale	Considers whether individuals display a passion for an activity and whether this is adaptive (Harmonious Passion) or maladaptive (Obsessive Passion).

concurrent and future manic symptoms and episodes (e.g., Kwapil et al., 2000; Walsh et al., 2015). The HPS also correlates highly with bipolar-relevant measures that have demonstrated adequate sensitivity and specificity, including the Mood Disorder Questionnaire (Hirschfeld et al., 2000).

Recent research has also examined the factor structure underlying the HPS, indicating the presence of five distinct factors/ subscales: (1) Activation, (2) Charisma, (3) Intellectual Confidence, (4) Lability, and (5) Modesty. The Activation subscale, in particular, appears to support the divergent validity of the HPS and its specificity to mania. This scale corresponds with high levels of activation, energy, and recklessness. Importantly, this subscale displays strong associations with bipolar-relevant measures, similar to total HPS scores (Stanton et al., 2019). However, compared to the full scale and other subscales, the Activation subscale shows weaker associations with other forms of psychopathology and personality aspects (e.g., substance abuse, borderline personality disorder, psychopathy, narcissism; Stanton et al., 2019). As such, this subscale of the HPS was used as the major indicator of mania risk in the current dissertation.

Current Mood Symptoms. *Altman Self-Rating Mania Scale (ASRM; Altman et al., 1997)*. The ASRM is a five-item scale that assesses manic symptomatology over the previous week. This scale prompts individuals to consider their levels of euphoria, self-confidence, need for sleep, talkativeness, and activity, and specifically, their degree of change compared to typical levels. Example response items from this scale are: *I do not feel happier or more cheerful than usual; I have frequently been more active than usual.*

This scale has been used extensively in the literature and has shown good test-retest reliability (Altman et al., 1997). The ASRM has also demonstrated good convergent validity, in that it has correlated strongly with other bipolar-relevant measures (Altman et al., 1997), including diagnostic interviews such as the Clinician-Administered Rating Scale for Mania (Altman et al., 1994) and

Young Mania Rating Scale (Young et al. 1978). In addition, this scale has distinguished individuals with mania from those with schizophrenia and unipolar depression (Altman et al., 1997).

Depression subscale of the Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a widely used self-report instrument that assesses depressive, anxious, and stressful symptomology. Only the Depression subscale was administered in the current study to yield a continuous measure of depressive symptoms. This subscale is comprised of 7 statements (e.g., *I couldn't seem to experience any positive feeling at all*; *I felt that I had nothing to look forward to*), which participants are asked to rate using a 4-point scale, ranging from 0 (i.e., did not apply to me at all) to 3 (i.e., applied to me very much, or most of the time). The Depression subscale of the DASS-21 has shown excellent internal consistency (Antony, Bieling, Cox, Enns, & Swinson, 1998). This was also demonstrated in the current study (Cronbach's alpha = .94 for this measure). In addition, the Depression subscale correlates highly with related measures, such as the Beck Depression Inventory (Beck, Rush, Shaw, & Emery, 1979), supporting the concurrent validity of this measure.

Self-Schema Structure. *Psychological Distance Scaling Task (PDST; Dozois & Dobson, 2001b).* The PDST is a computer-based task in which participants are presented with a number of adjectives on a screen (e.g., *desirable, inadequate*). They are asked to position each adjective within a four-quadrant grid based on their perceived self-descriptiveness (*x*-axis) and valence (*y*-axis). The left endpoint of the x-axis is labelled "not at all like me" and the right endpoint is labelled "very much like me". In a similar manner, the top endpoint of the y-axis is labelled "very positive" whereas the bottom endpoint is labelled "very negative".

The set of adjectives employed in the current study can be found in Appendix A. These adjectives were taken from previous research using this task (e.g., Dozois, 2007; Seeds & Dozois, 2010), and have been matched on important variables such as word length, word frequency,

familiarity, and emotional intensity. These adjectives represent two different types of self-schema content, namely, positive and negative beliefs within the interpersonal and achievement domains. As such, 20 adjectives correspond with each of the following content domains: interpersonal positive (e.g., *admired, kind*), interpersonal negative (e.g., *unloved, annoying),* achievement positive (e.g., *capable, successful),* and achievement negative (e.g., *failure, helpless).* These content domains have been associated with excellent interrater reliability (94% agreement; $\kappa = .87$; Dozois, 2007; Dozois & Frewen, 2006).

At the beginning of the task, participants are presented with one adjective that appears at the center of the grid. After the participant has positioned this adjective using the computer mouse, they can press the "Enter" key or click a "Submit" button located below the grid. Consequently, the adjective disappears, and then another adjective is presented, until a total of 60 adjectives have been placed. Over multiple iterations, the computer calculates the interstimulus distance between adjectives within a given content domain (e.g., achievement positive).

To calculate and interpret PDST results in the present dissertation, a similar approach was taken to previous studies (e.g., Dozois & Dobson, 2001b; Seeds & Dozois, 2010). Specifically, interstimulus distance scores were calculated for six different content domains of the PDST: (i) Overall Positive, (ii) Overall Negative, (iii) Positive Achievement, (iv) Negative Achievement, (v) Positive Interpersonal, and (vi) Negative Interpersonal. To calculate interstimulus distance, the following idiographic formula was used:

$$\frac{\sqrt{\sum \begin{array}{l}(X_1 - X_2)^2 + (X_1 - X_3)^2 + \cdots + (X_{19} - X_{20})^2 + \\ (Y_1 - Y_2)^2 + (Y_1 - Y_3)^2 + \cdots + (Y_{19} - Y_{20})^2\end{array}}}{n(n-1)/2}$$

Here, X corresponds with the placement of adjectives along the self-descriptiveness axis, Y is the placement of adjectives along the valence axis, and n is the sum of all possible distances for a given domain. Thus, this formula computes the mean-squared distances of each adjective-adjective

combination within each content domain. This value is divided by the number of possible distances and the square root is taken. In the current study, these scores were then logarithmically transformed to address violations regarding the normal distribution of scores, consistent with previous research. The resulting value theoretically provides an indication of interconnectedness or consolidation, with the primary assumption being that less interstimulus distance between adjectives corresponds with greater interconnectedness, and vice versa. For more detailed information regarding this task, see Dozois & Dobson, 2001b.

Extant evidence supports the psychometric properties of the PDST (e.g., Dozois, 2002; Dozois & Dobson, 2001b, 2003; Dozois & Frewen, 2006). Among stably depressed individuals, the 6-month test-retest reliability coefficients are .70 and .51 for negative and positive interpersonal content, respectively (Dozois & Dobson, 2001a). The construct validity of this measure is informed by research demonstrating that negative self-schema content is highly consolidated among anxious and depressed samples, whereas diffuse, positive self-schema content appears to be characteristic of depression, in particular (Dozois & Dobson, 2001b). This task has also shown that the consolidation of negative, interpersonal content varies as a function of individual levels of dysphoria and number of previous depressive episodes (Dozois, 2002; Dozois & Dobson, 2003). Further investigations have demonstrated that the tight organization of negative self-schema content within the interpersonal domain is discernible outside of mood episodes in cases of depression (Dozois & Dobson, 2001a).

Self-Schema Content. *Belief Statements Questionnaire – Fulfillment subscale* (Hillson, 1997). The Beliefs Statements Questionnaire was designed to assess adaptive beliefs within the context of interpersonal and achievement-related situations. Only the Fulfillment subscale of this measure that probes participants about achievement situations was utilized in the current study. This subscale contextualizes adaptive beliefs (e.g., *It is important to like and feel proud of oneself and one's accomplishments*), such that they become self-referential and reflect perceived embodiment of

those beliefs (e.g., *I like and feel proud of myself and my accomplishments*). Participants were presented with seven of these statements, which they were asked to rate using a 7-point scale, ranging from 1(*Very untrue*) to 7 (*Very true*). The Accuracy subscale has good internal consistency (α = .85), as well as concurrent validity regarding psychological well-being (Hillson, 1997).

Cognitive Distortions Scale (CDS; Covin, Dozois, Ogniewicz, & Seeds, 2011). The CDS is a self-report instrument that examines participants' identification with ten cognitive distortions, namely, (1) Mindreading, (2) Catastrophizing, (3) All-or-Nothing Thinking, (4) Emotional Reasoning, (5) Labeling, (6) Mental Filter, (7) Overgeneralization, (8) Personalization, (9) Should Statements, and (10) Minimizing or Disqualifying the Positive. The CDS is comprised of 10 items that present a brief description of each cognitive distortion and two vignettes that exemplify how the distortion may manifest in daily life. For example, the item for Emotional Reasoning describes how "*People can believe something to be true because it "feels" that way*." One of the accompanying vignettes illustrates how a man has received positive performance evaluations at work, and yet he feels like a failure and thus begins to believe he is a failure. For each cognitive distortion, participants are then asked to indicate the perceived frequency with which they experience that cognitive distortion within social (e.g., family, romantic relationships) and achievement-related situations (e.g., work, school), using a 7-point scale that ranges from 1(*Never*) to 7(*All The Time*). The CDS has shown excellent reliability (α = .85) and concurrent validity in terms of its association with measures of stress, anxiety, and depression (Covin et al., 2011).

Dysfunctional Attitudes Scale, Goal Attainment subscale (DAS-GA; Lam et al., 2004). This subscale of the Dysfunctional Attitudes Scale (Power et al., 1994) is designed to be specific to mania-relevant cognitions, as indicated by previous factor analytic research (Lam et al., 2004). It is comprised of six items that describe dysfunctional attitudes related to goal-striving and achievement, as well as the importance of consistently feeling positive (e.g., *A person should do well at everything*

he/she undertakes; I should be happy all the time). Participants are presented with these statements and indicate their agreement using a 7-point scale, from *Totally Agree* to *Totally Disagree.* This subscale has been associated with adequate internal consistency (α = .79), as well as good convergent and discriminant validity. In particular, this subscale has positively correlated with past hospitalizations due to manic episodes, and it has distinguished between patients with bipolar disorder and unipolar depression (Lam et al., 2004).

Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1990). The MPS is a 45-item, self-report inventory that examines three dimensions of perfectionism: (1) Self-oriented, (2) Other-oriented, and (3) Socially prescribed perfectionism. Self-oriented perfectionism refers to perfectionistic behaviour directed towards oneself (e.g., *I strive to be as perfect as I can be; When I am working on something, I cannot relax until it is perfect*), whereas other-oriented perfectionism focuses on the expectations of others (e.g., *I have high expectations for the people that are important to me; I can't be bothered with people who won't strive to better themselves*). Socially prescribed perfectionism involves attributing one's perfectionistic behaviours to others (e.g., *People expect nothing less than perfection from me; I find it difficult to meet others' expectations of me*). Participants rate their agreement with items using a 7-point scale, from 1(*Strongly Disagree*) to 7 (*Strongly Agree*). The MPS has demonstrated good internal consistency, with Cronbach's alphas ranging from .82 to .87 for the self-oriented, other-oriented, and socially prescribed subscales (Hewitt & Flett, 1991). Similarly, the validity of the MPS is supported by research indicating that these subscales converge with other measures of perfectionism, while also showing differential relationships with psychopathology and personality constructs in the expected manner. As one illustration, other-oriented and socially prescribed perfectionism, in particular, have shown positive relationships with several personality disorders, highlighting the interpersonal dimension shared by these constructs (Hewitt & Flett, 1991).

Passion Scale (Vallerand et al., 2003). The Passion Scale is comprised of 17 items that participants rate using a 7-point scale, from 1(*Not Agree at All*) to 7(*Very Strongly Agree*). At the beginning of the questionnaire, participants are asked to bring to mind their favourite activity. In the current study, activities listed by participants included writing, dancing, and playing guitar. Participants are then presented with the items that address three basic components: (1) the criteria for passion, (2) obsessive passion, and (3) harmonious passion. Regarding the first component, five items assess the extent to which participants are passionate about their activity by examining its frequency, enjoyment and personal importance (e.g., *This activity is part of who I am; I spend a lot of time doing this activity*). Secondly, six items examine whether individuals display 'obsessive passion' for the activity. Recall that this concept relates to having little control over an activity, and thus one's identity and other life activities become unduly affected (e.g., *I have the impression that my activity controls me; If I could, I would only do my activity*). Conversely, six items assess the extent to which individuals display harmonious passion with their activity (e.g., *This activity is in harmony with the other activities in my life; My activity is well integrated in my life*). Previous research indicates that the Passion Scale has good psychometric properties (α = .73 and .85 for harmonious and obsessive passion, respectively). In addition, these constructs have shown expected relations with well-being indicators. For example, a study of football players found that harmonious passion was associated with higher levels of positive affect over the course of a season, whereas obsessive passion was associated with higher levels of negative affect (Vallerand et al., 2003).

Mood Induction Procedures (MIPs). Individuals were asked to participate in a directed imagination task designed to evoke either a positive or neutral mood. The positive MIP has been used in previous studies of mania and instructed participants to imagine that they had attained a personally important goal (Tharp, Johnson, Sinclair, & Kumar, 2016). This exercise was adapted for the present study to also create a neutral MIP, which was not anticipated to evoke a strong emotional

reaction. Specifically, participants were asked to imagine a routine shopping trip, which has been used successfully in previous research as an emotionally neutral condition (Luten, 1995). This task was designed to be similar on important features, such as length of task and personal relevance.

Participants were randomly assigned to either the positive or neutral MIP. Instructions for these tasks can be found in Appendix B. Specifically, audio instructions and visual prompts guided participants through the imaginary scenario. First, participants were given an overview of the task and the specific scenario they were asked to imagine. Next, they were prompted to type answers to a number of questions that would help them to imagine their situation in detail (e.g., *What about your goal makes it important to you?; What would you think and feel if you achieved it?).* They were then instructed to clear their mind for 30 seconds, before imagining their scenario for two minutes.

Manipulation check. Follow-up questions were included in an effort to assess the effectiveness of the MIPs (see Appendix B). In particular, immediately following the imagination task, participants were asked to rate their emotional state using an 8-point Likert scale (-4 = *Extremely negative*, 0 = *Neutral*, 4 = *Extremely Positive*). For participants in the present study, the results of an independent *t*-test indicated their emotional state was significantly more positive following the positive versus neutral MIP, $t(441) = 12.57$, $p < .001$. In particular, the mean rating for emotional state was 3.04 ($SD = 1.20$) for the positive MIP and 0.94 ($SD = 2.11$) for the neutral MIP.

Procedure

Ethics approval was granted prior to data collection (see Appendix C for further details). Mechanical Turk users who met the inclusion criteria for the study were able to view the advertisement and proceed to the website hosting the study materials. After reading the Letter of Information and consenting to participate, individuals viewed an introductory video in which the experimenter introduced herself and provided a brief description of the study activities. Participants were then instructed to complete the HPS, before being presented with the ASRM, DASS-21, and

PDST in a randomized order. Following this, participants were randomly directed to either the Positive, Negative or Neutral MIP. Finally, they were asked to complete the PBS, CDS, DAS, Passion Scale, and MPS, in that order. Since it could not be precisely known how long the MIP effects would last, it was decided not to randomize this final set of questionnaires. Finally, participants were directed to the debriefing page, which contained information about the study, as well as the numeric MTurk input code needed by the participant in order to receive compensation.

Study 1 – Results and Discussion

The means, standard deviations, ranges, and reliabilities (Cronbach's alpha) for the mania, mood symptomatology, and self-schema measures can be found in Table 1.2. These values are consistent with those reported in previous research. In addition, the reliability coefficients for all measures were quite acceptable, ranging from .81 to .94. Simple correlations between the mania and mood symptomatology measures can be found in Appendix D. Consistent with previous research, significant positive relationships were found between mania risk and manic symptoms. Mania risk was also modestly associated with recent depressive symptoms.

The correlation matrix for the self-schema content and structure domains can also be found in Appendix D. Consistent with expectations, many of these self-schema aspects intercorrelated with one another. For example, in terms of content, small to large relationships were shown amongst the perfectionism styles, obsessive passion, and dysfunctional attitudes about goal attainment. In terms of structure, positive content within different domains (i.e., achievement and interpersonal) strongly correlated, and vice versa.

Associations between Mania Risk and Self-Schema Constructs

Recall that Research Questions 1 and 2 of this dissertation consider the relationships between mania risk and self-schema constructs. To begin exploring these primary research questions, bivariate correlations were calculated. These results are summarized in Table 1.3a and 1.3b, for self-schema content and structure, respectively. Table 1.3a shows that risk for mania (i.e., HPS scores) positively correlated with the vast majority of measures reflecting maladaptive schema content. Specifically, mania risk shared moderately strong relationships with interpersonal cognitive distortions, obsessive passion, and socially-prescribed perfectionism. Additionally, the HPS was modestly associated with the other forms of perfectionism, dysfunctional attitudes about goal attainment, and achievement cognitive distortions.

Table 1.2

Descriptive Statistics for the Mania, Mood Symptomatology, and Self-Schema Measures

Category	Measure	*M*	*SD*	Range	Reliability
Mania	HPS Activation	2.05	2.53	0-9	.86
Mood	ASRM	4.27	4.52	0-20	.85
	DASS-21	4.93	5.46	0-21	.94
Self-Schema Content	DAS	26.89	7.18	6-42	.84
	CDS-A	39.38	12.63	10-70	.89
	CDS-I	39.50	12.27	10-70	.88
	PBS	38.09	8.53	7-49	.92
	PS-O	20.92	8.91	6-42	.85
	PS-H	32.61	6.08	12-42	.81
	MPS-S	66.01	18.11	18-105	.91
	MPS-O	54.99	13.89	16-95	.82
	MPS-SP	54.14	15.09	15-102	.85
Self-Schema Structure	PDST Overall Positive	0.88	0.62	-1.25-3.76	
	PDST Overall	2.32	0.93	-0.81-4.92	
	PDST-AP	0.50	0.42	-0.58-2.40	
	PDST-AN	1.20	0.56	-0.33-2.48	
	PDST-IP	0.40	0.29	-0.67-1.84	
	PDST-IN	1.25	0.52	-0.49-2.49	

Notes. N = 438-459 for all self-report measures. HPS = Hypomanic Personality Scale, Activation subscale; ASRM = Altman Self-Rating Mania Scale; DASS-21 = Depression, Anxiety, and Stress Scales – 21, Depression Subscale; DAS = Dysfunctional Attitudes Scale, Goal Attainment Subscale; CDS-A = Cognitive Distortions Scale, Achievement Subscale; CDS- I = Cognitive Distortions Scale, Interpersonal Subscale; PBS = Positive Belief Statements Scale, Fulfillment Subscale; PS-O = Passion Scale, Obsessive Subscale; PS-H = Passion Scale, Harmonious Subscale; MPS-S = Multidimensional Perfectionism Scale, Self-Oriented Subscale; MPS-O = Multidimensional Perfectionism Scale, Other-Oriented Subscale; MPS-SP = Multidimensional Perfectionism Scale, Socially Prescribed Subscale; PSDT = Psychological Distance Scaling Task; AP = Achievement Positive; AN = Achievement Negative; IP = Interpersonal Positive; IN = Interpersonal Negative.

Table 1.3a

Correlations between Mania Risk and Self-Schema Content

	DAS	CDS-A	CDS-I	PS-O	PS-H	MS-S	MS-O	MS-SP	PBS
HPS	.20***	.16**	.22***	.42***	-.05	.12*	.14**	.26***	-.01

Notes. DAS = Dysfunctional Attitudes Scale, Goal Attainment Subscale; CDS-A = Cognitive Distortions Scale, Achievement Subscale; CDS- I = Cognitive Distortions Scale, Interpersonal Subscale; PS-O = Passion Scale, Obsessive Subscale; PS-H = Passion Scale, Harmonious Subscale; MPS-S = Multidimensional Perfectionism Scale, Self-Oriented Subscale; MPS-O = Multidimensional Perfectionism Scale, Other-Oriented Subscale; MPS-SP = Multidimensional Perfectionism Scale, Socially Prescribed Subscale; PBS = Positive Belief Statements Scale, Fulfillment Subscale.*$p < .05$, **$p < .01$

Table 1.3b

Correlations between Mania Risk and Self-Schema Structure

	PDST-P	PDST-AP	PDST-SP	PDST-N	PDST-AN	PDST-SN
HPS	-.22***	-.21***	-.19***	-.02	.06	-.09

Notes. PDST = Psychological Distance Scaling Task; P = Overall Positive; N = Overall Negative; AP = Positive Achievement, AN = Negative Achievement, IP = Positive Interpersonal, IN = Negative Interpersonal. ***$p < .01$

Similarly, in Table 1.3b, it is illustrated that mania risk also shared significant relationships with self-schema structure domains. In line with expectations, high HPS scores corresponded with tightly organized content that was positive in valence. More specifically, higher HPS scores were associated with highly interconnected, positive content within the achievement and interpersonal domains. Notably, all the above correlations between the HPS and PDST positive domains were small in magnitude. Somewhat inconsistent with hypotheses, mania risk did not correlate with the organization of negative self-schema content. However, as an aside, it was observed that total scores on the HPS (versus HPS Activation scores) shared a small relationship with negative, interpersonally relevant content, $r = -.15$, $p = .01$. The direction of this relation suggests that high total HPS scores corresponded with tightly interconnected, negative content within the interpersonal domain.

Predicting Self-Schema Aspects from Mania Risk

In order to further understand how self-schema constructs (both content and structure) may distinguish those at heightened vulnerability towards mania, it is critical to parse the contribution of mood symptoms from the relation between mania risk and self-schema aspects. Thus, a number of block regression analyses were conducted to examine how self-schema constructs may be distinctively related to mania risk. For each hierarchical regression analysis, depressive and manic symptoms were entered in the first and second block, respectively, before mania risk was entered in the third block.

Schema Content. The results of the regression analyses for the self-schema content measures are displayed in Table 1.4. These findings indicate that mania risk significantly added to the prediction of several content measures, even after controlling for the presence of mood symptoms. Specifically, after manic and depressive symptoms had been taken into account, high risk for mania corresponded with greater endorsement of dysfunctional attitudes concerning goal attainment, qualities indicative of obsessive passion, and socially prescribed perfectionism. In the third block of

Table 1.4

Summary of Regression Results for Self-Schema Content

Schema Content	Block 1	Block 2 Change	Block 3 Change	Overall Model and Predictors
Dysfunctional Attitudes – Goal Attainment	$F = 0.01$ $R^2 = .00$	$\Delta F = 9.84^{**}$ $\Delta R^2 = .02$	$\Delta F = 7.44^{***}$ $\Delta R^2 = .03$	$F = 5.81^{***}$ $R^2 = .04$ Depression (-.03) Mania (.08) Mania Risk (.15)**
Cognitive Distortions – Achievement	$F = 107.64^{***}$ $R^2 = .20$	$\Delta F = 10.98^{***}$ $\Delta R^2 = .02$	$\Delta F = 1.60$ $\Delta R^2 = .00$	$F = 40.99^{***}$ $R^2 = .23$ Depression (.44)*** Mania (.11)* Mania Risk (.06)
Cognitive Distortions – Interpersonal	$F = 105.15^{***}$ $R^2 = .20$	$\Delta F = 16.43^{***}$ $\Delta R^2 = .03$	$\Delta F = 6.87^{**}$ $\Delta R^2 = .01$	$F = 40.99^{***}$ $R^2 = .25$ Depression (.43)*** Mania (.11)* Mania Risk (.13)**
Adaptive Beliefs about Achievement	$F = 369.88^{***}$ $R^2 = .47$	$\Delta F = 6.80^{**}$ $\Delta R^2 = .01$	$\Delta F = 0.22$ $\Delta R^2 = .00$	$F = 127.10^{***}$ $R^2 = .48$ Depression (-.69)*** Mania (.08)* Mania Risk (.02)
Obsessive Passion	$F = 4.43^{*}$ $R^2 = .01$	$\Delta F = 64.18^{***}$ $\Delta R^2 = .13$	$\Delta F = 36.49^{***}$ $\Delta R^2 = .07$	$F = 37.25^{***}$ $R^2 = .21$ Depression (.06) Mania (.22)*** Mania Risk (.30)**
Harmonious Passion	$F = 64.43^{***}$ $R^2 = .14$	$\Delta F = 2.27$ $\Delta R^2 = .01$	$\Delta F = 0.20$ $\Delta R^2 = .00$	$F = 22.32^{***}$ $R^2 = .15$ Depression (-.37)*** Mania (-.08) Mania Risk (.02)

Self-Oriented Perfectionism	$F = 0.63$ $R^2 = .00$	$\Delta F = 2.15$ $\Delta R^2 = .00$	$\Delta F = 3.50$ $\Delta R^2 = .04$	$F = 2.10$ $R^2 = .02$ Depression (.03) Mania (.02) Mania Risk (.11)
Other-Oriented Perfectionism	$F = 0.37$ $R^2 = .00$	$\Delta F = 15.14$*** $\Delta R^2 = .04$	$\Delta F = 1.04$ $\Delta R^2 = .00$	$F = 5.52$** $R^2 = .04$ Depression (.01) Mania (.16)** Mania Risk (.06)
Socially Prescribed Perfectionism	$F = 49.05$*** $R^2 = .11$	$\Delta F = 19.12$**** $\Delta R^2 = .04$	$\Delta F = 10.82$*** $\Delta R^2 = .02$	$F = 27.64$*** $R^2 = .18$ Depression (.30)*** Mania (.12)* Mania Risk (.17)***

Notes. Values in parentheses represent corresponding standardized regression coefficients.
*$p < .05$, **$p < .01$, ***$p < .001$

the regression analysis, mania risk also positively predicted cognitive distortions within the interpersonal domain. Contrary to expectations, the HPS did not predict achievement cognitive distortions once mood symptoms had been controlled for, despite the previously reported, positive relation shared between these constructs. This result can likely be explained by the strong contribution of recent depressive symptoms; depression was consistently a strong predictor of cognitive distortions within both the interpersonal and achievement domains. Finally, mania risk did not significantly add to the prediction of adaptive self-referent beliefs about achievement, harmonious passion, nor self-oriented or other-oriented perfectionism.

As further illustrated in Table 1.4, mood symptoms also frequently added to the prediction of self-schema content. In particular, depression was a moderate to strong predictor of the majority of content constructs. This is not surprisingly since many of these scales were designed to examine depressogenic cognition, and such relationships have been well documented in the literature (e.g., Covin et al., 2011). Since one of the goals of this dissertation is to isolate self-schema aspects that appear to be distinctly related to mania, notable are findings that exclusively implicate manic symptoms and/or mania risk. As displayed in Table 1.4, dysfunctional attitudes about goal attainment and obsessive passion represent cases in which depressive symptoms was not a significant predictor, once mania constructs have been entered into the regression equation. As such, these findings contribute to discriminant validity, suggesting that these content measures are particularly important for understanding self-referent beliefs within the context of mania.

Schema Structure. The regression results for schema structure components are presented in Table 1.5. First, mania risk significantly predicted the organization of overall positive schema content, beyond the contributions of recent mood symptoms. Notably, although depression corresponded with loosely connected, positive content, recent manic symptoms as well as mania risk corresponded with tightly interconnected positive content. Alternatively, only recent depressive

Table 1.5.

Summary of Regression Results for Self-Schema Structure

Schema Structure	Block 1	Block 2 Change	Block 3 Change	Overall Model and Predictors
Overall Positive	$F = 57.26^{***}$ $R^2 = .12$	$\Delta F = 39.49^{***}$ $\Delta R^2 = .07$	$\Delta F = 12.71^{***}$ $\Delta R^2 = .03$	$F = 37.64^{***}$ $R^2 = .22$ Depression (.37)*** Mania (-.19)*** Mania Risk (-.17)***
Positive Achievement	$F = 38.36^{***}$ $R^2 = .08$	$\Delta F = 23.88^{***}$ $\Delta R^2 = .05$	$\Delta F = 12.36^{***}$ $\Delta R^2 = .03$	$F = 26.08^{***}$ $R^2 = .15$ Depression (.31)*** Mania (-.14)** Mania Risk (-.17)***
Positive Interpersonal	$F = 50.86^{***}$ $R^2 = .10$	$\Delta F = 30.05^{***}$ $\Delta R^2 = .06$	$\Delta F = 8.11^{**}$ $\Delta R^2 = .02$	$F = 31.24^{***}$ $R^2 = .17$ Depression (.34)*** Mania (-.18)*** Mania Risk (-.14)**
Overall Negative	$F = 74.07^{***}$ $R^2 = .22$	$\Delta F = 0.83$ $\Delta R^2 = .00$	$\Delta F = 1.09$ $\Delta R^2 = .00$	$F = 25.32^{***}$ $R^2 = .22$ Depression (-.46)*** Mania (.09) Mania Risk (-.07)
Negative Achievement	$F = 71.18^{***}$ $R^2 = .20$	$\Delta F = 5.39^{*}$ $\Delta R^2 = .02$	$\Delta F = 0.00$ $\Delta R^2 = .00$	$F = 25.81^{***}$ $R^2 = .22$ Depression (-.44)*** Mania (.12)* Mania Risk (.00)
Negative Interpersonal	$F = 63.98^{***}$ $R^2 = .16$	$\Delta F = 0.04$ $\Delta R^2 = .00$	$\Delta F = 3.38+$ $\Delta R^2 = .01$	$F = 22.54^{***}$ $R^2 = .17$ Depression (-.39)*** Mania (.07) Mania Risk (-.12)+

Notes. Values in parentheses represent corresponding standardized regression coefficients.
$^{*}p < .05$, $^{*}p < .01$, $^{***}p < .001$, $+p = .06$.

symptoms significantly predicted overall negative self-schema structure when all constructs were entered in the final block of the regression analysis.

Positive Domains. When examining more specific domains of self-schema structure, mania risk significantly predicted the organization of positive content within the achievement domain after controlling for the influence of recent mood symptoms. HPS scores corresponded with highly interconnected content within the interpersonal domain as well. In both cases, manic symptomatology was also associated with tightly organized, positive content. Conversely, recent depressive symptoms corresponded with loosely organized, positive content within these domains, which is consistent with past research.

Negative Domains. Contrary to tentative hypotheses, the HPS was not a significant predictor of negative achievement structure or interpersonal structure after accounting for the influence of mood symptoms. However, the trend for negative interpersonal structure ($p = .06$) showed the expected pattern, whereby high mania risk corresponded with highly interconnected negative content. Conversely, greater endorsement of recent manic symptoms corresponded with less connectivity within the achievement domain, but not the interpersonal domain. Greater depressive symptoms corresponded with highly interconnected negative content within both domains.

Examining the Effects of Mood Priming on the Activation of Self-Schema Content

To address the second research question of this dissertation, a set of multiple regression analyses was conducted to examine whether the positive mood induction procedure moderated relations between mania risk and self-schema content. To derive the predictors for these analyses, the MIP was numerically coded and the HPS was mean-centered. A product term was then calculated for the interaction effect.

A summary of these analyses is presented in Table 1.6. As this table illustrates, there were no significant interaction effects associated with any of the self-schema content measures. Overall, these

Table 1.6

Summary of Moderation Analyses examining the Effects of Mood Induction Procedures on the Activation of Self-Schema Content

Schema Content	Predictors	Overall Model
Dysfunctional Attitudes – Goal Attainment	HPS (.29)*** MIP (.09) HPS x MIP (-.11)	F = 8.37*** R^2 = .06
Cognitive Distortions – Interpersonal	HPS (.34)*** MIP (.04) HPS x MIP (.06)	F = 13.68** R^2 = .09
Cognitive Distortions – Achievement	HPS (.21)** MIP (.08) HPS x MIP (.01)	F = 7.49*** R^2 = .05
Self-Referent Adaptive Beliefs - Achievement	HPS (-.02)** MIP (.04)** HPS x MIP (-.06)**	F = 0.80 R^2 = .01
Obsessive Passion	HPS (.44)*** MIP (.01) HPS x MIP (-.09)	F = 27.25** R^2 = .17
Harmonious Passion	HPS (.00) MIP (-.04) HPS x MIP (.06)	F = 1.54 R^2 = .01
Self-Oriented Perfectionism	HPS (.23)** MIP (.09) HPS x MIP (-.03)	F = 7.34*** R^2 = .05
Other-Oriented Perfectionism	HPS (.27)*** MIP (.07) HPS x MIP (-.05)	F = 8.83*** R^2 = .06
Socially Prescribed Perfectionism	HPS (.34)*** MIP (.09) HPS x MIP (-.04)	F = 16.32*** R^2 = .11

Notes. HPS = Hypomanic Personality Scale; MIP = Positive Mood Induction Procedure; HPS x MIP = Interaction between HPS and MIP. Values in parentheses represent corresponding standardized regression coefficients. **p < .01, ***p < .001

findings indicate that the positive mood induction procedure did not impact the examination of self-schema content in the current study. As such, mood priming may not be necessary to detect these aspects of self-schema content showing sensitivity and/or specificity to mania.

Self-Schema Components Mediate Maladaptive Pathways to Mood Symptoms

To further assess the importance of self-schema content and structure in relation to mania constructs, it was examined whether self-schema components could help to explain the relation between mania risk and mood symptoms. Recall that the current measure of mania risk (i.e., HPS) indexes a stable pattern of cognitive, behavioural and emotional experiences that predicts onset of clinically significant manic symptoms, and the ASRM and DASS-21 assess the recent incidence of manic/depressive symptoms. Thus, it would be helpful to understand how self-schema components as potential mediators may elucidate the relation between a vulnerability marker (i.e., HPS) and the occurrence of mood symptoms. As such, multiple mediation analyses were conducted utilizing the procedures outlined by Preacher and Hayes (2008). This approach permitted analysis of the estimated indirect (i.e., mediated) effects, as well as the direct effect of the predictor (i.e., mania risk) on the criterion variable (i.e., mood symptoms) while controlling for the mediators within the model.

Separate mediation analyses were conducted predicting manic symptoms and depressive symptoms, using the bootstrap sampling procedures developed by Preacher and Hayes (2008). This bootstrap method involves drawing a large number of samples (n = 1000) from the dataset using replacement, such that path coefficients can be calculated for each sample. The result is that mean direct and indirect effects and their confidence intervals (CIs) can be calculated on the basis of these sample estimates. The CIs are used to determine the statistical significance of the effects within the mediation model. In the current dissertation, if the value for a given effect (i.e., indirect or direct) did not fall within the 95% CI, it was concluded that this result was statistically significant at the $p < .05$ level.

In addition, since the following mediation analyses were conducted using cross-sectional data, reverse mediation models were also conducted exchanging the predictor and criterion variables. This approach was used to examine whether further empirical support could be found for these mediation models that are based on theoretical considerations.

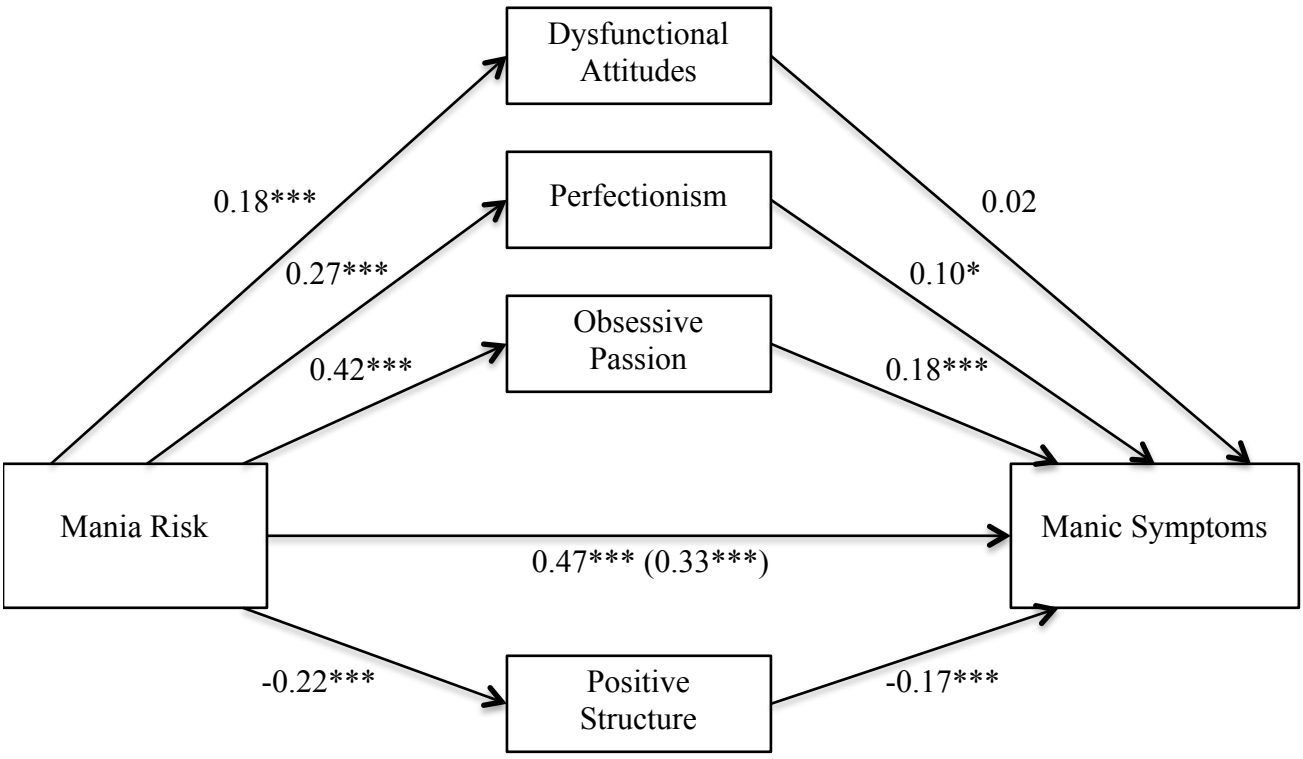
Manic Symptoms. First, it was examined whether certain types of self-schema content and structure mediated between the HPS and manic symptoms. In light of the earlier regression results highlighting relations between mania risk and dysfunctional attitudes about success, obsessive passion, and socially prescribed perfectionism, these content constructs were examined as potential mediators for manic symptoms. Overall positive self-schema structure was also entered within this multiple mediation model. As displayed in Figure 1.1, results indicated that obsessive passion, perfectionism, and positive self-schema structure partially mediated the relation between mania risk and manic symptoms. These results were in the expected direction, with high mania risk corresponding with greater obsessive passion, higher levels of perfectionism, and highly interconnected positive self-schema content, which in turn predicted greater manic symptoms.

Notably, when the reverse model was tested whereby manic symptoms served as the predictor variable and mania risk as the criterion variable, the regression coefficients and indirect effects looked similar to the theorized model (see Appendix E for details). However, one exception was that the indirect effect for positive self-schema structure was not significant in the reverse model (CI = -.0014 to .0548).

Depressive Symptoms. Given previous research that heavily implicates cognitive distortions within the context of depressive symptoms, a sub-hypothesis was that cognitive distortions in the achievement domain may follow from mania risk, but lead to depressive symptoms rather than manic symptoms. As displayed in Figure 1.2, meditational results supported this hypothesis and indicated that cognitive distortions within both the Achievement and Interpersonal domains fully mediated the

Figure 1.1

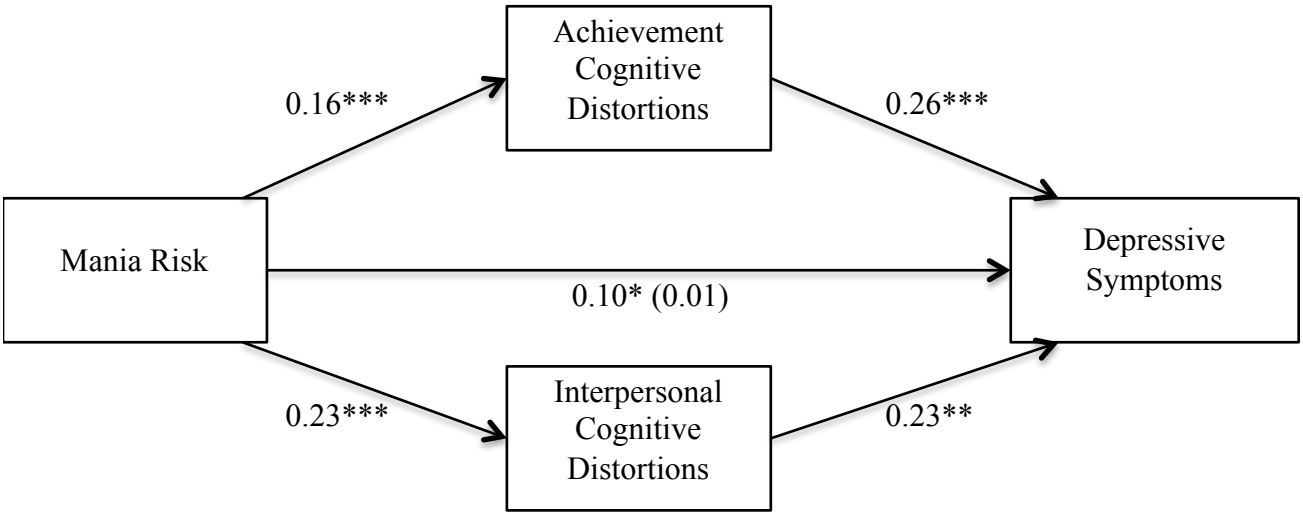
Self-Schema Content and Structure Mediate between Mania Risk and Manic Symptoms



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Dysfunctional Attitudes, β = -.00; Socially-Prescribed Perfectionism, β = .03*; Obsessive Passion, β = .08*; Overall Positive Structure, β = .04*; Total indirect effect, β = .14*. *p < .05, ***p < .001.

Figure 1.2

Cognitive Distortions Mediate between Mania Risk and Depressive Symptoms



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Achievement Cognitive Distortions, $\beta = .04$*; Interpersonal Cognitive Distortions, $\beta = .05$*; Total indirect effect, $\beta = .09$*. *$p < .05$, **$p < .01$, ***$p < .001$.

relation between the HPS and depressive symptoms. Specifically, the results of these analyses indicate that greater mania risk predicted high levels of cognitive distortions, which, in turn, predicted greater depressive symptoms. Moreover, neither achievement cognitive distortions (CI = -.0153 to .0361) nor interpersonal cognitive distortions (CI = -.0247 to .0500) significantly mediated between the HPS and manic symptoms.

Again, the reverse model was also tested (i.e., depressive symptoms as the predictor variable and mania risk as the criterion variable), since the above results for the theorized model are cross-sectional. As shown in Appendix E, for the reverse model, achievement cognitive distortions was not a significant mediator between depressive symptoms and mania risk (CI = -.1257 and .0366). In addition, the total indirect effects for both models were identical. Thus, it does not appear that the reverse model is superior to the theorized model in the current study.

Adaptive Self-Schema Components as Moderators of Paths to Mood Symptoms

Recall that it was also hypothesized that adaptive self-schema components (i.e., adaptive beliefs about success and harmonious passion) could potentially moderate pathways towards mood symptoms. A moderation effect was explored since it was not necessarily anticipated that there would be direct associations between the HPS and these protective constructs. Rather, it was theorized that there may be a subgroup of individuals at high risk for mania who display lower levels of mood symptoms at high levels of these adaptive self-schema constructs.

To examine potential moderation effects, a multiple regression approach was employed utilizing centered values of the predictors. These results indicated that the interaction between harmonious passion and manic symptoms was not significant, $\beta = -.06$, $t = -1.46$, $p = .08$. However, the observed trend was in line with the hypothesis that harmonious passion acts as a protective factor among those with temperamental vulnerability towards mania. As displayed in Figure 1.3, it appeared that the slope representing high versus low levels of harmonious passion was less steep,

despite tests of simple slopes indicating that both slopes were significantly different from zero. Of note, the two main effects were significant, whereby high levels of mania risk and low levels of harmonious passion corresponded with greater manic symptoms. Together, these results suggest that mania risk was positively associated with manic symptoms, but there was a trend where this association may have been weaker among those showing high versus low levels of harmonious passion (see Figure 1.3).

Regarding the other possible moderation effects involving adaptive constructs, adaptive beliefs about success also did not significantly moderate between mania risk and symptoms, β = -.05, t = -1.22, p = .22. Moreover, harmonious passion (β = -.02, t = -0.41, p = .68) and PBS (β = .01, t = 0.40, p = .68) did not significantly moderate between the HPS and depressive symptoms.

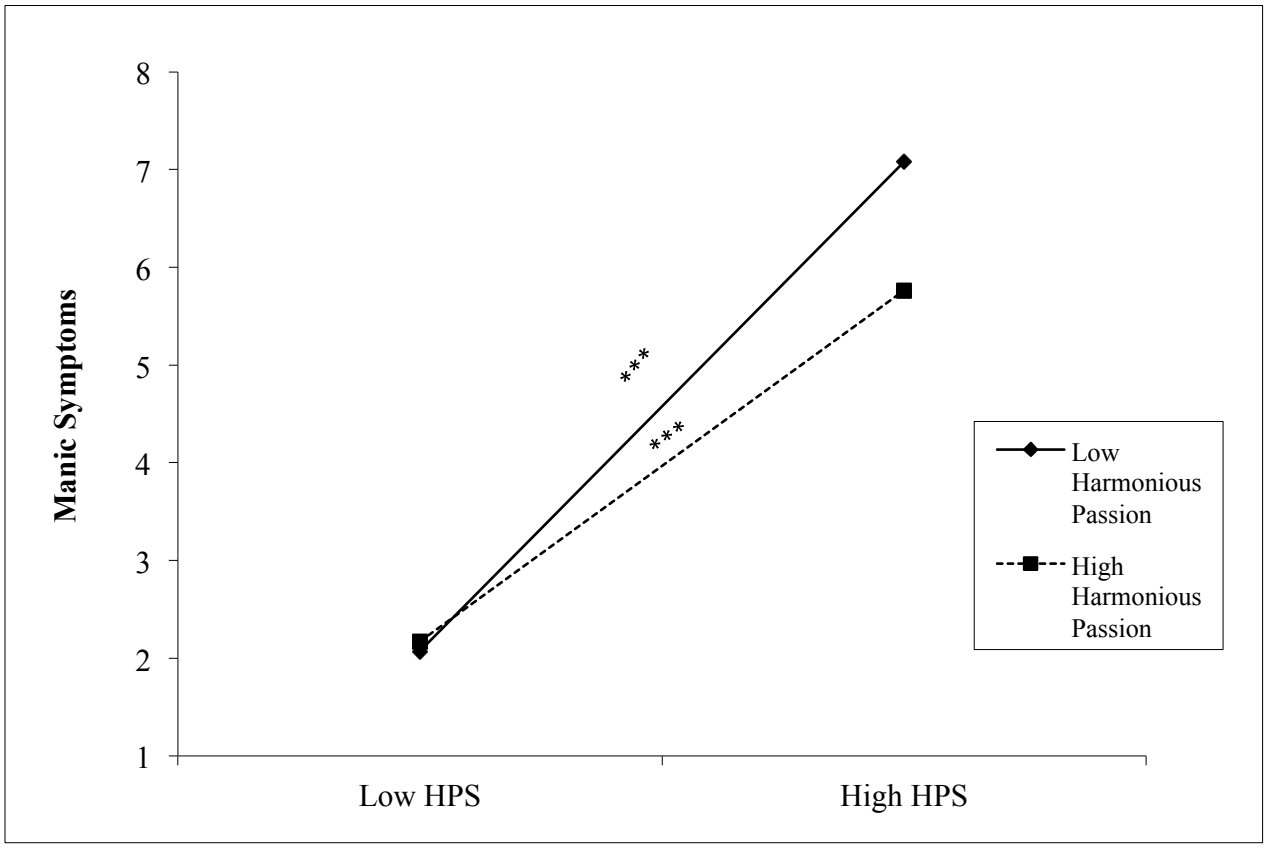
Summary of Major Findings

Findings of this study suggest that manic self-schemas are characterized by maladaptive content, and particularly content that is relevant to goal-striving and achievement. Even after controlling for the influence of mood symptoms, temperamental risk for mania was associated with dysfunctional beliefs about goal attainment, obsessive passion, and a subtype of perfectionism (other-oriented perfectionism). However, results of the current investigation also indicate that cognitive distortions in interpersonal, rather than achievement contexts, are more predictive of mania risk after accounting for manic and depressive symptoms.

Notably, this cross-sectional examination in Study 1 also suggests that certain aspects of self-schema structure correspond with mania risk. In particular, the hypomanic personality was associated with highly interconnected positive content, within both the achievement and interpersonal domains, after accounting for manic and depressive symptoms. Contrary to predictions, mania risk as assessed by the Activation subscale of the HPS did not also correspond with highly consolidated negative self-schema content. However, regression results did approach significance (p < .06), in line with

Figure 1.3

Harmonious Passion Moderates the Relation between Mania Risk and Symptoms



Notes. HPS = Hypomanic Personality Scale. *** = $p < .01$.

mania risk predicting tightly organized negative content within the interpersonal domain.

Moreover, the results of this study suggest that self-schema constructs could help to explain pathways leading to mood symptoms. Specifically, positive self-schema structure, obsessive passion, and socially-prescribed perfectionism partially mediated relations between mania risk and manic symptoms, whereas cognitive distortions fully mediated between mania risk and depressive symptoms. Study 1 also provided some preliminary evidence that adaptive constructs relevant to goal-striving (i.e., harmonious passion) may have a role in dampening manic symptoms among those at heightened risk for mania.

Contrary to hypotheses, the above findings did not suggest that mood induction procedures increased the sensitivity with which manic self-schemas could be examined. Thus, it may not be necessary to employ these procedures while studying the types of self-schema content included in the present research.

Despite the promising findings of Study 1 that help to elucidate self-schema characteristics associated with mania, a number of limitations need to be addressed. In particular, an important extension of Study1 would be a longitudinal examination, in order to more rigorously investigate the role of self-schema components within a vulnerability framework of mania. For instance, if self-schema components could predict prospective increases in manic symptoms, this finding would further support the predictive utility of schema constructs.

Moreover, a question that still remains unanswered is how these self-schema components representing putative risk factors may interact with life events to give rise to mood symptoms among those at high mania risk. This consideration is critical to address from the perspective of a cognitive vulnerability-stress model.

In addition, since this is one of the first known studies to examine self-schema organization in relation to mania, the temporal stability of self-schema structure is largely unknown. This is

particularly important to investigate within the context of mania, since previous research on bipolar disorder suggests that it may be associated with an unstable view of self (e.g., highly fluctuating levels of self-esteem; Bentall et al., 2011; Knowles et al., 2007; van der Gucht et al., 2009).

Finally, since Study 1 represents a preliminary investigation of self-schema characteristics, it would be important to examine whether these results can be replicated and do not simply reflect spurious findings. Since the effect sizes associated with many of the major findings are quite small, this adds to the need for replication in order to consider the meaningfulness of results.

Chapter 3

Study 2: A Longitudinal Examination

Study 2 provides a longitudinal examination of the various potential relationships between manic risk, self-schema constructs (content and structure) and life events across four separate time-points, each two-weeks apart. The four different time-points of Study 2 allows for a temporal examination of a range of potential effects concerning mania risk, the self-schema, life events, and mood symptomatology. In particular, Study 2 provides an initial empirical examination of a cognitive vulnerability-stress process that can be modeled and evaluated. As such, this longitudinal component of Study 2 directly addresses the third and fourth research questions of this dissertation, namely, to assess how the self-schema may predict changes in manic symptomatology over time, and how aspects of self-schema content and structure may interact with life events to differentially influence symptoms among individuals at varying levels of mania risk. In addition, the cross-sectional components of Study 2 provide an opportunity for a replication test of the main findings of Study 1, but with a different sample. This cross-sectional replication addresses the sixth research question of this dissertation.

Study 2 used a high-risk design to more sensitively examine the above research questions. This approach involved oversampling from individuals showing high levels of temperamental vulnerability for mania (i.e., high HPS scores), to increase statistical power and promote comparison among individuals at different levels of mania risk. In addition, mood symptoms and life events were measured at multiple time-points and were considered in relation to the cognitive constructs.

Research Question 3: Do self-schema components show utility in predicting the course of mood symptoms?

Study 2 further addresses this research question by testing self-schema components as robust predictors of the course of manic symptoms. Within a longitudinal design, this is possible by

assessing whether aspects of self-schema content and structure predicted future increases in manic symptoms. A paucity of research has utilized longitudinal or prospective designs to examine psychological vulnerability mechanisms in mania, which is the 'gold standard' approach. Moreover, no known investigations have examined the potential role of self-schema organization in predicting future manic symptoms. Assessing the predictive utility of self-schema components is important for gauging their potential as vulnerability factors and for addressing methodological limitations. Regarding the latter, if self-schema components predicted prospective increases in manic symptoms, this would seriously challenge methodological concerns that self-schema findings can be solely explained by concurrent manic symptomatology.

Hypotheses. It was hypothesized that self-schema structure would robustly predict the course of manic symptoms. This hypothesis was informed by research on depression, which has established that self-schema organization is an enduring vulnerability factor, as well as a stronger predictor of future mood episodes compared to self-schema content (Dozois, 2007). In the case of mania, it was anticipated that positive self-schema structure, rather than negative, would be prospectively associated with future manic symptoms. To a lesser extent, it was predicted that self-schema content may also predict future changes in manic symptoms.

Temporal Stability of Schema Structure. A secondary research question of Study 2 concerns the temporal stability of self-schema structure in mania. The longitudinal design of this study also allows for a preliminary investigation of this question. Phenomenological characteristics of bipolar disorder (e.g., fluctuations in mood and self-esteem) suggest that the organization of self-beliefs may be prone to change, despite general assumptions that self-schema structure is a relatively stable feature. For instance, findings concerning the temporal stability of self-esteem provide indirect evidence concerning the organization of an individual's self-referent beliefs. In particular, research has demonstrated that mania is associated with high fluctuations in self-esteem, which are apparent

outside of mood episodes (Bentall et al., 2011; Knowles et al., 2007; van der Gucht et al., 2009). Thus, it was hypothesized that participants at a high risk for mania would show some change in the organization of self-schema content across time, in addition to unstable self-esteem levels, relative to individuals at lower levels of risk. This longitudinal component of the research also permits examination of the interplay between self-schema structure and self-esteem levels over time.

Research Question 4: Do self-schema components interact with congruent life events to predict the course of mood symptoms among those at high risk for mania?

As reviewed in the General Introduction, prior studies have begun to examine life events that may trigger manic symptoms. In particular, research has pointed to the role of achievement and goal-striving events in the course of manic symptoms (e.g., Johnson et al., 2008; Nusslock et al., 2007). Consistent with a reward sensitivity model of mania (see Johnson et al., 2012), a subset of events has also been conceptualized as BAS-Activating (Urošević et al., 2010).

Recall that very limited research has considered the potential interaction between cognitive vulnerability factors and life events in relation to mania. Thus, a major focus of Study 2 is to address this consideration, in keeping with a cognitive vulnerability model of mania. Moreover, in light of the current operationalization of mania risk, it is also important to examine whether these patterns operate differently among those at varying levels of mania risk.

Hypotheses. Given past research and Study 1 findings, a broad hypothesis of Study 2 was that positive life events would interact with positive self-schema components to predict future manic symptoms, specifically among those at heightened risk for mania. Thus, it was predicted that a three-way interaction between self-schema constructs, life events, and mania risk would be observed. It was again anticipated in Study 2 that self-schema structure would be a robust predictor showing these associations. As such, a core hypothesis was that highly interconnected, positive self-schema content would correspond with future increases in manic symptoms when activated by positive life

events, and among those at high risk for mania, in particular. Regarding the specific nature of positive events, it was predicted that goal attainment and BAS-Activating events would be the strongest predictors of future manic symptoms. Conversely, it was not anticipated that negative life events would trigger manic symptoms in conjunction with positive schema components.

Research Question 5: Can major findings regarding self-schema components and their relation to mania show replication?

Study 2 also begins to address the final research question of this dissertation by considering whether the cross-sectional results from Study 1 could be replicated in a similar sample. Thus, it was anticipated that the major findings of Study 2 would show replication, whereby both self-schema content and structure would predict concurrent manic symptoms, after accounting for the influence of recent mood symptoms. In addition, it was also hypothesized in Study 2 that self-schema constructs would similarly clarify the nature of pathways towards mood symptoms in mania by showing a mediating role in certain maladaptive pathways; and then showing a moderating role for self-schema content conceptualized as protective factors (i.e., Harmonious Passion and adaptive beliefs about success).

Study 2 – Method

Participants

The Amazon Mechanical Turk (MTurk) program was again utilized to recruit participants. Similar to Study 1, only individuals from predominantly English-speaking countries were permitted to sign-up for Study 2. Likewise, only individuals with an MTurk approval rating of 95% or above were able to complete the task.

A total of 996 participants (567 females, 429 males) completed Time 1 of this longitudinal study. Of the participants who completed Time 1, only 180 participants were invited to return for Times 2, 3, and 4, occurring 2, 4, or 6 weeks later, respectively. The goal was to identify a large number of high-scorers on the HPS at Time 1 and to retain these participants within the longitudinal sample, since high scores (HPS $\geq$ 33) are typically infrequent within the general population. Thus, an equal proportion of participants at different levels of the HPS (i.e., high risk: HPS $\geq$ 33, moderate risk: 32 $\leq$ HPS $\geq$ 21, and low risk: HPS $\leq$ 20) were randomly selected from the pool of Time 1 participants and invited to complete the remaining study sessions. A summary of the sample demographics can be found in Table 2.1. There were no notable demographic differences between the initial and retained sample.

Overall, a total of 139 participants (75 females, 64 males) completed Time 2, 137 participants (72 females, 65 males) completed Time 3, and 126 participants (63 females, 63 males) completed Time 4. Of those participants who completed Time 2-4, only 15% fell within the high risk group (26 participants). As such, fewer than anticipated 'high risk' participants completed the entire study. Participants were compensated $0.50, $1.50, $2.00, and $2.00 for completing Times 1, 2, 3, and 4, respectively.

Careful responding questions were used in a similar manner as Study 1 to assess the attention of participants completing the study. One or two careful responding questions were interspersed

Table 2.1

Demographic Characteristics of Sample across the Longitudinal Study

	Time 1	Time 2	Time 3	Time 4
Age	11% (18-24 yrs) 38% (25-34 yrs) 25% (35-44 yrs) 12% (45-54 yrs) 14% (55-74 yrs)	8% (18-24 yrs) 42% (25-34 yrs) 25% (35-44 yrs) 10% (45-54 yrs) 15% (55-74 yrs)	6% (18-24 yrs) 44% (25-34 yrs) 24% (35-44 yrs) 10% (45-54 yrs) 16% (55-74 yrs)	10% (18-24 yrs) 42% (25-34 yrs) 24% (35-44 yrs) 9% (45-54 yrs) 15% (55-74 yrs)
Ethnicity	74% (White) 10% (Black) 5% (Hispanic) 8% (Asian) 3% (Other)	75% (White) 7% (Black) 7% (Hispanic) 7% (Asian) 4% (Other)	76% (White) 7% (Black) 6% (Hispanic) 7% (Asian) 4% (Other)	75% (White) 8% (Black) 6% (Hispanic) 7% (Asian) 4% (Other)
Country	98.5% (US) 1% (Canada) 0.5% (Australia)	100% (US)	100% (US)	100% (US)
Education	0.5% (HS) 8% (HS diploma) 4% (Voc. training) 19% (College) 68.5% (College degree)	1% (HS) 12% (HS diploma) 6% (Voc. training) 17% (College) 64% (College degree)	1% (HS) 13% (HS diploma) 5% (Voc. training) 15% (College) 66% (College degree)	12% (HS diploma) 4% (Voc. training) 16% (College) 68% (College degree)
Mental Health History	24% dx 6.5% multiple dx 20% current dx 20% family history of BD	27% dx 10% multiple dx 23% current dx 25% family history of BD	27% dx 10% multiple dx 23% current dx 24% family history of BD	25% dx 10% multiple dx 22% current dx 24% family history of BD

Notes. All demographic information was self-reported. Yrs = years; US = United States; HS = some high school completed; HS diploma = high school diploma; voc. training = trade/technical/vocational training; college = some college completed; dx = past self-reported diagnosis of mental disorder; current dx = current self-reported diagnosis of mental disorder; family history of BD = self-reported family history of bipolar disorder.

within the questionnaires for each time-point, depending on the length of the study session. If participants answered one or more of these questions incorrectly, they were not invited to complete Time 2-4, and their results were excluded from study analyses (n = 3).

Materials

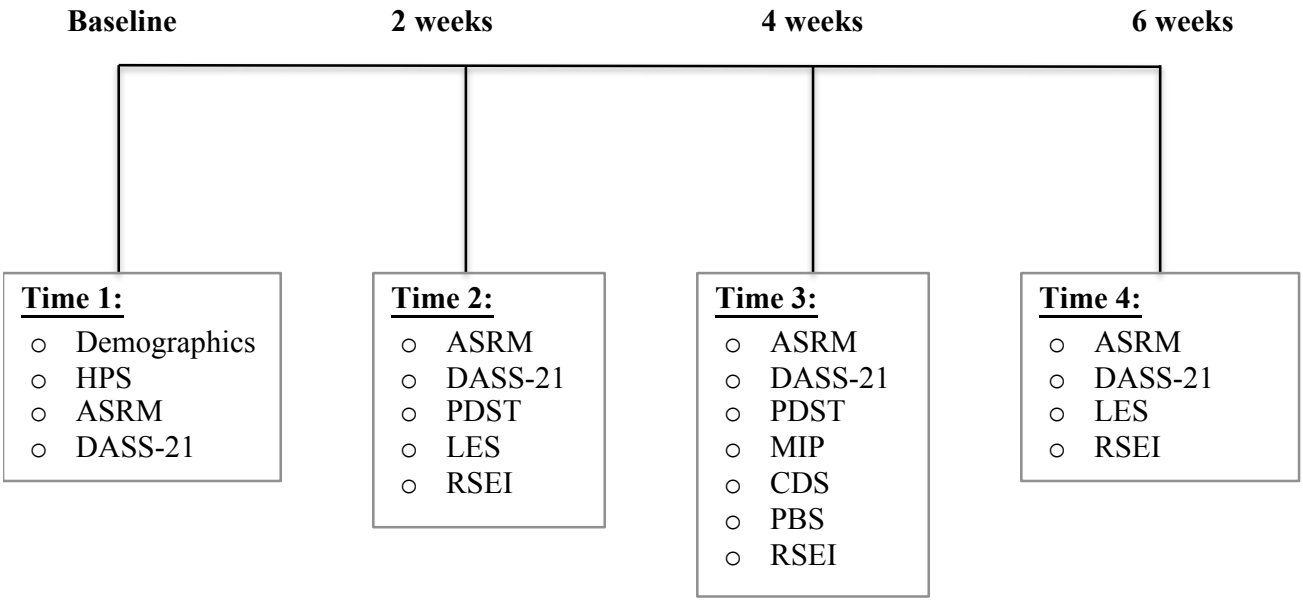
A summary of the materials and the timing of their administration in Study 2 is shown in Figure 2.1. The 6-week longitudinal period was chosen primarily because the life events measure included in this study probed for events occurring over the previous four weeks (see below for further details of this measure). Thus, four weeks was the minimum required length for the study period, in order to assess change in mood symptoms as a function of life events reported by participants. However, given the overall objectives of this study, a 6-week time period was chosen. Here, participants were asked to complete one study session every two weeks, for a total of four sessions. This two-week interval between time-points was intended to provide sufficient opportunity to observe the incidence of mood symptoms among participants.

Risk for Mania. *Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986)*. The HPS has been described previously. Cut-off scores used to delineate high (HPS ≥ 33) and low (HPS ≤ 21) mania risk have been well validated by previous research (Eckblad & Chapman, 1986; Kwapil et al., 2000). In particular, a number of studies suggest that cases of high-risk scorers generalize to clinical samples of diagnosed bipolar disorder (e.g., Kwapil et al., 2000; Merikangas et al., 2007). The current study did not exclude participants who fell between these cut-offs (32 ≤ HPS ≥ 21) and ostensibly fit within a 'moderate risk' category, in order to permit examination of a wide range of effects. Similar to Study 1, the HPS was utilized as a continuous measure of mania risk within statistical analyses. The HPS was administered only during Time 1 of this study.

Current Mood Symptoms. *Altman Self-Rating Mania Scale (ASRM; Altman et al., 1997)*. The ASRM has also been described previously in Study 1. This scale was administered at each of the four

Figure 2.1

Schematic Representation of Timeline and Design of Study



Notes. HPS = Hypomanic Personality Scale; ASRM = Altman Self-Rating Mania Scale; DASS-21 = Depression, Anxiety, and Stress Scales-21, Depression subscale; LES = Life Events Survey; RSEI = Rosenberg Self-Esteem Inventory; CDS = Cognitive Distortions Scale; PBS = Positive Belief Statements Scale.

time-points of the present study to probe the presence of manic symptoms over the previous week.

Depression subscale of the Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 Depression subscale, described previously in Study 1, was also administered at each of the four time-points of Study 2 to assess participants' level of depressive symptoms over the previous week. See Study 1 for more detailed information about this scale.

Self-Schema Structure. *Psychological Distance Scaling Task (PDST; Dozois & Dobson, 2001b).* The PDST was once again employed as a measure of self-schema structure in the current study. Participants were asked to complete this task at two time-points (i.e., Time 2 and Time 3), in order to examine reliability of self-schema structure measurement, in addition to investigating other relations of interest. Further information about the PDST is provided in Study 1.

Self-Schema Content. *Belief Statements Questionnaire – Fulfillment subscale* (Hillson, 1997). This subscale of the Beliefs Statements Questionnaire was administered to participants during Time 3 of the present study to assess for the presence of adaptive beliefs related to achievement. For further information about this measure, see Study 1.

Cognitive Distortions Scale (CDS; Covin, Dozois, Ogniewicz, & Seeds, 2011). Similar to Study 1, the CDS was utilized in the present study to examine cognitive distortions among individuals at different levels of mania risk. More detailed information about this measure can be found in Study 1.

Life Events. *Life Events Scale (LES; Alloy & Clements, 1992; Needles & Abramson, 1990).* The Life Events Scale is a self-report measure that has been used in previous research to examine life events that are highly relevant to mania. An expanded version of this scale was employed in the present research, similar to the approach taken by previous researchers (e.g., Bender et al., 2010).

This version of the LES was used because it contains a longer, 193-item form that probes for various kinds of life events that are not exclusive to negative or 'stressful' events. This is important,

given previous findings implicating certain positive life events (i.e., achievement, BAS-activating events) in the course of manic symptoms. In the current study, the LES probed for events occurring over the previous 4 weeks. As seen in Figure 2.1, this scale was administered at Times 2 and 4 in order to assess the relation between life events and mood symptoms (at Time 2), as well as life events and change in mood symptoms (i.e., change in symptoms from Time 2 to Time 4, based on life events reported at Time 4).

The LES's 193 items probe for events occurring in a number of different life domains (e.g., education, employment, finances, housing, caretaking, family, interpersonal/romantic relationships). The specified events vary along a number of dimensions, including valence (i.e., positive, negative) and content (e.g., achievement, interpersonal). A number of events were also intended to correspond with BAS Activation (e.g., *Positive evaluation of work performance by someone other than a family member or a friend [e.g., yearly review, concert review in newspaper, etc*.]), BAS Deactivation (e.g., *Betrayed by boyfriend/ girlfriend/ spouse [e.g., lied to; cheated; important promise broken]*), and Goal Attainment (e.g., *Finished an important project, task, or venture that is related to school, work, hobby, etc.*). Previous research has validated these categories using *a priori* team ratings, which have been associated with good interrater agreement. In particular, the consistencies among three independent raters were as follows: $\alpha = .79$ for BAS Activation, $\alpha = .94$ for BAS Deactivation, and $\alpha = .91$ for Goal Attainment (Urošević, et al., 2011). Likewise, rating schemes have also been developed and validated to address the objective impact of events. Based on the consensus of independent raters, Objective Impact Ratings (OIRs) have been developed for each life event along a 4-point scale, ranging from *0(no or slight impact*) to *4(extreme impact)* (Bender et al., 2010).

At the beginning of the LES questionnaire, general instructions ask participants to indicate whether the specified events occurred over the past 4 weeks, regardless of how they "*responded to, coped with, or felt after an event or situation",* and whether or not they consider the event or

situation "*important".* Specifically, participants are asked to select *No, did not occur* or *Yes, did occur* for each life event presented (e.g., *Kicked out of school; Received an "A" on an exam or major project in an important class; Put off major current life goal due to lack of money e.g., going to school; moving out of parents' house; etc.; Began relationship with new boyfriend/girlfriend/spouse).* If participants selected *Yes, did occur* for a given event, they were then asked to indicate the number of occurrences of the event.

The LES has demonstrated good reliability and validity (e.g., Alloy, Reilly-Harrington, et al., 1999; Francis-Raniere et al., 2006, Safford et al., 2007). The gold-standard for administering this tool to index and contextualize life events is to use an accompanying interview (Francis-Raniere et al., 2006). Since this was an initial examination of life events as they pertain to mania and self-schema constructs, and high levels of recruitment were prioritized given the low base rate of high HPS scorers, only the self-report measure was used in this dissertation as a measure of life events.

Self-Esteem Variability. *Rosenberg Self-Esteem Inventory (RSEI; Rosenberg, 1965).* The RSEI was administered to participants at Times 2 to 4 to examine self-esteem stability over time. This self-report instrument consists of 10 items (e.g., *I am able to do things as well as most other people*, *All in all, I am inclined to feel that I am a failure*). For each item, participants were asked to rate the statement using a 4-point Likert scale, from *Strongly Agree* to *Strongly Disagree*. In a daily diary version that has been used in previous research (e.g., Knowles et al., 2007), this scale prompts respondents to consider their momentary self-esteem judgments (i.e., think of whether the statement applies to them "*as of right now*").

The RSEI is a widely used measure of self-esteem in psychological research studies. The English version of this scale, as well as a number of its translations, have been associated with good internal consistency and test-retest reliability (e.g., Martín-Albo et al., 2007; Sinclair et al., 2010). In addition, the convergent validity of this measure is supported by numerous studies examining

relationships between the RSEI and well-being indicators. For example, the RSEI has shown negative relationships with constructs such as depression and perceived stress, and positive relationships with life satisfaction and optimism (Robins, Hendin, & Trzesniewski, 2001).

Mood Induction Procedure (MIP). The positive MIP (Tharp et al., 2016) that was utilized in Study 1 was also employed in the present study. Since it was initially hypothesized that a positive mood state would be necessary to activate mania-relevant cognitions, participants engaged in this guided imagination task prior to completing measures of schema content. For more detailed information about this task, please refer to Study 1 and Appendix B.

Procedure

Ethics approval for the study was granted prior to participant enrolment (see Appendix C). MTurk users were able to view an advertisement and proceed to the study website if they met the inclusion criteria. The Letter of Information contained details about the four study phases and informed participants that they may or may not be asked to continue with the entire longitudinal study. For each of the four time-points, participants were presented with an introductory video similar to Study 1, in which the experimenter introduced herself and provided a brief description of the activities for that phase. Participants were then directed to the relevant questionnaires and tasks, which were presented in randomized order. The only exception was during Time 3, when the CDS and PBS were always presented in the same sequential order following the MIP. The rationale for this consistent ordering was described previously for Study 1. Finally, at the end of each study session, participants were directed to a debriefing page with information about the project and when they might be contacted about future study phases.

Study 2 – Results and Discussion

The descriptive statistics (sample size, means, standard deviations, Cronbach's alphas) for the major measures of Study 2 can be found in Appendix F, for each of the 4 time-points of the study. Similar to Study 1, the present findings are consistent with values reported in previous research, with the Study 2 measures also displaying good psychometric properties.

Replication Findings for Relations between Mania and Self-Schema Content and Structure

Overall, the results for the present study were consistent with Study 1 findings indicating that significant relations exist between mania risk and self-schema components. The details of these analyses are summarized in Table 2.2.

Structure. As shown in Table 2.2, block regression findings were replicated in Study 2 for self-schema structure, suggesting that high mania risk corresponded with tightly organized, positive self-schema content, even after controlling for recent mood symptoms. Significant effects were observed in Study 2 for overall positive structure and achievement structure. However, these results for positive interpersonal structure were non-significant in the present study.

In addition, mania risk did not add to the prediction of negative self-schema structure. This is consistent with the results of Study 1, in which there was only a non-significant trend ($p = .06$) associated with the HPS as a predictor of negative interpersonal structure. Of note, however, in Study 2 there was a significant bivariate correlation between mania risk and negative achievement structure, $r = -.24$, $p = .02$. The direction of this relation is consistent with the non-significant trend observed in Study 1, in which high mania risk corresponded with highly interconnected negative content.

Content. For the self-schema content measures included in the present study (i.e., CDS, PBS), no significant effects of mania risk were observed within the block regression analyses (see Table 2.2). This is somewhat inconsistent with Study 1 results, where a small, significant contribution of the HPS was documented for self-schema cognitive distortions within the

Table 2.2

Study 2 Replication of Regression Results for Self-Schema Constructs of Structure and Content

Self-Schema Construct	Block 1	Block 2 Change	Block 3 Change	Overall Model and Predictors
Overall Positive Structure	$F = 21.47$*** $R^2 = .14$	F-change = 6.19* R^2 change = .04	F-change = 7.0** R^2 change = .05	$F = 12.27$*** $R^2 = .22$ Depression (.43)*** Mania (-.15)+ Mania Risk (-.23)**
Positive Achievement Structure	$F = 21.45$*** $R^2 = .14$	F-change = 4.86* R^2 change = .03	F-change = 7.94** R^2 change = .05	$F = 12.12$*** $R^2 = .22$ Depression (.44)*** Mania (-.09) Mania Risk (-.25)**
Positive Interpersonal Structure	$F = 12.35$** $R^2 = .09$	F-change = 5.29* R^2 change = .04	F-change = 2.82 R^2 change = .02	$F = 7.04$** $R^2 = .18$ Depression (.33)*** Mania (-.14) Mania Risk (-.16)$^+$
Overall Negative Structure	$F = 39.63$*** $R^2 = .32$	F-change = 1.12 R^2 change = .01	F-change = 0.20 R^2 change = .00	$F = 13.54$*** $R^2 = .33$ Depression (-.59)*** Mania (-.11) Mania Risk (.04)
Negative Achievement Structure	$F = 48.33$*** $R^2 = .33$	F-change = 1.33 R^2 change = .01	F-change = 0.06 R^2 change = .00	$F = 16.58$ $R^2 = .18$ Depression (-.60)*** Mania (-.10) Mania Risk (.02)
Negative Interpersonal Structure	$F = 21.43$*** $R^2 = .17$	F-change = 0.80 R^2 change = .01	F-change = 0.20 R^2 change = .00	$F = 7.41$ $R^2 = .17$ Depression (-.44)*** Mania (-.09) Mania Risk (.09)

Cognitive Distortions – Achievement	F = 22.58*** R^2 = .17	F-change = 5.34* R^2 change = .04	F-change = 2.48 R^2 change = .02	F = 10.55** R^2 = .23 Depression (.37)*** Mania (.18)* Mania Risk (.14)
Cognitive Distortions – Interpersonal	F = 31.01*** R^2 = .22	F-change = 4.24* R^2 change = .04	F-change = 1.34 R^2 change = .01	F = 12.54*** R^2 = .26 Depression (.44)*** Mania (.15)+ Mania Risk (.10)
Self-Referent Adaptive Beliefs - Achievement	F = 55.10*** R^2 = .33	F-change = 0.01 R^2 change = .00	F-change = 1.18 R^2 change = .01	F = 18.62*** R^2 = .35 Depression (-.61)*** Mania (-.02) Mania Risk (.09)

Notes. Values in parentheses represent corresponding standardized regression coefficients. Depressive and manic symptoms were entered in Block 1 and 2, respectively. To control for the role of concurrent mood symptoms in Block 1 and 2, Time 2 depressive/manic symptoms were entered as predictors for self-schema structure regression analyses, and Time 3 depressive/manic symptoms were predictors for self-schema content analyses (corresponding to the time-points when these schema constructs were measured during the study). Mania risk (i.e., Hypomanic Personality Scale) was entered in Block 3 of the regression equations.
N = 132-136. +p < .10, *p < .05, **p < .01, ***p < .001.

interpersonal domain. In the current study, this result trended towards significance (p = .07). However, significant bivariate correlations in Study 2 indicated that heightened risk for mania corresponded with greater endorsement of self-schema cognitive distortions within both the achievement (r = .29, p = .001) and interpersonal (r = .23, p = .01) domains, consistent with the results of Study 1. Finally, neither mania risk nor manic symptoms in Study 2 predicted adaptive beliefs about achievement, as in the previous study.

Role of Mood Symptoms. Depressive symptoms in Study 2 again corresponded with poor consolidation of positive self-schema content as well as highly consolidated negative self-schema content. Higher levels of depressive symptoms were also associated with more cognitive distortions in achievement and interpersonal contexts (see Table 2.2). Likewise, manic symptoms in Study 2 also corresponded with schema constructs in the expected manner (i.e., greater connectivity regarding positive self-schema structure and higher levels of cognitive distortions). Similar to Study 1, manic symptoms often contributed to the prediction of schema constructs in Block 2, and occasionally lost significance as a predictor, once mania risk was added in Block 3.

Self-Schema Structure and the Prediction of Future Increases in Manic Symptoms

The impetus for a longitudinal component in the current study was to examine temporal relations between the self-schema constructs (structure and content) and mood symptomatology. As such, hierarchical regression analyses were conducted to investigate whether positive self-schema structure, in particular, was predictive of future increases in manic symptoms. Block 1 controlled for previous manic symptoms, and positive self-schema structure components were entered as predictors in Block 2 of individual regression equations. Since self-schema structure was initially assessed at Time 2, Time 2 manic symptoms were entered in Block 1 and the three positive PDST scores from Time 2 were entered in Block 2 of individual regressions predicting Time 3 or Time 4 manic symptoms. A summary of these analyses is presented in Table 2.3.

Table 2.3

Study 2 Regression Findings for Self-Schema Structure Predicting Future Increases in Manic Symptoms

Schema Construct	Time 3		Time 4	
	Block 1	Block 2	Block 1	Block 2
Overall Positive Structure	F = 59.78*** R^2 = .34 ASRM2 (.59)***	F-change = 2.21 R^2 change = .01 ASRM2 (.52)*** PDST-P (-.12)	F = 62.71*** R^2 = .38 ASRM2 (.63)***	F-change = 3.51+ R^2 change = .02 ASRM2 (.60)*** **PDST-P (-0.16)***
Positive Achievement Structure		F-change = 0.60 R^2 change = .00 ASRM2 (.57)*** PDST-A (-.06)		F-change = 1.56 R^2 change = .01 ASRM2 (.61)*** PDST-A (-.10)
Positive Interpersonal Structure		F-change = 6.90* R^2 change = .03 ASRM2 (0.55)*** **PDST-I (-0.18)***		F-change = 5.70** R^2 change = .04 ASRM2 (.59)*** **PDST-I (-.20)****

Notes. ASRM2 = Altman Self-Rating Mania Scale, Time 2 Symptoms; PDST = Psychological Distance Scaling Task, PDST-P = Overall Positive Structure, PDST-A = Achievement Structure, PDST-I = Interpersonal Structure. Time 3 and Time 4 manic symptoms were the dependent variables in regression equations for Time 2 – Time 3 and Time 2 – Time 4 change in symptoms, respectively. * = $p < .05$, ** $p < .01$, *** = $p < .001$.

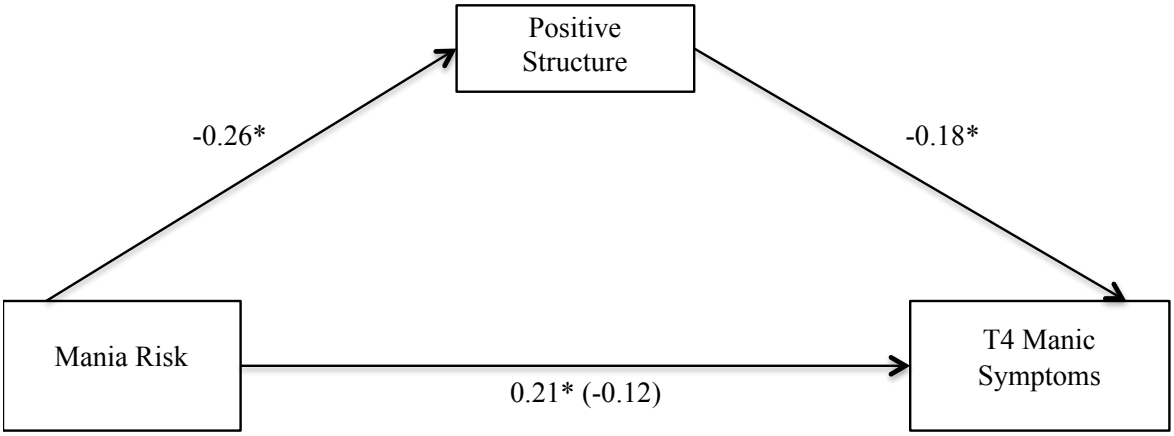
The findings in Table 2.3 indicate that overall positive and positive interpersonal self-schema structure contributed to the prediction of future manic symptoms in the expected direction. Specifically, higher connectivity of positive self-beliefs predicted increases in manic symptoms at both Time 3 and Time 4 for positive interpersonal structure. However, overall positive self-schema structure only predicted increases in manic symptoms at Time 4, whereas positive achievement structure was not a significant predictor for either Time 3 or 4. When taken together, these longitudinal results of Study 2 support the potential role of positive self-schema structure in contributing to the course of manic symptoms. In turn, this pattern of findings challenges a methodological concern that any self-schema differences among those at high mania risk may solely reflect current manic symptomatology.

Mediating Role of Self-Schema Components. The longitudinal component of the current study also replicates and extends the Study 1 cross-sectional results concerning the mediating role of self-schema components within maladaptive pathways. In particular, overall positive self-schema structure in the current study fully mediated the relation between mania risk and future (i.e., Time 4) manic symptoms. These longitudinal mediation results are displayed in Figure 2.2a. Similar to Study 1, higher HPS scores in Study 2 led to greater connectivity of positive content (measured at Time 2), which, in turn, led to higher levels of Time 4 manic symptoms. To control for previous levels of manic symptoms within this model, Time 2 manic symptoms were entered as a covariate ($\beta = .61$, $p < .001$). Of note, the mediation model was not significant for the prediction of Time 3 manic symptoms (CI = -.0188 to .0595).

Moreover, cognitive distortions again mediated the relation between mania risk and depression, but in the current study this was also shown for future depressive symptoms. As displayed in Figure 2.2b, high mania risk predicted greater cognitive distortions in the interpersonal domain (measured at Time 3), which, in turn, predicted higher levels of Time 4 depressive symptoms

Figure 2.2a

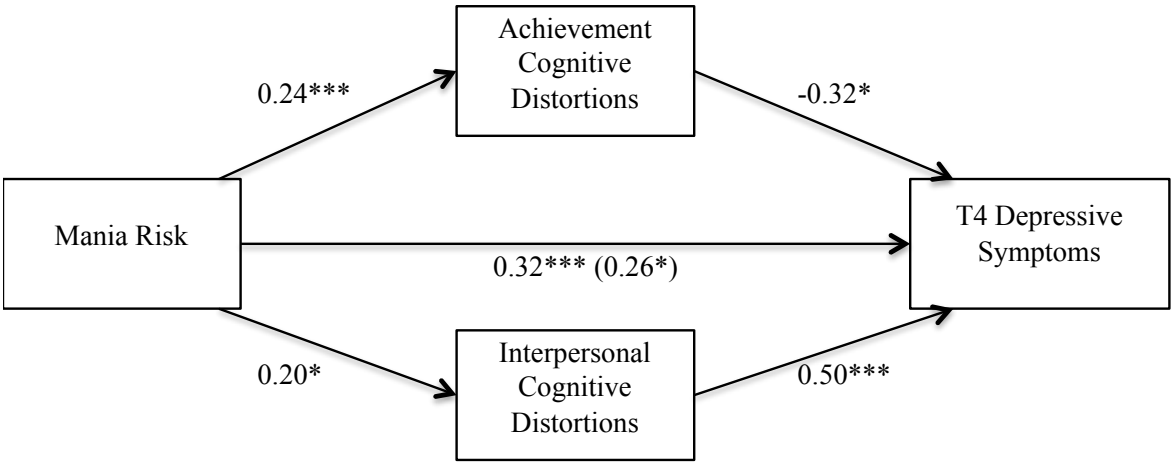
Longitudinal Mediation Results for Manic Symptoms



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effect for Overall Positive Structure was $\beta = .05$*. *$p < .05$

Figure 2.2b

Longitudinal Mediation Results for Depressive Symptoms



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Achievement Cognitive Distortions, $\beta = -.08$; Interpersonal Cognitive Distortions, $\beta = .10$*; Total indirect effect, $\beta = .02$. *$p < .05$, ***$p < .001$

(when controlling for previous levels of depressive symptoms at Time 3, $\beta = .68$, $p < .001$). This pattern resembled Study 1 findings. However, contrary to the results of Study 1, the indirect effect for achievement cognitive distortions was not significant within this multiple mediation model (CI = -.2044 to .0008). In addition, Study 1 results indicated that cognitive distortions (in both domains) fully mediated pathways from mania risk to depressive symptoms, whereas the current results were consistent with a partial mediation effect. Overall, these longitudinal findings provide more robust support compared to the Study 1 cross-sectional results, concerning the theorized meditational models advanced in the present dissertation.

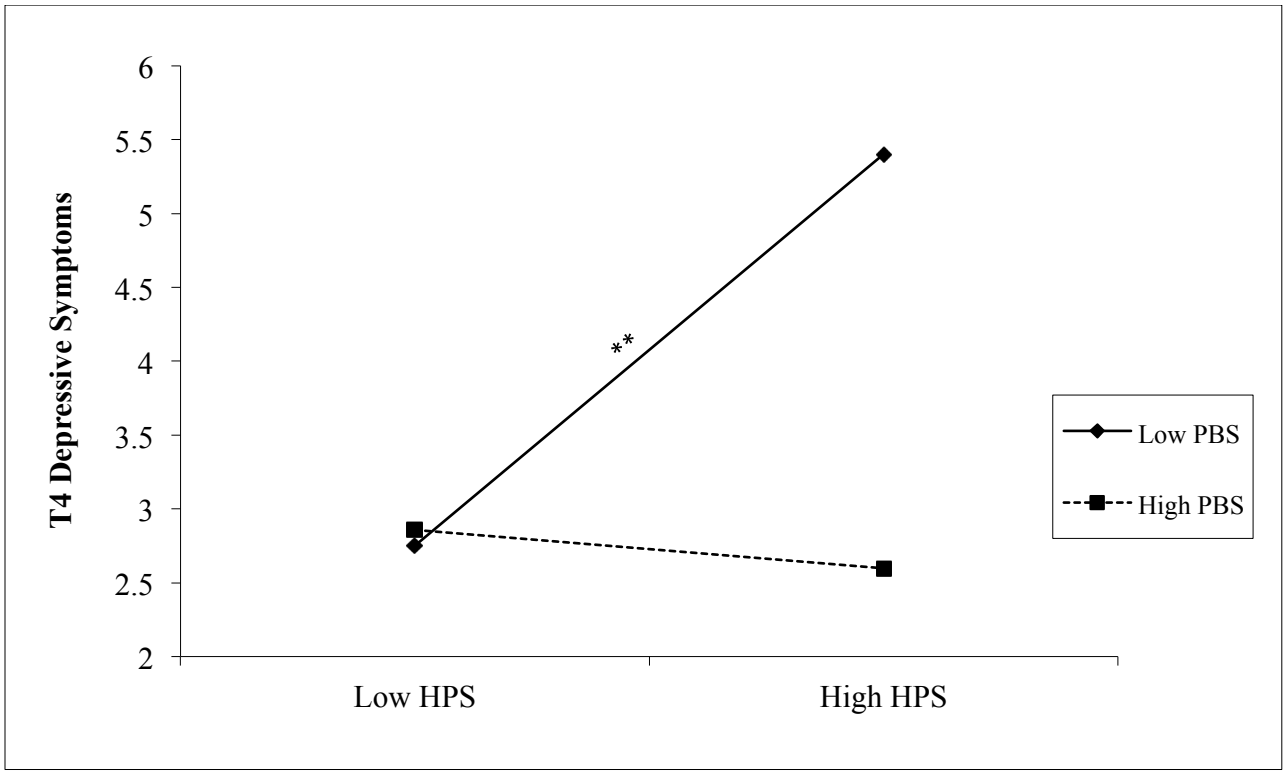
Moderating Role of Adaptive Self-Schema Content. In the current study, recall that only the PBS was included as a measure of adaptive self-schema content. Thus, Study 2 permitted an examination of the PBS as a potential protective factor concerning future mood symptoms. Similar to Study 1, the PBS did not significantly moderate between the HPS and manic symptoms, but in this instance for future manic symptoms measured at Time 4, $\beta = .03$, $t = 0.69$, $p = .79$. However, in the present investigation, the PBS (measured at Time 3) was a significant moderator between mania risk and future depressive symptoms at Time 4, when controlling for previous (Time 3) depressive symptoms, $\beta = -.19$, $t = -2.67$, p .01 (see Figure 2.3). There was also a significant main effect of the HPS ($\beta = .13$, $t = 2.19$, $p = .03$), but not the PBS ($\beta = -.13$, $t = -1.68$, $p = .10$), in which high levels of mania risk corresponded with high levels of depressive symptoms. Tests of simple slopes suggest that high mania risk was only associated with greater depressive symptoms among individuals who also displayed low adaptive beliefs about success, $t = 2.77$, $p = .007$. Thus, this pattern is consistent with the PBS having a protective role in the course of depressive symptoms among individuals with high temperamental vulnerability to mania.

Mania Risk and Temporal Stability of Self-Schema Structure

The longitudinal component of Study 2 also permitted examination of the temporal stability

Figure 2.3

Adaptive Self-Referent Beliefs about Success Moderate the Relation between Mania Risk and Depressive Symptoms



Notes. Analysis controlled for the influence of previous depressive symptoms (Time 3). T4 = Time 4; HPS = Hypomanic Personality Scale; PBS = Positive Beliefs Statements. $^{**}p < .01$

of self-schema structure among individuals at heightened risk for mania. For the total sample, there were moderate to strong correlations between participants' Time 2 and Time 3 PDST scores (r = .55 to .90; see Table 2.4), suggesting good overall temporal stability of self-schema structure, as measured by the PDST. This finding is consistent with previous research that has reported on the stability of self-schema structure across time (e.g., Dozois & Dobson, 2001a; Dozois, 2007).

To examine whether mania risk may be associated with reduced temporal stability of self-schema structure, difference scores were created for each PDST domain, in which absolute differences between Time 2 and Time 3 scores were calculated. Subsequently, block regression analyses were conducted to determine whether mania risk predicted difference scores, while controlling for participants' initial PDST scores. Thus, Time 2 PDST scores were entered in the first block of these regression analyses, and HPS scores were entered in the second block. As shown in Table 2.4, the HPS significantly predicted difference scores for overall positive structure, as well as positive and negative achievement structure, suggesting that heightened mania risk is modestly associated with less stable measurement of self-schema structure in these areas.

Mania Risk as a Predictor of Self-Esteem Stability

Relatedly, another supplementary hypothesis of Study 2 concerns the stability of self-esteem. Recall that limited research suggests that individuals with a history or risk of mania display more variable levels of self-esteem compared to control participants (e.g., van der Gucht et al., 2009). The results of the current study are in line with this finding. In particular, elevated HPS scores predicted high fluctuations in self-esteem. Block regression results indicated that the HPS positively predicted variance in participants' self-esteem ratings across the study period after controlling for initial self-esteem levels (β = .35, p < .001), and even after controlling for a participant's average levels of depressive and manic symptoms (β = .28, p = .004). Average levels of manic symptoms (β = .27, p = .01), but not depressive symptoms (β = .18, p = .18), also positively predicted self-esteem

Table 2.4

Temporal Reliability of PDST Domains and Relation to Mania Risk

PDST Domain	Overall Temporal Reliability	Predicting Difference Scores from Mania Risk	
		Block 1	Block 2
Overall Positive	r = .71**	F = 3.59 R^2 = .03	F-change = 5.88* R^2 change = .05
		PDST-P2 (-.18)	**HPS (.22)***
Overall Negative	r = .90**	F = 2.96 R^2 = .04	F-change = 0.01 R^2 change = .00
		PDST-N2 (.21)	HPS (-.01)
Positive Achievement	r = .75**	F = 0.08 R^2 = .00	F-change = 6.75** R^2 change = .06
		PDST-A2 (.04)	**HPS (.24)****
Positive Interpersonal	r = .62**	F = 11.48** R^2 = .09	F-change = 2.16 R^2 change = .02
		PDST-I2 (-.30)**	HPS (.13)
Negative Achievement	r = .55**	F = 7.31** R^2 = .10	F-change = 4.86* R^2 change = .06
		PDST-NA2 (.32)**	**HPS (.25)***
Negative Interpersonal	r = .63**	F = 1.80 R^2 = .02	F-change = 0.13 R^2 change = .00
		PDST-NI2 (.15)	HPS (.04)

Notes. Temporal reliability and difference scores were calculated using PDST results from Time 2 and Time 3. Block 1 controlled for a participant's initial PDST score (i.e., Time 2) for the respective structure domain. HPS = Hypomanic Personality Scale, PDST = Psychological Distance Scaling Task, PDST-A2 = Time 2 Positive Achievement Structure, PDST-I2 = Time 2 Positive Interpersonal Structure; PDST-N2 = Time 2 Negative Structure; PDST-NA2 = Time 2 Negative Achievement Structure; PDST-NI2 = Time 2 Negative Interpersonal Structure. *p < .05, **p < .01

fluctuations; however, neither predictor was significant after the HPS was entered into the block regression analysis (β = .11, p = .24 and β = .14, p = .33, respectively). Thus, overall, it appears that heightened risk for mania is associated with self-esteem instability, and this relation is robust compared to the influence of mood symptoms.

As an aside, higher HPS scores were associated with lower mean levels of self-esteem, overall (i.e., averaging Time 2 to Time 4 measurements), r = -.20, p = .02. This finding is also consistent with previous research, in which individuals with bipolar disorder have generally shown lower levels of self-esteem compared to those with no history of disorder (see Nilsson et al., 2010).

Self-Schema Structure and Self-Esteem Variability. To place the above findings related to the stability of self-schema organization within the context of self-esteem, Study 2 also examined how self-schema components assessed at the different time-points may predict momentary levels of self-esteem. These constructs showed the expected pattern, whereby higher levels of self-esteem at Time 2 were associated with Time 2 PDST scores representing highly interconnected, positive self-schema content (r =-.46, p < .001) and loosely interconnected, negative self-schema content (r = .55, p < .001). The same pattern was shown for Time 3 self-esteem levels and Time 3 Overall Positive (r = -.40, p < .001) and Negative (r = .63, p < .001) PDST scores. These findings reinforce assumptions that self-schema organization of positive and negative content bears upon one's momentary feelings of self-liking.

Life Events and Mania

A central research question addressed by this dissertation is whether self-schema components interact with life events to predict the course of mood symptoms. Recall that previous research implicates certain positive life events in the course of manic symptoms, particularly goal attainment and BAS-activating events (e.g., Johnson, 2008; Urošević et al., 2008). As summarized in Appendix F, in the present sample, simple correlations showed many of the expected, positive relationships

between positive life events (Positive, BAS-Activating, Goal Attainment) and concurrent or future manic symptoms. Conversely, the same relationships were not demonstrated among negative life events and manic symptoms. Instead, consistent with the literature, negative life events (Negative and BAS-Deactivating) shared positive relationships with concurrent/ future depressive symptoms (see Appendix G).

Manic Symptoms: Testing for Interactions with Positive Self-Schema Structure by Life Events

To comprehensively evaluate a vulnerability-stress model of mania, Study 2 examined whether self-schema components interacted with life events and mania risk to predict the course of manic symptoms. Recall that it was hypothesized that individuals with certain self-schema characteristics (e.g., tightly organized positive content) would show high prevalence of manic symptoms, when activated by positive life events and at higher levels of mania risk (indexed by the HPS).

To test these predictions, sets of three-way interaction effects were examined in the present study. Recall that life events were measured at both Time 2 and Time 4, with each time-point probing for events occurring over the prior four weeks. Thus, it was possible to examine: (i) the relation between life events (reported at Time 2) and concurrent manic symptoms (assessed at Time 2), and (ii) change in manic symptoms (between Time 2 and Time 4) as a function of the various life events (reported at Time 4). For concurrent mood symptoms, individual predictors were entered in Block 1, two-way interaction terms were entered in Block 2, and the three-way interaction was entered in Block 3 of the regression analyses. For predicting change in manic symptoms over time, Time 2 manic symptoms were entered in Block 1, individual predictors were entered in Block 2, and two-way and three-way interaction terms were entered in Blocks 3 and 4, respectively. For all analyses, Overall Positive PDST scores from Time 2 (when first assessed) were utilized as predictors for self-schema structure. All predictors were centered prior to conducting the above analyses.

Concurrent Symptoms. As summarized in Table 2.5, there were no significant three-way or two-way interactions for Time 2 life events predicting concurrent (Time 2) manic symptoms. However, there were significant main effects of the HPS, self-schema structure, and positive and goal attainment events, whereby greater mania risk, highly interconnected positive self-schema content, and greater life events corresponded with higher levels of manic symptoms reported at Time 2.

Prospective Increases in Manic Symptoms. For life events reported at Time 4 predicting change in manic symptoms between Time 2 and 4, there were no significant three-way interactions for any of the life events studied. However, there were two significant interaction effects associated with positive and goal attainment events, concerning the relation between these life events and positive self-schema structure (see Table 2.6 for details). Similar to the above results for concurrent manic symptoms, there were also main effects of life events and positive self-schema structure.

Tests of simple slopes were conducted to examine the nature of the significant two-way interaction effects. As displayed in Figure 2.4a and 2.4b, for both positive and goal events, slopes representing high interconnectivity of positive self-schema content significantly differed from zero, whereas slopes corresponding with low interconnectivity did not. Consistent with what was hypothesized, these results suggest that greater positive and goal attainment events were associated with increases in manic symptoms over time, but only among individuals with tightly organized, positive self-schema content.

Specific Domains of Self-Schema Structure. Follow-up analyses were conducted in light of these significant moderation results to examine more specific domains of positive self-schema content. As such, the above analyses for positive and goal attainment events were repeated for positive content parsed in the achievement and interpersonal domains. Results of these analyses indicated that positive achievement self-schema structure significantly interacted with both positive (β = -.18, p = .04) and goal events (β = -.19, p = .03). Conversely, the interaction terms for

Table 2.5

Moderation Results for Concurrent Manic Symptoms (Time 2): Positive Self-Schema Structure x Positive Life Events

Predictor	ΔF	ΔR^2	β	Final Model
Positive Events				
Block 1:	6.64***	.44		
HPS			.26**	(.24)**
T2 PDST-P			-.19*	(-.22)*
T2 LES-P			.19*	(.18)*
Block 2:	0.78	.02		
HPS x T2 PDST-P			.08	(.08)
HPS x T2 LES-P			-.14	(-.14)
T2 PDST-P x T2 LES-P			.01	(.02)
Block 3:	1.41	.03		
HPS x T2 PDST-P x T2 LES-P			-.01	R^2 = .39, F(7, 124) = 3.14**
BAS-Activating Events	6.24**	.13		
Block 1:			.25**	(.26)**
HPS			-.20*	(-.25)*
T2 PDST-P			-.01	(.07)
T2 LES-B				
Block 2:	0.67	.01		
HPS x T2 PDST-P			.11	(.11)
HPS x T2 LES-B			-.12	(-.11)
T2 PDST-P x T2 LES-B			.03	(.06)
Block 3:	0.03	.00		
HPS x T2 PDST-P x T2 LES-B			-.03	R^2 = .14, F(7, 124) = 2.92**
Goal Attainment Events				
Block 1:	6.78**	.14		
HPS			.25**	(-.21)*
T2 PDST-P			-.18*	(.23)**
T2 LES-G			.18*	(.18)*
Block 2:	0.58	.01		
HPS x T2 PDST-P			.08	(.11)
HPS x T2 LES-G			-.09	(-.11)
T2 PDST-P x T2 LES-G			.03	(.06)
Block 3:	0.01	.00		
HPS x T2 PDST-P x T2 LES-G			.01	R^2 = .15, F(7, 124) = 3.10**

Notes. Values in parentheses represent Block 4 regression coefficients. HPS = Hypomanic Personality Scale; T2 = Time 2; PDST-P = Psychological Distance Scaling Task, Positive Structure; LES = Life Events Scale; LES-P = Positive Events; LES- B = BAS-Activating Events; LES-G = Goal Events. *p < .05, **p < .01, ***p < .001

Table 2.6

Moderation Results for Time 2- Time 4 Change in Manic Symptoms: Positive Self-Schema Structure x Positive Life Events

Predictor	ΔF	ΔR^2	β	Final Model
Positive Events				
Block 1:	64.15***	.40		
T2 ASRM			.63***	(.55)***
Block 2:	3.29*	.06		
HPS			.09	(.04)
T2 PDST-P			-.17*	(-.27)*
T4 LES-P			.19*	(.23)*
Block 3:	1.58	.03		
HPS x T2 PDST-P			-.06	(-.08)
HPS x T4 LES-P			.03	(.06)
T2 PDST-P x T4 LES-P			-.16*	**(-.22)***
Block 4:	0.20	.00		
HPS x T2 PDST-P x T4 LES-P			.05	R^2 = .49, F(8, 117) = 10.53***
BAS-Activating Events				
Block 1:	64.15***	.40		
T2 ASRM			.67***	(.57)***
Block 2:	1.58	.03		
HPS			.04	(.05)
T2 PDST-P			-.15	(-.15)
T4 LES-B			-.05	(-.05)
Block 3:	0.05	.00		
HPS x T2 PDST-P			-.01	(-.01)
HPS x T4 LES-B			-.04	(-.30)*
T2 PDST-P x T4 LES-B			-.07	(0.21)+
Block 4:	0.10	.00		
HPS x T2 PDST-P x T4 LES-P			.06	R^2 = .43, F(8, 117) = 8.44***
Goal Attainment Events				
Block 1:	64.15***	.39		
T2 ASRM			.63***	(.56)***
Block 2:	3.14*	.06		
HPS			.09	(.08)
T2 PDST-P			-.16*	(-.32)*
T4 LES-G			.18*	(.22)*
Block 3:	2.06	.04		
HPS x T2 PDST-P			.04	(.11)
HPS x T4 LES-G			-.08	(-.11)
T2 PDST-P x T4 LES-G			-.30*	**(-.30)***
Block 4:	1.04	.01		
HPS x T2 PDST-P x T4 LES-G			.13	R^2 = .49, F(8, 117) = 10.96***

Notes. Values in parentheses represent Block 4 regression coefficients. ASRM = Altman Self-Rating Mania Scale; PDST-P = Psychological Distance Scaling Task, Positive Structure; LES = Life Events Scale; LES-P = Positive Events; LES- B = BAS-Activating Events; LES-G = Goal Events. *p < .05, **p < .01, ***p < .001

Figure 2.4a

Positive Self-Schema Structure Interacts with Positive Events to Predict Increases in Manic Symptoms

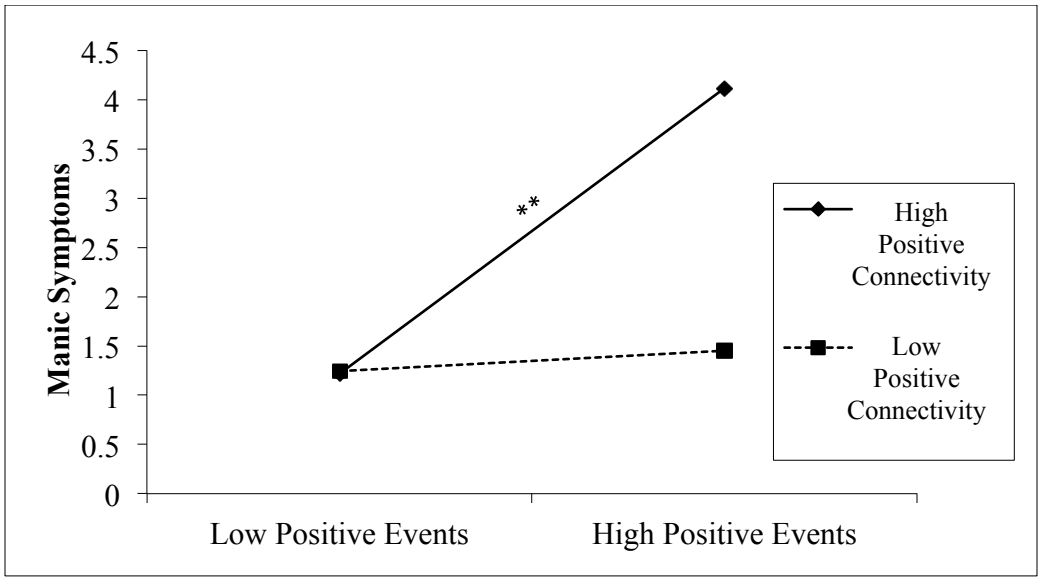
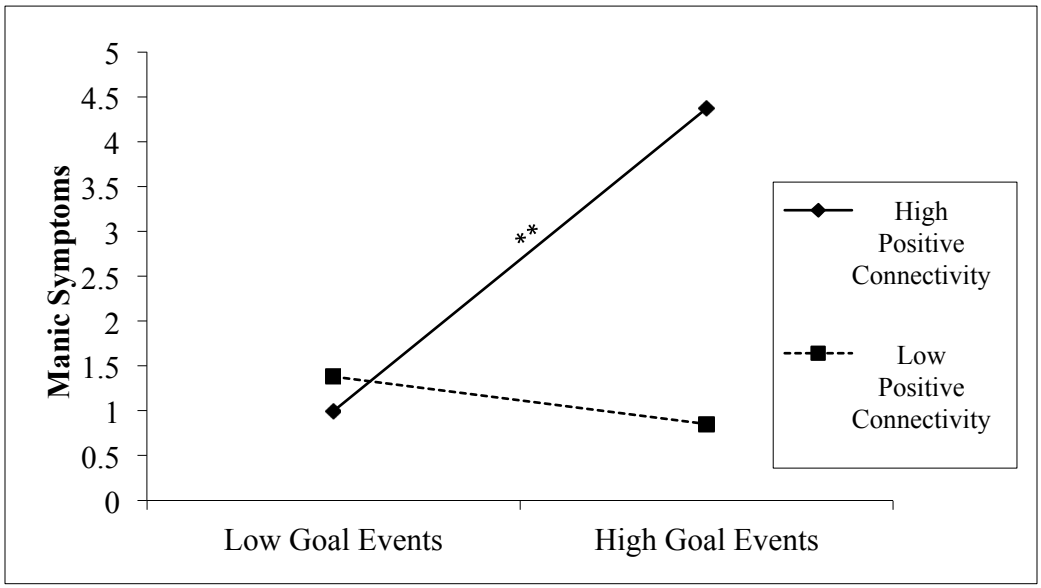


Figure 2.4b

Positive Self-Schema Structure Interacts with Goal Events to Predict Increases in Manic Symptoms



Note. $^{**}p < .01$

interpersonal structure were not significant for positive (β = -.13, p = .11) or goal events (β = -.15, p = .06). The results of simple slope tests and interpretation of the significant interaction effects for positive achievement structure were consistent with the above results for overall positive structure.

Taken together, moderation results pertaining to positive self-schema structure suggest that increases in manic symptoms may be associated with positive events (i.e., general positive and goal attainment) when positive self-schema content is also highly interconnected. Within analyses of three-way interactions, mania risk as indexed by the HPS did not have a clear moderating role regarding the impact of positive events in the course of manic symptoms. One possibility is that there was not adequate power in this study to comprehensively examine the potential impact of mania risk within the context of life events and self-schema structure, since fewer than expected 'high HPS' participants were retained in the longitudinal sample. Another consideration is that there may be considerable competition or overlap between the role of the HPS and positive self-schema structure as predictors regarding the trajectory of manic symptoms.

Moreover, it is also unclear why there was a discrepancy between concurrent versus prospective manic symptoms in the above moderation results, whereby significant two-way interactions between life events and positive self-schema structure were only found for prospective increases in manic symptoms. One possibility is that examining the relation between life events and change in manic symptoms over time served as a more rigorous examination of these constructs, which may have resulted in greater precision and statistical power.

Summary of Major Findings

Study 2 replicated and extended major findings from Study 1 concerning aspects of self-schema structure and content associated with mania. In the present study, positive self-schema structure again shared important relations with mania constructs. Longitudinal results also provided preliminary support for self-schema structure as an enduring vulnerability factor associated with

mania. Specifically, high connectivity of positive self-schema content predicted increases in manic symptoms over time. Regarding self-schema content, cognitive distortions in interpersonal/ achievement domains and adaptive beliefs about achievement also appeared relevant to the cognitive profile of mania, specifically in relation to depressive symptoms.

Notably, the longitudinal component of Study 2 permitted examination of the stability of self-schema characteristics over time. Greater mania risk was associated with less stable organization of overall positive content, as well as positive and negative content within the achievement domain, despite evidence that self-schema structure was a relatively stable characteristic within the current sample. Relatedly, high mania risk also corresponded with fluctuations in self-esteem over time, whereby self-schema structure was a strong predictor of momentary levels of self-esteem.

Study 2 also provided an initial examination of the role of self-schema structure within a cognitive vulnerability-stress framework of mania, by considering the interaction between life events and the organization of positive self-schema content. These results indicated that self-schema structure moderated the relation between life events and change in manic symptoms over time, such that positive and goal events were associated with increases in manic symptoms among individuals with tightly organized, positive self-schema content. A role of positive achievement structure, in particular, was implicated in interactions with life events.

Although it was anticipated that interactions between positive life events and self-schema constructs would only be observed at high levels of mania risk, this was not found in the current investigation. That is, three-way moderation results were not significant, suggesting that the HPS did not play a role in the interactions between life events and positive self-schema structure. Of note, the current sample was considerably smaller compared to Study 1, and sample attrition between Time 1 and future study sessions resulted in fewer than expected ‘high HPS’ individuals participating in Study 2. Thus, it would be important to further examine relations between life events and schema

components within a larger sample, to assess whether a lack of significant three-way interactions involving mania risk may be attributed, at least in part, to low statistical power in the current study.

In addition, the current study only included measures of self-schema content (i.e., CDS and PBS) that appear particularly relevant for the course of depressive symptoms, rather than manic symptoms within the context of mania risk. Thus, interactions between life events and self-schema content were not assessed in Study 2. As such, Study 3 will examine interactions between life events and self-schema content measures that have been used previously in Study 1 (i.e., dysfunctional attitudes about achievement and obsessive passion) that were hypothesized to be more important for the course of manic symptoms.

Finally, the first two studies of this dissertation were conducted with samples drawn from the same population (i.e., an online, community sample). Thus, it would be important to examine relations between mania and self-schema components within an entirely different, non-clinical sample, in order to further assess whether the previous findings may be characteristic of a non-clinical investigation of mania risk.

Chapter 4

Study 3: Replication of Main Findings with a University Student Sample

The third and final study in this dissertation focuses primarily on the sixth research question by examining whether the main findings demonstrated in the first two studies replicate when extended to a different, nonclinical sample. In doing so, the previously described set of research questions were examined in a university student sample to provide a further test of the empirical associations among mania risk, self-schema components, life events, and mood symptomatology. In this Study 3 examination of the constructs and hypotheses tested in the prior two studies, it was not expected that there would be marked differences between the main findings obtained for the previous two community samples, when compared with the current university sample.

Hypotheses. The hypotheses put forth in Study 3 derived from those advanced in Studies 1 and 2. Specifically, it was anticipated that self-schema content and self-schema structure would both predict temperamental vulnerability to mania, after controlling for the influence of mood symptoms. Once again, tightly organized, positive self-schema content was expected to correspond with mania risk. However, in light of the findings obtained in Studies 1 and 2, it was not expected that this pattern of findings for positive self-schema structure would be restricted to content within the achievement domain. It was also predicted in Study 3 that the additional self-schema content examined in Study 1 (i.e., dysfunctional attitudes about achievement and obsessive passion) would once again be positively associated with mania risk in this current study. Moreover, it was again expected that self-schema constructs in Study 3 would play a significant role in the relations between mania risk and mood symptoms. In particular, it was anticipated that self-schema components would function as significant mediators in certain maladaptive pathways. In Study 3 these include positive self-schema structure, along with self-schema content of dysfunctional attitudes and obsessive passion, as significant mediators of manic symptoms. Consistent with earlier hypotheses, it was also

predicted that a putative protective factor, namely, harmonious passion, may moderate (rather than mediate) the relation between mania risk and manic symptoms within the present investigation.

In Study 3, it was again posited that significant three-way interactions would be found concerning self-schema constructs, positive life events, and mania risk, when predicting manic symptoms. Despite some Study 2 evidence that does not support a role for the hypomanic personality (HPS) in these three-way interactions, it is suggested here that these Study 2 null findings may primarily relate to limited statistical power. This proposal is generally supported by other findings in Studies 1 and 2 that show a positive association between the HPS and manic symptoms.

Furthermore, the results of Study 2 implicate self-schema structure, in particular, interacting with life events. As such, it was predicted that positive self-schema structure in Study 3 would again interact with positive life events to predict manic symptoms, with this pattern particularly noticeable among those at high risk for mania. In addition, Study 3 examines self-schema content (i.e., DAS and Obsessive Passion) that is hypothesized to interact with mania risk and positive life events to predict manic symptoms. However, recall here that a general hypothesis of this dissertation was that self-schema structure may be more relevant to a cognitive vulnerability-stress model of mania, compared to self-schema content.

Method Study 3

Participants

Participants were students enrolled in an introductory Psychology course at The University of Western Ontario, who completed this study in exchange for course credit[1]. Five hundred and fifty-three students signed up for the study, however results from 22 participants were excluded from analyses due to incorrect answers to careful responding questions (i.e., two or more incorrect responses to seven questions). Thus, 531 students (386 females, 145 males) comprised the final sample for the current study. The vast majority of participants were aged 18 to 24 years (98%), with only 2% of participants aged 25 to 44 years. Regarding ethnicity, 48% of participants identified as White, 40% as Asian, and 12% as another ethnicity. In terms of the mental health history of participants, 11% of individuals reported a past diagnosis of mental disorder, with 4% endorsing more than one diagnosis and 9% reporting a current diagnosis. A family history of bipolar-related disorder was also reported by 6% of participants.

Materials

A list of the materials used in the current study is presented in Table 3.1. All of the measures employed in Study 3 were used in Study 1 and/or 2, and have been described in more detail in previous chapters of this dissertation.

Mania Risk. The HPS (Eckblad & Chapman, 1986) was again used in the present study as a continuous measure of temperamental risk for mania. For further details of this measure, please see Chapter 2 (Study 1).

Mood Disorder Symptoms. The ASRM and DASS were also used in Study 3 to measure

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[1] This study was originally planned as a longitudinal investigation, similar to Study 2, to promote statistical power. However, the study design was modified such that only a cross-sectional examination was completed, due to significant attrition at the second time-point of the study occurring 3 weeks later (total $n = 33$ at Time 2).

Table 3.1

Summary of Study 3 Materials

Study Measure
Hypomanic Personality Scale
Altman Self-Rating Mania Scale
DASS-21 – Depression subscale
Rosenberg Self-Esteem Inventory
Psychological Distance Scaling Task
Life Events Survey
Mood Induction Procedure
Dysfunctional Attitudes Scale
Passion Scale

Note. DASS-21 = Depression, Anxiety, and Stress Scales-21.

recent manic and depressive symptoms, respectively. Detailed information regarding these measures is also presented in Chapter 2.

Life Events. As in Study 2, the expanded version of the LES was employed to examine various life events experienced by participants. In the present study, participants were asked to consider whether any of the specified life events had occurred over the previous 3 weeks. A detailed description of the LES is provided in Chapter 3 (Study 2).

Mood Induction Procedure. The same positive MIP utilized in Study 1 and 2 was employed in the current study to promote the potential activation of self-schema content relevant to mania. This was implemented prior to understanding the impact of the MIP on the study of schema characteristics. For details, see Chapter 2 (Study 1) and Appendix B.

Self-Schema Structure. *Psychological Distance Scaling Task (PDST; Dozois & Dobson, 2001b).* The PDST was similarly employed as a measure of self-schema structure in the present study. See Chapter 2 (Study 1) for a detailed description of this task.

Self-Schema Content. The *Dysfunctional Attitudes Scale* and *Passion Scale* were again administered in the current study to examine aspects of self-schema content. Details regarding each of these measures can be found in Chapter 2 (Study 1).

Procedure

Ethics approval was obtained prior to participant recruitment (see Appendix H). Once they had viewed the advertisement, students could sign-up for the study and complete the study session online. After being directed to the study website and consenting to participate in the study, individuals were randomly presented with the mood symptom, mania risk, self-esteem, schema structure, and life event measures. Following the mood induction procedure, all participants completed the DAS and Passion Scale in that order, in light of previously explained considerations (see Chapter 2).

Study 3 – Results and Discussion

Descriptive statistics (sample size, means, standard deviations, Cronbach's alphas) for the study measures are displayed in Appendix I.

Replication Results for Relations between Mania and Schema Constructs

In the current Study 3 university student sample, the major findings from Studies 1 and 2 were replicated concerning relations between mania and self-schema constructs (see Table 3.2). Similar hierarchical regression analyses were again conducted in Study 3 to determine the contribution of mania risk to self-schema constructs, controlling for recent manic and depressive symptoms. As in Studies 1 and 2, heightened mania risk in Study 3 corresponded with tightly organized, positive self-schema content. However, contrary to the results of the two prior studies, only manic symptoms (and not mania risk) significantly predicted high connectivity of positive content within the achievement domain. Moreover, consistent with Study 1, but not Study 2, greater mania risk predicted high connectivity of positive self-schema content within the interpersonal domain in the current investigation (see Table 3.2).

In addition, mania risk did not contribute to the prediction of negative self-schema content within Study 3 block regression analyses, similar to Studies 1 and 2. However, of note, bivariate correlations indicate that mania risk showed a weak association with negative interpersonal structure, $r = -.10$, $p = .04$. Although a similar correlational result was observed in Study 2 whereby mania risk corresponded with high connectivity of negative self-schema content, recall that this was shown for negative achievement (rather than interpersonal) structure.

Moreover, Study 3 also replicated results regarding the contribution of mania risk to the prediction of self-schema content. Specifically, higher mania risk was again associated in the present study with greater endorsement of dysfunctional attitudes about goal attainment and higher levels of

Table 3.2

Study 3 Replication of Regression Results for Self-Schema Constructs of Structure and Content in a University Student Sample

Self-Schema Construct	Block 1	Block 2 Change	Block 3 Change	Overall Model and Predictors
Overall Positive Structure	$F = 165.63$*** $R^2 = .24$	F-change = 8.91** R^2 change = .02	F-change = 5.78* R^2 change = .01	$F = 61.49$*** $R^2 = .26$ Depression (.48)*** Mania (-.08)* Mania Risk (-.10)*
Positive Achievement Structure	$F = 142.08$*** $R^2 = .21$	F-change = 5.76* R^2 change = .01	F-change = 2.22 R^2 change = .01	$F = 50.55$*** $R^2 = .22$ Depression (.44)*** Mania (-.07)* Mania Risk (-.06)
Positive Interpersonal Structure	$F = 104.76$** $R^2 = .16$	F-change = 8.36** R^2 change = .02	F-change = 7.92** R^2 change = .01	$F = 41.30$*** $R^2 = .19$ Depression (.38)*** Mania (-.08)* Mania Risk (-.12)**
Overall Negative Structure	$F = 98.31$*** $R^2 = .19$	F-change = 1.83 R^2 change = .00	F-change = 2.19 R^2 change = .00	$F = 34.27$*** $R^2 = .19$ Depression (-.44)*** Mania (-.04) Mania Risk (-.07)
Negative Achievement Structure	$F = 108.12$*** $R^2 = .20$	F-change = 1.54 R^2 change = .00	F-change = 1.05 R^2 change = .00	$F = 36.95$*** $R^2 = .19$ Depression (-.45)*** Mania (-.04) Mania Risk (-.05)
Negative Interpersonal Structure	$F = 71.39$*** $R^2 = .13$	F-change = 3.16 R^2 change = .01	F-change = 2.39 R^2 change = .00	$F = 25.82$*** $R^2 = .14$ Depression (-.37)*** Mania (-.06) Mania Risk (-.07)

Dysfunctional Attitudes – Goal Attainment Content	$F = 0.45$ $R^2 = .00$	F-change = 10.63*** R^2 change = .02	F-change = 7.12** R^2 change = .02	$F = 10.55$** $R^2 = .04$ Depression (-.03) Mania (.10)* Mania Risk (.14)**
Obsessive Passion Content	$F = 11.42$** $R^2 = .02$	F-change = 25.56*** R^2 change = .05	F-change = 23.48*** R^2 change = .04	$F = 20.86$** $R^2 = .11$ Depression (.15)** Mania (.13)** Mania Risk (.22)***
Harmonious Passion Content	$F = 11.28$** $R^2 = .02$	F-change = 5.54* R^2 change = .01	F-change = 2.67 R^2 change = .00	$F = 6.55$*** $R^2 = .04$ Depression (-.12)** Mania (.08) Mania Risk (.07)

Notes. Values in parentheses represent corresponding standardized regression coefficients. Depressive and manic symptoms were entered in Block 1 and 2, respectively. Mania risk (i.e., Hypomanic Personality Scale) was entered in Block 3 of the regression equations.
$N = 531$. *$p < .05$, **$p < .01$, ***$p < .001$.

obsessive passion. Consistent with earlier results of this dissertation, mania risk was not a significant predictor of harmonious passion.

Within the block regressions analyses of Study 3 (see Table 3.2), depressive symptoms again showed expected patterns. Notably, depression was not associated in the Study 3 sample with dysfunctional attitudes about achievement, similar to the Study 1 sample. In addition, manic symptoms in Study 3 often added to the prediction of self-schema components, showing the same patterns of findings as mania risk. Overall, these results for Study 3 are generally consistent with the regression findings from Studies 1 and 2.

Self-Schema Constructs Mediate between Mania Risk and Symptoms in a University Sample

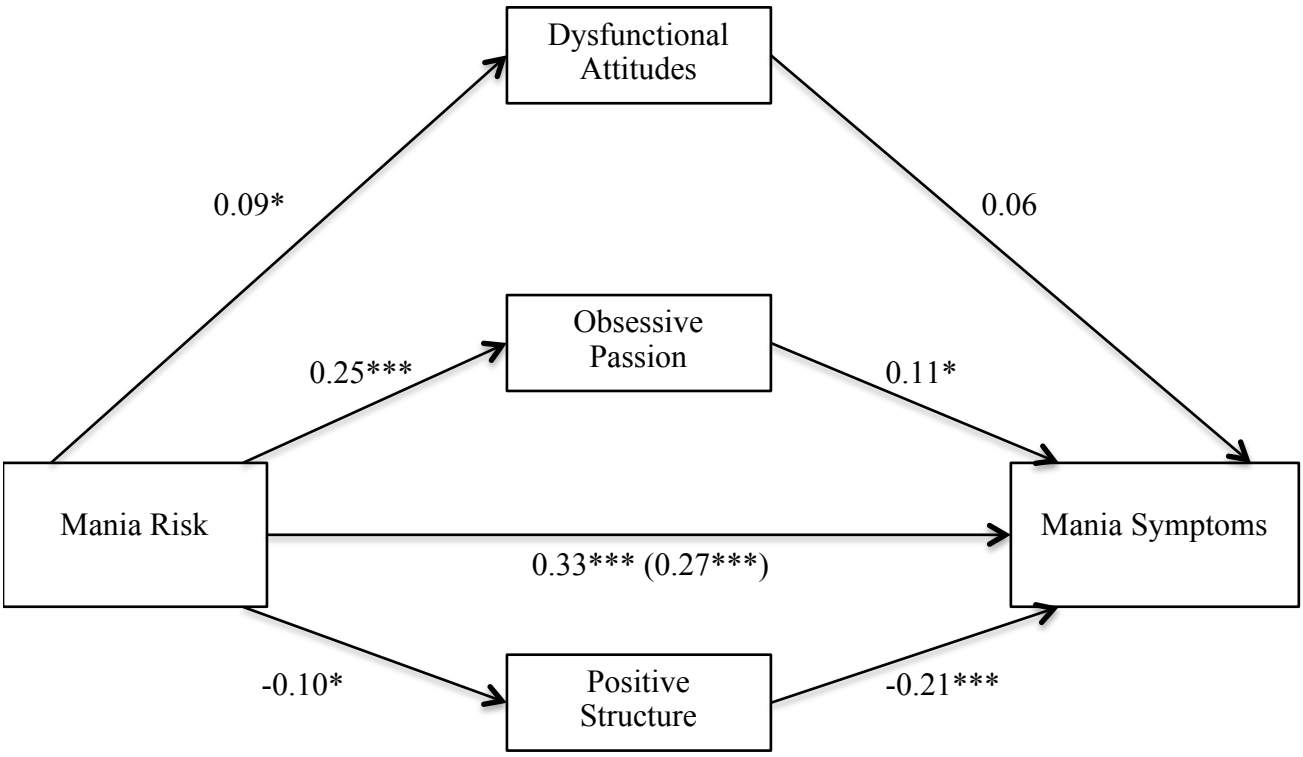
In Study 3 it was demonstrated that self-schema components once again helped to explain relations between important mania-relevant constructs, but in this instance, for a university student sample. These findings are shown in Figure 3.1 below. Specifically, the current findings indicate that positive self-schema structure and obsessive passion significantly mediated the relation between mania risk and manic symptoms. Of note is that consistent across all three studies in this dissertation, greater mania risk corresponded with tighter organization of positive self-schema content (i.e., less interstimulus distance), which, in turn, predicted higher levels of manic symptoms.

The mediating effect for obsessive passion in the current study was also very similar to that reported previously in Study 1, as higher HPS scores were once again associated with greater obsessive passion, which predicted higher levels of manic symptoms (see Figure 3.1). Furthermore, similar to Study 1 findings, there was not a significant indirect effect for dysfunctional attitudes about goal attainment within this multiple mediation model that included self-schema structure and other types of self-schema content (see Figure 3.1).

Replication Results for the Moderating Role of Harmonious Passion for Manic Symptoms

The current study permitted further examination of harmonious passion as a protective

Figure 3.1. Replication of Mediation Results for Manic Symptoms



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Dysfunctional Attitudes, $\beta = .01$; Obsessive Passion, $\beta = .03$*; Overall Positive Structure, $\beta = .02$*; Total indirect effect, $\beta = .05$*. *$p < .05$, ***$p < .001$.

attribute within the context of mania. Similar to Study 1, it was examined whether harmonious passion was adaptive as a moderator of mania risk, with high levels of harmonious passion corresponding with attenuated manic symptoms. Moderation analysis in Study 3 indicated that harmonious passion did not significantly interact with mania risk to predict manic symptoms within the university student sample, $\beta = .02$, $t = 0.56$, $p = .57$. This is consistent with the non-significant result found in Study 1; although recall that in Study 1 there was a trend ($p = .08$) in line with the hypothesis that harmonious passion moderated between mania risk and symptoms.

Manic Symptoms: Testing Interactions between Mania Risk, Life Events and Self-Schema Constructs

To further investigate a cognitive vulnerability-stress hypothesis, potential three-way interactions among mania risk, self-schema constructs, and life events in predicting recent manic symptoms were also examined within the university student sample of Study 3. A multiple regression approach similar to that used in the previous two studies was once again employed with the Study 3 sample, using centered values of predictors. A summary of the details of these moderation analyses is presented in Table 3.3.

Self-Schema Structure. Consistent with hypotheses, significant three-way interactions were found for general positive and BAS-Activating events. Of note, for the remaining analysis involving goal attainment events, there was a non-significant trend ($p = .08$) that resembled the result for general positive events.

The interaction effect for Positive events is depicted in Figure 3.2. Corresponding regression results indicated there were main effects of the HPS and PDST, suggesting that high mania risk and greater connectivity of positive self-schema content was associated with higher levels of manic symptoms. None of the two-way interaction terms were significant within the context of the significant three-way interaction.

Table 3.3.

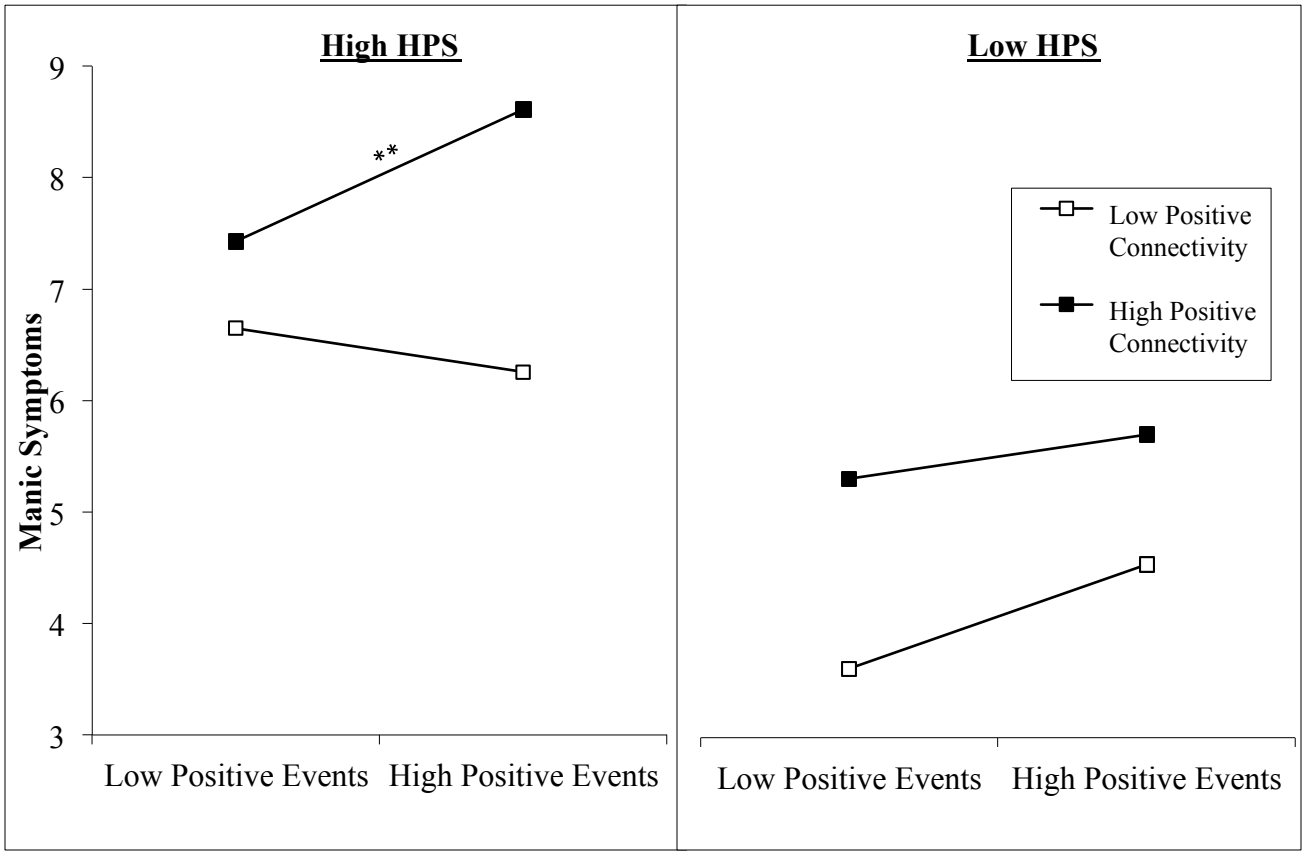
Schema Structure: Three-Way Interaction Results Predicting Manic Symptoms.

Predictor	ΔF	ΔR^2	β	Final Model
Positive Events				
Block 1:	32.01***	.15		
T1 HPS			.29***	(.29)***
T2 LES-P			.10***	(.07)+
T2 PDST-P			-.20***	(-.18)***
Block 2:	0.36	.00		
HPS x LES-P			-.02	(-.03)
LES-P x PDST-P			-.04	(-.04)
HPS x PDST-P			-.01	(-.01)
Block 3:	3.72*	.01		
HPS x T2 LES-P x T2 PDST-P			-.10*	**(-.10)***
				R^2 = .16, F(7, 533) = 14.42***
BAS-Activating Events				
Block 1:	31.00***	.15		
T1 HPS			.31***	(.33)***
T2 LES-B			-.06	(-.06)
T2 PDST-P			-.20***	(-.17)***
Block 2:	1.16	.00		
HPS x LES-B			-.04	(-.03)
LES-B x PDST-P			-.07	(-.09)*
HPS x PDST-P			-.01	(-.00)
Block 3:	6.62**	.01		
HPS x T2 LES-B x T2 PDST-P			-.11**	**(-.11)****
				R^2 = .15, F(7, 533) = 14.89***
Goal Attainment Events				
Block 1:	32.67***	.15		
T1 HPS			.29***	(.33)***
T2 LES-G			.10**	(-.06)
T2 PDST-P			-.19***	(-.17)***
Block 2:	0.04	.00		
HPS x LES-G			.00	(-.01)
LES-G x PDST-P			-.01	(-.01)
HPS x PDST-P			-.01	(-.01)
Block 3:	2.58+	.005		
HPS x T2 LES-G x T2 PDST-P			-.08+	(-.08)+
				R^2 = .15, F(7, 533) = 14.34***

Notes. Values in parentheses represent Block 4 regression coefficients. ASRM = Altman Self-Rating Mania Scale; PDST-P = Psychological Distance Scaling Task, Positive Structure; LES = Life Events Scale; LES-P = Positive Events; LES- B = BAS-Activating Events; LES-G = Goal Attainment Events.
+p < .10, **p < .01, ***p < .001

Figure 3.2

Three-Way Interaction between Positive Schema Structure, Positive Events, and Mania Risk



Notes. HPS = Hypomanic Personality Scale. Slopes were plotted using high and low values of constructs (± 1 standard deviation). ***p* < .01

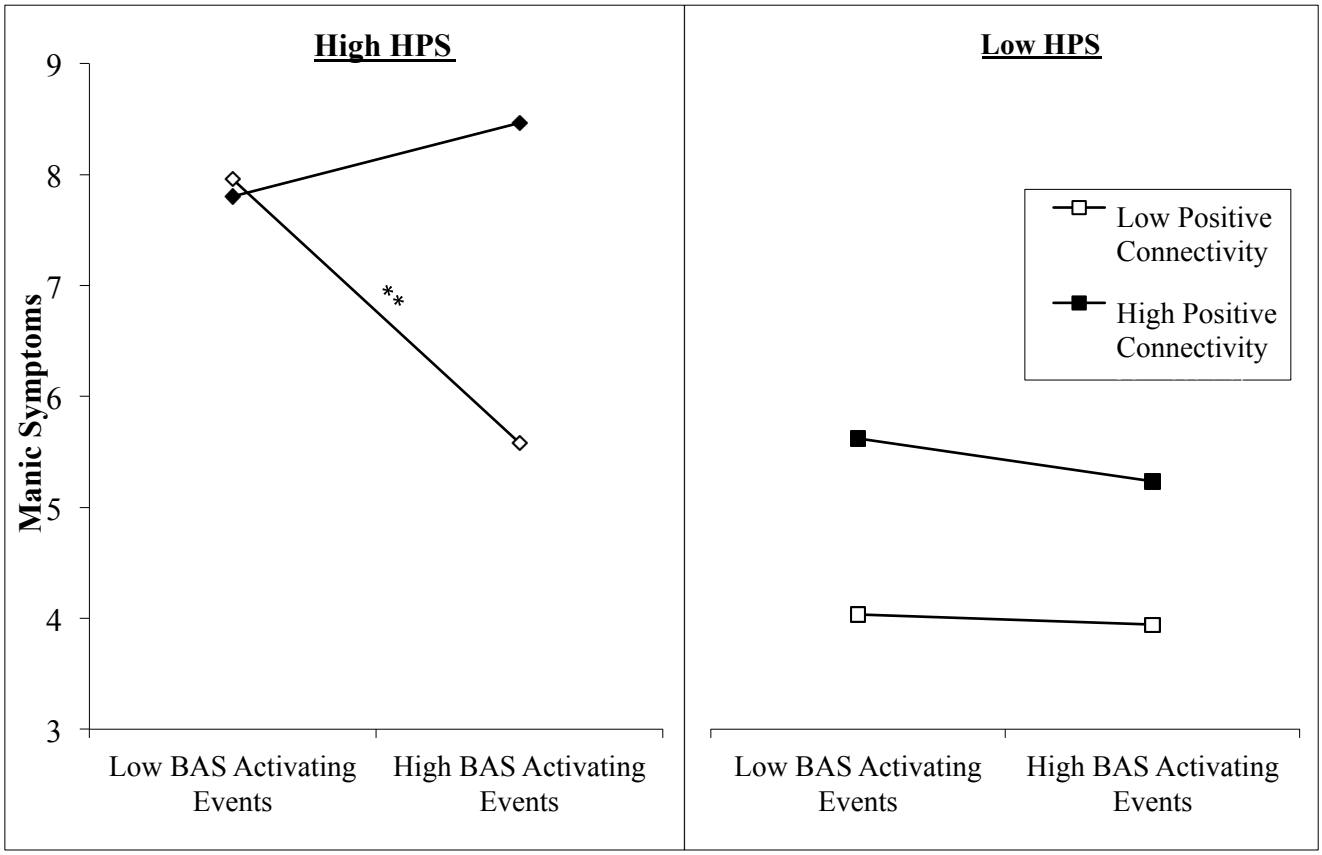
As shown in Figure 3.2, only the slope reflecting high HPS scores and high connectivity of positive self-schema content was significantly different from zero ($t = 2.48$, $p = .01$), indicating that these individuals showed greater manic symptoms when they experienced more positive life events compared to fewer positive life events. Such an effect was not observed at other levels of the HPS and self-schema structure. Similarly, tests of slope differences also indicated that this slope corresponding with high HPS scores and high self-schema connectivity was significantly different from the slope corresponding with high HPS levels and low self-schema connectivity ($t = -1.94$, $p = .04$). Overall, these Study 3 findings suggest that positive life events were associated with higher levels of manic symptoms within the current student sample, specifically among those who displayed high temperamental risk for mania as well as tightly organized, positive self-schema content.

Moderation results associated with BAS-Activating events showed a slightly different pattern of results (see Table 3.3). As depicted in Figure 3.3, the slope representing high mania risk and high connectivity of positive self-schema content was the only slope that was positively graded, but this slope was not statistically different from zero ($t = 1.10$, $p = .25$). Thus, this result does not definitively suggest that higher levels of BAS-Activating events were associated with greater manic symptoms among individuals at high mania risk. Conversely, it was the slope representing high HPS levels and low connectivity of positive content that significantly differed from zero ($t = -3.49$, $p = .002$), indicating that greater BAS-Activating events were actually associated with fewer manic symptoms among these individuals. Nevertheless, these two slopes corresponding with high mania risk significantly differed from each other ($t = 3.10$, $p = .002$), indicating that BAS-Activating events had a dissimilar role when individuals with high HPS scores also showed high connectivity of positive self-schema content.

Specific Domains of Self-Schema Structure. Follow-up analyses were also conducted in Study 3 to explore content domains of self-schema structure that may be involved in the above

Figure 3.3.

Three-Way Interaction between Positive Schema Structure, BAS-Activating Events, and Mania Risk



Notes. HPS = Hypomanic Personality Scale. Slopes were plotted using high and low values of constructs (± 1 standard deviation). ***p* < .01

significant interactions. For general positive events, the three-way interaction for positive interpersonal structure was significant (β = -.10, t = -2.02, p = .04), whereas the interaction associated with achievement structure was non-significant (β = -.08, t = -1.86, p = .07). Alternatively, both positive achievement (β = -.10, t = -2.17, p = .03) and interpersonal structure (β = -.12, t = -2.81, p = .01) moderated the effect of BAS-activating events on manic symptoms, in conjunction with mania risk. The interpretation of these significant interactions was identical to that for overall positive self-schema structure, described previously.

The above findings for Study 3 are generally consistent with the moderation results from Study 2. Important differences include how significant two-way interaction effects included positive and goal attainment events in the previous study, whereas three-way interaction results for goal events only approached significance in the present study. Moreover, BAS-Activating events were not implicated within significant interactions involving life events in Study 2. In the present study, BAS events were associated with several moderating effects that showed a somewhat different pattern of results compared to the other events studied in this dissertation. Specifically, it did not appear that BAS-Activating events had the same sensitization effect as positive and goal events in the current and/or previous study, where greater BAS-Activating events corresponded with higher levels of manic symptoms.

Furthermore, there were no significant three-way interactions found in Study 2 that supported a moderating role of the HPS, whereas the present results of Study 3 indicate that individuals showing greater risk for mania reported greater manic symptoms at differing levels of positive self-schema structure and life events. In this regard, one notable difference between the two studies was the number of observations available (i.e., n =139 in Study 2 and n=531 in Study 3) for the above analyses involving life events. This likely resulted in greater statistical power in the present study, which could help to explain the additional presence of significant, three-way interaction effects.

Moreover, another difference between the two studies was that there appeared to be a more prominent role for positive achievement self-schema structure within Study 2 interactions involving life events, whereas both achievement and interpersonal domains were implicated in the present study.

Schema Content. Study 3 also examined self-schema content that was not explored in Study 2 (i.e., the DAS and Obsessive Passion), regarding potential interactions with life events and mania risk. However, no significant three-way or two-way interaction effects involving life events were found for dysfunctional attitudes about achievement or obsessive passion in Study 3, despite main effects of the individual predictors in the expected directions. Specifically, greater mania risk (i.e., HPS), positive events (i.e., positive and goal attainment), and maladaptive self-schema content (i.e., DAS and Obsessive Passion) corresponded with higher levels of manic symptoms. A full summary of these moderation results for Study 3 can be found in Appendix J.

Chapter 5

General Discussion

The present dissertation addressed several research questions associated with the preliminary examination of a novel, cognitive vulnerability-stress model of mania. In particular, the three studies in this dissertation focused on self-schema constructs that have yet to be examined in relation to mania. These self-schema constructs span both cognitive structure (i.e., degree of interconnection) and content (i.e., cognitive distortions in different domains, adaptive self-referent beliefs about success, and obsessive passion).

This dissertation project considered the relation between self-schema components and mania constructs, as well as the predictive utility of self-schema constructs for the course of mood symptoms. The current investigation also addressed whether mood induction procedures (MIP) may be required to facilitate the empirical examination of any self-schema content relevant to mania.

A central aspect of this dissertation was the assessment of whether self-schema components may play an important role in a vulnerability-stress model of manic symptoms. This was done by considering possible interactions among self-schema components and various life events. As this dissertation provided an initial examination of a cognitive vulnerability model that centralized the role of self-schema structure, the research question of whether major findings could be replicated within different non-clinical samples was also considered. Overall, this initial work is intended to help inform future clinical research and theory in this domain. The major findings across the three studies of this dissertation are discussed below. In doing so, limitations and extensions of the current research are also considered.

Mania and Self-Schema Constructs of Content and Structure

A central objective of this dissertation was to identify self-schema characteristics that correspond with mania, and in particular, appear distinctly related to vulnerability to mania rather

than depression. As such, the present research extended the literature by examining several novel types of self-schema content in relation to mania. Importantly, this examination also considered the relevance of each type of content for mania versus depressive symptoms.

Self-Schema Content Findings. To begin, it was first found that mania risk was associated with high levels of dysfunctional attitudes about goal attainment, which have been previously linked to bipolar disorder (Lam et al., 2004). Recall that these attitudes pertain to unrealistic goals about success (e.g., "A person should do well at everything he or she undertakes") and positive mood states (e.g., "I should be happy all the time"). Across Studies 1 and 3, the present findings supported the notion that these attitudes appear particularly relevant to mania, as they also showed no significant associations with depressive symptoms. However, within the mediation model tested in the current research, these attitudes did not significantly mediate between the hypomanic personality and manic symptoms. Thus, it is possible that these attitudes may have a less distinctive role within the course of manic symptoms, in comparison to self-schema structure and other types of self-schema content.

In the present dissertation, obsessive passion was a newly studied construct (Vallerand et al., 2003) in relation to mania. The present findings suggest that this construct is particularly relevant for the course of manic versus depressive symptoms. It was initially hypothesized that this individual difference characteristic would pertain to the content of the manic self-schema, since it captures relentless pursuit of a valued activity at the expense of other values and life activities (e.g., "I have the impression that this activity controls me"; "I have difficulties controlling the urge to do my activity"; Vallerand et al., 2003). As such, obsessive passion relates to maladaptive patterns of activation and goal pursuit. Recall that goal dysregulation has been implicated in bipolar disorder (Johnson, 2005), where success has been associated with higher levels of activation and goal pursuit, rather than the short-term reduction in effort towards future goals that is seen amongst the general population (Carver & Scheier, 1998; Fulford et al., 2010). Importantly, results of both Studies 1 and 3

in the present dissertation indicate that obsessive passion was not only associated with mania constructs, but it also served as a significant mediator between the hypomanic personality and manic symptoms within a model that also accounted for other types of self-schema content and self-schema structure. Conversely, obsessive passion showed minimal associations with depressive symptoms, particularly in comparison to mania constructs (see Study 1 and Study 3). Accordingly, this is the first known investigation to identify obsessive passion as an individual difference characteristic that is highly relevant to mania in comparison to depression.

When considering self-schema content, a number of previous investigations have linked bipolar disorder to perfectionistic attitudes (e.g., Scott et al., 2000; Corry et al., 2017). The results of the present dissertation continued to build on this prior work. Specifically, Study 1 of this dissertation showed that the mania constructs of risk and symptoms were both associated with self-oriented and other-oriented perfectionism, whereas the same patterns were not shown for recent depressive symptoms. This is somewhat inconsistent with previous research linking self-oriented perfectionism with chronic depressive symptoms (e.g., Corry et al., 2017). However, since Study 1 only assessed recent depressive symptoms, this could likely help to explain the discrepancy between the present results and this existing finding in the literature.

Moreover, in the present thesis it was found that mania risk also predicted high levels of socially-prescribed perfectionism, even after accounting for the influence of recent mood symptoms. This pattern of results in Study 1 suggests that socially-prescribed perfectionism may be a more enduring vulnerability characteristic associated with mania. In addition, socially-prescribed perfectionism also played a role within the multiple mediation model of manic symptoms tested in Study 1. These results are consistent with limited prior work indicating that chronic manic symptoms are associated with high levels of socially-prescribed perfectionism, of all the different dimensions of perfectionism (Corry et al., 2017; Hewitt et al., 1998). The present research extends these findings by

documenting an association between socially-prescribed perfectionism and mania risk within a non-clinical sample. Recall that this aspect of perfectionism addresses perfectionistic behaviour that is attributed to the motives and expectations of others (Hewitt & Flett, 1990). As such, socially-prescribed perfectionism incorporates a strong social evaluative component.

The above findings concerning socially-prescribed perfectionism may fit well with existing theory and research on goal dysregulation in bipolar disorder (Johnson, 2005). Recall that a pattern of extremely optimistic life ambitions has been noted among individuals with bipolar disorder and high mania risk, in which extrinsic rather than intrinsic motivations appear dominant (e.g., success, fame) (Gruber & Johnson, 2009; Johnson, Eisner, & Carver, 2009). In turn, these extrinsic motivations may relate to the importance of social evaluation regarding one's goals. Thus, there may be an interpersonal component to maladaptive beliefs about achievement that have been implicated in vulnerability to mania (e.g., Lam et al., 2004). In particular, individuals may strongly base self-judgments about success in relation to their ability to exceed perceived high standards from the perspective of others.

The present findings also showed that high levels of cognitive distortions appear to characterize the manic self-schema. Here, it was initially hypothesized that cognitive distortions in the achievement domain would be the most closely associated with mania constructs. Instead, the findings of Study 1 and 2 indicate that cognitive content distortions in both the achievement and interpersonal domains were significantly associated with the hypomanic personality and manic symptoms. However, it was only in Study 1 that mania risk added to the prediction of interpersonal cognitive distortions, beyond the contributions of manic and depressive symptoms. This latter finding was not replicated in Study 2. Instead, strong associations were found between cognitive distortions and depressive symptoms across Studies 1 and 2.

Taken together, the above findings suggest that this type of self-schema content may bear more strongly on the course of depressive versus manic symptoms in bipolar disorder. In line with this proposal, cognitive distortions (particularly within the interpersonal domain) mediated between mania risk and depressive symptoms, rather than manic symptoms. This is somewhat unsurprising, particularly since the nature of cognitive distortions seems to suggest that these are more likely to lead to dysphoria or anxiety, rather than an elevated state.

Finally, the current research provided the first known investigation to consider self-referent adaptive beliefs that may be relevant to reward sensitivity and goal dysregulation theories of mania (Hillson, 1997). Results were somewhat inconclusive as to whether harmonious passion and adaptive self-referent beliefs about success may be protective among individuals at heightened risk for mania. In particular, only a non-significant trend in Study 1 indicated that greater harmonious passion corresponded with attenuated manic symptoms at high levels of the HPS. In addition, greater adaptive beliefs about success corresponded with fewer depressive symptoms at high levels of the HPS in Study 2, but this finding only approached significance in Study 1. This line of inquiry pertains to psychological resiliency in bipolar disorder, and the current findings point to a need to further examine and more sensitively investigate cognitive mechanisms that may be protective among those at heightened risk for mania.

In summary, the above findings identified several types of self-schema content that appear to characterize mania. However, it should be noted that there was considerable overlap between depressive symptoms and mania constructs in terms of self-schema content, with limited characteristics showing unique associations with mania risk and symptoms.

Self-Schema Structure Findings. A core finding of this dissertation pertains to the organization of self-referent information and mania. Specifically, replicated results across all three studies suggest that the self-schema in mania has a structural component that is distinct from

depression. Both the core measure tapping vulnerability to mania (hypomanic personality), as well as manic symptoms, were consistently associated with positive self-schema content that was highly interconnected. In contrast, and consistent with prior research (e.g., Dozois & Frewen, 2006), it was also found across all three studies of the present dissertation that depression relates to the loose organization of positive content. Furthermore, greater interconnectivity of positive self-schema content also mediated between the hypomanic personality and manic symptoms in Studies 1, 2, and 3 of the present dissertation, suggesting that this structural self-schema characteristic may help to explain how mania risk translates to manic symptoms. Further evidence consistent with this notion was obtained in Study 2, showing that high connectivity of positive self-schema content prospectively predicted increases in manic symptoms over time.

The above findings concerning positive self-schema structure were consistent with hypotheses, whereby it was posited that a densely interconnected subset of positively valenced, self-referent information could help to explain the phenomenology of manic episodes (e.g., grandiosity, energy). Specifically, the organization of positively valenced information would bear on the accessibility of information about the self and thus, on the regulation of emotion. This differentiated pattern of self-schema organization could also help to resolve commonalities regarding self-schema content across mania and depression.

The present findings regarding self-schema structure expand the very limited existing research on cognitive organization in bipolar disorder. Recall that a handful of investigations (Alatiq et al., 2010; Power, de Jong, & Lloyd, 2002; Taylor et al., 2007) have documented that individuals with bipolar disorder display a highly compartmentalized self-concept, in which self-aspects (e.g., family member, colleague, friend) show some polarization in terms of the valence of self-characteristics (i.e., predominantly positive or negative in nature). Similarly, the current findings

suggest there is a pattern of highly interconnected, positively valenced content among individuals with higher temperamental risk for mania.

It is important to clarify here that the present findings are not being interpreted as showing that, in cases of mania, individuals have an overly positive self-view. As described previously in the General Introduction and noted above, bipolar disorder appears to be characterized by predominantly negative self-schema content, which has been observed during and outside of depressive episodes (e.g., Alloy et al., 2009). Indeed, there was no significant association in the present research between the hypomanic personality and the positive self-referent beliefs studied (e.g., "I like and feel proud of my achievements"; Hillson, 1997). Further, recall that there was even a small association in Study 2 between the hypomanic personality and self-esteem, whereby individuals with greater mania risk actually showed lower levels of self-esteem. Finally, the effect sizes associated with positive self-schema structure were quite small in magnitude, albeit, consistently replicated across all three studies. As such, it is not posited that individuals with high mania risk hold themselves in too positive a regard. Rather, it is theorized that positively valenced information about the self may be organized in a problematic manner. One possibility is that individuals with temperamental risk for mania may display a relatively small amount of positive self-referent information, however, this information could be tightly organized in the self-schema structure.

Regarding this hypothesis that dense connectivity of positive self-schema content may be restricted to a sub-network of self-relevant information, the current research did not find any direct evidence for this proposal or elucidate the precise nature of highly interconnected, positive content. Recall that it was predicted that beliefs in the achievement domain would show the highest levels of self-schema connectivity, given previous research on reward sensitivity and goal-striving (e.g., Alloy & Abramson, 2008; Johnson et al., 2012). However, across the three studies, results were mixed as to whether the organization of achievement versus interpersonally-relevant content may be more

predictive of the course of manic symptoms. For instance, recall that in Study 2, positive interpersonal structure, instead of achievement structure, predicted future increases in manic symptoms. Yet, as discussed in more detail below, positive achievement structure showed significant interactions with life events in Study 2. Conversely, it appeared that positive self-schema structure, in general, demonstrated more consistent patterns in the present research.

Several considerations may help to clarify why mania risk was not associated with a consistent pattern of self-schema structure organization within a specific content domain. This could have occurred since the measure of self-schema structure employed in the present research, the PDST (Dozois & Dobson, 2001b), derives from research on depression. As such, the content areas examined for depression may not hold the same meaning for mania. Moreover, as mentioned when discussing the current self-schema content findings, a social evaluative component may, in fact, be highly relevant to ideas of achievement or success in mania. As a result, the distinction between achievement and interpersonal content may be more blurred. Thus, an important future direction for this research would be to modify content of the PDST, such that new domains are considered according to their hypothesized relevance to mania. Given previous research highlighting attitudes regarding the importance of success and highly ambitious goals in relation to mania risk (e.g., Lam et al., 2004; Johnson et al., 2012), this is an important content domain to examine.

Another domain of potential interest for future investigation concerns the intersection between activation and self-appraisals. Previous research has considered how self-appraisals of internal states may be implicated in the development of mania (e.g., Jones & Day, 2008; Mansell et al., 2007). Specifically, these self-appraisals refer to the manner in which internal changes (e.g., high energy, racing thoughts) are interpreted in a personally relevant manner (Jones, 2001). Extremely positive self-appraisals of hypomanic states (e.g., interpreting increased energy as a sign of impending success) have been implicated in the development of mania (Jones & Day, 2008; Jones et

al., 2006). Appraisals of internal states were not examined in the present research, yet these may relate to specific areas of content that are densely connected and would putatively lead to elevated mood states.

A further consideration is that Study 2 in this dissertation found that the hypomanic personality was associated with less temporal stability of self-schema structure. This supports the notion that high connectivity of positive self-schema content may not reflect stably high self-views, but rather dynamically changing self-appraisals. Similarly, consistent with past research on bipolar disorder (e.g., van der Gucht et al., 2009), the current results for Study 2 also indicated that greater temperamental risk for mania corresponded with fluctuations in self-esteem, even after accounting for the influence of mood symptoms. In the present research, self-schema structure also predicted momentary levels of self-esteem, which provides some empirical support for the theory that the activation of differently organized networks corresponds with changes in self-liking, which would ostensibly impact one's mood state.

Future research could examine how self-schema instability findings may relate to different types of self-appraisals. One consideration is that the measurement of self-schema structure may not only capture an individual's firm beliefs (e.g. their actual self-views), but also their aspirations or expectations for themselves (e.g., their ideal self-views). This possibility seems particularly viable in mania, given the previously described research on bipolar disorder, perfectionism, and the over-endorsement of highly ambitious goals (e.g., Johnson, 2005; Lam et al., 2004). In this regard, self-discrepancy theory (Higgins, 1987) may also be quite relevant to mania, as this approach postulates that there are different domains of self-conceptualization. Here, the 'actual-self' refers to one's actual, self-perceived qualities, whereas the 'ideal-self' and 'ought-self' encompass the qualities a person wishes or feels obliged to have, respectively.

Researchers have more recently considered self-discrepancy theory in relation to bipolar disorder (Alatiq et al., 2010; Bentall et al., 2005). Although evidence suggests that self-discrepancies are generally quite stable over time (Strauman, 1996), one study examined self-discrepancy over different phases of bipolar illness (Bentall et al., 2005). These investigators found that bipolar depressed patients exhibited greater discrepancy between their actual and ideal-selves compared to manic, hypomanic, and remitted bipolar disorder patients and healthy control participants. A converse relationship was demonstrated amongst (hypo)manic patients, who reported abnormally low levels of discrepancy between their actual, ideal and ought-selves compared to the other groups. These results suggest that how individuals with bipolar disorder view themselves against their idealized standard of being is subject to change. In addition, periods of (hypo)mania may be associated with appraisals that individuals are closer to idealized standards of being (Bentall et al., 2005). Thus, it may be advisable for future studies of mania risk to differentiate between beliefs regarding one's current self-appraisals, versus appraisals pertaining to one's future potential or idealized outcomes; and then examine the organization of these beliefs.

Contrary to hypotheses, despite some inconsistent associations between the HPS and negative self-schema structure, the current project did not find that mania risk robustly predicted the organization of negative self-schema content. Recall that it was hypothesized that some areas of negative self-schema content would show high connectivity, similar to the pattern shown for depression. This hypothesis stemmed from the fact that individuals with a history of mania also frequently experience depressive symptoms (Akiskal et al., 2000). Although there was some weak evidence for these expected associations between mania risk and negative self-schema structure across the three studies, this pattern was less clearly demonstrated compared to that for positive self-schema structure.

There are several possible explanations for why the current results do not support this hypothesis. For one, since there is evidence to suggest that vulnerability mechanisms in mania and depression are separable (e.g., McGuffin et al, 2003), it is possible that high connectivity of negative self-schema content is specific to depressive symptoms in cases of bipolar disorder. Thus, this increased consolidation of negative self-schema content may not be observed when examining the hypomanic personality, alone, and particularly when also accounting for the influence of depressive symptoms. In order to better understand the organization of negative self-beliefs among individuals with bipolar disorder, a more sensitive design would be informative, which contrasts the self-schema structure of individuals with a history of mania and depression, individuals with a history of mania alone, and individuals with a history of unipolar depression.

Another possible explanation for these findings pertains to the previous consideration regarding self-schema measurement and potentially tapping idealized ways of being (Higgins, 1967). Since results of the current research suggest that greater mania risk was associated with unstable measurement of negative achievement structure, there is some indication that dynamic factors may be influencing the apparent organization of negative self-beliefs. Finally, the current research may not have captured the domain in which negative self-schema content may show high levels of connectivity. For instance, the importance of negative self-appraisals of internal states, in addition to positive appraisals, has also been considered in relation to bipolar disorder (e.g., Mansell et al., 2007). Negative appraisals of (hypo)manic symptoms could relate to fears such as being out of control and on the verge of breakdown (Mansell et al., 2006). Moreover, in line with reward sensitivity and goal dysregulation models (e.g., Johnson et al., 2012), negative content that pertains to failing to meet one's high standards or future aspirations may also be relevant to mania. As such, these important subsets of beliefs should also be considered in future studies of self-schema organization in mania.

One major limitation of the current research is that it was conducted with non-clinical samples. As mentioned in the General Introduction, there are advantages to a research design that uses risk markers rather than remitted diagnostic status to study vulnerability to psychopathology. In addition, the HPS (Eckblad & Chapman, 1986), as a measure reflecting risk for mania, has been extensively used in contemporary psychological research on mania (e.g., Kim et al., 2017; Pornpattananangkul et al., 2015). However, it is still critical that future research be conducted among clinical samples of bipolar disorder, in order to determine whether individuals exhibit similar self-schema characteristics as identified by the current investigation. Another future direction of this research would involve examining whether this project's findings would extend to various different presentations of mania (e.g., manic episodes with psychotic features), or whether differences exist among certain groups (e.g., bipolar I versus bipolar II disorder). In addition, contrasting self-schema content and structure displayed by individuals with bipolar disorder compared to similar clinical presentations (e.g., major depressive disorder, schizophrenia), would also be important to further understand unique and shared aspects of psychological vulnerability.

Mood Induction Findings

The present dissertation also considered whether mood induction procedures (MIPs) appear to impact the study of self-schema content associated with mania. Contrary to tentative hypotheses, there was not a significant effect of positive mood induction, whereby individuals were asked to imagine that they had achieved an important goal. As such, these null findings suggest that the MIP was not necessary to detect associations between mania and the specific types of self-schema content studied in the current dissertation. Thus, one possibility is that mood priming may not be required for the study of self-schema content characterizing mania. However, it is important to recognize that there were several limitations of the current assessment of MIPs. First, it cannot be determined how long presumed effects of the MIP lasted in the present investigation. Thus, it is unclear whether

certain measures administered further after the mood induction may have shown significant MIP impact, if they had been presented closer in time to the induction. As such, a more rigorous test of MIPs is still warranted, particularly since very limited research has thus far assessed the effects of mood priming on the study of self-schema characteristics in mania.

Similarly, since the current investigation was the first test of this MIP, it is not clear whether the use of this procedure was relevant to the activation of self-schema components associated with mania. In the future, it would be important to compare and contrast the effects of other possible MIPs (e.g., negative mood prime), before ruling out the importance of mood priming for the study of self-schema characteristics associated with mania.

Finally, an effect of the MIP was not examined for self-schema structure, since existing research suggests that this is a more stable characteristic of the self-schema (e.g., Dozois & Dobson, 2001a). As such, mood priming is likely not necessary to study self-schema organization. However, given the current results pertaining to reduced temporal stability of self-schema structure in mania, it would be important to examine whether there might be an impact of mood priming on the momentary, perceptible organization of self-beliefs. One possibility is that highly interconnected networks of positive content may become even more discernible when activated by mania-relevant triggers, which would help to explain variability associated with repeated measurement of self-schema structure among individuals at high mania risk. This pattern would be consistent with the following results concerning interactions between positive self-schema structure and life events.

Findings for Interactions between Life Events and Self-Schema Components

This dissertation applied the cognitive vulnerability-stress framework to mania by examining both the content and structure of self-schemas, as well as providing a preliminary investigation of the interplay between self-schema components and life events. Consistent with previous research, the current results implicate the role of positive life events in the course of manic symptoms. Across

Studies 2 and 3, there were main effects of positive life events, in which generally positive and goal attainment events, in particular, predicted concurrent and prospective increases in manic symptoms. Most importantly, initial support was also provided in Studies 2 and 3 for a cognitive vulnerability-stress framework, whereby positive self-schema structure significantly interacted with positive life events. Specifically, high frequency and impact of positive life events predicted concurrent or future increases in manic symptoms, particularly among individuals who showed high interconnectivity of positive self-schema content. Study 3 also found that this interaction between positive self-schema structure and positive life events was only observed at high levels of mania risk.

The above findings support the current literature regarding the impact of life events in bipolar disorder (e.g., Alloy & Abramson, 2010; Nusslock et al., 2007), and how this pattern is differentiated from depression (e.g., Johnson et al., 2008a), by continuing to show that certain positive versus negative events predict the course of manic symptoms. The current project also extends existing research by demonstrating that positive life events interact with the organization of positive self-beliefs to predict manic symptoms. It is theorized that this relation was observed because certain positive events, particularly those related to activation and goal-striving, triggered highly interconnected networks of positively valenced, self-referent information. It is postulated that these events may play such a role because they provide momentary evidence to individuals regarding dysfunctional beliefs about positive emotion, success, or power, such that one is capable of anything (Lam et al., 2004; Mansell et al., 2007). Since this positive self-schema content is tightly organized, activation of such a network would lead to widespread activation of similar beliefs or ideas about oneself, which would ostensibly lead to high levels of positive emotion and energy, in turn.

Such elevations in mood and energy could then initiate a feedback loop, in which positive self-schema content continues to be activated. This proposal is supported by the previously reviewed research on bipolar disorder and responses to positive affect, in which individuals with a history or

risk for mania are likely to respond to positive affect with positive self-focused rumination (e.g., Raes et al., 2010). Moreover, such changes in cognition would likely be accompanied by behavioural responses. Existing research on mania suggests that high levels of activation could lead to momentary behaviour that continues to propel mood upwards, otherwise referred to as 'ascent behaviours' (e.g., ingesting stimulants, increasing activity; Mansell et al., 2007). This would be particularly relevant if the content of activated cognitions pertains to positive self-appraisals of elevated states (Mansell et al., 2007). As such, a vicious cycle could be created, in which the repetitive activation of cognitions and triggering of ascent behaviours give rise to manic symptomatology.

In terms of more specific types of positive events, consistent with hypotheses, both goal attainment events and BAS-activating events shared significant interactions with self-schema structure in Studies 2 and 3, respectively. Although the expected pattern was shown for goal attainment events, BAS-activating events did not show a significant, sensitization effect regarding their association with manic symptoms at high levels of mania risk and positive self-schema connectivity. Conversely, it was noted that greater BAS-activating events in Study 3 unexpectedly predicted fewer manic symptoms at high levels of mania risk, when there were also low levels of connectivity for positive content. It is unclear what this pattern of findings could mean concerning the impact of BAS events among individuals at high mania risk. One possible interpretation is that highly interconnected, positive self-beliefs play an important role in determining the impact of BAS events on manic symptoms, and without this characteristic, individuals who display high temperamental risk for mania would not show high levels of manic symptomatology within the context of these events.

Another consideration is that the nature of BAS-Activating events is quite different from general positive and goal attainment events, in that BAS-Activating events may not always be positive or as noticeable as achievement events (e.g., studying for an upcoming exam, planning a

party, having an argument with a family member). As such, a more sensitive design may be required to accurately assess BAS-activating events experienced by participants, along dimensions that are proposed to be significant to mania. In this regard, a further limitation of the present dissertation is that an interview method was not used to contextualize life events reported by participants, and more sensitively rate their impact. As such, an important future direction of this research would be to examine interactions between life events and self-schema structure using a more rigorous study design that incorporates a life events interview.

As previously discussed, another limitation of this dissertation is that this research was not conducted with clinical samples of bipolar disorder. Since the role of mania risk was demonstrated in significant interactions with life events and schema structure when a larger sample was examined in Study 3, it may be the case that there was not sufficient power in Study 2 to examine differences across levels of mania risk within moderation analyses. However, it would be important to replicate these findings and determine whether they can generalize to different expressions of mania.

Regarding interactions between life events and specific domains of self-schema structure, the current findings were mixed as to whether the organization of achievement or interpersonal content was more critical. In line with initial hypotheses, there was slightly more support for the role of achievement self-schema structure in interactions with life events, with both Study 2 and 3 showing significant results for this domain of self-schema content. However, findings of Study 3 also indicated that significant interactions with life events involved interpersonal self-schema structure. Of note, there were significantly more female participants than male participants in Study 3, compared to Study 2 where the gender distribution was more balanced. Thus, one possibility is that gender differences may help to explain this discrepancy across Studies 2 and 3. Another possibility, as discussed in the first section of this General Discussion, is that the self-schema structure domains examined in the present dissertation may not capture the most relevant content for mania. Thus, it is

important that future research consider other content domains of self-schema structure and how these may moderate the impact of life events on manic symptoms. Another future direction of the current research involves examining gender differences in relation to self-schema characteristics associated with mania.

Finally, the results of this dissertation indicated that self-schema structure was more important than content for moderating the relation between positive life events and manic symptoms. Contrary to results for structure, none of the content measures studied interacted with life events to predict concurrent or prospective increases in manic symptoms. However, since only Study 3 examined interactions between life events and self-schema content, it is important to replicate this finding. Nevertheless, the current results suggest that self-schema structure may be more informative for the course of manic symptoms from a cognitive vulnerability-stress perspective. This finding could relate to existing research on self-schema structure, indicating that it is a more enduring characteristic and more predictive of relapse in depression compared to self-schema content (e.g., Dozois, 2007). Since substantial overlap exists between mania and depression in terms of the self-schema content that appears to characterize these presentations, self-schema structure may also be a more distinguishing feature of cognitive vulnerability to mania. Future research is needed to clarify the relative importance of self-schema structure versus content within the context of mania.

Clinical Implications

Given the limitations of this research, only tentative statements can be made regarding the generalizability of these findings to cases of bipolar disorder and the clinical implications of this work. However, the present results linking mania to self-schema structure irregularities fit within a broader literature suggesting that self-concept disturbance characterizes bipolar disorder (e.g., dysfunctional attitudes about success; highly fluctuating levels of self-esteem; unstable actual versus idealized self-views) (e.g., Bentall et al., 2006; Lam et al., 2004; van der Gucht et al., 2009). Overall,

this evidence indicates that an important therapeutic goal would be to support patients in exploring and challenging maladaptive views of oneself, in order to develop a more balanced and adaptive self-understanding. This overarching goal is consistent with current applications of cognitive-behavioural therapy (CBT) for bipolar disorder (Oud et al., 2016).

More specifically, if it is the case that individuals prone to mania show a set of positive beliefs that are temporally unstable and tightly organized, this could have important negative consequences for psychological well-being. In particular, this pattern suggests that individuals only have select moments in which they feel positively about themselves and that this is not consistently experienced. This proposal is also corroborated by documented associations between mania and the prevalence of negative self-beliefs and fluctuating self-esteem levels (e.g., Bentall et al., 2011; Adams et al., 2014). Further, activation of highly interconnected networks of positive self-schema content would theoretically lead to momentary positive self-appraisals that are extreme. This would contribute to drastically different views of the self from moment to moment, which would reasonably correspond with rapid changes in mood. Alternatively, adopting a more generalized and balanced positive self-view would likely contribute to more stable moods and higher levels of well-being. As such, therapeutic work could support individuals in generalizing and balancing positive self-beliefs so they are more temporally stable and less polarized regarding their organization.

If future research can extend this work and provide further support for self-schema structure as a vulnerability marker for mania, there would also be helpful applications to psychological assessment. For instance, a tool such as the PDST (Dozois & Dobson, 2001a, 2001b) could be adapted for use in a clinical context, particularly if more specific domains of structure can be identified for mania. Changes in the measurement of self-schema structure (e.g., greater temporal stability) could be used to gauge the effectiveness of clinical interventions for bipolar disorder (e.g., psychotropic drugs, psychological treatments), particularly in relation to manic symptoms.

References

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: critique and reformulation. *Journal of abnormal psychology*, *87*(1), 49.

Adams, A. M., Shapero, B. G., Pendergast, L. H., Alloy, L. B., & Abramson, L. Y. (2014). Self-referent information processing in individuals with bipolar spectrum disorders. *Journal of Affective Disorders, 152,* 483-490.

Ak, M., Lapsekili, N., Haciomeroglu, B., Sutcigil, L., & Turkcapar, H. (2012). Early maladaptive schemas in bipolar disorder. *Psychology and Psychotherapy, 85*(3), 260-267.

Akiskal, H. S., Bourgeois, M. L., Angst, J., Post, R., Möller, H. J., & Hirschfeld, R. (2000). Re-evaluating the prevalence of and diagnostic composition within the broad clinical spectrum of bipolar disorders. *Journal of Affective Disorders*, 59, S5-S30.

Alatiq, Y., Crane, C., Williams, J. M. G., & Goodwin, G. M. (2010). Self-discrepancy in students with bipolar disorder II or NOS. *Journal of Behaviour Therapy and Experimental Psychiatry, 41*(2), 135-139.

Alloy, L. B., & Abramson, L. Y. (2010). The role of the behavioural approach system (gray) in bipolar spectrum disorders. *Current Directions in Psychological Science, 19*, 189–194. doi:10.1177/ 0963721410370292

Alloy, L. B., Abramson, L. Y., Whitehouse, W. G., Hogan, M. E., Tashman, N., Steinberg, D., Rose, D. T., & Donovan, P. (1999). Depressogenic cognitive styles: Predictive validity, information processing and personality characteristics, and developmental origins. *Behaviour Research and Therapy, 37,* 503-531. doi:10.1016/S0005-7967(98)00157-0

Alloy, L. B., Abramson, L. Y., Urosevic, S., Walshaw, P. D., Nusslock, R., & Neeren, A. M. (2005). The psychosocial context of bipolar disorder: Environmental, cognitive, and developmental risk factors. *Clinical Psychology Review, 25*(8), 1043-1075.

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Cogswell, A., Grandin, L. D., Hughes, M. E., ... & Hogan, M. E. (2008). Behavioural approach system and behavioural inhibition system sensitivities and bipolar spectrum disorders: Prospective prediction of bipolar mood episodes. *Bipolar Disorders, 10,* 310–322. doi:10.1111/ j.1399–5618.2007.00547.x

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., Gerstein, R. K., Keyser, J. D., Whitehouse, W. G., Urosevic, S., Nusslock, R., Hogan, M. E., & Harmon-Jones, E. (2009). Behavioral approach system (BAS)–relevant cognitive styles and bipolar spectrum disorders: Concurrent and prospective associations. *Journal of Abnormal Psychology, 118*(3), 459.

Alloy, L. B., Abramson, L. Y., Walshaw, P. D., & Neeren, A. M. (2006). Cognitive vulnerability to unipolar and bipolar mood disorders. *Journal of Social and Clinical Psychology, 25*(7), 726-754.

Alloy, L. B., & Clements, C. M. (1992). Illusion of control: Invulnerability to negative affect and depressive symptoms after laboratory and natural stressors. *Journal of Abnormal Psychology, 101*(2), 234-245.

Alloy, L. B., Nusslock, R., & Boland, E. M. (2015). The development and course of bipolar spectrum disorders: An integrated reward and circadian rhythm dysregulation model. *Annual Review of Clinical Psychology*, *11*, 213-250.

Alloy, L. B., Bender, R. E., Whitehouse, W. G., Wagner, C. A., Liu, R. T., Grant, D. A., ... & Abramson, L. Y. (2012a). High Behavioural Approach System (BAS) sensitivity, reward responsiveness, and goal-striving predict first onset of bipolar spectrum disorders: A prospective behavioural high-risk design. *Journal of Abnormal Psychology, 121*(2), 339-351. doi:10.1037/a0025877

Alloy, L. B., Reilly-Harrington, N., Fresco, D. M., Whitehouse, W. G., & Zechmeister, J. S. (1999). Cognitive styles and life events in subsyndromal unipolar and bipolar disorders: Stability and

prospective prediction of depressive and hypomanic mood swings. *Journal of Cognitive Psychotherapy*, *13*(1), 21.

Alloy, L. B., Urošević, S., Abramson, L. Y., Jager-Hyman, S., Nusslock, R., Whitehouse, W. G., & Hogan, M. (2012b). Progression along the bipolar spectrum: A longitudinal study of predictors of conversion from bipolar spectrum conditions to bipolar I and II disorders. *Journal of Abnormal Psychology, 121*(1), 16–27. doi: 10.1037/a0023973

Altman, E. G., Hedeker, D., Peterson, J. L., & Davis, J. M. (1997). The Altman self-rating mania scale. *Biological Psychiatry, 42*(10), 948-955.

Altman, E. G., Hedeker, D. R., Janicak, P. G., Peterson, J. L., & Davis, J. M. (1994). The clinician-administered rating scale for mania (CARS-M): development, reliability, and validity. *Biological Psychiatry*, *36*(2), 124-134.

American Psychiatric Association (APA). (2013). *The Diagnostic and Statistical Manual of Mental Disorders (5th ed.) (DSM-5).* Washington, DC: APA.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological assessment*, *10*(2), 176.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Beck, A. T. (1967). *Depression.* New York, NY: Harper and Row.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.

Beck, A., Steer, R., & Brown, G. (1996). *Beck Depression Inventory-II.* San Antonio.

Bender, R. E., Alloy, L. B., Sylvia, L. G., Uroševic, S., & Abramson, L. Y. (2010). Generation of life events in bipolar spectrum disorders: A re-examination and extension of the stress generation theory. *Journal of Clinical Psychology, 66*(9), 907-926.

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 & Psychotherapy, 18*(5), 397-410.

Bentall, R. P., Kinderman, P., & Manson, K. (2005). Self□discrepancies in bipolar disorder: Comparison of manic, depressed, remitted and normal participants. *British Journal of Clinical Psychology*, *44*(4), 457-473.

Berk, M., Dodd, S., Callaly, P., Berk, L., Fitzgerald, P., De Castella, A. R., Filia, S., Filia, K., Tahtalian, S., Biffin, F., & Kelin, K., (2007). History of illness prior to a diagnosis of bipolar disorder or schizoaffective disorder. *Journal of Affective Disorders, 103*(1), 181-186.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36,* 129-148.

Brown, J. D. (1993). Self-esteem and self-evaluation: Feeling is believing. In J. Suls (Ed.), *Psychological perspectives on the self* (Vol. 4, pp. 27–58). Hillsdale, NJ: Erlbaum.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data?. *Perspectives on Psychological Science, 6(*1), 3-5.

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology, 70*(1), 141.

Carver, C.S., & White, T.L. (1994). Behavioural inhibition, behavioural activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*, 319–333.

Carver, C.S., & Scheier, M.F. (1998). *On the Self-Regulation of Behaviour.* New York: Cambridge University Press.

Chen, S. H., & Johnson, S. L. (2012). Family influences on mania-relevant cognitions and beliefs: A cognitive model of mania and reward. *Journal of Clinical Psychology, 68*(7), 829-842. doi:10.1002/jclp.21862.

Clark, D. A., Beck, A. T., & Alford, B. A. (1999). *Scientific foundations of cognitive theory and therapy of depression.* Philadelphia: Wiley.

Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience and Biobehavioral Reviews, 28*(3), 317-332. doi: http://dx.doi.org/10.1016/j.neubiorev .2004.01.005

Corry, J., Green, M., Roberts, G., Fullerton, J. M., Schofield, P. R., & Mitchell, P. B. (2017). Does perfectionism in bipolar disorder pedigrees mediate associations between anxiety/stress and mood symptoms?. *International journal of bipolar disorders*, *5*(1), 34.

Coryell, W., Endicott, J., Keller, M., Andreasen, N., Grove, W., Hirschfeld, R.M., & Scheftner, W. (1989). Bipolar affective disorder and high achievement: A familial association. *The American Journal of Psychiatry, 146,* 983–988.

Covin, R., Dozois, D. J. A., Ogniewicz, A., & Seeds, P. M. (2011). Measuring cognitive errors: Initial development of the cognitive distortions scale (CDS). *International Journal of Cognitive Therapy, 4,* 297–322.

Delduca, C. M., Jones, S. H., & Barnard, P. (2010). A preliminary investigation of the effect of hypomanic personality on the specificity and speed of autobiographical memory recall. *Memory, 18*(1), 12-26. doi:10.1080/09658210903387513

Depue, R. A. (1987). *General Behavior Inventory (assessment manual)*. Minneapolis, MN: University of Minnesota.

Depue, R. A., & Iacono, W. G. (1989). Neurobehavioural aspects of affective disorders. *Annual Review of Psychology, 40*(1), 457-492.

Devlin, H. C., Johnson, S. L., & Gruber, J. (2015). Feeling good and taking a chance? Associations of hypomania risk with cognitive and behavioral risk taking. *Cognitive therapy and research*, *39*(4), 473-479.

Dodd, A. L., Mansell, W., Morrison, A. P., & Tai, S. (2011a). Do extreme beliefs about internal states predict hypomanic symptoms in an analogue sample? *Cognitive Therapy and Research, 35,* 497–504. doi:10.1007/ s10608-010-9342-y

Dodd, A. L., Mansell, W., Morrison, A. P., & Tai, S. J. (2011b). Bipolar vulnerability and extreme appraisals of internal states. *Clinical Psychology and Psychotherapy, 18*, 387–396. doi:10.1002/cpp.779

Dodge, K. A. (1986). A social information processing model of social competence in children. In M. Perlmutter (Ed.), *Minnesota symposium on child psychology* (pp. 77-125). Hillsdale, NJ: Erlbaum.

Dozois, D. J. A. (2007). Stability of negative self-structures: A longitudinal comparison of depressed, remitted, and nonpsychiatric controls. *Journal of Clinical Psychology, 63,* 319-338.

Dozois D. J. A., & Backs-Dermott, B. J. (2000). Sociotropic personality and information processing following imaginal priming: A test of the congruency hypothesis. *Canadian Journal of Behavioural Science, 32,* 117-126.

Dozois, D. J. A., & Beck, A. T. (2008). Cognitive schemas, beliefs and assumptions. In K. Dobson & D. Dozois (Eds.), *Risk factors in depression* (pp. 119–143). San Diego, CA: Elsevier Academic Press.

Dozois, D. J. A., & Dobson, K. S. (2001a). A longitudinal investigation of information processing and cognitive organization in clinical depression: Stability of schematic interconnectedness. *Journal of Consulting and Clinical Psychology, 69*(6), 914-925.

Dozois, D. J., & Dobson, K. S. (2001b). Information processing and cognitive organization in unipolar depression: Specificity and comorbidity issues. *Journal of Abnormal Psychology, 110*, 236–246.

Dozois, D. J., & Frewen, P. A. (2006). Specificity of cognitive structure in depression and social phobia: A comparison of interpersonal and achievement content. *Journal of affective disorders*, *90*(2-3), 101-109.

Edvardsen, J., Torgersen, S., Røysamb, E., Lygren, S., Skre, I., Onstad, S., & Øien, P. A. (2008). Heritability of bipolar spectrum disorders. Unity or heterogeneity?. *Journal of affective disorders*, *106*(3), 229-240.

Eckblad, M., & Chapman, L. J. (1986). Development and validation of a scale for hypomanic personality. *Journal of Abnormal Psychology, 95*(3), 214-222.

Ehlers, C. L., Frank, E., & Kupfer, D. J. (1988). Social zeitgebers and biological rhythms: a unified approach to understanding the etiology of depression. *Archives of General Psychiatry, 45*(10), 948-952.

Eisner, L., Johnson, S. L., & Carver, C.S. (2008). Cognitive responses to failure and success relate uniquely to bipolar depression versus mania. *Journal of Abnormal Psychology, 117,* 154-163.

Eroğlu, M. Z., Karakuş, G., & Tamam, L. (2013). Bipolar disorder and suicide. Düşünen Adam: *The Journal of Psychiatry and Neurological Sciences, 26*(2), 139-147.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002). Structured Clinical Interview for DSM-IV Axis I Disorders. *New York State Psychiatric Institute.*

Feldman, G., Joormann, J., & Johnson, S. L. (2008). A self-report measure of responses to positive affect: Rumination and Dampening. *Cognitive Therapy and Research, 32,* 507–525. doi:10.1007/s10608-006-9083-0

Francis-Raniere, E. L., Alloy, L. B., & Abramson, L. Y. (2006). Depressive personality styles and bipolar spectrum disorders: Prospective tests of the event congruency hypothesis. *Bipolar Disorders, 8,* 382–399. doi:10.1111/j.1399–5618.2006.00337.x

Fulford, D., Johnson, S. L., Llabre, M. M., & Carver, C. S. (2010). Pushing and coasting in dynamic goal pursuit: Coasting is attenuated in bipolar disorder. *Psychological Science, 21,* 1021–1027. doi:10.1177/0956797610373372

Fulford, D., Johnson, S. L., & Tuchman, N. (2009). The Cognition Checklist for Mania—Revised (CCL-M-R): Factor-analytic structure and links with risk for mania, diagnoses of mania, and current symptoms. *International Journal of Cognitive Therapy, 2*, 313–324. doi: 10.1521/ijct.2009.2.4.313

Goldberg, J. F., Gerstein, R. K., Wenze, S. J., Welker, T. M., & Beck, A. T. (2008). Dysfunctional attitudes and cognitive schemas in bipolar manic and unipolar depressed outpatients: Implications for cognitively based psychotherapeutics. *The Journal of Nervous and Mental Disease, 196*(3), 207-210.

Goldstein, T. R., Ha, W., Axelson, D. A., Goldstein, B. I., Liao, F., Gill, M. K., ... & Birmaher, B. (2012). Predictors of prospectively examined suicide attempts among youth with bipolar disorder. *Archives of General Psychiatry, 69*(11), 1113-1122. doi:10.1001/archgenpsychiatry.2012.650.

Goodwin, F. K., & Jamison, K. R. (1990). *Manic-depressive illness*. New York: Oxford University Press.

Gray, J. A. (1970). The psychophysiological basis of introversion–extraversion. *Behavioral Research and Therapy, 8*, 249–266.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition & Emotion, 4*(3), 269-288.

Gruber, J., 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.

Hawke, L. D., & Provencher, M. D. (2012). Early maladaptive schemas among patients diagnosed with bipolar disorder. *Journal of Affective Disorders, 136*(3), 803-811. doi:10.1016/j.jad.2011.09.036

Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W., & Mikail, S. F. (1991). The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in psychiatric samples. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*(3), 464.

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,* 697–704. doi:10.1016/j.brat.2009.05.005

Hawke, L. D., Provencher, M. D., & Arntz, A. (2011). Early Maladaptive Schemas in the risk for bipolar spectrum disorders. *Journal of Affective Disorders, 133*(3), 428-436.

Hewitt, P. L., Flett, G. L., Ediger, E., Norton, G. R., & Flynn, C. A. (1998). Perfectionism in chronic and state symptoms of depression. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, *30*(4), 234.

Hewitt, P. L., & Flett, G. L. (1990). Perfectionism and depression: A multidimensional analysis. *Journal of social behavior and personality*, *5*(5), 423.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 3,* 319–340.

Hillson, J. M. C. (1997). An investigation of positive individualism and positive relations with others: Dimensions of positive personality (Unpublished doctoral dissertation). University of Western Ontario, London, Canada.

Ingram, R. E., Bernet, C. Z., & McLaughlin, S. C. (1994). Attentional allocation processes in individuals at risk for depression. Cognitive Therapy and Research, 18, 317-332.

Ingram, R. E., Miranda, J., & Segal, Z. V. (1998). *Cognitive vulnerability to depression.* New York, NY: Guilford Press.

Johnson, S. L., Eisner, L. R., & Carver, C. S. (2009). Elevated expectancies among persons diagnosed with bipolar disorder. *British Journal of Clinical Psychology, 48*(2), 217-222.

Jamison, K. R. (1996). *Touched with fire: Manic-depressive illness and the artistic temperament.* New York: Free Press.

Johnson, S. L., Carver, C. S., & Gotlib, I. H. (2012). Elevated ambitions for fame among persons diagnosed with bipolar I disorder. *Journal of Abnormal Psychology*, *121*(3), 602.

Johnson, S. L., Carver, C. S., & Gotlib, I. H. (2012b). Elevated ambitions for fame among persons diagnosed with bipolar I disorder. *Journal of Abnormal Psychology, 121*(3), 602-609.

Johnson, S. L., Carver, C. S., Joor, J., & Cuccaro, M. (2015). A genetic analysis of the validity of the Hypomanic Personality Scale. *Bipolar disorders*, *17*(3), 331-339.

Johnson, S. L. (2005). Life events in bipolar disorder: Towards more specific models. *Clinical Psychology Review, 25*(8), 1008-1027.

Johnson, S. L., & Carver, C. S. (2006). Extreme goal setting and vulnerability to mania among undiagnosed young adults. *Cognitive Therapy and Research, 30*(3), 377-395.

Johnson, S.L., Cuellar, A.K., Ruggero, C., Winett-Perlman, C., Goodnick, P., White, R., & Miller, I. (2008b). Life events as predictors of mania and depression in bipolar I disorder. *Journal of Abnormal Psychology, 117*, 268–277.

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.

Johnson, S. L., & Fingerhut, R. (2004). Negative cognitions predict the course of bipolar depression, not mania. *Journal of Cognitive Psychotherapy, 18*(2), 149-162.

Johnson, S. L., Fulford, D., & Carver, C. S. (2012). The Double‐Edged Sword of Goal Engagement: Consequences of Goal Pursuit in Bipolar Disorder. *Clinical Psychology & Psychotherapy*, *19*(4), 352-362.

Johnson, S. L., McKenzie, G. L., & McMurrich, S. (2008a). Ruminative responses to negative and positive affect among students diagnosed with bipolar disorder and major depressive disorder. *Cognitive Therapy and Research, 32*(5), 702–713.

Johnson, S. L., & Miller, I. (1997). Negative life events and time to recovery from episodes of bipolar disorder. *Journal of Abnormal Psychology, 106*(3), 449-457.

Johnson, S. L., Winett, C. A., Meyer, B., Greenhouse, W. J., & Miller, I. (1999). Social support and the course of bipolar disorder. *Journal of Abnormal Psychology, 108*(4), 558-566.

Jones, S. H., Mansell, W. & Waller, L. (2006). Appraisal of hypomania relevant experiences: Development of a questionnaire to assess positive self dispositional appraisals in bipolar and behavioural high risk samples. *Journal of Affective Disorders, 93,* 19–28. doi:10.1016/j.jad.2006.01.017

Jones, S. H. (2001). Circadian rhythms, multilevel models of emotion and bipolar disorder: An initial step towards integration? *Clinical Psychology Review, 21*, 1193–1209. doi:10.1016/S0272-7358(01)00111-8

Jones, S., & Day, C. (2008). Self appraisal and behavioural activation in the prediction of hypomanic personality and depressive symptoms. *Personality and Individual Differences, 45*(7), 643-648. doi:10.1016/j.paid.2008.07.008

Just, N., Abramson, L. Y., & Alloy, L. B. (2001). Remitted depression studies as tests of the cognitive vulnerability hypotheses of depression onset: A critique and conceptual analysis. *Clinical Psychology Review*, *21*(1), 63-83.

Kim, B. N., Kwon, S. M., & Meyer, T. D. (2017). Reward Sensitivity and Affect After Success: Role of Positive Attribution Bias in Korean Individuals at Risk for Bipolar Disorder. *Journal of Social and Clinical Psychology*, *36*(7), 607-627.

Knowles, R., Tai, S., Jones, S. H., Highfield, J., Morriss, R., & Bentall, R. P. (2007). Stability of self-esteem in bipolar disorder: Comparisons among remitted bipolar patients, remitted unipolar patients and healthy controls. *Bipolar Disorders, 9*(5), 490-495.

Kraepelin, E. (1921). *Manic-depressive insanity and paranoia*. Edinburgh, Scotland: Livingstone.

Kuiper, N. A., & Rogers, T. B. (1979). Encoding of personal information: Self–other differences. *Journal of Personality and Social Psychology, 37*(4), 499-514.

Kutcher, S., Robertson, H. A., & Bird, D. (1998). Premorbid functioning in adolescent onset bipolar I disorder: a preliminary report from an ongoing study. *Journal of Affective Disorders, 51*(2), 137-144.

Kwapil, T. R., Miller, M. B., Zinser, M. C., Chapman, L. J., Chapman, J., & Eckblad, M. (2000). A longitudinal study of high scorers on the Hypomanic Personality Scale. *Journal of Abnormal Psychology, 109*(2), 222-226.

Lakdawalla, Z., Hankin, B. L., & Mermelstein, R. (2007). Cognitive theories of depression in children and adolescents: A conceptual and quantitative review. *Clinical Child and Family Psychology Review, 10*(1), 1-24.

Lee, R., Lam, D., Mansell, W., & Farmer, A. (2010). Sense of hyper-positive self, goal-attainment beliefs and coping strategies in bipolar I disorder. *Psychological Medicine, 40* 967–975. doi:10.1017/S0033291709991206

Lam, D., Wright, K., & Sham, P. (2005). Sense of hyper-positive self and response to cognitive therapy in bipolar disorder. *Psychological Medicine, 35,* 69–77. doi:10.1017/S0033291704002910

Lam, D. H., Wright, K., & Smith, N. (2004). Dysfunctional assumptions in bipolar disorder. *Journal of Affective Disorders, 79*, 193–199.

Leahy R. L., & Beck A. T. (1988). Cognitive therapy of depression and mania. In A. Gorgotas & R. Cancro (Eds.), *Depression and mania* (pp. 517–537). New York: Elsevier.

Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence?. *Journal of abnormal psychology*, *90*(3), 213.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33,* 335–343.

Luten, A. G. (1995). The effects of thought suppression and expression on the maintenance of depressed and anxious emotional states (Unpublished doctoral dissertation). Northwestern University, Evanston, Illinois.

Mann-Wrobel, M. C., Carreno, J. T., & Dickinson, D. (2011). Meta-analysis of neuropsychological functioning in euthymic bipolar disorder: An update and investigation of

Mansell, W., & Scott, J. (2006). Dysfunctional beliefs in individuals with bipolar disorder. In S. Jones & R. Bentall (Eds.), *The psychology of bipolar disorder: New developments and research strategies* (pp. 73-90). New York: Oxford University Press.

Mansell, W., 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*, 515–539. doi:10.1017/S1352465807003827

Mansell, W., Rigby, Z., Tai, S., & Lowe, C. (2008). Do current beliefs predict hypomanic symptoms beyond personality style? Factor analysis of the hypomanic attitudes and positive predictions inventory (HAPPI) and its association with hypomanic symptoms in a student population. *Journal of Clinical Psychology*, *64*(4), 450-465.

Martín-Albo, J., Núñez, J. L., Navarro, J. G., & Grijalvo, F. (2007). The Rosenberg Self-Esteem Scale: translation and validation in university students. *The Spanish Journal of Psychology, 10*(2), 458-467.

Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior Research Methods, 44*(1), 1-23.

McGuffin, P., Rijsdijk, F., Andrew, M., Sham, P., Katz, R., & Cardno, A. (2003). The heritability of bipolar affective disorder and the genetic relationship to unipolar depression. *Archives of General Psychiatry, 60*(5), 497-502. doi:10.1001/archpsyc.60.5.497.

McReynolds, P., Altrocchi, J., & House, C. (2000). Self□Pluralism: Assessment and Relations to Adjustment, Life Changes, and Age. *Journal of Personality, 68*(2), 347-381.

Merikangas, K. R., Akiskal, H. S., Angst, J., Greenberg, P. E., Hirschfeld, R. M., Petukhova, M., & Kessler, R. C. (2007). Lifetime and 12-month prevalence of bipolar spectrum disorder in the National Comorbidity Survey replication. *Archives of General Psychiatry, 64*(5), 543-552.

Mitchell, P. B., Slade, T., & Andrews, G. (2004). Twelve-month prevalence and disability of DSM-IV bipolar disorder in an Australian general population survey. *Psychological Medicine, 34*(05), 777-785. doi:10.1017/S0033291703001636

Neale, J. M. (1988). Defensive function of manic episodes. In T. F. Oltmanns & B.A. Maher (Eds.), *Delusional beliefs* (pp.138-156). New York: Wiley.

Needles, D. J., & Abramson, L. Y. (1990). Positive life events, attributional style, and hopefulness: Testing a model of recovery from depression. *Journal of Abnormal Psychology*, *99*(2), 156-165.

Nilsson, A. K. K., Jørgensen, C. R., Straarup, K. N., & Licht, R. W. (2010). Severity of affective temperament and maladaptive self-schemas differentiate borderline patients, bipolar patients, and controls. *Comprehensive Psychiatry, 51*(5), 486-491.

Nusslock, R., Abramson, L. Y., Harmon-Jones, E., Alloy, L. B., & Hogan, M. E. (2007). A goal-striving life event and the onset of hypomanic and depressive episodes and symptoms: perspective from the behavioural approach system (BAS) dysregulation theory. *Journal of Abnormal Psychology, 116*(1), 105-115.

Oud, M., Mayo-Wilson, E., Braidwood, R., Schulte, P., Jones, S. H., Morriss, R., ... & Kendall, T. (2016). Psychological interventions for adults with bipolar disorder: systematic review and meta-analysis. *The British Journal of Psychiatry*, *208*(3), 213-222.

Pardoen, D., Bauwens, F., Tracy, A., Martin, F. & Mendlewicz, J. (1993). Self-esteem in recovered bipolar and unipolar outpatients. *British Journal of Psychiatry 163,* 755–762.

Peris, T. S., & Miklowitz, D. J. (2015). Parental expressed emotion and youth psychopathology: New directions for an old construct. *Child Psychiatry & Human Development*, *46*(6), 863-873.

Pontin, J. (2007). *Artificial intelligence, with help from the humans.* New York Times. March.

Pornpattananangkul, N., Hu, X., & Nusslock, R. (2015). Threat/reward-sensitivity and hypomanic-personality modulate cognitive-control and attentional neural processes to emotional stimuli. *Social cognitive and affective neuroscience*, 10(11), 1525-1536.

Power, M. J., de Jong, F., & Lloyd, A. (2002). The organization of the self-concept in bipolar disorders: An empirical study and replication. *Cognitive Therapy and Research, 26*(4), 553-561.

Power, M. J., Katz, R., McGuffin, P., Duggan, C. F., Lam, D., & Beck, A. T. (1994). The Dysfunctional Attitude Scale (DAS): A comparison of forms A and B and proposals for a new subscaled version. *Journal of Research in Personality, 28*(3), 263-276.

Pyle, A., & Mansell, W. (2010). Cognitive biases in hypomanic personality: preliminary findings indicating the relevance of self-versus-other encoding and high-versus-low levels of activation. *Behavioural and Cognitive Psychotherapy, 38*(4), 459-472. doi:10.1017/S1352465810000299

Raes, F., Daems, K., Feldman, G. C., Johnson, S., & Van Gucht, D. (2010). A psychometric evaluation of the Dutch version of the Responses to Positive Affect questionnaire. *Psychologica Belgica, 49,* 293–310. doi:10.5334/pb-49-4-293

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*(2), 151-161.

Rosenberg, M. (1965*). Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Safford, S. M., Alloy, L. B., Abramson, L. Y., & Crossfield, A. G. (2007). Negative cognitive style as a predictor of negative life events in depression-prone individuals: A test of the stress generation hypothesis. *Journal of Affective Disorders, 99,* 147–154.

Salavert, J., Caseras, X., Torrubia, R., Furest, S., Arranz, B., Dueñas, R., & San, L. (2007). The functioning of the behavioural activation and inhibition systems in bipolar I euthymic patients and its influence in subsequent episodes over an eighteen-month period. *Personality and Individual Differences, 42*(7), 1323-1331. doi:10.1016/j.paid.2006.10.010

Seeds, P. M., & Dozois, D. J. A. (2010). Prospective evaluations of a cognitive vulnerability-stress model for depression: The interaction of schema self-structures and negative life events. *Journal of Clinical Psychology, 66*, 1307-1323.

Segal, Z. V. (1988). Appraisal of the self-schema construct in cognitive models of depression. *Psychological Bulletin, 103*, 147–162.

Segal, Z. V, Kennedy, S., Gemar, M., Hood, K., Pedersen, R., & Buis, T. (2006). Cognitive reactivity to sad mood provocation and the prediction of depressive relapse. *Archives of General Psychiatry, 63*, 749–755.

Scott, L., & O'Hara, M. W. (1993). Self-discrepancies in clinically anxious and depressed university students. *Journal of Abnormal Psychology, 102*(2), 282-287.

Scott, J., Stanton, B., Garland, A., & Ferrier, I. N. (2000). Cognitive vulnerability in patients with bipolar disorder. *Psychological Medicine, 30*(2), 467-472.

Sheehan, D. V., Lecrubier, Y., Harnett-Sheehan, K., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R, & Dunbar, G. (1998). The M.I.N.I. International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview. *Journal of Clinical Psychiatry, 59,* 22-33.

Showers, C. (1992). Compartmentalization of positive and negative self-knowledge: Keeping bad apples out of the bunch. *Journal of Personality and Social Psychology, 62*(6), 1036-1049.

Sinclair, S. J., Blais, M. A., Gansler, D. A., Sandberg, E., Bistis, K., & LoCicero, A. (2010). Psychometric properties of the Rosenberg Self-Esteem Scale: Overall and across demographic groups living within the United States. *Evaluation & The Health Professions, 33*(1), 56-80.

Sobel, M. E. (1982). Asymptotic intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), *Sociological methodology 1982* (pp.290-312). San Francisco: Jossey-Bass.

Stanton, K., Daly, E., Stasik-O'Brien, S. M., Ellickson-Larew, S., Clark, L. A., & Watson, D. (2017). An integrative analysis of the Narcissistic Personality Inventory and the Hypomanic Personality Scale: Implications for construct validity. *Assessment*, *24*(6), 695-711.

Stanton, K., McArtor, D. B., & Watson, D. (2019). Parsing the hypomanic personality: Explicating the nature of specific dimensions defining mania risk. *Assessment, 26*(3), 492-507.

Strauman, T. J. (1989). Self-discrepancies in clinical depression and social phobia: Cognitive structures that underlie emotional disorders?. *Journal of Abnormal Psychology, 98*(1), 14-22.

Strauman, T. J. (1996). Stability within the self: A longitudinal study of the structural implications of self-discrepancy theory. *Journal of Personality and Social Psychology, 71*(6), 1142.

Taylor, J. L., Morley, S., & Barton, S. B. (2007). Self-organization in bipolar disorder: Compartmentalization and self-complexity. *Cognitive Therapy and Research, 31*(1), 83-96.

Tharp, J. A., Johnson, S. L., Sinclair, S., & Kumar, S. (2016). Goals in bipolar I disorder: Big dreams predict more mania. *Motivation and Emotion, 40*(2), 290-299.

Urošević, S., Abramson, L. Y., Harmon-Jones, E., & Alloy, L. B. (2008). Dysregulation of the behavioural approach system (BAS) in bipolar spectrum disorders: Review of theory and evidence. *Clinical Psychology Review, 28*(7), 1188-1205. doi:10.1016/j.cpr.2008.04.004

Urošević, S., Abramson, L. Y., Alloy, L. B., Nusslock, R., Harmon-Jones, E., Bender, R., & Hogan, M. E. (2010). Increased rates of events that activate or deactivate the behavioral approach system, but not events related to goal attainment, in bipolar spectrum disorders. *Journal of Abnormal Psychology, 119*(3), 610-615.

Vallerand, R.J., Blanchard, C., Mageau, G.A., Koestner, R., Ratelle, C.F., Leonard, M., Gagné, M., & Marsolais, J. (2003). Les passions de l'âme: On obsessive and harmonious passions. *Journal of Personality and Social Psychology*, *85*, 756-767.

Van der Gucht, E., Morriss, R., Lancaster, G., Kinderman, P., & Bentall, R. P. (2009). Psychological processes in bipolar affective disorder: Negative cognitive style and reward processing. *The British Journal of Psychiatry, 194*(2), 146-151.

Walsh, M. A., DeGeorge, D. P., Barrantes-Vidal, N., & Kwapil, T. R. (2015). A 3-year longitudinal study of risk for bipolar spectrum psychopathology. *Journal of abnormal psychology*, *124*(3), 486.

Wright, K.A., Lam, D., & Brown, R.G. (2008). Dysregulation of the behavioural activation system in remitted bipolar I disorder. *Journal of Abnormal Psychology, 117*, 838–848.

Wright, K.A., Lam, D., & Newsom-Davis, I. (2005). Induced mood change and dysfunctional attitudes in remitted bipolar I affective disorder. *Journal of Abnormal Psychology, 114,* 689–696. doi:10.1037/0021–843X.114.4.689

World Health Organization (WHO). 2008. *The Global Burden of Disease: 2004 Update.* Geneva: World Health Organization.

World Health Organization (WHO). (1990). Composite International Diagnostic Interview (CIDI, Version 1.0). Geneva: World Health Organization.

Young, J. E. (2005). *Young Schema Questionnaire – Short Form 3 (YSQ-S3).* New York, NY: Cognitive Therapy Center.

Young, J. (1990). *Cognitive therapy for personality disorders: A schema-focused approach.* Sarasota, FL: Professional Resource Exchange.

Young, J. (1999). Cognitive therapy for personality disorders: A schema-focused approach (3rd ed.). Sarasota, FL: Professional Resource Exchange

Young, J. E., & Brown, G. (1994). Young schema questionnaire. (2nd. Ed.). In J. E. Young (Ed.), *Cognitive therapy for personality disorders: A schema-focused approach* (Rev. ed., pp. 63–76). Sarasota, FL: Professional Resource Press.

Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). Schema therapy: A practitioner's guide. New York: Guilford Press.

Young, R. C., Biggs, J. T., Ziegler, V. E., & Meyer, D. A. (1978). A rating scale for mania: reliability, validity and sensitivity. *The British Journal of Psychiatry*, *133*(5), 429-435.

Zimmerman, M., & Coryell, W. (1987). The inventory to diagnose depression, lifetime version. *Acta Psychiatrica Scandinavica, 75*(5), 495-499.

Appendices

Appendix A: Psychological Distance Scaling Task – Word List

Interpersonal Positive

Admired, Caring, Comforted, Comical, Considerate, Desirable, Devoted, Encouraged, Generous, Humorous, Joyful, Kind, Playful, Outgoing, Neighbourly, Romantic, Supported, Trustworthy, Understanding, Valuable

Interpersonal Negative

Alone, Annoying, Conceited, Demanding, Dependent, Deserted, Shy, Forsaken, Dull, Lonely, Overbearing, Pushy, Quarrelsome, Rejected, Resentful, Shunned, Snobbish, Unfriendly, Unloved, Unwanted

Achievement Positive

Achieving, Ambitious, Capable, Driven, Eager, Efficient, Exceptional, Gifted, Impressive, Intelligent, Extraordinary, Outstanding, Marvellous, Remarkable, Respected, Skillful, Striving, Successful, Superior, Talented

Achievement Negative

Aimless, Apathetic, Beaten, Criticized, Defeated, Deficient, Destroyed, Failure, Hasty, Helpless, Hurried, Inadequate, Incompetent, Inferior, Insignificant, Lazy, Stagnant, Stupid, Useless, Worthless

Appendix B: Mood Induction Procedures

POSITIVE MOOD INDUCTION:

In this part of the experiment, we will ask you to participate in an exercise that is meant to create a temporary positive mood state. We'd like you to think about a goal that is important to you and imagine that you have achieved it. This goal could be anything – it could be a success in the workplace, achieving a dream in a love or family relationship, an achievement of recognition for something that is important to you, or many other things.

Bring to mind a goal that is very important to you and which would make you very happy if you achieved it. First take some time to describe this goal.

What about your goal makes it important to you?
What would you think and feel if you achieved it?
Are there other people there? What would you see, hear, smell, feel, etc?

Now we're going to ask you to spend some time imagining that you have achieved this goal. First, try and clear your mind for 30 seconds. When you hear the bell, begin imagining this scenario. To help create a happy mood, please try to vividly imagine achieving this goal and how this would make you feel. When you hear the bell a second time, please answer the questions onscreen.

(Participants visualize for 2 minutes)

Manipulation check:
How did you feel while imagining that you achieved this goal? (-4 to 4 scale, where -4 is extremely negative, 0 Is neutral and 4 is extremely positive)
Did you think of anything else besides achieving your goal just now?
What emotions did you feel, if any?

Name the emotion and rate it on a 0-8 scale, where 0 Is no emotion and 8 is the strongest manifestation of that emotion in your entire life.

NEUTRAL EMOTION INDUCTION:

In this part of the experiment, we will ask you to participate in mental imagery exercise. We'd like you to think about doing some routine shopping in a store and imagine that you are doing it in this moment. The type of shopping should be part of your regular routine – such as going to a grocery store, drug store, etc.

Bring to mind an example of regular shopping you do as part of your living routine. First take some time to describe this situation.

What store and type of shopping are you thinking of?
What would you think and feel while doing the shopping?
Are there other people there? What would you see, hear, smell, feel, etc?

Now we're going to ask you to spend some time imagining that you are doing this shopping in the store.

First, try and clear your mind for 30 seconds. When you hear the bell, begin imagining this scenario. To help to create the mental imagery, please try to vividly imagine you are doing this shopping and how this would make you feel. When you hear the bell a second time, please answer the questions onscreen.

(Participants visualize for 2 minutes)

Manipulation check:

How did you feel while imagining that you were shopping? (-4 to 4 scale, where -4 is extremely negative, 0 Is neutral and 4 is extremely positive)

Did you think of anything else besides doing this routine shopping just now?

What emotions did you feel, if any?

Name the emotion and rate it on a 0-8 scale, where 0 Is no emotion and 8 is the strongest manifestation of that emotion in your entire life.

Appendix C: Study 1 and 2 Ethics Approval Notice

Western Research

Research Ethics

Western University Non-Medical Research Ethics Board
NMREB Delegated Initial Approval Notice

Principal Investigator: Prof. Nick Kuiper
Department & Institution: Social Science\Psychology,Western University

NMREB File Number: 109539
Study Title: Personality and Mood

NMREB Initial Approval Date: August 17, 2017
NMREB Expiry Date: August 17, 2018

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Western University Protocol	Received August 3, 2017	
Advertisement	Cross-Sectional Study - Received July 7, 2017	
Advertisement	Longitudinal Study - Received July 7, 2017	
Letter of Information & Consent	Cross-Sectional Study	2017/07/26
Letter of Information & Consent	Longitudinal Study	2017/07/26
Instruments	Altman Self-Rating Mania Scale - Received July 7, 2017	
Instruments	Cognitive Distortions Scale - Received August 3, 2017	
Instruments	DASS Depression Subscale - Received July 7, 2017	
Instruments	Dysfunctional Attitudes Scale (GA subscale) - Received July 7, 2017	
Instruments	Hypomanic Personality Scale - Received August 3, 2017	
Instruments	Mood Induction Procedures - Received July 7, 2017	
Instruments	Passion Scale - Received July 7, 2017	
Instruments	Positive Belief Statements Scale - Received July 7, 2017	
Instruments	PDST - Instructions and Stimuli - Received July 7, 2017	
Instruments	Rosenberg Self-Esteem Inventory - Received July 7, 2017	
Instruments	Multidimensional Perfectionism Scale - Received August 3, 2017	
Instruments	Careful Responding Questions - Received July 7, 2017	
Instruments	Life Events Scale - Received August 3, 2017	
Instruments	Intro Video Scripts - Received July 7, 2017	
Instruments	Video URLs - Received August 3, 2017	
Instruments	Demographic Questions - Received August 3, 2017	
Other	Debriefing Letter for Cross-Sectional Study	2017/07/26
Other	Debriefing Letter for Longitudinal Study	2017/07/26

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

[redacted]
Ethics Officer, on behalf of Dr. Randal Graham, NMREB Chair or delegated board member

EO: Erika Basile___ Grace Kelly ___ Katelyn Harris✓ Nicola Morphet___ Karen Gopaul___ Patricia Sargeant___

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Appendix D: Simple Correlations among Study 1 Major Measures

Correlations between the Mania and Mood Symptomatology Measures

	ASRM	DASS-21
HPS	.47**	.15*

Correlations between the Self-Schema Content Measures.

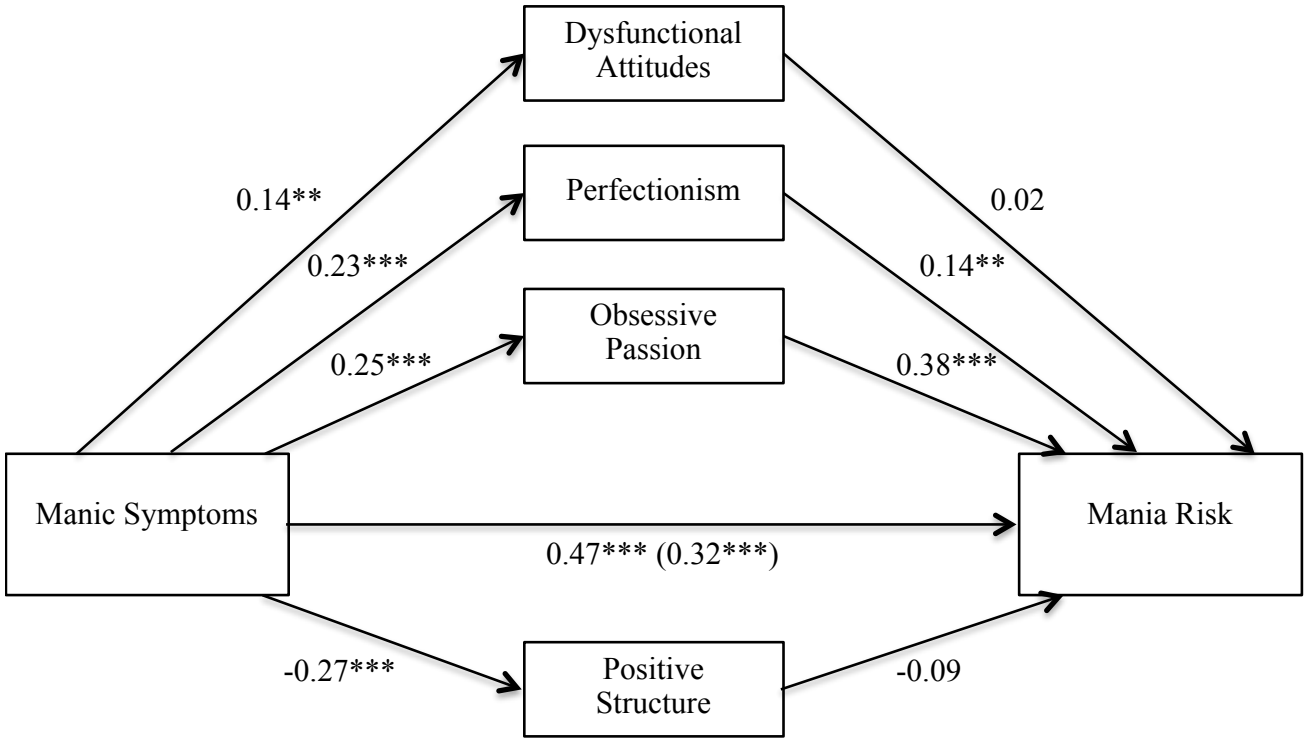
	DAS	CDS-I	CDS-A	PBS	PS- H	PS-O	MPS-SF	MPS-O	MPS-S
DAS		.20***	.17***	.21***	.12*	.33***	.42***	.22***	.23***
CDS-I			.84***	-.34***	-.17**	.30***	.23***	.17**	.39***
CDS-A				-.35***	-.14**	.30***	.21***	.10*	.41***
PBS					.53***	.04	.13**	.05	-.32***
PS-H						.18***	.07	-.14**	-.23**
PS-O				.			.18***	.19***	.29***
MS-SF								.56***	.43***
MS-O									.42***

Correlations between the Self-Schema Structure Domains.

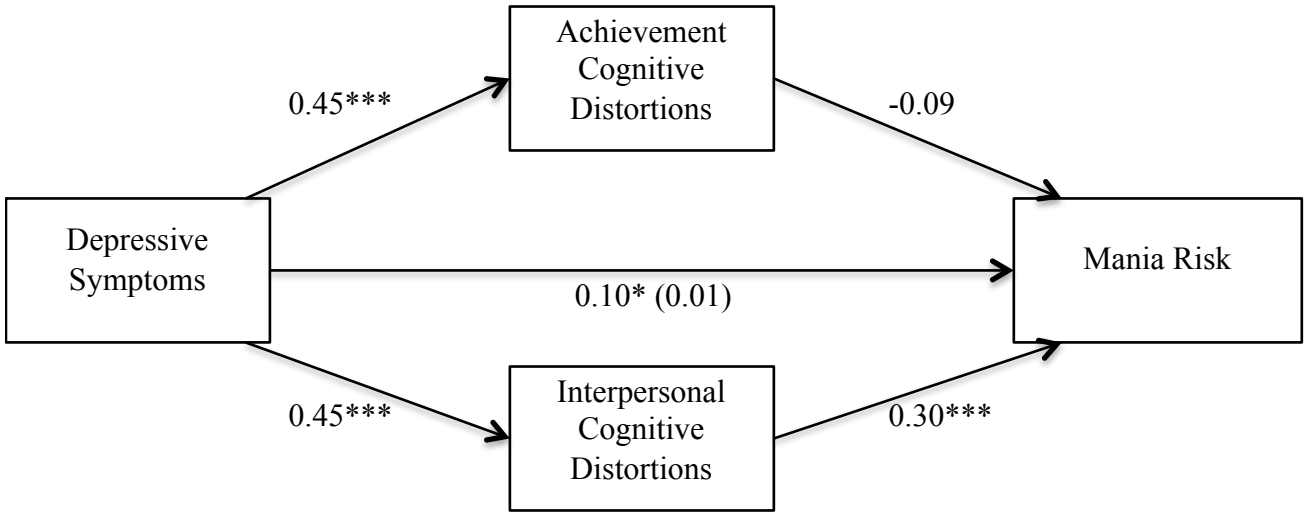
	PDST-AP	PDST-AN	PDST-IP	PDST-IN
PDST-AP		-.33***	.71***	-.10
PDST-AN			-.26***	.54***
PDST-IP				-.19**

Notes. HPS = Hypomanic Personality Scale; ASRM = Altman Self-Rating Mania Scale; DASS-21 = Depression, Anxiety, and Stress Scales-21, Depression subscale; DAS = Dysfunctional Attitudes Scale, Goal Attainment Subscale; CDS- I = Cognitive Distortions Scale, Interpersonal Subscale; CDS-A = Cognitive Distortions Scale, Achievement Subscale; PBS = Positive Belief Statements Scale, Fulfillment Subscale; PS-O = Passion Scale, Obsessive Subscale; PS-H = Passion Scale, Harmonious Subscale; MPS-S = Multidimensional Perfectionism Scale, Self-Oriented Subscale; MPS-O = Multidimensional Perfectionism Scale, Other-Oriented Subscale; MPS-SP = Multidimensional Perfectionism Scale, Socially Prescribed Subscale; PDST = Psychological Distance Scaling Task; AP = Achievement Positive; AN = Achievement Negative; IP = Interpersonal Positive; IN = Interpersonal Negative. ***$p < .001$, **$p <.0$, *$p < .05$.

Appendix E: Study 1 Mediation Analyses – Reverse Models



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Dysfunctional Attitudes, β = -.00; Socially-Prescribed Perfectionism, β = .03*; Obsessive Passion, β = .09*; Positive Structure, β = .02; Total indirect effect, β = .14*. *p < .05, **p < .01, ***p < .001.



Notes. Values represent standardized regression coefficients. The estimated direct effect is presented in parentheses. The estimated indirect effects were as follows: Achievement Cognitive Distortions, β = -.04; Interpersonal Cognitive Distortions, β = .14*; Total indirect effect, β = .09*. *p < .05, ***p < .001.

Appendix F: Study 2 Descriptive Statistics

Time 1 Descriptive Statistics for Major Measures

Category	Measure	*M*	*SD*	Range	Reliability
Mania	HPS Activation	2.09	2.39	0-9	.80
Mood Symptomatology	ASRM	4.48	4.39	0-20	.84
	DASS-21	4.63	5.16	0-21	.94

Time 2 Descriptive Statistics for Major Measures

Category	Measure	*M*	*SD*	Range	Reliability
Mood Symptomatology	ASRM	5.77	4.33	0-19	.83
	DASS-21	3.46	4.27	0-21	.93
Self-Schema Structure	PDST Overall Positive	0.81	0.66	-1.46-2.96	
	PDST Overall Negative	2.32	1.02	-0.21-4.59	
	PDST-AP	0.45	0.44	-0.75-2.20	
	PDST-AN	1.40	0.60	-0.05-2.50	
	PDST-IP	0.37	0.28	-0.71-1.29	
	PDST-IN	1.27	0.56	-0.19-2.42	
Life Events	Positive	19.74	19.71	0-104	
	Goal Attainment	13.44	15.17	0-85	
	BAS-Activating	22.25	23.14	0-123	
	Negative	52.56	69.81	0-315	
	BAS-Deactivating	47.81	63.74	0-287	
Self-Esteem	RSEI Total	32.50	6.14	10-40	.92

Time 3 Descriptive Statistics for Major Measures

Category	Measure	*M*	*SD*	Range	Reliability
Mood Symptomatology	ASRM	5.18	4.18	0-16	.80
	DASS-21	3.96	5.01	0-21	.94
Self-Schema Content	CDS-A	39.38	12.63	10-70	.88
	CDS-I	39.50	12.27	10-70	.87
	PBS	38.09	8.53	7-49	.91
Self-Schema Structure	PDST Overall Positive	0.82	0.58	-0.87-2.85	
	PDST Overall Negative	2.60	0.97	0.51-4.68	
	PDST-AP	0.46	0.40	-0.46-2.16	
	PDST-AN	1.27	0.61	0.10-2.51	
	PDST-IP	0.37	0.29	-0.41-1.43	
	PDST-IN	1.31	0.56	-0.49-2.49	
Self-Esteem	RSEI Total	31.65	7.03	10-40	.94

Time 4 Descriptive Statistics for Major Measures

Category	Measure	*M*	*SD*	Range	Reliability
Mood Symptomatology	ASRM	5.54	4.68	0-16	.83
	DASS-21	3.97	4.93	0-21	.95
Life Events	Positive	16.98	16.14	0-60	
	Goal Attainment	11.26	12.74	0-55	
	BAS-Activating	18.42	19.96	0-88	
	Negative	45.38	56.03	0-265	
	BAS-Deactivating	41.33	51.44	0-265	
Self-Esteem	RSEI Total	32.00	7.10	10-40	.94

Other Descriptive Statistics for Major Measures

Category	*M*	*SD*	Range
Average Manic Symptoms T1-T4	4.27	4.52	0-20
Average Depressive Symptoms T1-T4	4.93	5.46	0-21
PDST Positive Difference T2-T3	0.33	0.34	0-2.13
PDST Negative Difference T2-T3	0.38	0.27	0.01-0.27
PDST AP Difference T2-T3	0.22	0.20	0-0.11
PDST AN Difference T2-T3	0.41	0.40	0-1.70
PDST IP Difference T2-T3	0.16	0.18	0-1.09
PDST IN Difference T2-T3	0.38	0.29	0.01-1.09
Self-Esteem Variability T2-T4	1.77	1.67	0-7.78
Average Self-Esteem T2-T4	31.76	6.36	10-40

Note. N = 438-455 for all measures. HPS = Hypomanic Personality Scale, Activation subscale; ASRM = Altman Self-Rating Mania Scale; DASS-21 = Depression, Anxiety, and Stress Scales – 21, Depression Subscale; PSDT = Psychological Distance Scaling Task; AP = Achievement Positive; AN = Achievement Negative; IP = Interpersonal Positive; IN = Interpersonal Negative; CDS-A = Cognitive Distortions Scale, Achievement Subscale; CDS- I = Cognitive Distortions Scale, Interpersonal Subscale; PBS = Positive Belief Statements Scale, Fulfillment Subscale; RSEI = Rosenberg Self-Esteem Inventory; T1 = Time 1, T2 = Time 2, T3 = Time 3, T4 = Time 4.

Appendix G: Study 2 Simple Correlations between Mood Symptoms and Life Events

Correlations between Positive Life Events at Time 2 and Manic Symptoms.

	Positive T2	BAS-Activating T2	Goal Attainment T2
Manic T2	.27**	.16^{+}	.28**
Manic T3	.17^{+}	.08	.11
Manic T4	.21*	.09	.23*
Average Manic	.35**	.25**	.33**

Correlations between Positive Life Events at Time 4 and Manic Symptoms.

	Positive T4	BAS-Activating T4	Goal Attainment T4
Manic T4	.37**	.06	.39**
Average Manic	.35**	.12	.39**

Correlations between Negative Life Events and Manic Symptoms.

	Negative T2	BAS-Deactivating	Negative T4	BAS-
Manic T2	.04	.05		
Manic T3	.00	.01		
Manic T4	.00	.02	-.07	-.05
Average	.13	.14	.04	.05

Correlations between Negative Life Events and Depressive Symptoms.

	Negative T2	BAS-Deactivating T2	Negative T4	BAS-Deactivating T4
Depression T2	.52**	.53**		
Depression T3	.43**	.45**		
Depression T4	.48**	.50**	.51**	.52**
Average	.51**	.52**	.52**	.53**

Notes. Manic = Manic symptoms; T2= Time 2; T3 = Time 3; T4 = Time 4; Average Manic = Average number of manic symptoms reported across the entire study; Positive = General Positive Life Events; BAS-Activating = BAS-Activating Events; Goal Attainment = Goal Attainment Events; Depression= Depressive symptoms; Average Depression = Average number of depressive symptoms reported across the entire study; Negative = General Negative Life Events; BAS-Deactivating = BAS-Deactivating Events. ** = $p < .01$, * = $p < .05$, $^{+}$ = $p < .08$

Appendix H: Study 3 Ethics Approval Notice

Western Research

Research Ethics

Western University Non-Medical Research Ethics Board
NMREB Delegated Initial Approval Notice

Principal Investigator: Prof. Nick Kuiper
Department & Institution: Social Science\Psychology,Western University

NMREB File Number: 109653
Study Title: Mood and Life Events Study

NMREB Initial Approval Date: September 25, 2017
NMREB Expiry Date: September 26, 2018

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Letter of Information & Consent	Phase I	2017/09/13
Letter of Information & Consent	Phase III	2017/09/13
Letter of Information & Consent	Phase II	2017/09/13
Other	Debriefing Letter for Phase II	2017/09/13
Other	Debriefing Letter for Phase III	2017/09/13
Other	Debriefing Letter for Phase II	2017/09/13
Other	Debriefing Letter for Phase I	2017/09/13
Advertisement	SONA ad (Phase I-III)	2017/09/14
Instruments	Intro Video Script	2017/08/04
Instruments	Video URLs	2017/08/04
Instruments	MINI - Edited Instructions	2017/09/13
Instruments	HPS	2017/08/04
Instruments	BAS Scale	2017/08/04
Instruments	Multidimensional Perfectionism Scale	2017/08/04
Instruments	Rosenberg Self-Esteem Inventory (RSEI)	2017/08/04
Instruments	Life Events Scale	2017/08/04
Instruments	PDST Stimuli	2017/08/04
Instruments	Positive MIP	2017/08/04
Instruments	Passion Scale	2017/08/04
Instruments	Positive Belief Statements Scale (PBS)	2017/08/04
Instruments	Dysfunctional Attitudes Scale (Goal Attainment subscale)	2017/08/04
Instruments	Cognition Distortions Scale (CDS)	2017/08/04
Instruments	DASS-21 Depression subscale	2017/08/04
Instruments	Demographic Questions	2017/08/04
Instruments	Altman Self-Rating Mania Scale (ASRM)	2017/08/04
Revised Western University Protocol	Received September 24, 2017	

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

[redacted]

Ethics Officer, on behalf of Dr. Randal Graham, NMREB Chair or delegated board member

EO: Erika Basile __ Grace Kelly __ Katelyn Harris __ Nicola Morphet __ Karen Gopaul __ Patricia Sargeant __ Kelly Patterson __

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Appendix I: Study 3 Descriptive Statistics

Category	Measure	*M*	*SD*	Range	Reliability
Mania	HPS Activation	3.25	2.54	0-9	.86
Mood Symptomatology	ASRM	4.27	4.52	0-20	.80
	DASS-21	4.93	5.46	0-21	.90
Self-Schema Content	DAS	26.37	6.79	6-42	.80
	PS-O	19.39	8.17	6-42	.83
	PS-H	29.43	6.84	12-42	.81
Self-Schema Structure	PDST Overall Positive	0.86	0.49	-1.35-3.56	
	PDST Overall Negative	2.41	0.90	-0.52-5.03	
	PDST-AP	0.49	0.34	-0.65-2.31	
	PDST-AN	1.27	0.55	-0.36-2.64	
	PDST-IP	0.38	0.21	-0.66-1.53	
	PDST-IN	1.22	0.47	-0.20-2.55	
Life Events	Positive	53.40	31.57	0-186	
	Goal Attainment	29.30	20.13	0-113	
	BAS-Activating	48.30	30.44	0-153	
	Negative	58.93	48.10	0-277	
	BAS-Deactivating	45.77	40.73	0-237	

Appendix J: Study 3 Moderation Results for Self-Schema Content

Three-Way Interactions: Positive Events

Self-Schema Content	β	Model
Dysfunctional Attitudes – Goal Attainment	HPS (.30)*** DAS (.11)** LES Positive (.11)** HPSxDAS (.02) HPSxLES (-.02) DASxLES (-.01) HPSxDASxLES (.01)	$F = 11.42$, $R^2 = 13$, $p < .001$
Obsessive Passion	HPS (.30)*** Obsessive (.11)** LES Goal (.13)** HPSxObsessive (.02) HPSxLES (.01) ObsessivexLES (-.01) HPSxObsessivexLES (-.04)	$F = 11.72$, $R^2 = 13$, $p < .001$

Three-Way Interactions: Goal Attainment Events

Self-Schema Content	β	Model
Dysfunctional Attitudes – Goal Attainment	HPS (.30)*** DAS (.11)** LES Positive (.11)** HPSxDAS (.01) HPSxLES (-.01) DASxLES (-.02) HPSxDASxLES (.01)	$F = 11.42$, $R^2 = 13$, $p < .001$
Obsessive Passion	HPS (.29)*** Obsessive (.10)* LES Goal (.12)** HPSxObsessive (-.05) HPSxLES (.01) ObsessivexLES (-.02) HPSxObsessjvexLES (.04)	$F = 11.69$, $R^2 = 13$, $p < .001$

Notes. HPS = Hypomanic Personality Scale; DAS = Dysfunctional Attitudes Scale, Goal Attainment subscale; LES – Life Events Scale; Obsessive = Obsessive Passion; Positive = Positive Events; Goal = Goal Attainment Events. Values in parentheses represent corresponding standardized regression coefficients. *$p < .05$, **$p < .01$, ***$p < .001$.

Curriculum Vitae

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Post-secondary Education and Degrees:

Brescia University College
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2016-2019

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University of Western Ontario
2012-2018

Associate Vice-President's Innovation Award
University of Western Ontario
2016

Ontario Graduate Scholarship
Ministry of Training, Colleges and Universities
2013-2015

Joseph-Armand Bombardier Canada Graduate Scholarship: Masters

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2012-2013

Principal's Entrance Scholarship, Graduation with Distinction, Dean's Honour Roll, Merici Award in Arts and Social Science, Dr. Pat Devolder Award, Subject Awards (Mathematics, Food and Nutrition)
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Lab Coordinator
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Research Assistant
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Publications:

Geller, J., **Maiolino, N**., Samson, L., & S. Srikameswaran. (Accepted). Is experiencing care as collaborative associated with enhanced outcomes in inpatient eating disorders treatment? *Eating Disorders: The Journal of Treatment & Prevention,* 1-22.

Maiolino, N., & Martin, R. A. (2017). Dissociative and somatic symptom and related disorders. In D. Dozois (Ed.), *Abnormal Psychology: Perspectives (6th edition).* Pearson Canada.

Kuiper, N. A., & **Maiolino, N.** (2017). Humor in business and society: The impact of individual differences in sense of humor. In F. Maon, A. Lindgreen, J. Vanhamme, R. J. Angell, & J. Memery (Eds.), *Humor in Business and Society Relationships: A Research Anthology.* Gower Publishers.

Maiolino, N. & Kuiper, N. A. (2016). Examining the impact of a brief humor exercise on psychological well-being. *Translational Issues in Psychological Science, Special Issue: The Psychology of Humor, 2*, 4-13.

Kuiper, N. A., & **Maiolino, N.** (2016). Identity and intimacy development, humor styles, and psychological well-being. *Identity: An International Journal of Theory and Research, 16*(2), 115-125.

Kuiper, N. A., Klein, D., Vertes, J. & **Maiolino, N.** (2014). Humor styles and the intolerance of uncertainty model of generalized anxiety. *Europe's Journal of Psychology: Special Issue on Humor, Well-being & Health, 10*(3), 543-556.

Maiolino, N., & Kuiper, N. A. (2014). Integrating humor and positive psychology approaches to psychological well-being. *Europe's Journal of Psychology: Special Issue on Humor, Well-being & Health, 10*, 557-570.

Kuiper, N. A., Comeau, C., Klein, D. & **Maiolino, N.** (2014). The role of humor styles in the Clark & Wells Model of Social Anxiety. *Israeli Journal of Humor Research: An International Journal, 6,* 14-36.

Conference Presentations:

Maiolino, N., Samson, L., Srikameswaran, S., & J. Geller. (June, 2019). *Does experiencing care as collaborative enhance eating disorders treatment outcome?* Poster presented at UBC Psychiatry Research Conference, Vancouver, BC.

Williamson, E., **Maiolino, N.** & Kuiper, N. A. (May, 2019). *Relationships between Mania, Depression and Positive Psychology Attributes.* Poster presentation for the 80th Annual Convention of the Canadian Psychological Association, Halifax, BC.

Maiolino, N. & Kuiper, N. A. (June, 2016). *A meta-analytic review of the efficacy of cognitive-behavioural therapy for bipolar disorder.* Poster accepted for the 77th Annual Convention of the Canadian Psychological Association, Victoria, BC.

Maiolino, N. & Kuiper, N. A. (October, 2015). *The psychology of mania: An integrative model of goal-striving and self-evaluative disturbance.* Poster presentation at the 2015 meeting of the Society for Research in Psychopathology, New Orleans, LA.

Maiolino, N. & Kuiper, N. A. (June, 2015). *Positive life orientation: Establishing the existence of a broad, positive disposition.* Poster presentation at the 76th Annual Convention of the Canadian Psychological Association, Ottawa, ON.

Comeau, C., Kuiper, N. A., & **Maiolino, N.** (June, 2015). *The role of humor styles in the Clark and Wells model of social anxiety.* Poster presentation at the 76th Annual Convention of the Canadian Psychological Association, Ottawa, ON.

Maiolino, N. & Kuiper, N. A. (July, 2014). *Examining the effects of positive psychology and humor exercises on well-being: An integrative perspective.* Poster accepted for the European Conference on Positive Psychology, Amsterdam, Netherlands.

Maiolino, N. & Kuiper, N. A. (June, 2013). *Integrating positive psychology and humor approaches to well-being.* Poster presentation at the 74th Annual Convention of the Canadian Psychological Association, Quebec City, QC.

Pound, M.S., Kuiper, N. A, & **Maiolino, N.** (June, 2013). *Receiving emotional support and the experience of daily affect.* Poster presentation at the 74th Annual Convention of the Canadian Psychological Association, Quebec City, QC.

Maiolino, N., & Mitchell, J. B. (April, 2011). *The impact of elevation on cooperation and altruism: An evolutionary perspective.* Paper presented at the Annual Ontario Psychology Undergraduate Thesis Conference, Guelph, ON.