Do cognitive responses to how we feel really matter?
a psychometric evaluation and experimental extension of the Responses to Positive Affect questionnaire (RPA)

Abstract

This study aims to investigate cognitive response styles to positive affect. A Swedish version of the Responses to Positive Affect questionnaire (RPA) was psychometrically evaluated and experimentally tested as participants were mood induced. The 3-factor model for the RPA questionnaire (Self-focused positive rumination, Emotion-focused positive rumination and Dampening) was replicated, and the RPA was further explored through analyses of convergent and incremental validity. The experimental results revealed that the two positive rumination subscales had a strong relationship with each other and current positive affect. However, none of the RPA subscales functioned as moderators in the relationship between cognitive response style and participants’ mood reactivity.

Key Words: cognitive response style, psychometric evaluation, emotion regulation, mood induction, response to positive affect

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1. Introduction

Emotions and cognitions are intimately tied psychological processes and are a traditional focus of many therapeutic interventions (Hayes, 2004; Hayes, Strosahl & Wilson, 1999; Linehan, 1993). While a lot of scientific attention has been devoted to the relationship between negative cognitive response styles such as rumination and negative affective states, not nearly as much focus has been devoted to the relationship between cognitive processes and positive affective states. However, elevated scores on measures of positive cognitive response styles have recently been shown to be related to hypomanic states and often appear among persons at risk of or diagnosed with bipolar disorder (Johnson & Jones, 2009). This shows that cognitive response styles in relation to positive affective states may be important. We propose that there is still a gap within the research field of cognitive response styles, specifically in relation to positive emotions. Moreover, there is currently no questionnaire in Swedish that captures the phenomenon of cognitive response style in relation to positive affect. This study aims to investigate the relationship between cognitive style and emotions. More specifically, the psychometric properties of a new instrument that measures cognitive responses to positive affect will be investigated, as well as, whether cognitive response style interacts with changes in emotional state during an experimental manipulation constructed to evoke positive affect.

1.1 Affect, mood and emotion

Although denoting similar experiences, the constructs of affect, mood and emotion have somewhat differential definitions. Both ‘mood’ and ‘emotion’ are considered experiential and somewhat overlapping, however, they may be distinguished from one another as they differ in intensity and duration. Emotions tend to be more intense and relatively shorter than moods. Also,
while emotions often have a concrete object of reference, the causes of mood states may be difficult to establish (Larsen, 2000).

The term ‘affect’, however, denotes a broader experiential ‘tone’. More specifically, affect is defined as “the feeling tone associated with mood and emotion, and /…/ primarily evaluative” (Larsen, 2000, p.3). This definition of ‘affect’ is further supported by the proposition that ‘affect’ is a good-bad discriminative superordinate category that includes emotions, moods, stress responses and other motivational impulses. Thus, affect, mood and emotion overlap and are interrelated but may differ in their specificity, duration and the proposed intensity of experience. However, although the terms may be theoretically distinguishable, the level of measurement in most studies (such as self-report) may practically not support distinguishing these processes nor is it necessary to differentiate them for the purpose of this study. Moreover, a clear distinction between these different affective processes is practically non-existent throughout the research literature (Gross & Thompson, 2007). Therefore, these terms will be used interchangeably throughout the text.

1.2 Emotion regulation

The experience and regulation of positive and negative emotion is an intricate and multidimensional process. It can be modeled to consist of several parts. Some of these are intrinsic (in the individual) and some are extrinsic (outside the individual). Also, the parts can either be defined as conscious/effortful or unconscious/effortless. Moreover, depending on an individual’s goal, emotion regulation may serve to intensify, maintain or dampen an already existing emotion (Gross & Thompson, 2007). Hence, the concept of cognitive response style may be viewed as an emotional regulatory process, occurring on the level of thought. More specifically, this study concerns intrinsic processes and regulation of positive emotion from a
cognitive perspective, i.e. it investigates whether peoples’ thoughts may interact with their positive emotions in order to either increase or decrease the intensity and duration of the emotion. Interestingly, cognitive emotion regulation may also be viewed as a transdiagnostic process (Aldao & Nolen-Hoeksema, 2010; Kring & Sloan, 2010; Wilamowska et al, 2010), occurring across diagnostic categories of psychological disorders. Anxiety, depression, eating disorders and alcohol abuse have been mentioned as examples of diagnostic categories where these processes have been noted (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

Figure 1 illustrates a modal model of emotion regulation, where the concept of cognitive response style may be seen as one component (Gross & Thompson, 2007). The model builds on three core features of emotion. The first core feature states that emotions arise when a person attends to a situation relevant to his/her goals, and the second core feature describes emotions as multi-faceted phenomena involving the whole body (and thus including changes in physiology, behavior and experience). Third, and as a natural consequence of the complex multisystem changes associated with emotions, emotions are described as highly variable (i.e. the possible trajectories of emotion are many).

Moreover, the model is based on the principles of conditioning (Stimulus-Response), and the assumption that all human behavior is learned. Broadly, it may be divided into two separate higher-order processes, namely antecedent-focused regulation and response-focused regulation. The former is made up of the first four factors in the model (left to right), and occurs before a person’s appraisal of the situation has even had a chance to provoke emotional response tendencies. The latter is made up solely of the factor Response Modulation, and occurs only after responses have already been generated (Gross & Thompson, 2007).
As mentioned, the model presented in Figure 1 should be interpreted in chronological order from left to right. First, Situation Selection refers to making choices that make it more or less likely that a particular emotion (desirable or undesirable) will occur. From a behavioral perspective, this selection is based on previous experience (hence, the recursive arrow in the model). An example of Situation Selection may be someone avoiding situations that previously have elicited unwanted affect, e.g. a socially anxious person avoiding a social gathering knowing that many people will be present. Thus, Situation Selection may be used as a means to manage one’s emotions, before even entering a particular situation. Second, Situation Modification (which sometimes overlaps with Situation Selection) refers to the modification of the physical, external environments surrounding us, as a means to evoke or avoid a certain emotional response (Gross & Thompson, 2007). A socially anxious person may enter a particular situation such as a social gathering, yet choose to stay close to exits or already familiar people, in order to decrease unwanted emotions, e.g. shame or anxiety. Third, moving into the organismic black box of the model, i.e. the place within the organism/person where cognitions may influence the course of
the sequence, the factor Attentional Deployment refers to how attention may be directed differently when a person has already entered a situation (i.e. an internal change, as opposed to external). Two examples of this kind of attentional shift are ‘distraction’ and ‘concentration’. The former refers to changing attentional focus as attention is removed from the situation as a means to regulate emotions. The latter, on the other hand, refers to individuals focusing their attention even more intensely on the situation. As an example of Attentional Deployment, a socially anxious person may increase levels of social anxiety and related unwanted emotions when in a social situation by repeatedly focusing the attention paid to him-/herself as a social object, which in turn serves to perpetuate anxious thoughts. Fourth, Cognitive Change has to do with reappraising the current situation in order to change the emotional significance it imposes. For instance, individuals can either alter how they think about a particular situation, or alter how they think about their capacity to manage the situation (Gross & Thompson, 2007). For instance, a socially anxious person may actively make efforts to generate alternative thoughts in order to cognitively re-evaluate the situation, thus making it seem less threatening and thereby minimizing unwanted affect. Lastly, Response Modulation (the only response-focused factor) refers to processes that occur after response tendencies are already initiated. It includes several attempts to directly influence the experiential and physiological aspects of emotion, e.g. by exercising, using drugs, or eating (Gross & Thompson, 2007). The concept of cognitive response style is claimed to reflect response-focused strategies since it is a means of modifying emotions after they have already been initiated (Feldman, Joormann, & Johnson, 2008), and thus refers to this particular process. As a concrete example of Response Modulation, for instance, the socially anxious person from the examples above may choose to use alcohol when in a perceived socially threatening context, in order to decrease anxiety.
In summary, the model of emotion regulation presents several possible trajectories, building on the three core features of emotion: emotions arise when a people attend to goal-relevant situations are multifaceted whole-body phenomena, and therefore emotions are highly variable. Along this sequence, emotion regulation in various forms may take place, and the concept of cognitive response style seems to play an important part within this framework, occurring on the level of Response Modulation, i.e. after an emotion is already evoked.

1.3 Repetitive thinking

Repetitive thinking is interesting from a perspective of psychopathology. Previous research primarily focused on one subtype of repetitive thinking, namely negative/depressive rumination. Negative rumination was conceptualized within the Response Style Theory (RST) which more specifically attempted to explain the role of negative rumination in depression (Nolen-Hoeksema, 1991; Smith & Alloy, 2009). Rumination in general is defined as “a class of conscious thoughts that revolve around a common instrumental theme /.../ in the absence of immediate environmental demands requiring the thoughts” (Martin & Tesser, 1996, p. 7). Hence, the general concept of rumination (both positive and negative)\(^1\) belongs under the umbrella of repetitive thinking, together with other several slightly different but related constructs, e.g. ’worry’, and ’perseverative cognitions’ (Watkins, 2008).

A recent meta-review investigated the outcomes of repetitive thinking, and categorized them as either constructive or unconstructive (Watkins, 2008). This categorization was needed as some of the previous models claimed that repetitive thinking produced positive changes in meaning and insight and reduced health problems, while other models claimed that it interfered

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\(^1\) For more information on similarities and differences of the subtypes of RT, see Segerstrom et al. (2003) or Watkins (2008).

\(^2\) The concepts of ‘savoring’ and ‘positive rumination’ are somewhat overlapping, and may be used interchangeably.

\(^3\) The Self-Assessment Manikin (SAM) by Lang (1980) consists of graphic pictures (5 in total) along a 9-point Likert scale (in between each figure there is an additional box that may be selected). E.g., for the arousal dimension, SAM ranges from a frowning, unhappy figure to a smiling, happy figure (Lang et al, 2008). Hence, if an
with mood repair, problem solving attempts, and may have lead to physical disease (Segerstrom, Alden, Stanton & Shortridge, 2003). In summary, repetitive thinking has both constructive as well as unconstructive outcomes. More specifically, the main constructive outcomes were: recovery from upsetting/traumatic events (repetitive thinking as cognitive processing focusing on the trauma, enabling post-traumatic growth), adaptive preparation and anticipatory planning, recovering from depression (repetitive thinking as reflective pondering), and uptake of health promoting behaviors (following worry about physical health). The main unconstructive consequences, on the other hand, were: depression (repetitive thinking first and foremost as depressive rumination), anxiety (repetitive thinking on negative thought content), and physical health problems (repetitive thinking as worry and/or negative rumination) (Watkins, 2008).

One important factor in distinguishing between different subtypes of repetitive thinking is ‘valence’, the positive or negative psychological value assigned to something or someone. Valence touches upon both the cognitive-affective systems at work in the individual (e.g. whether a person is optimistic/pessimistic, or in a positive/negative mood state), as well as the actual thought content (positive/negative) (Martin & Tesser, 1996 in Watkins, 2008). For instance, depressive rumination has more specifically been conceptualized in terms of responses to negative moods. For negatively valenced thought content, repetitive thinking may exacerbate the consequences of these thoughts as it amplifies already existing negative moods, which in turn creates an even more unfavourable mood outcome for the individual (i.e. a downward unconstructive spiral). On the other hand, it is hypothesized that positively valenced thought content together with repetitive thinking (i.e. positive rumination) also may have unconstructive consequences. Thus, the increase of positive affect may not necessarily have positive consequences. For instance, for individuals vulnerable to hypomania/mania, repetitive thinking
in relation to positive affect could amplify positive moods and consequently create unwanted behavioral activation (i.e. an upward unconstructive spiral) (Watkins, 2008).

To summarize, rumination was initially researched within the Response Style Theory (RST), which specifically investigated negative rumination in relation to depression. Later, the more inclusive concept of repetitive thinking (including positive and negative rumination) was investigated since existing models explaining this construct were somewhat contradictory. A meta-review revealed that constructive and unconstructive outcomes could be a result of positive rumination, although the label indicated something wanted and/or pleasant (Watkins, 2008). For more detailed account of responses to positive affect, see section 1.5 below, following section 1.4 which briefly summarizes cognitive responses to negative affect.

1.4 Responses to negative affect

People’s reactions to emotional states are important as people are not passive in response to their emotions, and one way in which people actively respond to emotions is by regulating them cognitively (Gross & Thompson, 2007; Larsen, 2000). Also, the actual response to affect may be seen as a key component in emotional disorders, as a strong relationship between the response of the affect and the onset, maintenance and recurrence of the disorder has been shown (Nolen-Hoeksema, 1991; Papageorgiou & Wells, 2004; Smith & Alloy, 2009). For instance, negative/depressive rumination has repeatedly been linked to the onset and maintenance of depression (Nolen-Hoeksema, 2000): and predicts the onset of depression among non-depressed patients, as well as depression and anxiety one year later in patients that are currently depressed (Harvey, Watkins, Mansell & Shafran, 2006). Also, ruminative responses to negative affect predict anxiety (Calmes & Roberts, 2007). Thus, it is important to consider the actual response to the affect, rather than only considering the affect per se.
The interplay between thought and negative affect was originally researched through Response Style Theory (RST) (Nolen-Hoeksema, 1991, 2000, 2004). RST claims that people’s cognitive responses to depressive symptoms also predict the duration and severity of the depression (Roelofs, Muris, Huibers, Peeters & Arntz, 2006). Furthermore, RST proposes distinctive ways of cognitively responding to negative affect, namely ‘depressive rumination’ and ‘distraction’. Depressive rumination is described as focusing repetitively on depressive symptoms without managing to either problem-solve or engage in behaviors that may relieve the symptoms. Distraction, on the other hand, is described as intentionally directing the attention away from the depressive symptoms (Nolen-Hoeksema, 1991). Furthermore, RST proposes three possible mechanisms in the interplay of rumination and depression. First, it suggests that people who frequently engage in depressive rumination more easily remember negative autobiographical memories rather than positive, creating a vicious cycle that maintains negative moods. Second, depressive rumination hinders effective problem-solving, i.e. constructive attempts to change unfavorable situations in life. Lastly, depressive rumination may lessen the chance that a person engages in behaviors that could possibly relieve their depression (Abela, Brozina, & Haigh, 2002; Joormann, Dkane, & Gotlib, 2006; Nolen-Hoeksema, 1991).

Recently, the construct depressive rumination as proposed by RST has gradually been abandoned, as it has been submerged in a more general term referred to as repetitive negative thinking (RNT), which occur across most Axis I disorders, and therefore is transdiagnostic (Ehring & Watkins, 2008). The factor that distinguishes repetitive negative thinking across disorders, however, seems to be the actual thought content rather than its characteristic of recurrent thoughts (Ehring et al., 2011).
Taken together, previous and more recent research in the area of response to negative affect suggests that people are active in response to their affective states, and that they seem to use different strategies when responding to affective states. Also, how they respond and which strategies they use tend to be predictive of different outcomes.

1.5 Responses to positive affect

From a transdiagnostic perspective of emotion regulation, repetitive thinking and psychopathology, responses to positive affect seem equally important as responses to negative affect. More specifically, it has been suggested that co-morbidity for these disorders is due partly to a content overlap with emotion regulation as their common denominator (Martin & Tesser, 1996; Larsen & Prizmic, 2004; Watkins, 2008), and these findings have neurological correlates (Wilamowska et al., 2010). More specifically, it has been suggested that people systematically use different cognitive emotion regulation strategies. Two of these strategies are ‘dampening’ (down-regulation of positive emotions) and ‘savoring’\(^2\) (upregulation and maintenance of positive emotions) (Miyamoto & Ma, 2011). There are indications that these strategies are relevant in the explanation of depression and anxiety as these disorders are both associated with down-regulation of positive emotions (Eisner, Johnson & Carver, 2009).

Depression is hypothesized as resulting from increased negative affect, but also from decreased positive affect (Rottenberg, Kasch, Gross, & Gotlib, 2002; Henriques & Davidson, 2000; Sloan, Bradley, Dimoulas, & Lang, 2002). Furthermore, depression is associated with the cognitive response styles of dampening, self-focused rumination, and emotion-focused rumination (the two latter are forms of positive rumination) (Feldman et al., 2008; Raes et al., 2009). Depression correlates negatively with positive rumination, and positively with dampening (Feldman et al., 2008; Raes, Daems, Feldman, Johnson, & van Gucht, 2009). Hence, the more

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\(^2\) The concepts of ‘savoring’ and ‘positive rumination’ are somewhat overlapping, and may be used interchangeably.
one savor positive affect (positive rumination), the less depressive symptoms one experiences. Likewise, the more one dampens positive affect, the more likely one is to experience depressive symptoms. Thus, dampening of positive affect may have a large impact on onset and maintenance of unipolar depression, even after the impact of negative ruminative thinking is controlled for. Nonetheless, it is unclear whether it is depression that has a negative influence on responses to positive affect, or vice versa (Feldman et al., 2008).

Cognitive responses to positive affect have also been investigated in relation to anxiety. For instance, people suffering from social anxiety have been found to experience less positive affect than others (Kashdan, 2007), and also to engage in less activities which in turn results in a decrease of positive affect (Kashdan & Steger, 2006). Also, an association has been found between generalized anxiety disorder (GAD) and fear of positive affect as well as less expression of positive affect (Turk, Heimberg, Luterek, Mennin & Fresco, 2005). Moreover, people with anxiety seem to use dysfunctional emotion regulation strategies. Studies are showing that dampening of positive affect correlates positively with anxiety disorders, e.g. GAD, social phobia, panic disorder and obsessive compulsive disorder (OCD), and that it contributes to the prediction of all of them, except for OCD. Savoring, on the other hand, correlates negatively with these disorders (Eisner et al., 2009). In other words, the more one savors and the less one dampens positive affect, the less likely one is to experience anxiety.

Cognitive responses to positive affect are also associated with elevated mood states: there is a significant positive relationship between dampening and being vulnerable to mania (Feldman et al., 2008; Raes et al., 2009). The explanation for this somewhat unexpected relationship may be that people who suffer from Bipolar I disorder tend to dampen the effects of hypomanic symptoms in order to inhibit the development of mania symptoms (Lam & Wong, 1997). There
is also a positive association between positive rumination (self-focused and emotion-focused) and vulnerability to mania (Feldman et al., 2008; Raes et al., 2009). Thus, the more one ruminates on positive affect, the more vulnerable one is to develop symptoms of mania. However, others have found a positive relationship between self-focused rumination and hypomania, but not between hypomania and dampening (Dempsey, Gooding & Jones, 2011).

Taken together, responses to positive affect may have a central role within the context of emotion regulation compared to responses to negative affect. More specifically, people systematically tend to use different strategies in response to positive affect, and these strategies have important implications for the onset and maintenance of emotion psychopathology.

1.6 The Responses to Positive Affect questionnaire (RPA): previous research

The Responses to Positive Affect questionnaire (RPA) assesses cognitive responses to positive affect. It was constructed as a parallel to a measure of cognitive responses to negative affect, namely the Response Style Questionnaire (RSQ) (Nolen-Hoeksema & Morrow, 1993), which emerged as a self-report instrument within Response Style Theory (RST). One of the subscales of the RSQ is the Ruminative Response Scale (RRS, Nolen-Hoeksema, Larson & Grayson, 1999), which in turn is made up of items that measure the two separate constructs: brooding (moody pondering on disappointments in life and personal shortcomings) and reflection (analyzing one’s feelings and thoughts using a problem-solving approach) (Feldman, et al., 2008; Roelofs et al., 2006). The RRS subscale of the RSQ has previously been criticized since a possible content overlap has been suggested between depressive rumination and depressive symptoms, hence resulting in a strong relationship between the two. However, when the effect of depressive symptom contamination was controlled for, the two distinct factors of brooding and reflection of the RRS remained (Bagby, Rector, Bachiocci & McBride, 2004; Treynor, Gonzalez
& Nolen-Hoeksema, 2003). In relation to responses to positive affect, previous studies on the RPA questionnaire have used the two subscales from the RRS in order to compare and contrast the constructs of ruminative responses to negative affect and positive affect, respectively (Feldman et al., 2008; Raes et al., 2009).

1.6.1 Psychometric properties of the original Responses to Positive Affect questionnaire

For the original RPA questionnaire, a 3-factor model was suggested with the underlying factors dampening, self-focused rumination, and emotion-focused rumination, and all showed satisfactory reliability (Dempsey et al., 2011; Feldman et al., 2008; Raes et al., 2009). Emotion-focused rumination is signified by positive rumination on mood and somatic experiences, whereas self-focused rumination is characterized by positive rumination on people’s aspects of themselves and their personally relevant goals. For the original RPA questionnaire, the two positive rumination subscales were moderately associated with each other ($r=.50$), whereas none of them had a significant association with dampening. Thus, dampening is essentially different from positive rumination (Feldman et al, 2008).

The study on the original RPA questionnaire also revealed significant associations between the RPA subscales and criterion measures of depression, hypomania, mania vulnerability, and the two RRS/RSQ subscales of brooding and reflection (convergent validity). First, the results revealed that higher scores on dampening were significantly associated with greater depressive rumination (both brooding and reflection subscales), but no current symptoms of mania (although there was a significant association with vulnerability to mania). Second, higher scores on emotion-focused rumination were associated with higher levels of depressive rumination (i.e. brooding and reflection), vulnerability to mania, as well as current manic symptoms. Third, higher scores on self-focused rumination were associated with lower current
depression, but greater vulnerability to mania and current manic symptoms. Also, the possibility of depressive symptom contamination was controlled for, and the correlations described above were minimally affected. Hence, the risk of the associations resulting from symptom contamination could be ruled out (Feldman et al., 2008).

Furthermore, the incremental validity of the original RPA questionnaire was explored, as the amount of variance in both depression and mania was examined whilst taking into account the construct of depressive rumination, as measured through the brooding subscale of the RRS/RSQ. The RPA subscales predicted 10% of the variance in depressive symptoms over and beyond the construct of depressive rumination. More specifically, dampening uniquely predicted more severe depression, whereas emotion-focused rumination predicted less severe depression. For mania, on the other hand, the RPA subscales accounted for 8% of the variability in mania, above and beyond depressive rumination. Also, for mania, self-focused rumination significantly predicted a larger amount of manic symptoms (Feldman et al., 2008).

1.6.2 Psychometric properties of the Dutch Responses to Positive Affect questionnaire

The 3-factor structure of the RPA questionnaire (Feldman et al., 2008) was further replicated in Holland, which indicated that the model is valid (with satisfactory internal consistency for each scale, $\alpha < .72$). However, there was an item switch for items 4 and 16 compared to the original English version: Item 4 “(Think about how you feel up to doing everything”) belonged in the subscale emotion-focused rumination for the original RPA questionnaire, whereas it loaded more strongly on self-focused rumination for the Dutch RPA. In addition, item 16 (“Think about how proud you are of yourself”) went through the opposite switch, loading more strongly on emotion-focused rumination for the Dutch RPA questionnaire. Also, item 12 (“Think about how hard it is
RPA: validation and extension

Convergent validity was also investigated for the Dutch RPA questionnaire. First, it turned out that the higher the scores on the dampening subscale, the greater degree of depression, trait hypomania, lower positive affect, and higher negative affect. Second, higher scores on self-focused rumination correlated with higher positive affect, and lower negative affect. Third, higher scores on emotion-focused rumination were significantly correlated with lower negative affect, higher positive affect, and lower levels of current depression. Moreover, the correlation found between the dampening subscale of the RPA questionnaire and the brooding subscale from the RRS remained after the possibility of depressive symptom contamination was investigated. However, other interesting patterns appeared. The dampening subscale’s significant association with trait hypomania disappeared, suggesting that current depressive symptoms were confounding for this particular association. Also, as depressive symptom contamination was controlled for, a significant correlation between self-focused rumination and trait hypomania emerged. The correlation between the two were initially masked because of the fact that scores on self-focused rumination were previously related to current depressive symptoms, although trait hypomania showed the exact opposite tendencies (Raes et al., 2009).

The Dutch validation study further investigated the RPA subscales’ amount of variability in the explanation of depression and mania, respectively. For depression, the RPA subscales together predicted 17% of the variance in depression over and above the construct of depressive rumination: emotion-focused rumination served as a negative predictor, and dampening served as a positive predictor. For mania, on the other hand, the subscales of RPA together accounted for 3% of the variance in mania over and above the construct of depressive rumination. However,
self-focused rumination as predictive of mania fell short of significance, although coming fairly close \((p < .07)\). Therefore, the self-focused rumination subscale was entered alone in another regression analysis, and this time self-focused rumination as a predictor of mania symptoms reached statistical significance \((Raes \text{ et al.}, \ 2009)\).

1.7 Summary

The concept of cognitive response style to positive affect may be viewed as an emotion regulatory process occurring after an emotion is already evoked (response-focused), as suggested by the modal model of emotion regulation \((Gross \text{ & Thompson}, \ 2007)\). Repetitive thinking is an umbrella term, including rumination of both positive and negative affect, and seems to have both constructive and unconstructive consequences \((Watkins, \ 2008)\). Response Style Theory \((RST)\) \((Nolen-Hoeksema, \ 1991; \ 2000; \ 2004)\) originated as an attempt to explain depressive rumination, and the theory further suggest that people are active in response to affective states \((Gross \text{ & Thompson}, \ 2007; \ Larsen, \ 2000)\). Recently, the wider transdiagnostic concept of repetitive negative thinking \((RNT)\) has replaced depressive rumination. Moreover, research indicates that people use different strategies in response to positive affect, and these strategies are systematically connected to different kinds of psychopathology. The RPA questionnaire was constructed to capture responses to positive affect, as a parallel to the Response Style Questionnaire \((RSQ)\). Earlier versions of the RPA questionnaire consist of three factors: dampening, emotion-focused rumination, and self-focused rumination, \((Feldman \text{ et al.}, \ 2008; \ Raes \text{ et al.}, \ 2009)\).

2. Aims and hypotheses

This study focuses on the psychometric properties of measures of cognitive response styles to positive emotion. The aim of this study is twofold. First, the aim is to investigate the replicability
of the 3-factor model previously found for the original Responses to Positive Affect questionnaire (Feldman et al., 2008), and the recently translated Dutch version (Raes et al., 2009). Second, the aim is to investigate the relationship between cognitive response styles and positive mood reactivity. The design of the study is subsequently also twofold: cross-sectional data will be used for the replication of the original Responses to Positive Affect questionnaire (RPA), and an experimental design is applied in the investigation of the relationship between cognitive response style and mood outcome. In order to replicate the 3-factor model in the original RPA questionnaire we will investigate internal consistency as well as convergent and incremental validity of the Swedish RPA’s subscales. This will be examined using criterion measures of depressive and anxiety symptoms, symptoms of hypomania/mania and cognitive processes. It is hypothesized that the 3-factor model identified for both the English and Dutch RPA questionnaires will be replicated in the Swedish RPA questionnaire.

Furthermore, the second main aim is to examine cognitive response styles as measured by the RPA questionnaire, and how they may relate to mood reactivity, which will be experimentally tested through a standardized positive mood induction procedure. We hypothesize that the two ruminative factors previously identified in the RPA questionnaire (Emotion-focused positive rumination and Self-focused positive rumination) will be positively correlated to and possibly function as a moderator of participants’ mood reactivity. We further hypothesize that the non-ruminative factor of the RPA questionnaire (dampening) will be negatively correlated to elevated positive mood and a moderator also in the prediction of non-occurrence of elevated positive mood, after the participants are positively mood induced.

Following research questions are central in this study:

1) Is the previous 3-factor model of the RPA questionnaire also found in a Swedish sample?
2) Is the Swedish RPA questionnaire a valid measure?

3) Do the presumed subscale of the Swedish RPA questionnaire function as moderators in participants’ mood reactivity?

3. Method

3.1 Design

The design of the current study consists of a cross-sectional psychometric analysis of the Swedish RPA questionnaire, and an experimental 2x2 design investigating the relationship between cognitive style in response to positive affect as measured by the RPA questionnaire, and positive mood reactivity as induced by a standardized mood induction. Participants were randomized into two conditions: the first one constructed to evoke positive affect, and the second one constructed to keep the participants’ affect fairly neutral. Figure 2 gives a schematic overview of the study.

Figure 2. Overview of the design of the current study.
As seen in Figure 2, solely the pre-test survey (see Appendix A) was used for the cross-sectional part of the study; the total sample was taken into account (n=111). From the cross-sectional part of the study, 60 of the participants also took part in the experiment. First they completed the pre-test survey, and were then randomized into two different conditions, where they received a neutral mood induction and a positive mood induction, respectively. Following the experiment a post-test survey was distributed (see Appendix B).

3.2 Participants

The sample consists of psychology and social work students (n=111) attending Örebro University, Sweden (mean age of 24.93 years, SD= 5.48, range= 19-47). 78% of the participants were women, and 22% men. At the time of the experiment, 43% were single, 32% were cohabiting or married, 22% were in a relationship (but living on their own), and 3% were divorced. Invitation to participate and practical information about the study and the experimental procedures was given during student lectures. The students were also informed about the voluntary nature of the experiment, as well as the ethical aspects and usage/storage of the collected data. Also, as a further incentive to participate, the students were invited to a lecture during December 2011 on the research area, method, and results of the study.

Approximately half of the total sample (n=60) participated in the experimental part of the study and were subjected to a mood induction procedure and also completed the post-test survey (mean age of 24.51 years, SD= 4.20, range=19-43). The other half of the sample (n=51) was recruited after the experiment to supplement the number of participants for the cross-sectional analysis, and they completed the pre-test survey only. Of these, 92% were women, and 8% were men.
3.3 Material

3.3.1 Pre- and post test survey

A pre- and post-test survey was constructed in order to collect relevant data for both the cross-sectional and the prospective analysis. The pre-test survey consisted of questions on demographics (as summarized in section 3.2.), a question on the degree of current positive mood, positive and negative affect, positive and negative response styles, anxiety, depression, and hypomanic symptoms (see Appendix A). The post-test survey consisted of questions on positive and negative affect, and three additional questions regarding the perceived impact of mood induction procedures (see Appendix B).

3.3.1.1 Cognitive style in response to positive affect

The Responses to Positive Affect questionnaire (RPA) was used to measure cognitive style in response to positive affect. RPA has 17 items, each measured on a 4-point Likert scale (1 = almost never, and 4 = almost always), where participants are asked to give an account of how they usually think or behave when they feel happy, excited or enthused. The original RPA consists of three subscales: self-focused positive rumination (e.g. ‘Think “I am getting everything done’”), emotion-focused positive rumination (e.g. ‘Think about how you feel up to doing everything’), and dampening (e.g. ‘Think “this is too good to be true”). All subscales show adequate reliability and validity (Feldman et al., 2008). It has also been found that scores on the original RPA questionnaire are related to hypomania risk, after controlling for other variables (Johnson & Jones, 2009). The RPA questionnaire has been validated in Dutch (Raes et al., 2009).

The original English RPA questionnaire was translated into Swedish by a professional translator, whereby the translated Swedish version was translated back into English by the authors of this study (both with Swedish as mother tongue). After this, a thorough comparison
was made in order to assure that there were no serious violations present, and small deviations were controlled and corrected.

3.3.1.2 Negative cognitive response style

The broader transdiagnostic construct of repetitive negative thinking (RNT) is measured by the Perseverative Thinking Questionnaire (PTQ), and was in this study used to capture a negative cognitive response style. In the PTQ, participants are asked to rate usual thoughts on negative experiences. PTQ is a so-called ‘content-independent’ self-report measure of repetitive negative thinking, i.e. it focuses less on disorder-specific content and more on repetitive negative thinking as a transdiagnostic process (Ehring et al., 2011). The PTQ consists of 15 items measured on a 5-point Likert scale (0 signifying never, and 4 signifying almost always). Moreover, PTQ measures one higher-order factor, i.e. RNT in general, as well as three lower-order factors. The first of the lower-order factors reflects the core characteristics of repetitive negative thinking: repetitiveness, intrusiveness, and difficulties with disengagement. To illustrate this construct, the item ‘The same thoughts keep going through my mind again and again’ is given. The second lower-order factor is perceived unproductiveness of repetitive negative thinking, and for this construct, the example ‘I think about many problems without solving any of them’ is given. Third, the item ‘I can’t do anything else while thinking about my problems’ is an example of repetitive negative thinking capturing mental capacity (Ehring et al., 2011). Moreover, PTQ shows good internal consistency, reliability and correlation with other measures of repetitive negative thinking (Ehring et al., 2011). The higher order-factor (i.e. all 15 items) has an internal consistency of $\alpha=0.93$ in our sample.
3.3.1.3 Positive and negative affect

The Positive and Negative Affect Schedule (PANAS) was used to measure positive and negative affect, as participants are asked to rate how they currently are feeling. The original PANAS measures ten positive and ten negative mood descriptors on a 5-point Likert scale (1 = very slightly/not at all, 5 = extremely). The PANAS has good reliability and validity (Crawford & Henry, 2004). The purpose of this study was to measure the participants’ current affective state, before and after the manipulation, and therefore a short form of the original PANAS was chosen (MacKinnon et al., 1999). The short form of PANAS consists of ten items on a 5-point Likert scale, with five items measuring positive affect, PA (e.g. ‘enthusiastic’) and five items measuring negative affect, NA (e.g. ‘upset’). Item scores are calculated separately for PA and NA, and thus give each participant an average score for PA and for NA before and after the manipulation. Internal consistency in our sample was α= 0.79 for NA and α= 0.76 for the PA. In addition to the PANAS, a question was used as a supplement to measure current positive affect, where participants were asked to rate to what extent they felt happy/positive, on a 10-point Likert scale (0 = not at all, 10 = very happy) (see Appendix B).

3.3.1.4 Anxiety and depression

In order to assess symptoms of depression and anxiety, the Hamilton Anxiety and Depression Scale (HADS) was used (Zigmond & Snaith, 1983). HADS has shown good validity and reliability, and it correlates well with other recognized measures of anxiety and depression (Bjelland, Dahl, Haug, & Neckelmann, 2002) In the HADS, participants are asked to rate to what extent they have felt symptoms of anxiety and depression during the last week.

HADS may be divided into two subscales: one measuring anxiety symptoms (HADS-A), and one measuring depressive symptoms (HADS-D). Each subscale consists of seven items on a
4-point Likert scale (e.g. 0 = not at all, 3 = almost always), although the exact descriptors vary from item to item. From HADS-A, the example ‘I get a sort of frightened feeling as if something awful is about to happen’ may be given. From HADS-D, the example ‘I still enjoy the things I used to enjoy’ is given. Internal consistency for our sample was $\alpha=0.83$ for HADS-A, and $\alpha=0.74$ for HADS-D.

### 3.3.1.5 Hypomania symptoms

Hypomania symptoms were assessed using the Affective Self Rating Scale (AS-18), where the average scores is an indication of depression and/or hypomania/mania. AS-18 is a self-rating scale constructed to suit an outpatient setting, and psychometric properties for the rating of manic-type symptoms are adequate (Adler & Brodin, 2011; Adler, 2011). Furthermore, AS-18 consists of two subscales: one measuring manic-type symptoms (AS-18-M), and one measuring depressive symptoms (AS-18-D). Each scale consists of nine items on a 5-point Likert scale (0 = none, 4 = very large), and item scores are calculated separately for each scale, giving an average score for depressive symptoms and hypomania symptoms, respectively. The cut-off value is 10 points for each scale. For the purpose of this study, only the hypomania measure (AS-18-M) was included. Participants are asked to rate to what extent they have experienced problems regarding their hypomania symptoms during the past week. An example of an item that is included in the AS-18-M is ‘that you have needed less sleep, yet felt alert’ (Sw. “att du behövt sova mindre och ändå varit pigg”). Both subscales of the AS-18 have been validated, and correlate well with Montgomery-Åsberg Depression Rating Scale (MADRS) and Hypomania Interview Guide (HIGH-C), which are two other well-established rating scales (Adler, 2011). The internal consistency of the AS-18-M in our sample was $\alpha=0.70$. 
3.3.1.6 Sleep

Sleep-related issues have recently been acknowledged as a transdiagnostic process, and sleep is closely tied to emotion regulation, e.g. insomnia and hypersomnia may be central in depression (DMS-IV-TR; Harvey, 2008, Harvey, 2011). More specifically, emotion regulation is undermined in individuals with sleep disturbances, which may lead to mood disorders (Harvey, 2011; Jackson, Cavanagh, & Scott, 2003 in Harvey, 2008). The items related to sleep (see Appendix A) were adopted from McDonald, Linton, & Jansson-Fröjmark (2008) and the obtained data were divided accordingly into three subgroups: no sleep problems, poor sleep and insomnia. However, since too few of the participants were categorized as suffering from either poor sleep or insomnia, the data did not call for any further analysis.

3.3.2 Procedure

This study used a Mood Induction Procedure (MIP), consisting of 1) a writing exercise (including visualization), 2) a passive viewing task based on static pictoral stimuli, and 3) auditory stimuli consisting of classical music played alongside the presentation of the pictures. This combination was used to maximize the likelihood that the participants as a group were emotionally affected by the stimuli (i.e. mood induced), regardless of individual differences. Furthermore, self-report may be used as a means to evaluate whether the participants have adhered to the requirements of the task (Kazdin, 2010), e.g. in this case to what extent they perceive themselves as mood induced. Subsequently, the post-test survey includes three questions (one for each MIP) asking participants to rate (1-10) to what extent they were able to focus on the task (see Appendix B).
3.3.2.1 Writing exercise

The Best Possible Self procedure (BPS) is a writing exercise used to induce positive mood. The best possible self is described as differing from concepts of the ideal self or the hoped-for-possible self; it is not based on the characteristics a person hopes or wishes to possess, but rather the qualities a person currently has (Roberts, Dutton, Spreitzer, Heaphy, & Quinn, 2005). There is evidence that various forms of the BPS, differing in frequency or the duration of the exercise, may cause significant mood changes in people. For instance, one version of the BPS (Sheldon & Luybomirsky, 2006 adapted from King, 2001) instructed participants to write about their best possible selves for 20 minutes/day during two consecutive weeks, as a means to induce positive mood. Also, a shortened version of the BPS where participants (Swedish psychology students) performed the exercise on solely one occasion gave a significant change in affect (Peters, Flink, Boersma, Linton, 2010). This brief version of the BPS was used for the current study (i.e. 15 minutes of writing + 5 minutes of visualization).

3.3.2.2 Viewing task

The International Affective Picture System (IAPS) was used as a viewing task to induce positive moods. It is a standardized set of color images (over 1,000 in number) and the images are chosen for their ability to elicit affective reactions in individuals. They have been assessed according to three dimensions by using the Self-Assessment Manikin (SAM): affective valence (pleasant-unpleasant), arousal (calm-excited) and dominance (in control-dominated). However, the latter has been proven to be “relatively weak in accounting for variance in evaluative judgments of symbolic stimuli” (Bradley & Lang, 2007, p. 32). Also, the original normative ratings of the

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3The Self-Assessment Manikin (SAM) by Lang (1980) consists of graphic pictures (5 in total) along a 9-point Likert scale (in between each figure there is an additional box that may be selected). E.g., for the arousal dimension, SAM ranges from a frowning, unhappy figure to a smiling, happy figure (Lang et al, 2008). Hence, if an individual is feeling neither happy nor unhappy, or neither calm nor aroused, s/he indicates this by using the midpoint of 5 on each scale (Bradley & Lang, 2007).
IAPS have been shown to be stable as regards within- and between-subject reliability (Lang, Bradley, Cuthbert, 2008). The norms have been replicated and extended within the US (e.g. Ito, Cacioppo, & Lang, 1998; Libkuman, Otani, Kern, Viger & Novak, 2007). Internationally, the affective ratings of the IAPS have been replicated in e.g. Germany, Sweden, and Italy, for a selected subset of images. However, Swedish participants as compared to German and American participants generally assigned lower arousal ratings for these subsets, which indicate calmer emotional reactions to the presented stimuli (Bradley & Lang, 2007).

In this study, a total number of 40 pictures were selected for the viewing task, following the example of a study where the IAPS was used successfully (Haagenars, Stins & Roelofs, 2011). 20 images were chosen for the positive condition (subset 1), and 20 for the neutral condition (Subset 2) (see Appendix C). The images were selected based on normative ratings, first and foremost taking into account the two primary dimensions affective valence (firstly) and arousal (secondly). In the norms, each image has been rated on a 9-point Likert scale, where the value of 5 is considered a neutral midpoint. Thus, pictures with a value close to 5 on the valence dimension are considered neutrally charged regarding affect (neither positive, nor negative). More specifically, the higher the value on the valence dimension, the more positive affect the image is supposed to elicit, according to the norms. Likewise, the higher the value on the arousal dimension, the more arousal-provoking the image is supposed to be, and vice versa (Mikels et al., 2005). In addition to the valence and arousal ratings, the actual content of the images was considered in order to vary picture content across categories. This is referred to as transversal selection (Delplanque, N’diaye, Scherer, & Grandjean, 2007).

As this study has two distinct experimental conditions, one positive and one neutral, there was a need to select both positive and neutral pictures. For the positive condition, each selected
image has a value equal to or greater than 5 and thus, is regarded as positively valenced. In addition, for the positive condition as regards the arousal dimension, images with higher values were chosen as the aim was to provoke positive affect during a brief viewing task. This resulted in Subset 1, (mean valence ratings= 7.34, SD= 0.53, range= 6.25-8.15, mean arousal ratings= 5.48, SD= 0.79, range= 4.02-6.96). For the neutral condition, on the other hand, the images closest to the midpoint of 5 on the valence dimension were selected, as it was attempted to not elicit either positive or negative affect in participants. Also, the images with the lowest values possible on the arousal dimension were selected, i.e. the least arousal-provoking images. This resulted in Subset 2 (mean valence ratings= 4.97, SD= 0.26, range= 4.65-5.59, mean arousal ratings= 2.81, SD= 0.63, range= 1.76-4.40).

3.3.2.3 Auditory stimuli

In addition, auditory stimuli were used to induce positive mood through a Musical Mood Induction Procedure (MMIPs). It has several benefits: it affects males and females equally (Clark & Teasdale, 1985), has an ability to create both positive and negative moods, does not rely on linguistic processing, and is claimed to result in “substantial and lasting mood changes” (d’Etoile, 2002, p. 150). In the current study, the music selected to accompany the images of Subset 1 (positive condition) was Vivaldi’s piece “Concerto no .1 in E major”, also known as “Spring” from the Four Seasons. This piece is known as an auditory means to induce happy affect in individuals (Eich, Ng, Macaulay, Percy & Grebneva, 2007). On the contrary, the music selected and played along with the presentation of Subset 2 (neutral condition) was the classical piece “Ballad for piano and orchestra” (Opus 19) by the Gabriel Fauré, as recommended by a musicologist as a means to evoke neutral affect in participants (Albersnagel, 1988).
3.4 Experimental Procedure

The experiment was conducted in the afternoon/evening (starting times ranging from 12pm to 5pm) for all experimental groups (7 groups in total), and occurred in conjunction to the students’ regular lectures at Örebro University, Sweden. Group sizes ranged from 3 to 21 participants. Also, the instructors went through practical training before the execution of the actual experiment.

First, participants were asked to complete the pre-test survey (see Appendix A), and were randomized into either a neutral or positive experimental condition (research condition and instructor were balanced for each experimental occasion). Second, participants were asked to follow one of the two instructors (depending on their assigned experimental condition) to a nearby classroom for the combined mood induction procedure. The mood induction procedure consisted of a writing/imagery task on either the concept of the Best Possible Self (BPS) for the positive condition, and the equivalent task for the neutral control condition, “A typical day” (details will be described below). Following the writing exercise, the participants were asked to preserve the emotion evoked in them during the writing task to the extent possible. Moreover, the participants randomized to the positive condition were asked to passively view a set of positively charged images, while classical music chosen to evoke positive moods were played simultaneously. In contrast, the participants in the neutral control condition viewed neutrally charged pictures, and listened to classical music selected to evoke neutral moods. The mood induction procedure was followed by a brief post-test measurement (see Appendix B). The duration of the total procedure was approximately 45-55 minutes.

The images were presented on a projector screen using Microsoft Powerpoint software; each image was presented for 5sec without between-picture interval, which resulted in a duration
of 100sec of visual mood induction (20 images x 5sec) per subset. The viewing time was based on the author’s own judgment, and on previous research on the IAPS: some are suggesting a viewing time of 4sec for each image (Bradley, Hamby, Löw & Lang, 2007), while others suggest 6sec (e.g. Cuthbert, Schupp, Bradley, Birbaumer, & Lang, 2000; Bradley & Lang, 2007).

3.5 Data Analysis
All analyses were made in the Statistical package for Social Sciences (SPSS), version 20.0. As one aim of this study was to validate the 3-factor model of the RPA questionnaire, and its incremental and convergent validity, there was a need for appropriate statistical methods. Convergent validity refers to whether constructs that theoretically should be related to each other, in fact are related (Pallant, 2007). Incremental validity, instead refers to whether a recently developed test yields “an improvement in prediction compared with the result from using data that are easily and routinely obtained as part of the process of assessment” (Hunsley & Meyer, 2003, p. 446.). Hence, one is interested in whether the RPA subscales measure responses to positive affect more adequately than other previously known questionnaires (Hunsley & Meyer, 2003).

First, in order to investigate the underlying factors of the RPA questionnaire, a factor analysis was performed. As the 3-factor model has previously been validated for the original English version and the Dutch version, a confirmatory factor analysis was suitable since the confirmatory factor analysis is theory-driven while the exploratory factor analysis is data-driven (Albright & Park, 2009). However, as our sample was relatively small (n= 111), such an analysis was not possible. Instead, exploratory factor analysis with three factors extracted was opted for (with Principal Component Analysis, PCA, as extraction method), and thus, previous research on the RPA questionnaire was considered. Our sample size also allowed for an exploratory factor
analysis since the ratio of subjects to items should be at least five cases for each item (Tabachnick & Fidell, 2007). Since the RPA questionnaire has a total of 17 items, a sample of at least 85 participants would be sufficient ($5 \times 17 = 85$). Moreover, the chosen rotation method was Oblimin rotation, as previous research suggests that the supposed underlying factors in the data may correlate (Field, 2009). Furthermore, it has been suggested that factor loadings larger than .4 can be interpreted (Stevens, 2002 in Field, 2009), although factor loadings above .3 may also be interpreted (Field, 2009).

Second, turning to the issue of convergent validity, the analyses of choice were bivariate correlations with regards to the hypothesized subscales of the RPA questionnaire and criterion measures such as depression, hypomania, anxiety, repetitive thinking and current positive or negative affect (following Raes et al., 2009). Partial correlations analysis was conducted to establish whether the significant associations from the bivariate correlations analysis remained after possible symptom contamination was controlled for. Hence, whether there actually were a third variable (i.e. confounder) that accounted for the significant associations between constructs was investigated. For all correlations, the parametric Pearson product-moment correlation coefficient was used, as our data fulfilled the criteria for using parametric tests (Field, 2009; Pallant, 2007).

Third, as regards incremental validity, hierarchical regression analyses were performed to explore the amount of variance in depression and hypomania respectively accounted for by the RPA subscales, over and above other constructs. This method enables an analysis on how each variable, as well as the proposed model as a whole, contributes to the variance in depression and hypomania (Pallant, 2007). The decision on what variables to enter and when was based on previous validations of the RPA questionnaire (Feldman et al, 2008; Raes et al., 2009).
addition to this, and as another aim of this study was to experimentally test the RPA questionnaire on our sample, a statistical method that allowed for comparison between groups (neutral/positive experimental condition) as well as comparison within groups (pre-rest survey and post-test survey) was needed. For this purpose, the analysis of variance (ANOVA) was used, and accompanied by recommended post-hoc-tests, in the cases where significant differences within the groups or between the groups were found, as recommended by Pallant (2007).

3.6 Ethics

The voluntary nature of the experiment was mentioned on several occasions, both orally and in written text. Also, the participants were informed that the design of the survey would not allow the collected data to be traceable back to each individual (before, after and during the experiment). The collected data was stored and handled according to the research principles proposed by The Swedish Research Council (Vetenskapsrådet, 2002). Also, as the MIPs in the current study were used to induce positive and neutral moods in participants, the risk of eliciting unpleasant affects in participants, or emotions that needed to be attended to post-experiment was relatively small. Also, the stimuli used to evoke neutral or positive affect (thoughts, pictures, music) were symbolic rather than real, and the emotional and physiological responses were therefore weaker (although existent). In addition to this, the physiological responses were present during e.g. the viewing of a subset of pictures, and only shortly thereafter. However, as a further insurance against any emotional problems in the participants following the experiment, the instructors remained in the classroom post-experiment and invited the participants to pose questions and/or give feedback (Bradley & Lang, 2007).
4. Results

4.1 A psychometric evaluation of the Swedish RPA questionnaire

4.1.1 Exploratory factor analysis

Previous research on the RPA questionnaire (Feldman et al., 2008; Raes et al., 2009) has identified and validated a three-factor solution. We performed an exploratory factor analysis, by using the extraction method of Principal Component Analysis (PCA) with Oblimin rotation. Three components were extracted (i.e. a forced entry). Prior to the actual analysis, the suitability of the data was thoroughly examined, and a brief inspection of the initial correlation matrix revealed many coefficients above .3, which then allowed for further exploration of the data. The Kaiser–Meyer-Olkin value was .77, which thus exceeded the recommended value of .6 (Kaiser, 1970, 1974 in Pallant, 2007). Also, Bartlett’s test of Sphericity further supported the factorability of the correlation matrix since it reached statistical significance (Bartlett, 1954 in Pallant, 2007).

The exploratory factor analysis (three components extracted) resulted in five factors with eigenvalues > 1, explaining 26.17%, 15.88%, 7.65%, 6.88%, 6.44% respectively. However, the obtained scree plot rather suggested a model with three factors, since there was a clear break after the third component. This three-component solution explained a total of 49.70% of the variance. Table 1 below presents the items and their respective factor loadings on the three primary underlying dimensions (as suggested by the obtained scree plot).
Table 1

*Pattern and item-total (subscale) correlations*

<table>
<thead>
<tr>
<th>RPA item</th>
<th>Factors</th>
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</thead>
<tbody>
<tr>
<td><strong>Factor I: Dampening</strong></td>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>r^a</td>
</tr>
<tr>
<td>(Eigenvalue = 4.45; 26.17% variance explained)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1 Think “My streak of luck is going to end soon” (rpa15)</td>
<td></td>
<td>.78</td>
<td>-.11</td>
<td>-.04</td>
<td>.78**</td>
</tr>
<tr>
<td>D2 Think about things that could go wrong (rpa9)</td>
<td></td>
<td>.76</td>
<td>.12</td>
<td>-.10</td>
<td>.75**</td>
</tr>
<tr>
<td>D3 Think about things that have not gone well for you (rpa17)</td>
<td></td>
<td>.72</td>
<td>.13</td>
<td>-.01</td>
<td>.69**</td>
</tr>
<tr>
<td>D4 Think “I don’t deserve this” (rpa14)</td>
<td></td>
<td>.71</td>
<td>-.09</td>
<td>.12</td>
<td>.68**</td>
</tr>
<tr>
<td>D5 Remind yourself these feelings won’t last (rpa10)</td>
<td></td>
<td>.71</td>
<td>-.14</td>
<td>-.18</td>
<td>.75**</td>
</tr>
<tr>
<td>D6 Think “People will think I’m bragging” (rpa11)</td>
<td></td>
<td>.56</td>
<td>-.19</td>
<td>.08</td>
<td>.58**</td>
</tr>
<tr>
<td>D7 Think about how hard it is to concentrate (rpa12)</td>
<td></td>
<td>.52</td>
<td>.09</td>
<td>-.15</td>
<td>.57**</td>
</tr>
<tr>
<td>D8 Think “This is too good to be true” (rpa6)</td>
<td></td>
<td>.41</td>
<td>.26</td>
<td>.26</td>
<td>.41**</td>
</tr>
<tr>
<td><strong>Factor II: Emotion-focus Rumination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Eigenvalue = 2.69; 15.88% of variance explained)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EF1 Think about how happy you feel (rpa7)</td>
<td></td>
<td>.09</td>
<td>.80</td>
<td>-.18</td>
<td>.64**</td>
</tr>
<tr>
<td>EF2 Think how strong you feel (rpa8)</td>
<td></td>
<td>.03</td>
<td>.77</td>
<td>.08</td>
<td>.74**</td>
</tr>
<tr>
<td>EF3 Think about how proud you are of yourself (rpa16)</td>
<td></td>
<td>-.12</td>
<td>.76</td>
<td>.08</td>
<td>.55**</td>
</tr>
<tr>
<td>EF4 Think “I’m achieving everything” (rpa13)</td>
<td></td>
<td>-.06</td>
<td>.57</td>
<td>.40</td>
<td>.57**</td>
</tr>
<tr>
<td>EF5 Savor this moment (rpa2)</td>
<td></td>
<td>-.30</td>
<td>.34</td>
<td>.06</td>
<td>.57**</td>
</tr>
<tr>
<td><strong>Factor III: Self-focus Rumination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Eigenvalue = 1.30; 7.65% of variance explained)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SF1 Think “I am getting everything done” (rpa3)</td>
<td></td>
<td>-.00</td>
<td>-.25</td>
<td>.70</td>
<td>.52**</td>
</tr>
<tr>
<td>SF2 Think about how you feel up to doing everything (rpa4)</td>
<td></td>
<td>-.21</td>
<td>.14</td>
<td>.63</td>
<td>.50**</td>
</tr>
<tr>
<td>SF3 Think “I am living up to my potential” (rpa5)</td>
<td></td>
<td>.02</td>
<td>.22</td>
<td>.59</td>
<td>.68**</td>
</tr>
<tr>
<td>SF4 Notice how you feel full of energy (rpa1)</td>
<td></td>
<td>-.01</td>
<td>.06</td>
<td>.57</td>
<td>.28**</td>
</tr>
</tbody>
</table>

*Note.* n = 111. r^a = corrected correlation between the item and its subscale.

** p <.01
As shown in Table 1, the item loadings supported a three-factor solution: one of the underlying dimensions reflected thoughts that dampens positive moods (Factor I: dampening), while the other two reflected forms of positive rumination (Factor II: emotion-focused rumination and Factor III: self-focused rumination). All factor loadings and item-total correlations were above .41, except for item 4 that showed a slightly weaker loading (.28). The intercorrelations of the factors and the subscale pattern are summarized in Table 2 below.

Table 2

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Dampening</th>
<th>Emotion-focused</th>
<th>Self-focused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dampening</td>
<td>13.25</td>
<td>4.22</td>
<td>8-27</td>
<td>(.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotion-focused</td>
<td>13.10</td>
<td>3.19</td>
<td>7-20</td>
<td>-.20*</td>
<td>(.62)</td>
<td></td>
</tr>
<tr>
<td>Self-focused</td>
<td>10.57</td>
<td>2.13</td>
<td>4-16</td>
<td>-.21*</td>
<td>.60**</td>
<td>(.63)</td>
</tr>
</tbody>
</table>

Note. n= 111. Cronbach’s alpha for the subscales are found on the diagonal (within brackets). Correlation coefficients appear below the diagonal.
* p <.05. ** p <.01.

As shown in Table 2, one subscale was largely independent of the other two (Factor I: dampening) and two other subscales (Factor II: emotion-focused rumination, Factor III: self-focused rumination). The two latter ones both signified positive rumination, and correlated moderately. In addition, Cronbach’s alpha values for the respective subscales were considered satisfactory.

4.2.3 Convergent validity

A correlation analysis was made to show whether criterion measures (repetitive thinking, depression, anxiety and hypomania) were associated to the three subscales of the RPA questionnaire. Also, a second correlation analysis was conducted, where depressive symptoms were partialed. The results are presented in Table 3 below.
### Table 3

#### Correlations of RPA subscales and criterion variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M(SD)</th>
<th>Dampening</th>
<th>Emotion-focus</th>
<th>Self-focus</th>
<th>Dampening</th>
<th>Emotion-focus</th>
<th>Self-focus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$r$</td>
<td></td>
<td></td>
<td>pr controlling for HADS-D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RNT (PTQ)</td>
<td>30.01(10.48)</td>
<td>.39**</td>
<td>-.04</td>
<td>-.11</td>
<td>.30**</td>
<td>.02</td>
<td>-.09</td>
</tr>
<tr>
<td>Depression (HADS-D)</td>
<td>3.08(2.46)</td>
<td>.33**</td>
<td>-.16</td>
<td>-.08*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Anxiety (HADS-A)</td>
<td>7.23(4.09)</td>
<td>.58**</td>
<td>-.29**</td>
<td>-.24*</td>
<td>.51***</td>
<td>-.25*</td>
<td>-.23*</td>
</tr>
<tr>
<td>Hypomania (AS-18-M)</td>
<td>10(65)</td>
<td>.53**</td>
<td>-.05</td>
<td>.05</td>
<td>.50***</td>
<td>-.01</td>
<td>.07</td>
</tr>
<tr>
<td>PANAS NA</td>
<td>7.04(2.81)</td>
<td>.45**</td>
<td>-.11</td>
<td>-.02</td>
<td>.36***</td>
<td>-.04</td>
<td>.01</td>
</tr>
<tr>
<td>PANAS PA</td>
<td>13.21(3.96)</td>
<td>-.04</td>
<td>.34**</td>
<td>.29**</td>
<td>.07</td>
<td>.31**</td>
<td>.28**</td>
</tr>
</tbody>
</table>

*Note. n= 111. Correlations between brackets are partial correlations controlling for HADS-D. PTQ = Perseverative Thinking Questionnaire; HADS = Hamilton Anxiety and Depression Scales; AS-18 = Affective Self Rating Scale; PANAS = Positive and Negative Affect Schedule; RPA = Responses to Positive Affect questionnaire.  
* p <.05. ** p <.01. *** p <.001.
As is shown in Table 3 above, the total sample had a mean HADS-D score of 3.08, which indicated minimal level of depressive symptoms (0-7 = not clinically depressed). For HADS-A, the mean score was 7.23, which indicated somewhat elevated levels of anxiety (0-7= no anxiety, 8-10= mild to moderate levels of anxiety). For hypomania, the mean AS-18-M score was 10 in our sample. Scores <10 are indicative of hypomania, according to the AS-18 manual.

Furthermore, the data from the bivariate correlation analysis suggested the dampening subscale correlated strongly with symptoms of both anxiety and hypomania, suggesting that the higher scores on dampening, the more one experiences symptoms of anxiety and hypomania. Also, there was a moderate positive association between the dampening subscale and repetitive negative thinking, depression, and current negative affect, respectively. For emotion-focused rumination, there was a small negative correlation with anxiety symptoms, meaning that the more one uses an emotion-focused cognitive response style, the less one is likely to experience anxiety symptoms. Also, there was a positive association between emotion-focused rumination and self-focused rumination with current positive affect. Moreover, the self-focused rumination subscale showed a small positive association with symptoms of anxiety: higher scores on HADS-A significantly correlated with higher scores on this particular subscale. As is shown in Table 4, as depressive symptom contamination was controlled for, these correlations and their respective level of strength remained. Hence, in our sample, the association found for the bivariate correlations were not due to a confounding variable in the form of depressive symptoms.

4.2.4 Incremental validity

In order to explore the incremental validity of the RPA questionnaire, two separate hierarchical regression analyses were conducted. The first one aimed to investigate if the RPA subscales explained a significant amount of variance in depressive symptoms (Table 4 below), and the
second one aimed to investigate if the RPA subscales could explain the variance in hypomania (Table 5 below). In the first hierarchical regression analysis concerning variance in depressive symptoms, HADS-D scores were used. In step 1, the construct of repetitive negative thinking, as measured by the PTQ, was entered. This means that the construct of RNT was held constant. In step 2, the three subscales of the RPA questionnaire were entered simultaneously. The results are presented in Table 4 below.

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>T</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>.35</td>
<td>.66</td>
<td>.53</td>
<td>1.53</td>
<td>.15***</td>
</tr>
<tr>
<td>RNT (PTQ)</td>
<td>.09</td>
<td>.02</td>
<td>.39</td>
<td>4.39***</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>.78</td>
<td>1.58</td>
<td>.50</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>RNT (PTQ)</td>
<td>.08</td>
<td>.02</td>
<td>.32</td>
<td>3.37**</td>
<td></td>
</tr>
<tr>
<td>Dampening (RPA)</td>
<td>.11</td>
<td>.06</td>
<td>.19</td>
<td>1.97</td>
<td></td>
</tr>
<tr>
<td>Self-focus (RPA)</td>
<td>.09</td>
<td>.11</td>
<td>.09</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Emotion-focus (RPA)</td>
<td>-.16</td>
<td>.10</td>
<td>-.16</td>
<td>-1.52</td>
<td></td>
</tr>
</tbody>
</table>

Note. HADS = Hamilton Anxiety and Depression Scales; PTQ = Perseverative Thinking Questionnaire; RPA = Responses to Positive Affect questionnaire.
** p <.01. *** p <.001.

Table 4 shows that repetitive negative thinking (RNT) significantly predicted depressive symptoms, explaining a total of 15% of the variance. For step 2 of the analysis, we concluded that the subscales of the RPA did not seem to significantly predict depressive symptoms, above and beyond the construct of repetitive negative thinking (RNT). Noteworthy was that the dampening subscale just fell short of significance as a predictor for depressive symptoms (p <.07), when entered simultaneously with the other subscales of the RPA in Step 2. However, as
the dampening subscale was entered on its own in Step 2, it reached statistical significance as a positive predictor of depressive symptoms ($\beta = 0.21$, $t(110)=2.21$, $p <.05$).

For the second hierarchical regression analysis concerning amount of variance in hypomania, scores from the AS-18-M were used. In step 1, the construct of repetitive negative thinking, as measured by the PTQ, was entered. In step 2, the three subscales of the RPA questionnaire were entered simultaneously. The results are presented in Table 5 below.

### Table 5

*Summary of hierarchical regression analysis for the RPA subscales and repetitive negative thinking (RNT) predicting hypomania/mania symptoms (AS-18-M)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$T$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>6.53</td>
<td>1.49</td>
<td>4.38***</td>
<td>0.07**</td>
<td></td>
</tr>
<tr>
<td>RNT (PTQ)</td>
<td>0.14</td>
<td>0.05</td>
<td>0.27</td>
<td>2.92**</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.76</td>
<td>3.16</td>
<td>-0.56</td>
<td>.25***</td>
<td></td>
</tr>
<tr>
<td>RNT (PTQ)</td>
<td>0.04</td>
<td>0.04</td>
<td>0.08</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Dampening (RPA)</td>
<td>0.67</td>
<td>0.14</td>
<td>0.53</td>
<td>5.97***</td>
<td></td>
</tr>
<tr>
<td>Self-focus (RPA)</td>
<td>0.45</td>
<td>0.22</td>
<td>0.21</td>
<td>2.09*</td>
<td></td>
</tr>
<tr>
<td>Emotion-focus (RPA)</td>
<td>-0.13</td>
<td>0.21</td>
<td>-0.07</td>
<td>-0.65</td>
<td></td>
</tr>
</tbody>
</table>

*Note. AS-18 = Affective Self Rating Scale; PTQ = Perseverative Thinking Questionnaire; RPA = Responses to Positive Affect questionnaire.*

As presented in Table 5, repetitive negative thinking (RNT) was a significant predictor of hypomania symptoms, explaining 7% of the variance in hypomanic symptoms. Also, as the RPA subscales were entered in Step 2 of the analysis, it was found that the three subscales of the RPA questionnaire together explained 25% of the variance in hypomania, above and beyond the construct of repetitive negative thinking. More specifically, the RPA subscales of dampening and self-focused rumination both positively predicted hypomania.
4.2 The effects of the experimental manipulation

As mentioned, the study consisted of two parts: one cross-sectional and one experimental. The participants in the experiment (n=60) were randomized into two different conditions: group 1 (n=28) received the positive mood induction, and group 2 (n=32) received the neutral mood induction (for a schematic overview, see Figure 2).

An independent samples t-test between the two groups pre-experiment and post-randomization showed no significant differences between the groups on the variables that were researched. These included demographics (age, sex, marital status), the RPA subscales, the PTQ, the PANAS, the HADS-D, the HADS-A, and the AS-18-M. Also, there were no differences between the groups as regards sleep items. Lastly, no differences between the groups were found regarding the participant’s perceived overall level of happiness (as measured on a 10-point Likert scale). Thus, we concluded that post-survey differences that existed were due to the actual intervention, and could not be explained by pre-experimental group differences.

The participants were also asked to rate if they perceived that they were able to properly experience the different stimuli presented to them. Since the mood induction procedure had three levels of intervention (writing exercise, viewing task, and auditory stimuli) one question was asked for each of the methods, and the participants were asked to give ratings on a 10-point Likert scale for each scale respectively. An independent samples t-test revealed that there were no significant differences between the groups regarding participants’ own judgment of whether they experienced themselves as mood induced. More specifically, for the first question on the writing exercise, group 1 reported a mean of 7.57 (SD= 1.93), and group 2 had a mean of 8.09 (SD= 1.63). Second, for the question on the viewing task, group 1 reported a mean of 7.93 (SD= 1.78), and group 2 a mean of 7.78 (SD = 1.54). Third, for the question on auditory stimuli, group
In order to further assess the impact of the two different interventions (positive mood induction= group 1, neutral mood induction= group 2) three separate mixed between-within subject analyses of variance (ANOVA) were conducted: one for the question on perceived overall level of happiness (1-10), one for current positive affect and one for negative affect, with the two latter ones measured by the PANAS.

First, concerning the question on perceived overall level of happiness (1-10), the two groups did not differ significantly from each other before the intervention (pre-test), as mentioned. The results are illustrated in Figure 3 below.

As presented in Figure 3, there was a significant interaction between intervention and time (Wilks Lambda= .70, F (1, 58)= 24.41, p < .001, partial eta squared= .30), meaning that there was an increase in perceived level of happiness between time 1 and time 2, and depending on the intervention given. Group 1 reported a mean of 6.18 (SD= 1.79) before the intervention, and a
mean of 7.43 (SD= 1.43) after the intervention. Group 2 reported a mean of 6.16 (SD= 1.48) before the intervention and a mean of 5.53 (SD= 1.67) after the intervention. In addition, there was no significant main effect for time (Wilks Lambda= .95, F (1, 58)= 2.71, p= .85, partial eta squared= .05). Thus, the results showed that Group 1 increased in perceived overall level of happiness, after having gone through the positive mood induction. Group 2, on the other hand, showed a slight decrease in perceived overall level of happiness after the neutral mood induction.

A second variable used in comparing the groups before and after the mood induction procedure was PANAS measuring positive affect. Again, an ANOVA was conducted to assess the impact of the two interventions, although this time on participants’ scores on positive affect across the two time periods. The results are displayed in Figure 4 below.

As presented in Figure 4 there was a significant interaction between intervention and time (Wilks Lambda= .69, F (1, 58)= 26.28, p < .001, partial eta squared= .30), which showed an increase in positive affect between time 1 and time 2, depending on intervention given. Group 1 reported a mean of 12.68 (SD= 3.40) before the intervention, and a mean of 15.68 (SD= 3.80) after the intervention. Group 2 reported a mean of 13.28 (SD= 4.04) before the intervention and a mean of 10.50 (SD= 3.71) after the intervention. Also, there was no main effect for time (Wilks Lambda=...
Thus, the results showed that Group 1 increased in positive affect after the positive mood induction, whereas Group 2 reported a slight decrease in positive affect after a neutral mood induction.

The third and last variable used in the evaluation of the mood induction was participants’ scores on the PANAS measuring negative affect. Once again, an ANOVA was conducted to assess the impact of the two interventions, this time regarding participants’ scores on negative affect over time. The results are displayed in Figure 5 below.

As presented in Figure 5 there was no significant interaction between intervention and time (Wilks Lambda= 1.00, F (1, 58)= 0.01, p= .93, partial eta squared= .00). Group 1 reported a mean of 6.96 (SD= 2.56) before the intervention, and a mean of 6.39 (SD= 2.47) after the intervention. Group 2 reported a mean of 6.69 (SD= 1.77) before the intervention and a mean of 6.16 (SD= 1.37) after the intervention. There was a main effect for time (Wilks Lambda= .90, F (1, 58)= 6.17, partial eta squared= .10), showing a small decrease in negative affect between Time 1 and Time 2 but not depending on intervention given. Hence, both groups decreased in scores on negative affect over time, i.e. regardless of the mood induction given.
Taken together, group belonging predicted change in positive affect. More specifically, the participants that went through a positive mood induction reported an increase in positive affect, and a slight decrease in negative affect. For participants who instead went through a neutral mood induction, there was as slight decrease in both positive affect and negative affect.

4.2.1 Experimental results

4.2.1.1 Dampening as a moderator

In order to investigate whether dampening moderated the relationship between experimental condition and change in positive and negative affect, a three-way mixed between-within subject ANOVA was conducted. The findings are summarized in Table 6 below.

Table 6

*Summary of results from the 2 (Experimental Condition) × 2 (High/low on Dampening) between-within ANOVA on change in positive and negative affect.*

<table>
<thead>
<tr>
<th>Factor</th>
<th>$F$ test</th>
<th>$Df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>6.63*</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC</td>
<td>.00</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × Dam H/L</td>
<td>1.23</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC × Dam H/L</td>
<td>.11</td>
<td>1, 56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor</th>
<th>$F$ test</th>
<th>$Df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>.02</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC</td>
<td>25.00***</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × Dam H/L</td>
<td>.15</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC × Dam H/L</td>
<td>.00</td>
<td>1, 56</td>
</tr>
</tbody>
</table>

*Note. ANOVA = analysis of variance. NA = Negative affect; EC = Experimental condition; Dam H/L = Dampening High/Low; PA = Positive affect.*

As summarized in Table 6, negative affect was significant on its own ($p < .05$), which in this case indicated that negative affect decreased between time 1 and time 2, independently of
experimental condition. Moreover, there were three combinations that were not significant: negative affect and experimental condition (NA × EC), negative affect and dampening (NA × Dam H/L), and negative affect together with both experimental condition and dampening (NA × EC × Dam H/L). This indicated that the levels of negative affect did not differ between the experimental conditions, and also, the dampening subscale did not seem to have an impact on change in negative affect. Taken together, the results indicted that Dampening did not serve as a moderator.

Positive affect in interaction with experimental condition (PA × EC) revealed a significant relationship (p < .001). This indicated that the participants’ levels of positive affect increased across time periods, depending on experimental condition, as shown above. However, dampening did not seem to have an impact on change in negative affect, and did not serve as a moderator in the relationship between positive affect and experimental condition.

4.2.1.2 Emotion-focused rumination as a moderator

In order to investigate if emotion-focused rumination served as a moderator in the relationship between experimental condition and change in positive and negative affect, a three-way mixed between-within subject ANOVA was conducted. The results are summarized in Table 7 below.
As shown in Table 7 above, there was a main effect for negative affect on its own (p < .05). Also, emotion-focused rumination had no impact on change in negative affect (similarly to the dampening subscale) (NA × EFR H/L). Since there was no significant relationship between negative affect and experimental condition, emotion-focused rumination did not serve as a moderator (NA × EC × EFR H/L).

Moreover, there was a significant interaction effect for positive affect with experimental condition (PA × EC) (p < .001). Also, a significant interaction effect was found between positive affect and emotion-focused rumination (PA × EFR H/L). This means that the participants who more frequently engaged in emotion-focused rumination also reported higher levels of positive affect. Furthermore, the relationship between experimental condition and positive affect was not

<table>
<thead>
<tr>
<th>Factor</th>
<th>F test</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>6.57*</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC</td>
<td>.03</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EFR H/L</td>
<td>.15</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC × EFR H/L</td>
<td>2.74</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA</td>
<td>.14</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC</td>
<td>31.79***</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EFR H/L</td>
<td>6.89*</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC × EFR H/L</td>
<td>.30</td>
<td>1, 56</td>
</tr>
</tbody>
</table>

Note. ANOVA = analysis of variance. NA = Negative affect; EC = Experimental condition; EFR H/L = Emotion-focused rumination High/Low; PA = Positive affect. *p < .05. **p < .01. ***p < .001.
moderated by emotion-focused rumination (PA × EC × EFR H/L), which can be compared to the findings on the dampening subscale.

4.2.1.3 Self-focused rumination as a moderator

In order to investigate the relationship between self-focused rumination and changes in positive and negative affect across time as well as between groups (positive/neutral condition), a three-way mixed between-within subject ANOVA was once again conducted. The results are summarized in Table 8 below.

Table 8

Summary of results from the 2 (Experimental Condition) × 2 (High/low on Self-focused rumination) between-within ANOVA on change in positive and negative affect.

<table>
<thead>
<tr>
<th>Factor</th>
<th>F test</th>
<th>Df</th>
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</thead>
<tbody>
<tr>
<td>NA</td>
<td>5.83*</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC</td>
<td>.00</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × SFR H/L</td>
<td>.21</td>
<td>1, 56</td>
</tr>
<tr>
<td>NA × EC × SFR H/L</td>
<td>.10</td>
<td>1, 56</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor</th>
<th>F test</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>.00</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC</td>
<td>27.47***</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × SFR H/L</td>
<td>5.74*</td>
<td>1, 56</td>
</tr>
<tr>
<td>PA × EC × SFR H/L</td>
<td>3.08</td>
<td>1, 56</td>
</tr>
</tbody>
</table>

*Note.* ANOVA = analysis of variance. NA = Negative affect; EC = Experimental condition; SFR H/L = Self-focused rumination High/Low; PA = Positive affect. *p < .05. **p < .01. ***p < .001.

As shown in Table 8 above, there was a significant main effect for negative affect (p < .05), but no significant interaction effect for the relationship between negative affect and experimental condition (NA × EC). Hence, self-focused rumination did not serve as a moderator in this
relationship (NA × EC × SFR H/L), as was the case for the dampening and emotion-focused rumination subscales respectively.

There was also a significant interaction effect for positive affect with experimental condition (PA × EC) (p <.001). In addition, a significant interaction effect was found between positive affect and emotion-focused rumination (PA × SFR H/L). Similarly to emotion-focused rumination, it indicated that the participants who more frequently engaged in self-focused rumination also reported higher levels of positive affect. Furthermore, the relationship between experimental condition and positive affect was not moderated by self-focused rumination (PA × EC × SFR H/L), although it almost reached statistical significance (p =.085).

4.4 Results: a summary

The exploratory factor analysis largely replicated the 3-factor model of the RPA questionnaire. Correlations revealed that dampening correlated strongly with anxiety and hypomania. Also, there was a moderate positive correlation between dampening and repetitive negative thinking, depression, and current negative affect, respectively. For emotion-focused rumination, there was a small negative correlation with anxiety. Also, there was a strong positive association between both self-focused rumination as well as emotion-focused rumination and current positive affect. Moreover, self-focused rumination showed a small positive association with anxiety. Also, symptom contamination in the form of depression was controlled for, after which the associations remained. Moreover, the evaluation of the mood induction procedure revealed that participants had been mood induced, and that the conditions were essentially different from each other. Also, the groups did not differ on any of the variables measured by the pre-test, and positive affect significantly increased in participants who were positively mood induced. When the data was further analyzed, none of the three subscales of the RPA questionnaire served as
moderators in the relationship between the type of mood induction given and changes in positive and negative affect. However, both types of positive rumination had a significant association with higher scores on positive affect.

5. Discussion

The aim of the study was twofold. First, it was to replicate the 3-factor model previously found for the original RPA questionnaire (Feldman et al., 2008) as well as the results of the Dutch validation study (Raes et al., 2009). The second aim was to examine cognitive response styles, and how they related to mood reactivity as experimentally tested through a standardized positive mood induction procedure. In order to investigate the psychometric properties of the Swedish RPA questionnaire, data from the total sample was used. Approximately half of the total sample participated in the experiment. A 2x2 design allowed for comparison between groups as well as across two time periods. The results largely replicated the 3-factor model (dampening, emotion-focused rumination, and self-focused rumination), although a few item switches were detected. Also, the subscales had significant associations with different psychiatric symptoms as well as positive and negative affect. For instance, associations were found between the dampening subscale and anxiety, hypomania, depression, repetitive negative thinking and negative affect, respectively. Both emotion-focused rumination and self-focused rumination had a positive association with positive affect, and a negative association with anxiety. Also, when controlling for repetitive negative thinking, the 3-factor model explained 25% of the variance in hypomania. None of the RPA subscales moderated participants’ mood reactivity. However, there was a significant relationship between the two positive rumination subscales and positive affect.
5.1 The 3-factor model and the Swedish RPA questionnaire

Since a 3-factor model of the RPA questionnaire has previously been suggested (Feldman et al., 2008; Raes et al., 2009), the decision to force three factors in the exploratory factor analysis was made. The results initially revealed five factors that met the Kaiser criterion (eigenvalues <1), which was indicative of a 5-factor model. The Kaiser criterion has, however, been described as overly sensitive at times (Pallant, 2007). Also, the interpretation of the obtained scree plot suggested three factors. The identified underlying factors were: dampening, emotion-focused rumination, and self-focused rumination (all showing satisfactory reliability). Hence, the psychometric properties of the RPA questionnaire seemed thus far to be replicable in a subclinical sample consisting of Swedish university students.

Moreover, the subscale intercorrelations showed that the dampening subscale did not correlate with the two positive rumination subscales, although the positive rumination subscales were strongly associated with each other. This indicated that the model consists of a minimum of two separate factors i.e. one corresponding to positive rumination, and one to dampening of positive affect. A further comparison of the factors showed that none of the items that belonged to the positive rumination subscales appeared in the dampening subscale, which was also the case for the previous versions. In comparison, a few item switches were found between Factor II and Factor III that both reflected forms of positive rumination. The items for the respective version of the RPA questionnaire (Feldman et al., 2008; Raes et al., 2009) are presented in Table 9 below.
Table 9

<table>
<thead>
<tr>
<th></th>
<th>English RPA</th>
<th>Dutch RPA</th>
<th>Swedish RPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor I: Dampening</td>
<td>6,9,10,11,12,14,15,17</td>
<td>6,9,10,11,14,15,17</td>
<td>6,9,10,11,12,14,15,17</td>
</tr>
<tr>
<td>Factor II: Emotion-focused</td>
<td>1,2,4,7,8</td>
<td>1,2,7,8,16</td>
<td>2,7,8,13,16</td>
</tr>
<tr>
<td>Factor III: Self-focused</td>
<td>3,5,13,16</td>
<td>3,4,5,13</td>
<td>1,3,4,5</td>
</tr>
</tbody>
</table>

*Note.* For the Dutch RPA, item 12 did not load strongly on any of the factors (.18 was the highest loading), and thus is excluded from the table, following Raes et al. (2009).

As shown in Table 9, the internal structure of the factors of the Swedish sample was similar to the findings of previous validation studies. For Factor I (dampening), the items found for the original RPA questionnaire (Feldman et al, 2008) and the Dutch RPA questionnaire (Raes et al., 2009) was also found in our results. The only exception was that item 12 did not load strongly for any of the factors for the Dutch sample. For Factor II (emotion-focused rumination), items 2,7,8,13,16 showed strong loadings, and for Factor III (self-focused rumination), items 1,3,4,5 showed strong loadings for our sample. However, item 1 (‘Notice how you feel full of energy’) seemed to have a stronger loading on self-focused rumination for the Swedish version. In the Dutch version, it belonged to emotion-focused rumination. Also, it seemed that item 13 (‘Think “I’m achieving everything”’) had a stronger loading on emotion-focused rumination in the Swedish version, whereas it for the Dutch version belonged in self-focused rumination. Thus, it appears as if items 1 and 13 have switched factors in comparison to the evaluations of the Dutch and Swedish samples, respectively. In addition to this, and compared with the Swedish sample and the validation of the original RPA questionnaire, there was an item switch between items 4 (‘Think about how you feel up to doing everything’) and item 16 (‘Think about how proud you are of yourself’) (see Table 2 above). As our results from the factor analysis were more similar to
the results of the Dutch study than the original study (Feldman et al., 2008), a few hypotheses may be raised. First, the back translation procedure of the items from English may have contributed to subtle differences in meaning, which could partly explain the item switches found. Second, the fact that the Swedish results were more similar to the Dutch results than the original American version could be attributed to intercontinental cultural differences.

5.2 *Is the RPA questionnaire contributing to the field of clinical psychology?*

This study also aimed to research cognitive response styles and their association with other recognized measures of psychiatric symptoms, and whether the RPA questionnaire could further contribute to our understanding of depression and hypomania. First, correlations between the 3-factor model and criterion measures of depression, anxiety, hypomania, and positive and negative affect were conducted. This revealed that the dampening subscale correlated with all of the above mentioned factors, except for positive affect. These results seemed probable, since dampening of positive affect has been found to co-exist with different psychiatric symptoms (Eisner et al., 2009; Kashdan, 2007; Turk et al, 2005), although no patterns of causality can be established. Further, the RPA questionnaire is a convergently valid measure, based on its correlation with other well-established measures. Also, both positive rumination subscales correlated positively with positive affect. Since there were strong intercorrelations between the two positive rumination subscales and item switches occurring only between these two, a 2-factor model of the RPA may be hypothesized, contrary to previous findings (Feldman et al, 2008; Raes et al, 2009).

Results also revealed that the 3-factor model of the RPA questionnaire significantly explained a substantial amount of the variability in hypomania, above and beyond the construct of repetitive negative thinking. Hence, the model makes a unique contribution to the explanation
of hypomania, in comparison to repetitive negative thinking. Hence, within this context, positive rumination and repetitive negative thinking may be conceptualized as two separate constructs as opposed to one construct describing rumination in general. Separating the two seems to be the question of whether it is a response to positive or negative affect (valence), as has previously been suggested (Watkins, 2008). Also, as the sample is of a sub-clinical character, symptoms of both depression and mania are expected to be rather low. It is possible that the use of a clinical sample would generate other results. Moreover, the results support the 3-factor model (as opposed to the previously discussed 2-factor model), as self-focused rumination together with dampening were the two significant contributors in the explanation of hypomania. Emotion-focused rumination, on the other hand, did not make a contribution. This discrepancy points to the possibility of the two positive rumination subscales being essentially different from one another and in fact measuring different constructs. Therefore, the 3-factor model is further supported.

In conclusion, our results suggest that the RPA subscales together partially explained hypomania symptoms, but the model as a whole as well as the subscales fell short of significance in the explanation of depression. More studies are needed on the psychometric properties of the RPA questionnaire, although our results point to that the RPA questionnaire makes an important contribution to the explanation of hypomania symptoms. However, the applicability of the questionnaire in clinical setting may be further debated.

5.3 The subscales of the RPA questionnaire as possible moderators

As the clinical implications of responses to positive affect may be many (Feldman et al., 2008) and since emotion regulation is central in many therapeutic practices (Hayes, Strosahl & Wilson, 1999; Linehan, 1993), the moderating role of cognitive response styles on mood reactivity needs
to be further researched. In order to investigate the subscales of the RPA questionnaire as possible moderators, an experimental approach was chosen. Participants were subjected to a mood induction procedure with two conditions: positive and neutral. Levels of participants’ positive and negative affect were collected pre- and post-experiment, and hence, data was collected across time. The evaluation of the mood induction procedure concluded that proper mood induction had been taking place, as participants in the positive condition significantly increased in positive affect. Following this, it was investigated whether the RPA subscales would act as moderators, i.e. if these would moderate the effect of the mood induction procedure. The experiment was conducted to extend the research on responses to positive affect further. None of the cognitive response styles (the RPA subscales) were moderating the effect of the mood induction procedure. However, there was a significant relationship between the two positive rumination subscales and positive affect.

We initially hypothesized that cognitive response style would serve as a moderator of change in affect, based on the notions that cognitive responses to affect would regulate the strength of the emotion (Gross & Thompson, 2007; Larsen, 2000). Dampening, as compared to the cognitive response styles of positive rumination, was assumed to either decrease or inhibit an increase in positive affect as measured before and after the mood induction. For instance, a person who generally dampens positive affect would then be less likely to experience positive affect. Negative affect, on the other hand, was assumed to be either increased or maintained on the same level for someone who generally engages in dampening. Moreover, the other two cognitive response styles of positive rumination would increase positive affect as participants were subjected to a positive mood induction. This was based on the fact that people who engage in positive rumination either repeatedly think about their positive emotions or life-events
(Feldman et al., 2008), and on previous research on savoring, where people who frequently engage in savoring are shown to upregulate and maintain positive affect (Miyamoto & Ma, 2011). In this respect, savoring and positive rumination may be thought of as similar processes, and subsequently this assumption was made.

However, these assumptions were not confirmed by the results. Instead, it revealed that none of the response styles had an impact on the effect of the mood induction. In this study, it seemed as though people who frequently engage in a dampening response style, did neither show a decrease in positive affect, nor an increase in negative affect. Also, dampening did not seem to have an impact on change in affect in any direction. Similarly to dampening, the positive rumination response styles did not moderate the effect of the mood induction on affect. This could mean that people in our sample who frequently engage in positive rumination generally experience higher levels of positive affect. However, results did not indicate that this group was influenced by the mood induction any differently than the other participants. Thus, although positive rumination seems to have a relationship with positive affect, our results did not support the idea that people with higher levels of positive rumination are more reactive to positive affect.

These findings may be discussed further. For example, questions can be raised regarding the mood induction as a method to capture mood reactivity in participants. As mentioned earlier, the mood induction was relatively short, and may not have lasted long enough for the participants to fully engage in the process. It is possible that cognitive responses should be conceptualized as processes that occur over a longer time period. Second, there is the possibility that people with a positive rumination response style are not more reactive to positive affect but instead are more able to maintain positive affect over time. Our results do not provide a full account of the long-term effects of the mood induction. Third, people with high levels of positive
ruminations had higher levels of positive affect before as well as after the experiment. Also, similar to other participants, the positive ruminators increased their levels of positive affect following the positive mood induction. One might question whether the results indicating that positive rumination did not function as a moderator is related to higher levels of positive affect in the positive ruminators prior to the experiment. If they would have entered the experiment with similar levels of positive affect as the other participants, the possibility of a higher increase in positive affect may have been allowed. Further research is needed to investigate the moderating functions of positive rumination.

5.4 Strengths and weaknesses of the current study

There are several aspects of the current study that may be discussed as possible strengths and weaknesses. To begin with, the sample size was reasonably large, particularly for the cross-sectional analysis, and according to power estimates the sample size was sufficient (Kazdin, 2010). Thus, the sample size made possible for conclusions to be drawn. Yet, there were not enough participants to conduct both an exploratory factor analysis and an accompanying confirmatory factor analysis (Pallant, 2007). As the sample size and the software available only allowed for an exploratory factor analysis, the cross-sectional data analysis had its limitations and a combination of an exploratory and a confirmatory factor analysis could perhaps provide more comprehensive conclusions (Tabachnick & Fidell, 2007). Another option would have been to only conduct a confirmatory factor analysis, since previous studies had already suggested and validated a number of underlying factors. Also, the choice of forcing three factors for the exploratory factor analysis may further be questioned, as the forced entry of factors delimits the possibilities of the data to speak more freely for itself (Albright & park, 2009). In addition, as the sample consisted of university students and thus was sub-clinical in nature, it is possible that
patterns that did not emerge in this study would reveal themselves in data from a clinical sample. More specifically, the 3-factor model accounts for a substantial amount of variance in the explanation of hypomania. In explaining depression, on the other hand, the dampening subscale on its own just fell short of being significant. For instance, if people would have reported higher levels of current psychiatric symptoms (i.e. depression), it could have modified the results regarding if and how the cognitive response styles significantly had an impact on changes in positive and negative affect. Consequently, the subclinical nature of the sample also restricted the generalizability of the results to a clinical setting. Also noteworthy is that the collected material consists of self-report data, and thus depends on whether or not the participants have sufficient ability to accurately rate how they are feeling and to what extent psychiatric symptoms are experienced.

Although the experiment was thoroughly standardized beforehand, there are a few methodological issues that may be discussed. As participants after randomization were directed to separate classrooms for the mood induction procedure, and the walking distance and path may have differed between the groups, it may have had an influence on their current level of positive and negative affect. However, the distance to the classroom was carefully balanced for each experimental situation, e.g. the classroom where the positive mood induction was conducted was the nearest every second time, and the farthest every second time. Still, the possibility of one of the groups being exposed to an affect-evoking experience on the way to the classroom has to be taken into account, since a confounding variable may be responsible for significant associations found. However, as there were seven groups in total and participants were randomized into two different conditions (i.e. 14 groups), the possibility of a confounder related to the walk may be considered eliminated. Other factors that may have influenced the results may be the fact that all
experiments were conducted in the afternoon, and that some of the students had recently started
their university studies, and therefore perhaps experienced higher levels of stress and anxiety.

Among the strengths of the study, its design can be mentioned. As the experimental
design of the study was prospective it therefore allowed for investigation of effects over time. It
also permitted randomization of the participants. Both of these properties make possible
conclusions on causality. Furthermore, initial screening of the data revealed that the groups were
similar on all variables before the experiment, and were significantly different for positive and
negative affect after the experiment. Hence, we may assume that reported changes in affect are
due to the type of mood induction given (i.e. positive or neutral). Also, as previous studies on
cognitive response styles have been cross-sectional in nature, this study further extends the
research within this area, since an experimental design was used.

5.5 Future research

During the process of this research project, many interesting possibilities of analysis were
revealed in the data, but the restricted time frame of the study did not permit for further
exploration of all of them. First, one of the aims was to replicate previous studies on the RPA
questionnaire (Feldman et al., 2008; Raes et al., 2009), and it resulted in the 3-factor model being
largely replicated. However, data from a larger sample would enable a more advanced
combination of data analysis, namely that the exploratory factor analysis is accompanied by a
confirmatory factor analysis, also for a Swedish sample. As our results indicate a 2-factor as an
alternative solution, another suggestion is to force a 2-factor model using an exploratory factor
analysis in order to obtain further information, and make possible for a comparison between the
two proposed models.
A further exploration of the RPA questionnaire would also have been to analyze how it relates to other constructs of psychiatric disorders. For instance, the issue of possible symptom contamination of depression was investigated in this study. However, as participants’ scores were slightly elevated on measures of anxiety and hypomania (not depression), one would want to conduct similar analyses to control for symptom contamination of anxiety and hypomania also. We advocate for further research, and a subsequent extension would be to test the RPA questionnaire in relation to a broader spectrum of psychiatric disorders, which would explore the construct of responses to positive affect as a possible underlying transdiagnostic process.

Furthermore, one hypothesis made from our results may be that people who frequently engage in positive rumination are also more inclined to maintain positive affect over time. Our experiment was relatively short and only measured instant change in affect. Therefore, we suggest that future studies utilize methods that allows for the investigation of the possible long-term effects of cognitive response style on affect. It would also be of interest to conduct a larger study investigating a broader range of variables such as personality related factors, as well as other psychological constructs not necessarily related to clinical psychology.
References


