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Ph.D. THESIS-EXTENDED SUMMARY

POSITIVE EMOTION REGULATION STRATEGIES. CORRELATES AND PREDICTORS

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CHAPTER I. THEORETICAL BACKGROUND

1.1. Introduction to research topic

Recently, there has been a growing interest in psychological research in positive emotion regulation. Studies have shown that the adaptive regulation of positive emotions is associated with positive emotions, and increased well-being in general (e. g. Bryant, 2003; Gentzler, Palmer & Ramsey, 2015) Also, there are studies that indicate that disturbances in positive emotion regulation are associated with pathological symptoms (e.g., depression, anxiety) and this draws attention to the fact that the regulation of positive affect is an important clinical problem (e g. Carl, Soskin, Kerns, Barlow., 2013; Nelis, Quoidbach, Hansenn & Mikolajczak, 2011).

The general aim of this thesis was to investigate the positive emotion regulation strategies in relationship with positive emotion, well-being and psychopathology symptoms (depression, anxiety and bipolar). The first chapter is focused on definitions and conceptualizations of positive emotions and positive emotion regulation, with relevance to the field of clinical psychology. Chapter 2 discusses the methodology and objectives of the studies we conducted, while Chapter 3 presents our original research on the topic of positive emotion regulation. In the last chapter, we synthesize the conclusions and implications of the studies, we discuss their limitations and provide new directions for future research.

1.2. Positive emotion regulation

Positive emotion regulation can be defined as a complex process through which people change the nature, frequency, and duration of positive emotions (Gross, 1998; Parrott, 1993). Research on positive emotion regulation shows that specific regulation strategies are meant to increase or decrease positive emotions as response tendencies (Carl et al., 2013). To explain the way people, regulate their emotions, James Gross (1998) proposes a model that comprehensively addresses emotional response tendencies, including the context, cognitive reappraisal and behavioral response of emotions.

The Process Model describes 5 emotion regulation strategies: situation selection, situation modification, attention deployment, cognitive change, and response modulation. This model offers a comprehensive view of the different stages from emotion generation to emotion regulation, so we can understand how positive emotion regulation processes are unfolding. For example, when someone intends to regulate a positive emotion, he/she will choose a positive situation to enter (situation selection; e.g., Someone chooses to go to dinner with some friends to a fancy restaurant). The same person can also change the situation to make it more pleasant (situation modification; e. g. Switch places at the table, to be next to his/her best friend). The person can also direct his/her attention to specific pleasant stimuli (attention deployment; e.g. He /she turns his/her attention to the conversation with friends while savoring his/her favorite dish) evaluate the situation (cognitive

change; e.g., He/ she is thinking how wonderful it is to stay with close friends and to eat such a great food), and express enjoyment (response modulation; e.g., smiling and laughing).

1.3. Positive emotion regulation strategies

Positive emotion regulation is quite a new research topic in clinical psychology, there are few studies so far that conceptualize and describe specific strategies, mainly because much interest was given to negative emotion regulation by now. Positive emotion regulation is different from negative emotion regulation, mostly because the biological, physiological and behavioural features of positive emotions are distinct from negative emotions (Garland, Fredrickson, Kring, Johnson, Meyer & Penn, 2010). Positive emotion regulation has different functions and it operates with different strategies. These strategies can be classified into two wide categories, strategies meant to downregulate positive emotions, and strategies intended to upregulate positive emotions.

One of the most common and studied positive emotion regulation strategy is *savoring*. Savoring is the process by with people generate, maintain and enhance the positive experience from the past, present, and future (Bryant, 2003).

Nelis et al. (2011) classify positive emotion regulation into two main categories and describe four specific strategies for each category. Dampening strategies are behavioral and cognitive strategies that individuals use to downregulate positive emotions. The most commonly used dampening strategies are:

1. *Inhibition or suppression of positive emotions* refers to a general inclination to suppress positive emotions once they are present. The tendency to suppress positive emotions was associated with a general decrease in choosing subjective positive experience over time (Gross & Levenson, 1997).
2. *Inattention to positive experiences* (or distraction). This strategy is characterized by paying attention to negative thoughts which are not related to the present positive event (e. g. someone who's at a dinner party with his/her friends is worrying about the tasks which are not finished at work).
3. *Fault finding.* This strategy can be described as paying attention to the negative elements of positive situations. This emotion regulation strategy determines the person to be unpleased with positive events because he/she is focusing on the things that could have been better.
4. *Negative mental time travel* refers to negative reminiscence and anticipation of negative consequences for positive events. Negative reminiscence refers to focusing on positive events in a negative light using external attributions.

Savoring strategies are meant to upregulate positive emotions. The most common savoring strategies described by Nelis et al. (2011):

1. *Savoring the present moment* (" being present") is described as directing full attention to the positive experience from the present moment (Bryant, 2003).
2. *Capitalizing* refers to celebrating and sharing positive experiences and positive feelings with others (Langston, 1994).
3. *Positive Mental Time Travel* is characterized by reminiscence and anticipation of positive events.

4. *The behavioral display* strategy is described as expressing positive emotions with nonverbal behavior.

Another conceptualization introduces the concept of *positive rumination* (Feldman et al., 2008), with its twofold meaning: being focused on the positive feelings (*emotion-focused*) and being focused on the positive meaning of the positive events for the self (*self-focused*).

1.3.1 Assessment of positive emotion regulation

Positive emotion regulation is usually assessed by self-report measures. These are questionnaires that focus on specific strategies and are usually not related to a specific context; they typically measure positive emotion regulation strategies as traits and general tendencies. Among the most frequently used are: the Savoring Belief Inventory (SBI, Bryant 2003), the Responses to Positive Affect scale (RPA; Feldman et al., 2008), the Emotion Regulation Profile - Revised (ERP-R, Nelis et al, 2011), and the Difficulties in Emotion Regulation Scale-positive (DERS-positive; Weiss, Gratz & Lavender, 2015).

Beside self-report questionnaires, other methods have also been used to assess positive emotion regulation. A limited number of studies have used experimental tasks. Functional Magnetic Resonance Imaging (fMRI) was used to measure brain activity during positive emotion regulation tasks by Heller et al., 2009 and Light et al., 2011. Computerized tasks such as the dot-probe have been used to identify attention biases relevant to positive stimuli (e.g., Joormann & Gotlib, 2007). The daily diary is another method that was used in positive emotion regulation research and is considered a more ecological way to measure and see emotion regulation patterns in everyday life (Lyubomirsky, King, & Diener, 2005; Kashdan & Steger, 2006).

1.4. Positive emotion regulation strategies, psychopathology symptoms, positive emotion and well-being

1.4.1. Positive emotion regulation and positive emotion

Studies show that savoring strategies are positively associated with increased levels of well-being and positive emotions (e. g. Quoidbach et al.,2010; Gentzler et al., 2015; Smith & Hollinger-Smith, 2014; Quoidbach et al.,2010) and dampening strategies are associated with decreased well-being and a low level of positive emotions (e. g. Hamilton, et al, 2017; Olofsson, Boersma, Engh, Wurm, 2014; Quoidbach et al, 2010). Bryant and Veroff (2017) show that the daily use of simple savoring strategies, such as noticing pleasurable aspects and acknowledging positive experiences, increases the happiness levels in compared to a negative focus condition and a neutral control condition. Not all savoring strategies predict well-being in the same amount. Quoidbach et al, 2010 showed that emotional well-being was predicted mainly by being present and positive mental time travel. Also, the strongest negative predictor of well-being was distraction from positive experiences.

1.4.2. Positive emotion regulation and psychopathology

Recent research in the clinical field has focused on the importance of positive emotion regulation in emotional disturbance (Carl et al, 2013).

In the following, we summarize findings on mental health problems most frequently linked to problems in positive emotion regulation, namely depression, anxiety, and bipolar disorder.

1.4.3. Positive emotion regulation disturbances in depression

Depression is one of the most common clinical disorder (Alonso, Angermeyer, & Lepine, 2004; Kessler, 1994). Studies show that depressive symptoms are associated with increased levels of dampening (Carl et al, 2013; Nelis et al., 2011; Gentzlet et al., 2015; Raes et al., 2014; Werner-Seidler et al., 2013) and decreased levels of savoring (Bryant, 2003; Eisner, Johnson, & Carver, 2009; Ramsey & Gentzler, 2014; Werner-Seidler al., 2013). If we use the process model of Gross (1998), to explain the difficulties in positive emotion regulation in depression, we find that deficits are found in all five emotion regulation processes (Carl et al, 2013).

a) Situation selection, and modification. Depression is strongly associated with avoidance of a wide range of activities that could help increase positive mood (e.g., recreation activities, social activities, leisure activities) (Lewinsohn & Amenson, 1978). Moreover, depressed people are not motivated to engage in pleasant activities, mainly because they are not sensitive to reward (Dillon & Pizzagalli, 2007; Shankman, Klein, Tenke, & Bruder 2007).

b) Attentional deployment. Studies show that people with depressive symptoms do not attend to positive information in general but are prone to focusing on negative stimuli from the environment (Bar-Haim, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Mogg & Bradley, 2005).

c) Cognitive change. The cognitive mechanism of depression has received the greatest attention in research. Recent studies on emotion regulation show that people with depressive symptoms tend to dampen positive emotions by thinking in ways that suppress positive affect (e.g "I don't deserve this", "This good situation will not last "), and also tend to make external attributions to success (e.g., "I did not get a good great because I did good, the professor was too kind to me") (Feldman et al., 2008).

d) Response modulation of positive emotions also raises problems to individuals with depression. Correlational studies show that suppression is positively correlated with depression (Gross & John, 2003, Johnson, Tharp, Peckham, & McMaster, 2016; Kashdan & Steger, 2006; Su, Lee & Oishi, 2013). A recent study that examined dampening of positive emotions in everyday life using the daily diary method showed that depressive symptoms are associated with daily increased dampening of positive affect (Li, Starr & Hershenberg, 2017).

1.4.4. Positive emotion regulation disturbances in anxiety

Anxiety disorders are also very common in the population, and are often comorbid with depression (Sartorius, Üstün, Lecrubier & Wittchen, 1996). Below, we briefly review studies that we have explored positive emotion regulation in relation to anxiety.

a) Situation selection and modification. Anxiety is usually associated with disturbances in situation selection and modification because it is mainly characterized by avoidance. Social anxiety is characterized by avoidance of social situations and the frequency of engaging in positive events is usually low (Kashdan & Steger, 2006). Agoraphobia is associated with avoidance of many positive situations and contexts (e.g., social and leisure activities and physical exercise) (Broocks et al., 1997; Morissette, Bitran. & Barlow, 2010).

b) Attentional deployment. In anxiety, vigilance related to negative stimuli is higher, and many studies have shown that individuals with anxiety have an automatic bias towards negative information (attention bias) (Bar-Haim et al., 2007; Mathew & MacLeod, 2005; Ruiz-Caballero & Bermudez, 1997). The attentional bias related to positive stimuli is less obvious for those with anxiety. There are several studies that have shown that those with social anxiety tend to avoid focusing on positive stimuli (Chen, Clarke, MacLeod, & Guastella, 2012; Taylor, Bomyea, & Amir, 2010), but it is still unclear whether the bias related to negative information distracts those with anxiety from positive stimuli and more research is needed.

c) Cognitive reappraisal. Individuals who suffer from anxiety disorders make negative interpretations of ambiguous scenarios (Mathews & MacLeod, 2005). Although there are no specific studies on the appraisal of positive events, data show that anxious individuals exhibit difficulties in savoring positive events, and tend to dampen positive emotions (Eisner et al., 2009).

d) Response modulation. Similar to depression, individuals with anxiety tend to suppress positive emotions (Carl, et al, 2013). Strategies like behavioral display and capitalizing are used less by those who have anxiety symptoms compared to individuals with no such symptoms (Nelis et al., 2011). Social phobia and generalized anxiety are characterized by poor expressions of positive emotions (Roemer, Salters, Raffa, & Orsillo, 2005; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005).

1.4.5. Positive emotion regulation in bipolar disorder

In the following we will summarize the studies that have explored positive emotion regulation in relation to bipolar disorder.

a) *Situation selection and modification*. Studies done so far show that individuals that are at risk for mania tend to pursue pleasure in an inappropriate context. Gruber (2011) shows that people at risk for mania pursue inappropriate positive responses to neutral and negative stimuli compared with a control group without risk for mania.

b) *Attentional deployment*. Some evidence shows that individuals who are at risk for mania display attention biased toward positive stimuli (Gruber, 2011; Johnson, McKenzie, & McMurrich., 2007). The fact that people at risk for mania report a greater degree of positive affect after viewing neutral and negative sequences of film clips, strengthens the hypothesis that they have a general tendency to turn their attention to positive information even in negative situations (Carl et al., 2013).

c) *Cognitive change*. Symptoms of mania are associated with automatic positive appraisal by generalizing positive information (Piff, Purcell, Gruber, Hertenstein, & Keltner, 2012). People with bipolar disorder who are between manic episodes use strategies of cognitive reappraisal more frequently when they are watching sad and neutral movies than healthy controls (Gruber, Harvey, & Gross, 2012).

d)Response modulation. Curiously, even though individuals that are at risk for mania are seeking pleasure and activities that maximize positive emotions they are also using dampening strategies relatively frequently (Feldman at al., 2008). Moreover, Gruber, Harvey, & Gross (2012) showed that individuals who are between episodes of bipolar I disorder use suppression strategies more often, to regulate their positive emotions, than healthy ones and fail to regulate their increased levels of positive emotions.

1.5. Evidence-based treatment strategies for clinical disturbances in positive emotion regulation

Even though the regulation of positive emotions has only recently captured the attention of the clinical field, a number of empirically validated techniques already exist that address components relevant to disturbances in positive affect.

In treating depression, *behavioral activation* is a strategy (BA; Jacobson, Martell, & Dimidjian, 2001) which is meant to change behavioral patterns based on avoidance of positive situations and passivity. BA is based on the fact that people with depression learn to re-engage in rewarding activities (Hopko, Lejuez, Ruggiero, & Eifert, 2003; Jacobson et al. 2001).

C*haracter strength* is a positive psychology intervention, is based on identifying personal strengths and making behavioral changes based on these in daily life (Seligman, Steen, Perk & Peterson, 2005). *Acts of kindness* is another positive intervention which consists of planning and performing acts of kindness toward others every day or week (Lyubomirsky, Sheldon, & Schkade, 2005). One other technique that is highly used in depression treatment is *counting blessings* which involves making a daily list of things for which someone is thankful (e.g., Emmons & Mc Cullough, 2003). All of this positive intervention has empirical support and have been shown to be effective in decreasing symptoms of depression and in improving the level of positive affect and well-being, especially in the non-clinical population; more studies on clinical population are needed (Carl et al., 2013).

Another treatment line is based on attentional control (attention-focus on positive emotions), including meditation-based strategies using mindfulness. Mindfulness meditation techniques are increasingly becoming an integral part of treatments that are designed to optimize the level of positive emotions (Garland et al., 2010). Studies show that mindfulness improves

cognitive flexibility resulting in the long-term cultivation of positive affect and well-being (Fredrickson & Joiner, 2002; Garland et al., 2010). One of the most empirically supported meditation practices is Mindfulness-Based Cognitive Therapy (MBCT, Teasdale, et al., 2000), which is based on the cultivation of momentary awareness of thoughts, emotions and bodily sensations plus refocusing attention on the environment without judging it. Several studies have shown that such mindfulness practices lead to increased levels of positive emotions (Erisman & Roemer, 2010; Jimenez, Niles, & Park, 2010). Another meditation practice which does not have so much empirical evidence yet is *loving-kindness meditation* (LKM- Salzberg, 2011). This technique is based on increasing compassion to oneself and others by imagining and repeating positive thoughts (e. g. May I be happy/ May I be kind) in a meditative manner. The results regarding the effectiveness of KLM are mixed. KLM intervention applied to those with anxiety symptoms (Weibel, McClintock, & Anderson, 2016) and those with schizophrenia (Johnson et al., 2011) seem to increase the level of positive emotions, of compassionate love and self-compassion in the experimental groups (the groups that benefited from the intervention) as compared to the control groups.

Another class of interventions comes from the paradigm of positive emotion regulation and mainly includes interventions based on savoring. Simple savoring exercises proposed by Bryant & Veroff (2017) involve focusing attention on either sensory experience such as eating, drinking or focusing attention on activities that are pleasant but a bit more complex (e. g. walking in the park). *Reminiscence intervention* is another savoring technique and is based on remembering positive experiences by re-experimenting them for 10 minutes daily through mental imagery (Bryant et al., 2005) or by talking about positive experiences from the past (e. g. Pinquart & Forstmeier, 2012). Positive mental travel exercises are also used for increasing savoring by vividly imagining future positive events that are supposed to happen the next day (Quoidbach et al., 2009; Kurtz & Lubominsky, 2013). *Capitalizing interventions* are also meant to increase savoring. These interventions are response modulation techniques, based on sharing positive events with close people.

1.6. Relevance and impact of the research topic

A first theoretical implication is a better understanding of the phenomenon of the regulation of positive emotions. Few studies have approached this topic so far, and a lot more attention was given to negative emotion regulation. Nevertheless, several studies now show that positive emotion dysregulation is associated with anxiety, depression, and bipolar disorder (Eisner et al., 2009; Feldman et al., 2008; Gruber, Eidelman, Johnson, Smith, & Harvey, 2011; Nelis et al, 2015; Raes, Daems, Feldman, Johnson & Van Gucht, 2009). It is necessary to study the factors that contribute to a poor regulation of positive emotions that have not yet been investigated, such as cognitive distortions which are vulnerability factors for emotional disturbances (Beck, 2008; David, Schnur, & Belloiu, 2002).

A second theoretical implication is a better temporal and functional characterization of positive emotion regulation and emotional disturbances. It may be insufficient to classify positive emotion regulation strategies in good and bad, dampening and savoring. There is a need to evaluate

them in context and time related to one's personal goals and also to clarify which positive emotion regulation strategies are associated with certain outcomes, maybe not all dampening strategies are equally influencing symptoms of depression, anxiety and bipolar disorder. Also, there is a need to discover which savoring strategies most influence well-being and positive emotions.

As practical implications, there is a need to test positive emotion regulation techniques to improve the quality and efficiency of treatment programs for emotional problems, considering that several studies have shown that positive emotion regulation is essential to mental health (Carl, et al, 2013).

CHAPTER II. RESEARCH OBJECTIVES AND OVERALL METHODOLOGY

The **general aim** of this research project is to investigate the impact of positive emotion regulation strategies, both adaptive and dysfunctional, on symptoms of depression, anxiety and bipolar disorder, and on positive outcomes such as positive emotions and well-being.

Our first main objective is to synthesize the relation between adaptive and dysfunctional positive emotion regulation strategies on the one hand, and positive emotions, well-being and symptoms of psychopathology (i.e., depression, anxiety, and bipolar disorder) on the other, by conducting a meta-analytic review (Study 1). To our knowledge, no meta-analysis has been conducted yet on the regulation of positive emotions.

The second main objective is to investigate the relation between positive emotion regulation strategies and irrational beliefs described in Rational Emotive Behavior Therapy (REBT): demandingness (DEM), awfulizing (AWL), low frustration tolerance (LFT) and self-downing/other-downing (SD/OD). In Study 2a, we test if dampening strategies mediate the relation between irrational beliefs and depressive symptoms, while in Study 2b we test if savoring strategies mediate the relation between irrational beliefs, joy and depressive symptoms.

The third objective is to investigate daily positive emotion regulation in individuals with symptoms of depression. Our goal was to identify the specific dampening and savoring strategies that individuals with symptoms of depression use to downregulate or upregulate their positive emotions following a positive event. A daily diary study was conducted to this end (Study 3).

The fourth main objective of the thesis is to investigate the efficacy of an internet-based savoring intervention for improving positive emotion regulation and reducing depressive symptoms. Although data show that people experiencing depressive symptoms have an impaired capacity of savoring positive life events, there is a lack of intervention protocols addressing this problem (Carl et al., 2013; Gross & Thompson, 2007).

The outline of the studies included in the thesis is presented in Figure 1.

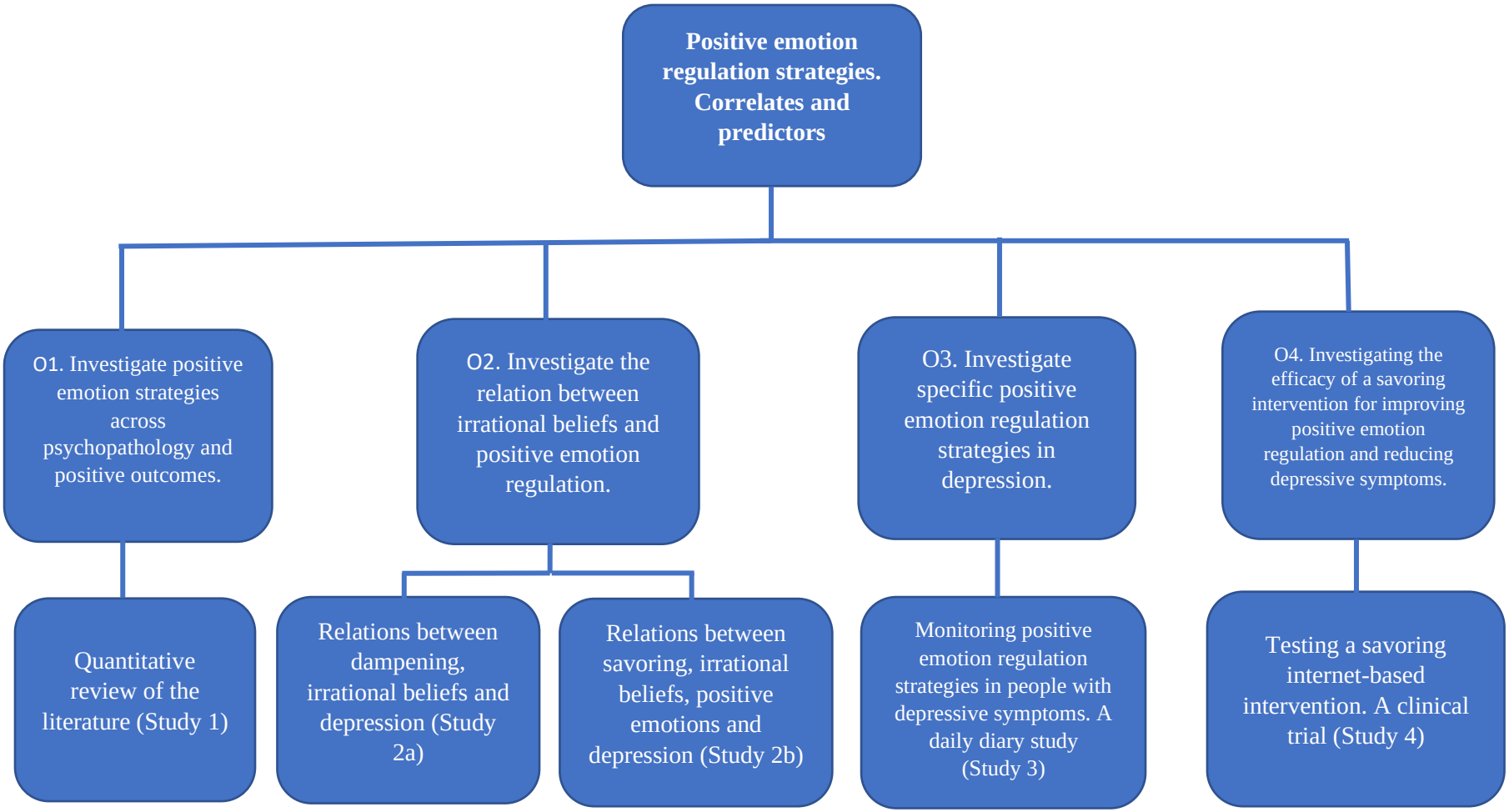

Figure 1. *Graphical outline of the objectives and research projects*

CHAPTER III. ORIGINAL RESEARCH

3.1. Study 1. Positive emotion-regulation strategies across psychopathology, positive emotion and well-being. A meta-analytic review[1]

3.1.1. Introduction

Over the past years, several studies have emerged investigating the role of positive emotion regulation in mental health. Attention in emotion regulation research has shifted from considering only negative emotion regulation to emphasizing how positive emotion regulation strategies influence positive emotions, well-being and psychopathology symptoms (depression, anxiety and bipolar disorder).

3.1.1.1. Positive emotion regulation strategies and positive emotions

Emotion regulation is the process by which people change the duration, frequency and nature of their emotions (Gross, 1998; Parrott, 1993). Positive emotion regulation is the process by which the individual adjusts the duration, nature, and frequency of positive affect (Gross & Thompson, 2007).

Positive emotion regulation research, thus far, has focused mainly on specific strategies for regulating positive emotions. The literature describes two broad categories of positive emotion regulation strategies aimed at reducing the duration, nature and frequency of positive emotions (i.e., dysfunctional strategies), and strategies that increase the duration, frequency and level of positive emotions (i.e., adaptive strategies). The former are characterized by down-regulation of positive emotions (Feldman et al., 2008; Nelis al al., 2011; Quoidbach, et al.,2010). Among these are: (1) suppression of positive emotions - positive emotions are hidden or repressed; (2) distraction from stimuli that can induce positive emotions; (3) fault finding - paying attention to the negative elements or focusing on what could be even better in a positive event; (4) negative mental time travel - reflecting on the positive events of the past, present and future in a negative perspective. Dysfunctional strategies are associated with decreased well-being, symptoms of depression, and low self-esteem (Feldman et al., 2008; Larsen, & McKibban, 2008; Schwartz, Reynolds III, Thase, Frank, Fasiczka, & Haaga, 2002).

Adaptive strategies instead, are those which amplify and maintain positive emotions (Bryant, 2003; Feldman et al., 2008; Nelis et al., 2011). Among these are: (1) behavioral display: maintaining and displaying positive emotions by behavioral expression (verbal or nonverbal) ;(2)

[1] This study was submitted for publication.
Căzănescu, D. G., Tecuta, L., & Szentagotai-Tătar, A. (2019). Positive emotion-regulation strategies across psychopathology, positive emotion and well-being. A meta-analytic review. Manuscript submitted for publication. Author contributions: D. G Căzănescu, and A. Szentagotai-Tătar contributed to the study design. The literature search, selection of studies and coding procedure were performed by D. G Căzănescu. D. G Căzănescu performed the data analysis and interpretation under the supervision of A. Szentagotai-Tătar. D. G Căzănescu and L. Tecuta drafted the manuscript, and A. Szentagotai-Tătar provided critical revisions of data analysis and writing the manuscript.

being present - focusing attention deliberately on positive experiences; (3) capitalizing - celebrating positive events with others; (4) mental time travel by remembering or anticipating positive events.

Feldman et al, (2008) propose the concept of positive rumination, which is twofold: emotion-focused rumination - focusing attention on the pleasant emotions that someone feels, and self-focused rumination - focusing attention on the positive characteristics of oneself. These strategies are associated with increased intensity and frequency of positive emotions (Erisman & Roemer, 2010).

While optimal positive emotion regulation is generally associated with increased levels of well-being and positive emotions, deficits in positive emotion regulation generate distress and are closely linked to emotional problems (Carl et al., 2013). In the following, we briefly summarize data on the relations between deficits in positive emotion regulation and emotional symptoms (depression, anxiety and bipolar symptoms).

3.1.1.2. Positive emotion regulation in psychopathology

Recent studies have shown that positive emotion regulation is frequently significantly altered in individuals who suffer from depression (Eisner et al., 2009; Feldman et al., 2008). Deficits in positive emotion regulation in depression can be found in several forms. First, depression is characterized by a lack of motivation and inability to choose contexts that give the opportunity to develop or increase the level of positive emotions (Carl et al., 2013). Moreover, people suffering from depression may have difficulties in employing adaptive strategies, exhibiting instead a negative attention bias, that is, an excessive focus on negative stimuli. Studies indicate that such patients are less attentive to faces expressing positive emotions or words describing positive affect (Bradley, Mogg, Falla, & Hamilton, 1998; Joormann & Gotlib, 2007; Levens & Gotlib, 2009). Moreover, individuals with depression tend to negatively interpret ambiguous scenarios (Mathws & MacLeod, 2005) and generate fewer positive memories or project less pleasant events in the future than non-depressed individuals (MacLeod, Tata, Kentish, & Jacobsen, 1997).

Some studies show that patients with depression use fewer strategies for increasing positive emotions such as capitalizing or behavioral display (Nelis et al., 2011). Symptoms of depression also predict low levels of savoring (Eisner et al., 2009).

Similarly, with depression, Anxiety disorders are strongly associated with reduced engagement in activities aimed to increase positive emotions and with avoidance (Carl et al., 2013). Individuals with high levels of anxiety seem to be primarily preoccupied with suppressing their anxiety, thereby paying little or no attention to pleasant stimuli (Kashdan & Steger, 2006). For example, agoraphobia is associated with avoidance in a variety of contexts (Morissette et al., 2010), while social anxiety is associated with decreased engagement in activities that may generate joy, usually involving social interactions (Broocks et al., 1997; Morissette et al, 2010). Moreover, individuals with anxiety symptoms exhibit difficulties in maintaining positive emotional responses for extended amounts of time, showing a tendency to dampen positive emotions as well as a tendency of not engaging in savoring of positive events (Eisner et al., 2009). Behavioral strategies for regulating positive emotions (e.g., behavioral display, capitalizing) are used less by people with

symptoms of anxiety compared to those who do not have such symptoms (Nelis et al., 2011). Social phobia and generalized anxiety are also closely related to a lack of expression of positive emotions (Roemer et al., 2005; Turk et al., 2005).Even though anxiety disorders and depression are frequently comorbid, poor regulation of positive emotions in anxiety is present even when controlling for symptoms of depression (Carl et al., 2013).

Regarding the deficits in positive emotion regulation strategies, symptoms of bipolar disorder are associated with increased levels of positive emotions, which motivate patients to engage in situations that are goal oriented (Johnson, Gruber & Eisner, 2007; Johnson et al., 2005). Moreover, these individuals engage in maladaptive behaviors and show positive emotional responses in neutral or negative situations (Gruber, 2011), underscoring their inability to control and adjust their positive emotions depending on the context. Additionally, an increased risk of developing bipolar disorder is associated with excessive reassessing of situations and overgeneralizing positive information in order to increase positive emotions (Carl et al., 2013). A recent study found that people with bipolar disorder (between episodes) use cognitive reappraisal more frequently when they are watching sad and neutral movies than healthy controls (Gruber et al., 2012).

Moreover, individuals with bipolar disorder who are between manic episodes use more positive rumination strategies (e.g., self-focused rumination) than those who do not suffer from bipolar disorder (Feldman et al., 2008; Gruber et al., 2011; Raes et al., 2009). Even though bipolar symptoms were associated with positive rumination strategies, the risk for mania was also associated with dampening (Feldman at al., 2008) and suppression of positive emotions.

3.1.1.3. General Objective of the Present Meta-analysis

To date, no quantitative analysis has been carried out to find the association between the positive emotion regulation strategies, emotional disorders, positive emotions, and well-being. The aim of the present meta-analysis is to synthesize the relations between specific positive emotion regulation strategies, positive emotions, well-being, and symptoms of depression, anxiety, and bipolar disorder. Potential moderators such as sample size, mean age of the sample and gender (the percentage of women) will be explored. We expect to find strong positive associations between adaptive strategies and positive emotions (e. g. joy, happiness) and well-being. We also expect to find negative correlations between adaptive strategies and symptoms of depression, anxiety and bipolar disorder. Based on the literature, we expect to find strong positive associations between dysfunctional strategies and symptoms of depression, anxiety and bipolar disorder. We also expect to find strong negative associations between dysfunctional strategies, positive emotions and well-being.

3.1.2. Method

3.1.2.1. Selection of studies

The literature search was conducted in the PsycINFO and PubMed electronic databases, and included studies published from inception to October 2018. The following keywords, representing positive emotion-regulation strategies were searched using every possible combination among them through the boolean operator "AND": "positive emotion regulation", "savoring", "dampening", "positive rumination", "positive mental time travel", "capitalizing", "behavioral display", "positive reappraisal", "negative mental time travel", "positive emotions suppression", "positive emotions distraction" in combination with types of pathology: "anxiety", "social anxiety", "panic disorder", "PTSD", "GAD", "phobia", "depression", "bipolar", and positive outcomes: "positive emotions", "positive affect", "well-being" and "mental health" in title, abstract and keywords.

In addition to searching in online data bases, we supplemented our searches by looking for articles in Google Scholar that included important measures in the field of positive emotion regulation (i.e., Savoring Belief Inventory, Response to Positive Affect, The Emotion Regulation Profile-Revised). Also, we checked references sections and examined tables of contents of relevant published articles on positive emotion regulation.

3.1.2.2. Inclusion/exclusion criteria

Studies were included in the analysis if they: (a) reported correlations between at least one positive emotion regulation strategy (adaptive and/or dysfunctional strategies) and symptoms of depression, anxiety and bipolar disorder, positive emotions and well-being (b) were published in English, (c) were published in peer reviewed journals and (d) provided sufficient data to derive the effect size between the variables of interest (for the 7 studies that did not report the correlations between variables of interest, we contacted the authors and 4 of them provided the correlations we needed), (e) included clinical or non-clinical populations. If multiple measures were reported in longitudinal studies, only baseline measures were included.

The following were excluded: (a) dissertations, master's theses, or conference presentations (because they usually do not go through a systematic peer-review process), (b) studies that did not provide sufficient data to calculate effect sizes, (c) experimental/treatment studies that did not include a control group and measures at baseline (did not allow calculation of effect sizes for the cases where the coefficient of correlation were not reported in the study), (d) studies on specific populations (e.g., caregivers), in order to increase representativeness of the sample, which is focused on the general population (non-clinical individuals) and clinical population diagnosed with anxiety, depression and bipolar disorder.

Applying these criteria, a total of 73 studies were found. Out of these, 62 were on non-clinical population, 9 on clinical samples, and 3 on mixed population (including both clinical and nonclinical) (see Figure 1).

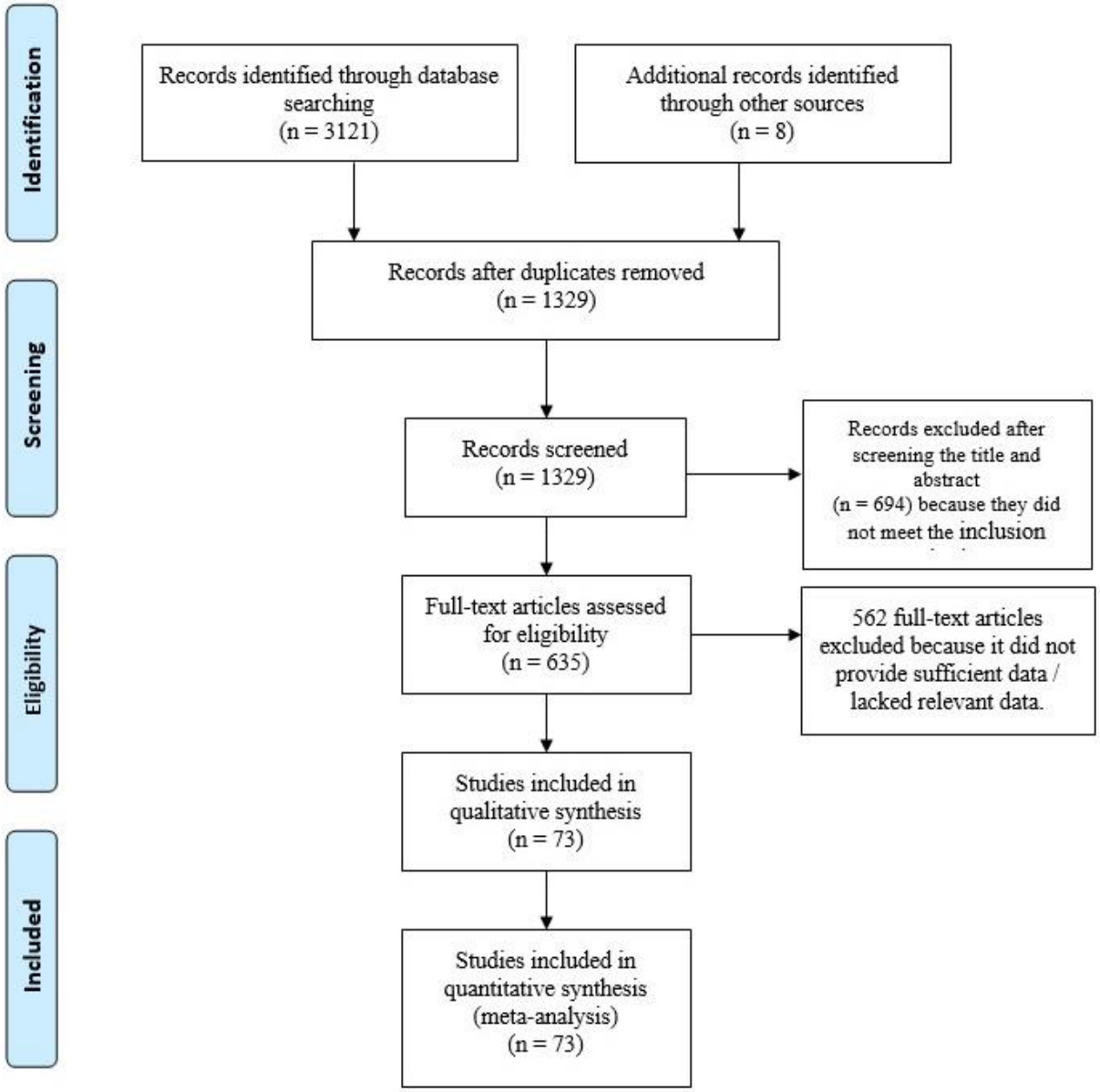

Figure 1. *Prisma flow diagram of the study selection process*

3.1.2.3. Coding procedure

Each study was coded independently. First, we coded the identification data of the studies (i.e., authors; publication year; type of the population [clinical, nonclinical and mixed]). Second, we coded the positive emotion regulation strategies measures by placing them into two broad categories: adaptive strategies (i.e., savoring, positive rumination, positive reappraisal, positive mental time travel, behavioral display and capitalizing) and dysfunctional strategies (i.e.,

dampening, distraction, fault finding, negative mental time travel, positive emotions suppression). Dependent variables coded were: psychopathology symptoms (i.e., depression, anxiety and bipolar), and positive outcomes (i.e., positive affect, happiness, joy) and well-being (including: life satisfaction, social, emotional, eudaimonic, hedonic and cognitive well-being). We also coded sample size, mean age and gender (percent of women) as continuous moderators, and clinical status (clinical and non-clinical) as categorical moderator.

3.1.2.4. Data analysis

Data were analyzed using CMA v. 3.0 (Borenstein, Hedges, Higgins, & Rothstein, 2009). We report effect sizes using the random effects model, as it is the most used in literature and allows the generalization of data beyond the studies included in our meta-analysis (Hedges & Vevea, 1998). Publication bias was addressed by visual inspection of the forest plot, classic fail-safe N (Rosenthal, 1991), Orwin's fail-safe N (Orwin, 1983), and Duval and Tweedie's (2000) trim-and fill procedure.

3.1.2.5. Effect size calculation and correlations

For the studies where the correlation coefficient was not provided, we computed Pearson's r effect sizes by using the mean differences and SDs from independent groups comparing the differences between clinical patients and nonclinical participates at baseline. In order to interpret effect sizes, we use Cohen's guidelines (1977): above .50 is considered a large effect size, around .30, medium, and below .10, small. We used sample size as unit of analysis. If one study reported multiple effect sizes, then an average effect size was computed and used in the analyses.

We first calculated the overall effect sizes of the relations between adaptive and dysfunctional strategies on the one hand, and symptoms of psychopathology and positive outcomes on the other. We then calculated the overall effect sizes of the relations between positive emotion regulation strategies (adaptative and dysfunctional) and depression, anxiety and bipolar symptoms, positive emotions and well-being. Finally, we divided adaptive strategies into *savoring* and *positive rumination* strategies, and dysfunctional ones into *dampening* and *suppression* strategies, and we correlated them with each type of outcome (i.e., depression, anxiety, bipolar symptoms, positive emotions and well-being). Where sufficient studies were available, we also used clinical status as a moderator of the relationship between types of emotion regulation strategy and each outcome.

3.1.3. Results

Overall relations between positive emotion regulation strategies, psychopathology symptoms and positive outcomes

A positive relation was found between adaptive strategies and positive outcomes (r = .37; k = 38, p < .001), with a medium effect size. Adaptive strategies were negatively correlated with psychopathology symptoms (r = -.12; k = 53, p < .001) with a small effect size. Dysfunctional strategies were negatively correlated with positive outcomes (r = -.16; k = 22, p < .001), with a

small effect size. Also, as expected, dysfunctional strategies were positively correlated with psychopathology, and the effect size was medium (r = .36; k = 48; p < .001).

Moderation analysis showed that clinical status (clinical vs. nonclinical population) was the categorical moderator. Clinical status was a significant moderator of the relation between adaptive strategies and psychopathology symptoms ($Q_{B=}$ 12.04; p<.05). Clinical status was not as a significant moderator of the relation between dysfunctional strategies and psychopathology symptoms (overall) (Q_B = .34, p >.05).

Relations between adaptive strategies and psychopathology symptoms and positive outcomes

The r coefficients were calculated for adaptive strategies and all psychopathology symptoms. A significant small to medium effect size relation was found between depression symptoms and adaptive strategies (r = -.20; k = 44; p <.001). A significant small effect size relation was also found between anxiety symptoms and adaptive strategies (r = -.13; k = 9; p <.005). A significant small effect size relation was found between bipolar symptoms and adaptive strategies (r = .20; k= 19; p < .001).

Moderation analysis revealed that clinical status was not a significant moderator of the relation between adaptive strategies and depressive symptoms (Q_B = 1.20; p >.05) but was a significant moderator of the relation between adaptive strategies and bipolar symptoms (Q_B = 10.02, p < .05).

Relations between adaptive strategies, positive emotions and well-being were only analyzed on nonclinical population, as there were not enough studies on clinical population that looked at these relations. A significant positive relation (medium effect size) was found between adaptive strategies, positive emotions (r = .37, k = 28, p <.001) and well-being (r = .33, k = 33, p <.001).

Relations between dysfunctional strategies, psychopathology symptoms and positive outcomes

The relation between dysfunctional strategies and depressive symptoms was positive and significant (r = .39, k = 39, p <.001), with a medium effect size. The relation between anxiety and dysfunctional strategies was also positive and significant (r = .42, k = 8, p <.001), and the effect size was medium. The correlation between bipolar symptoms and dysfunctional strategies was positive and significant, with a small to medium effect size (r = .27, k = 19, p <.001).

Results of the moderation analyses for relation between dysfunctional strategies and psychopathology symptoms revealed that clinical status was not a significant moderator of the relation between dysfunctional strategies and depressive symptoms (Q_B = .74; p > .05), nor of the relation between dysfunctional strategies and bipolar symptoms (overall) (Q_B = .92, p >.05).

Relations between dysfunctional positive emotion regulation strategies, positive emotions and well-being were only calculated for the nonclinical population, as there were no studies on clinical samples addressing these relations. A significant, small effect size negative relation was found between dysfunctional positive emotion regulation strategies and positive emotions (r = -

.14, k = 15, p <.005) and a small to medium effect size relation between dysfunctional strategies and well-being (r = -.21, k = 11, p <.001).

Relations between dampening and suppression strategies and psychopathology symptoms

Relations between dysfunctional strategies taken separately (i.e., dampening and suppression) and psychopathology symptoms were calculated.

Dampening was positively related with depression (r = .40, k = 36, p <.001) and anxiety (r = .43, k = 8, p <.001) both relations reflecting a medium size effect. The relation between dampening and bipolar symptoms was also significant (r = .27, k = 19, p <.005), with a small to medium effect size. The relation between suppression and depression was also significant (r = .23, k = 4, p <.05), with a small to medium effect size.

Clinical status was not a significant moderator between dampening strategies and depressive symptoms (Q_B = .17, p >.05) nor between dampening and bipolar symptoms (Q_B = .92, p >.05).

Relations between dampening strategies and positive outcomes

Dampening was negatively related with well-being (r = -.22, k = 9, p<.001) and positive emotions (r = -.14, k = 15, p < .005), with a small effect size in both cases.

Relation between savoring, positive rumination and psychopathology symptoms

Savoring was negatively related with depression (r = -.34, k = 14, p <.001), with a medium effect size, and negatively related with anxiety (r = -.24, k = 4, p < .001), with a small effect size.

The relation between positive rumination and depression was negative and significant (r = -.13, k = 30, p < .001), and the effect size was small. The relation between positive rumination and anxiety was non-significant (r = -.04, k = 6, p > .05), while the relation with bipolar symptoms was positive and significant, and the effect size was medium (r = .18, k = 17; p < .001).

Clinical status was not a significant moderator of the relation between positive rumination strategies and depressive symptoms (Q_B = .12, p >.05), but was a significant moderator of the relation between positive rumination and bipolar symptoms (Q_B = .10.02, p <.05).

Relations between savoring and positive rumination and positive outcomes

Relations between savoring, positive rumination and positive outcomes were also analyzed. Only studies conducted on nonclinical samples were available for these analyses. Savoring was

positively related with positive emotions (r = .35, k = 18, p <.001), with a medium effect size. Savoring was also related with well-being (r = .33, k = 12, p <.001), and the effect size was medium. Positive rumination was positively related with positive emotions (r = .39, k = 10, p <.001) and with well-being (r = .35, k = 9, p < .001), with medium effect sizes in both cases.

3.1.3.1. Continuous moderators

We used mean age, gender (percent of women) and sample size as continuous moderators for the overall relations between positive emotion regulation strategies and psychopathology symptoms and positive outcomes. Moderation analyses were conducted using meta-regression.

Mean age was not a significant moderator of the relation between adaptive positive emotion regulation strategies and positive emotions and well-being (overall) (β = .001, k = 28, p = .21), nor of the relation between adaptive strategies and psychopathology symptoms (β = -.003, k= 35, p = .32). Mean age was not a significant moderator of the relation between dysfunctional strategies and symptoms overall (β = .001, k= 32, p= .59), but was a significant moderator of the relation between dysfunctional strategies and positive emotions and well-being (overall), (β = .001, k = 15, p = .041). Gender (percentage of women) was not a significant moderator of the relation between adaptive strategies and positive emotions and well-being (overall) (β = -.03, k = 28, p = .87), nor of the relation between adaptive strategies and psychopathology symptoms (overall) (β = .16, k = 35, p = .36). Gender was not a significant moderator of the relation between, dysfunctional strategies and psychopathology symptoms (β = .13, k= 32, p = .62), nor of the relation between dysfunctional strategies, positive emotions and well-being (overall) (β = .16, k=22, p =.46). Sample size was not a significant moderator of the relation between adaptive strategies and positive emotions and well-being (overall) (β = .0000, k = 24, p = .72), nor of the relation between adaptive strategies and psychopathology symptoms (β = .0000, k = 28, p= 77). Sample size was not a significant moderator of the relation between dysfunctional strategies, positive emotions and well-being (overall) (β = - .0000, k= 13, p =.65), nor of the relation between dysfunctional strategies and symptoms (overall) (β = .0001, k= 32, p=.43).

3.1.3.2. Publication bias

We calculated publication bias using Trim and fill, Classic fail-safe N and Orwin`s fail safe N for all the correlations in the meta-analysis. For all the correlations between the emotion regulation strategies, psychopathology symptoms, positive emotions and well-being the Classic fail Safe N and Orwin`s fail safe N indicated no publication biases. The trim and fill procedure imputed 9 studies to the right of the mean, leading to a larger effect size, of r = .41 (95% *CI* [.37; .46]), for the association between adaptive strategies and positive outcomes. For the relation between adaptive strategies and psychopathology symptoms, 7 studies to the left of the mean were imputed increasing the effect size to r = -.16, (95% *CI* [-.22; -.10)]. Two studies to the right of the mean were imputed for the relation between dysfunctional strategies and positive outcomes, which decreased the effect size to r = -14 (95% *CI* [-.19; .08]).

For the relations between adaptive strategies and psychopathology symptoms the trim and fill method, 5 studies to the left of the mean were imputed, increasing the effect size to *r* = -.20 (95% CI [-.28; -.18)] for the association between depression and adaptive strategies. Three studies to the right of the mean were imputed in case of the relation between anxiety and adaptive strategies, decreasing the effect size to *r* = - .06 (95% *CI* [-.15; .02)]. Eight studies to the right of the mean were imputed for the association between bipolar symptoms and adaptive strategies, increasing the effect size to *r* =.27 (95% *CI* [.21; .33)]

The trim and fill procedure imputed 7 studies to the right of the mean for the relation between adaptive strategies and positive emotions, increasing the effect size to *r* = .42 (95% *CI* [.36; .46)]. For the association between adaptive strategies and well-being, one study was imputed to the left of the mean, decreasing the effect size to *r* = .32 (95% *CI* [.27; .37)].

The trim and fill procedure indicated that 5 studies to the left of the mean would decrease the effect size to *r* = .36 (95% *CI* [.31; .40)] in case of the relation between dysfunctional strategies and depression. One study to the right of the mean was imputed for the association between savoring and anxiety on nonclinical population, decreasing the effect size to *r* = -24 (95% *CI* [.33; .16)]. In the case of the association between positive rumination and depression, 2 studies were imputed to the left of the mean, increasing the effect size to *r* = -.14 (95% *CI* [-.20; -.08)], while in case of the relation between positive rumination and bipolar symptoms , trim and fill imputed 7 studies to the right of the mean, increasing the effect size to *r* = .27 (95% *CI* [.21; .35)].

Two studies that were imputed to the left of the mean increased the effect size to *r* = .42 (95% *CI* [.34; .49)] on nonclinical population for the correlation between positive rumination and positive emotions. Also, for the association between savoring and positive emotions, trim and fill procedure imputed 5 studies at the right of the mean, increasing the effect size to *r* = .42 (95% *CI* [.33; .50)].

3.1.4. Discussion

The current study is the first quantitative analysis to examine the magnitude of the associations between positive emotion regulation strategies and symptoms of depression, anxiety and bipolar disorder on the one hand, and positive emotions and well-being, on the other.

Results of the meta-analysis indicate that dysfunctional strategies are negatively associated with positive emotions and well-being, and positively related with psychopathology symptoms (overall). Adaptive strategies are positively related with positive outcomes, and negatively related with psychopathology symptoms (overall). We also found that the relation between adaptive strategies and psychopathology on nonclinical population is significantly higher than in clinical samples. Adaptive strategies (overall) are negatively related to symptoms of depression, anxiety and bipolar disorder. The relation between adaptive strategies and bipolar symptoms was significantly lower in clinical samples compared to the nonclinical population. Dysfunctional strategies were positively related with symptoms of depression, anxiety and bipolar disorder, and there were no significant differences between clinical and nonclinical samples in terms of this association. Dampening strategies were positively related with all symptoms of psychopathology (i. e. depression, anxiety and bipolar) and there were no significant differences between clinical

and nonclinical populations in terms of this association. Suppression was related with depression in nonclinical samples. Savoring was negatively related with psychopathology symptoms in nonclinical samples. Positive rumination was positively related with bipolar symptoms both in clinical and nonclinical populations, but the association was stronger for the nonclinical population. Positive rumination was negatively related with depression but was not related with anxiety. Savoring and positive rumination were positively related with well-being and positive emotions. Also, age was a significant moderator of the relation between dysfunctional strategies and positive outcomes, with a higher mean age being associated with a higher effect size.

Our quantitative analysis has important clinical implications. Results emphasize the importance of regulating positive emotions, a frequently neglected area in clinical research and practice. The medium correlations between symptoms of psychopathology and dysfunctional strategies of positive emotion regulation are of significance, as they underscore the importance of positive emotion regulation in mental health. While therapeutic interventions that target emotion dysregulation already exist, they are focused on negative emotions, rather than positive ones (Carl et al., 2013). Psychotherapeutic strategies that involve savoring and acceptance have been integrated in Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 2012) and Mindfulness-Based Cognitive Behavioral Therapy (Segal, Williams, & Teasdale, 2002) among others. However, such therapies focus on a few specific aspects thought to be central to maintaining psychopathology, rather than on providing a comprehensive approach to positive emotion regulation. It is not known if such techniques reduce dampening and increase savoring in patients. A comprehensive therapeutic approach to positive emotion regulation deficits is warranted, as psychological interventions for depression, anxiety and bipolar disorder may benefit from taking into account the importance of measuring and targeting both positive emotions and regulation strategies in clinical practice to promote patients' awareness of the types of emotion regulation strategies they endorse.

The results of this analysis indicate that bipolar symptoms correlate positively with positive rumination. While it is known that bipolar patients use dysfunctional strategies, it is possible that they are concurrently unable to reduce their positive emotions effectively. Indeed, consistent findings are reported in studies indicating that bipolar patients have difficulties in reducing their positive emotions, due to an overuse of strategies that upregulate positive emotions, even in negative situations (e.g. Gruber et al., 2012; Gruber, 2011). For such patients, the results of the meta-analysis underscore the possible clinical utility of treatment strategies aimed at both reducing and increasing positive emotions, depending on the context. Experimental studies may aid in clarifying and identifying which contexts trigger dysfunctional positive emotion regulation strategies in bipolar patients. However, further studies are needed to establish the relationship between bipolar symptoms and positive emotion regulation strategies.

To date, few studies have investigated the relation between positive emotion regulation strategies and positive emotions and well-being. Some experimental studies have shown that adaptive strategies can increase well-being and positive emotions (e.g., Bryant et al., 2005; Hurley & Kwon, 2012; McMakin, Siegle, & Shirk, 2010; Quoidbach et al., 2009). A recent review (Quoidbach, Mikolajczak, & Gross, 2015) summarizes the main strategies that have been evaluated so far in terms of efficiency in regulating positive emotions, but most studies have been conducted on nonclinical samples. For example, Bryant et al., (2005) tested a savoring intervention

based on recalling positive past experiences twice a day for 1 week, on college students. Results showed that participants in the savoring condition had a significantly higher level of happiness compared to participants in the control group. Smith & Hanny (2017) showed that savoring can also be effective in elderly people. After 6 days of intervention, happiness and resilience levels increased, and depression levels decreased compared to baseline. Another study (Quoidbach et al., 2009) found that adaptive strategies can be effective in increasing happiness in adults. Participants in the intervention condition, which lasted two weeks, were asked to imagine positive events that could occur the following day. Following the intervention, they reported a significantly higher level of happiness than the control group.

3.2. Study 2a. An investigation of the relationship between strategies that downregulate positive affect and irrational beliefs in depressive symptoms[2]

3.2.1. Introduction

In recent years, there has been growing interest in research regarding the impact of positive emotion regulation on mood disorders (e.g., depression). While previous studies had mainly focused on negative emotion regulation, researchers now recognize the importance of studying positive emotion regulation processes for a better understanding of the mechanisms and etiology of mood disorders (e. g., Carl et al., 2013; Feldman, et al., 2008; Raes, Smets, Nelis & Schoofs, 2012; Werner-Seidleret al., 2013).

Positive emotion regulation can be described as a series of processes by which people influence the nature, frequency, and duration of positive emotions (Gross, 1998). Researchers divide positive emotion regulation into two categories, *savoring strategies* (Bryant, 1989, 2003) which are utilized to maintain and increase the level of positive emotions and *dampening strategies* that are meant to decrease the level of positive emotions (Parrott, 1993; Wood et al., 2003). The current study focuses on dampening strategies, as more and more data show that depressive symptoms are associated with these strategies (Carl et al, 2013; Gentzler et al., 2015; Nelis et al., 2011; Raes et al., 2014; Werner-Seidler et al, 2013). Nelis et al. (2011) described four types of dampening strategies. One of these is *suppression,* described as a general inclination to suppress positive emotions once they occur. The tendency to suppress positive emotions is associated with a general decrease in positive experience over time (Gross & Lavanson, 1997). Correlational studies show that suppression is related with depressive symptoms (Gross & John, 2003, Kashdan & Steger, 2006; Su et al., 2013; Johnson et al., 2016). Another dampening strategy is *distraction*,

[2] This study was published.
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Author contributions: Both authors developed the study concept and contributed to the study design. D. G. Căzănescu performed the data analysis and interpretation under the supervision of A. Szentagotai-Tătar. D. G. Căzănescu drafted the manuscript, and A. Szentagotai-Tătar provided critical revisions of data analysis and writing the manuscript.

characterized by focusing attention on negative thoughts which are not related to the present positive event (e. g. someone who is at a dinner party worries about work-related tasks). This strategy is associated with symptoms of anxiety and depression (Borkovec et al., 2004). *Fault finding* is another dampening strategy, characterized by paying attention to the negative elements of positive situations by focusing on things that could be better. This strategy kills the joy of the moment and makes the person unsatisfied. There are no data yet on the relation between fault finding and depression, but this way of downregulating positive emotions is negatively correlated with life satisfaction and positive emotions (Schwartz et al., 2002). *Negative mental time travel* is another strategy meant to dampen positive affect by negative reminiscence and anticipation of negative consequences for positive events. Negative reminiscence refers to focusing on positive past events in a negative perspective; the individual makes external attributions, causing him/her to believe that he/she does not deserve good things (e.g.,"I did not deserve to be treated so well on last year's vacation"). The future anticipation of negative events means that a person does not expect to have positive emotions for a long time or that he/she believs that positive events will end soon (e.g.," These positive feelings won't last"). This maladaptive strategy is associated with depression and lower self-esteem (Feldman et al., 2008).

Besides emotional regulation processes, other factors that were studied in relation to depression are the cognitive ones. One of the cognitive models that describes cognitive distortions involved in emotional distress was proposed by Ellis (Ellis, 1962, 1994). The Rational Emotive Behavioral Therapy (REBT) model is based on the assumption that dysfunctional emotions are the result of irrational beliefs. There are four types of irrational beliefs: demands or absolutistic and inflexible requirements, awfulizing (or catastrophizing), frustration intolerance (or low frustration tolerance), global negative evaluations of one's person (self-downing), other people (other-downing) and life circumstances (i.e., life-downing) (Ellis, 1962, 1994). There is some evidence showing that irrational beliefs are important cognitive factors that are involved in various forms of psychopathology, including mood disorders (Blatt, 1995; Macavei, 2005; McDermutt, Haaga, & Bilek, 1997; Muran, Kassinove, Ross, & Muran, 1989; Nelson, 1977). These cognitive distortions are linked to depression and general distress (Macavei, 2005; Szentagotai, David, Lupu & Cosman, 2008; Vîslă, Flückiger, Holtforth & David, 2016). For example, a recent meta-analysis conducted by Vîslă et al., (2016) finds average correlations of .45 (k = 6) between irrational beliefs and depression.

Given the data presented above, we can conclude that depression is associated with both irrational beliefs and deficits in positive emotion regulation. Taking into account that, to our knowledge, irrational beliefs have not yet been studied in connection with dampening strategies in depression, the aim of this research was to examine the relations among irrational beliefs as proposed by the REBT model, dampening strategies and depressive symptoms.

The following hypotheses were proposed: (1) irrational beliefs predict dampening strategies and (2) dampening strategies mediate the relationship between irrational beliefs and depressive symptoms.

3.2.2. Method

3.2.2.1. Participants

A total of 157 undergraduate students at Babes-Bolyai University, Cluj-Napoca took part in this research. The sample included 129 women and 28 men, with ages ranging from 18 to 71 (M_{age} = 26.32, *SD* = 9.12).

3.2.2.2. Measures

The emotion regulation profile revised (ERP; Nelis, et al, 2011) was used to measure the ability to regulate negative and positive emotions. The questionnaire includes 6 scenarios that describe positive situations eliciting positive emotions (i.e., contentment, joy, awe, excitement, pride, and gratitude). Strategies chosen for each scenario are coded with 1 point, and the total score is calculated by summing the scores for each emotion regulation strategy. A total score on dampening can be obtained by summing the scores of the four subscales.

The Attitudes and beliefs scale-II (ABS-II; DiGiuseppe, Leaf, Exner, & Robin, 1988; Romanian version: Macavei, 2002) measures irrational beliefs. This questionaire consists of 72 statements comprising four subscales targeting the four major types of irrational beliefs: demandingness (DEM), awfulizing (AWL), low frustration tolerance (LFT), and self-downing/other-downing (SD/OD). Each of the four subscales consists of 18 items, half of the items are rationally phrased (DiGiuseppe et al., 1988). Participants evaluate the statements on a 5-point Likert scale, ranging from 0 (‘‘strongly disagree’’) to 4 (‘‘strongly agree’’).

The *Depression Anxiety Stress Scales – 21-item version* (DASS-21; Lovibond & Lovibond, 1995) is a self-report measure that assesses anxiety, depression, and stress. Each subscale comprises 7 items. Only the depression subscale was used in the current study.

3.2.2.3. Procedure

Participants filled in all questionnaires online. They expressed their voluntary consent to participate in the study after receiving announcements on social networks and via e-mail.

3.2.2.4. Data-analysis

First, we conducted Bivariate Pearson’s *r* correlations to investigate the associations between dampening strategies, irrational beliefs, and depressive symptoms. We then conducted multiple regression for irrational beliefs as predictors for dampening strategies using the stepwise method. Finally, we conducted mediation analyses to explore whether dampening strategies mediate the relations between irrational beliefs and depression. The mediation was conducted with PROCESS in IBM SPSS v. 24.0 (Model 4; Preacher & Hayes, 2008).

3.2.3. Results

Correlations

We calculated Bivariate Pearson’s *r* correlations for the all the variables included in the study: depression, dampening strategies and all types of irrational beliefs (SD/OD, DEM, AWL and LFT). Significant correlations were observed between all variables (see Table 1). As expected,

a significant positive correlation was found between dampening strategies and all types of irrational beliefs.

Table 1.

Pearson's r correlation coefficients

		M (*SD*)	1	2	3	4	5	6
1	Dampening	3.10 (2.92)	-					
2	SD/OD	18.47 (16.76)	.47**	-				
3	DEM	23.31 (12.32)	.28**	.68**	-			
4	LFT	25.15 (14.08)	.39**	.81**	.39**	-		
5	AWL	1 23.72 (13.71)	.39**	.84**	.86**	.91**	-	
6	Depression	4.59 (4.22)	.45**	.68**	.41**	.55**	59**	-

**Correlation is significant at the 0.01 level (2-tailed).

Regression analysis

We also conducted a multiple regression using the stepwise method in order to see which of the four irrational beliefs is the strongest predictor of dampening (see Table 2). Once all irrational beliefs are included in the stepwise regression equation, SD/OD remains the only significant predictor in the regression model. The SD/OD subscale explained the highest variance in dampening (F = 45.15, p < .001 $R^2_{Adjusted}$ = .22; B=.08; $SE\ B$=.01; β = .47).

Table 2.

Stepwise regression for irrational beliefs predicting dampening strategies

Step	Irrational beliefs	β	*t*	R^2	Sig.
1	DEM	.28	3.74	.08	.000
2	DEM	-.09	-1.1		.25
	LFT	.39	5.48	.15	.000
3	DEM	1.4	-1.1		.25
	AWL	1.3	1.05		.29
	LFT	.39	5.48	.15	.000
4	DEM	-.07	-.75		.45
	LFT	.04	.37		.70

AWL	-.02	-.15		.87
SD/OD	47	6.75	.22	.000

Mediation analysis

Results of the mediation analysis (see Figure 1) indicate that SD/OD is a significant predictor of dampening *path a* =.08, F (1, 155) = 45.15, R^2=.22; p<.001. Also, dampening is a significant predictor of depression *path b*= .15 F (2, 154) = 73.31, R^2= .48, p<.001). Also, SD/OD remain a significant predictor for depression *c' path*= .23, t = 2.46, p<.05. The total effect of SD/OD on depression was also significant, *c path* = .17; F (1, 155) = 136.10, R^2 = .47 p<.01. A bias-corrected bootstrap confidence interval for the indirect effect based on 5.000 bootstrap samples, did not contain zero *CI* = (.002; .04). Based on these results, we conclude that dampening is a significant mediator between SD/OD and depression.

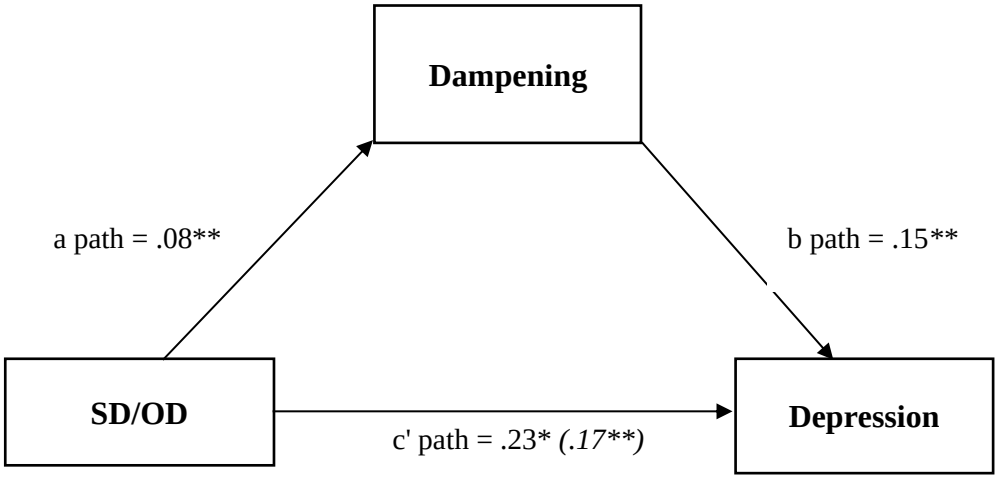

Figure 1. Standardized regression coefficients for the relationship between SD/OD and depression as mediated by dampening. The standardize regression coefficients between SD/OD and depression controlling for dampening is in parentheses.
**p < .05; **p < .01*

3.2.4. Discussion and conclussions

We found significant correlations between all types of irrational beliefs and dampening strategies. Also, significant correlations were found between depression and dampening strategies (r =.45). Another important finding is that irrational beliefs are also predictors of dampening strategies, SD/OD being the strongest predictor for dampening. Moreover, our mediation analysis showed that dampening is a mediator between SD/OD and depressive symptoms. Our findings

reveal that the processes involved in downregulating positive affect are influenced by SD/OD. These data suggest that, if irrational beliefs turn into rational ones, they can improve positive emotion regulation by reducing the use of strategies that downregulate positive emotions. Another important finding is that dampening strategies explain the relationship between irrational beliefs and depressive symptoms which means that depressive symptoms are not only influenced by irrational beliefs, but also by deficits in regulating positive affect. Our results could serve as a basis for improving the psychological treatment of depression. Thus, a new component, dedicated to positive emotion regulation, could be included alongside cognitive change techniques, as more and more studies draw attention to the fact that poor positive emotion regulation strategies are mechanisms in depression. (Carl et al., 2013; Werner-Seidler et al., 2013).

Our study brings important findings concerning the relationship between irrational beliefs and positive emotion regulation in depression. Results show that SD/OD is an important cognitive factor that leads to downregulation of positive emotions. The relationship between irrational beliefs and depressive symptoms can be explained by the strategies that are meant to downregulate positive affect. Until now, research has mainly focused on the effect of irrational beliefs on negative affect, but this study indicates that irrational beliefs also have an important effect on positive emotion regulation.

3.3. Study 2b. Savoring as mediator between irrational beliefs, depression, and joy[3]

3.3.1. Introduction

Positive emotion regulation refers to the process by which the individual attempts to influence the duration, the nature and frequency of positive affect (Parrot, 1993; Gross, 1998). Bryant (1989, 2003) described specific strategies meant to maintain and increase positive affect; these strategies are known as savoring strategies. Savoring is considered an adaptive strategy of positive emotion regulation and is described as a general ability or tendency to appreciating pleasurable life events (Bryant, 1989). Savoring has three major components: enjoying the positive events from the (a) present, (b) past and (c) future (by anticipating future positive life events (Bryant, 2003). Savoring is a complex concept which encompasses many processes such as cognitive reflection, attentional locus, focus on positive stimuli, gratitude, accomplishment, and physical pleasure (Bryant & Veroff, 2017).

Research shows that specific positive emotion regulation strategies are associated with positive outcomes. For example, several studies have found that an increased savoring tendency is

[3] This study was published.
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associated with positive emotions (e.g., joy, happiness; Langston, 1994; Emmons & McCullough, 2003; Bryant et al., 2005; Quoidbach et al., 2009; Reis et al., 2010). While optimal positive regulation is associated with positive emotions, dysfunctional regulation of positive emotions is associated with negative outcomes and emotional problems such as depression and anxiety (Carl et al., 2013). In this respect, there are a few studies that have reported an association between a low degree of savoring and depressive symptoms (Bryant, 2003; Eisner et al., 2009; Ramsey & Gentzler, 2014; Werner-Seidler et al.,2013). A recent study showed that savoring negatively correlated with hopelessness depression, and also moderates the relationship between positive life events and hopelessness depression (Chen & Zhow, 2017). Symptoms of depression also predict low levels of savoring (Eisner et al., 2009). In a study conducted by Hurley and Kwon (2012), college students who were asked to practice savoring exercises reported a significant decrease in depressive symptoms over a two-week period. These data also underscore the fact that low savoring predicts depressive symptoms. While the relationship between symptoms of depression and the use of fewer savoring strategies is documented in the literature, it is not clear why this is the case. A possible explanation is related to the presence of cognitive distortions.

Cognitive models such as the Rational Emotive Behavioral Therapy (REBT) model posit and show that irrational beliefs are linked to depressive symptoms (Vîslă, et al., 2016; Macavei, 2005). The REBT theory described four types of irrational beliefs: demands or absolutistic and inflexible requirements, awfulizing (or catastrophizing), frustration intolerance (or low frustration tolerance) and global evaluation of one's person (i.e., self-downing), other people (i.e., other-downing) and life circumstances (i.e., life-downing) (Ellis, 1962, 1994). According to Ellis' theory (Ellis, 1962), these four types of irrational beliefs lead to dysfunctional negative and positive emotions. For example, a depressed individual frequently thinks that he/she must not fail (demandingness), or otherwise, he/she is not a valuable person (self-downing).

A dysfunctional thinking style based on irrational beliefs is strongly associated with depression (Vîslă et al., 2016; Macavei, 2005). A recent meta-analysis (Vîslă et al., 2016) which investigated the correlation between irrational beliefs and psychological distress, included 6 studies for the link between irrational beliefs and depression, and finds an average correlation of .45. While this meta-analysis supports the notion that irrational beliefs are associated with negative emotions (Vîslă et al., 2016), no studies have examined the relationship between irrational beliefs, as conceptualized by the REBT model, positive emotions and positive emotion regulation strategies.

Considering that irrational beliefs are cognitive process related to depression (Bridges & Harnish 2010; Vîsla et al., 2015; Szentagotai & Freeman, 2007) it is plausible that the presence of cognitive distortions leads to maladaptive emotion regulation for positive emotions related to positive events.

3.3.1.1. Objectives and Hypothesis

The main objective of this research is to investigate the associations between irrational beliefs, savoring, depression and joy. We expect irrational beliefs to be negative predictors of savoring. Moreover, we expect to find that savoring is a significant mediator in the relation between irrational beliefs and depression on the one hand and joy on the other.

3.3.2. Method

3.3.2.1. Participants

Participants were 276 undergraduate students at Babes-Bolyai University, Cluj-Napoca. The sample included 231 women and 45 men, with ages ranging between 18 and 54 (M_{age} = 25.78, *SD* = 8.52).

3.3.2.2. Measures

The *Savoring Beliefs Inventory* (SBI; Bryant, 2003) includes 24 items and consists of three subscales measuring participants' perceived ability to savor positive experience through anticipation, present enjoyment, and reminiscence. Each subscale includes 8 items. Participants indicated how true each item is in their case, on a seven-point scale 1 (*''strongly disagree''*), 7 ("*strongly agree*"). Higher scores indicate that participants have a strong ability to savor positive experiences of life.

The *Attitudes and beliefs scale-II (ABS-II; DiGiuseppe, Leaf, Exner, & Robin, 1988;* Romanian version: Macavei, 2002) measures irrational beliefs. This questionaire consists of 72 statements comprising four subscales targeting the four major types of irrational beliefs: demandingness (DEM), awfulizing (AWL), low frustration tolerance (LFT), and self-downing/other-downing (SD/OD). Each of the four subscales consists of 18 items, half of the items are rationally phrased (DiGiuseppe et al., 1988). Participants evaluate the statements on a 5-point Likert scale, ranging from 0 (''strongly disagree'') to 4 (''strongly agree'').

The *Dispositional Positive Emotion Scales* (DPES; Shiota, Keltner, & John, 2006) is a self-report scale that measures trait positive emotions (joy, pride, amusement, contentment, admiration compassion and love); it consists of 38 items. In this study, we only used the joy subscale.

The *Depression Anxiety Stress Scales – 21-item version* (DASS-21; Lovibond & Lovibond, 1995) is a self-report measure, that assesses anxiety, depression, and stress. Each subscale includes 7 items. Only the depression subscale was used in the current study.

3.3.2.3. Procedure

Participants were recruited through announcements on social network sand via e-mail. All questionnaires were filled in online.

3.3.2.4. Data-analysis

First, Pearson's correlation was conducted to investigate the associations between savoring, irrational beliefs, joy, and depressive symptoms. We then conducted hieratical multiple regression with each type of irrational belief as predictors and savoring as an outcome. Mediation analyses were then performed to explore whether savoring mediated the relations between irrational beliefs and joy and depression. The mediation was conducted using the PROCESS macro for SPSS (Model 4; Preacher & Hayes, 2008).

3.3.3. Results

Correlations

Significant correlations were observed between all variables (see Table 1). As expected, a significant negative correlation was found between savoring and all types of irrational beliefs *(p* = .000*).* A significant positive correlation was observed between savoring and joy while the correlation between joy and all types of irrational beliefs was negative and significant (*p* = .000*).*

Table 1.

Pearson r correlation coefficients

	Mean	*SD*	*Skew*	*Kurt*	Savoring	SD/OD	DEM	FI	AWL	Joy	Depression
Savoring	4.94	.93	-.51	.16	-	-.61***	-.45***	-.51***	-.51***	.65***	-.58***
SD/OD	17.81	15.17	.97	.38		-	.69***	.82***	.83***	-.48***	.61***
DEM	22.36	11.50	.28	-.03			-	.79***	.83***	-.25***	.38***
FI	25.25	13.35	.44	-.03				-	.89***	-.32***	.53***
AWL	22.86	12.93	.44	.01					-	- .36***	.56***
Joy	27.55	7.63	-.23	-.49						-	-.53***
Depression	4.97	4.67	1.27	1.09							-

Note. AWL= Awfulizing; DEM = Demandingness; FI = frustration intolerance; Kurt = Kurtosis; SD = Standard deviation; SD/OD = self- downing/other downing; Skew = Skewness.
***p< .001 (2-tailed)

Regression analysis

Multicollinearity indicators were tested due to the fact that correlations between irrational beliefs are very high (see Table 1). All irrational beliefs were included in one regression to see if there was multicollinearity between the irrational beliefs in predicting savoring. As indicators for multicollinearity, we use the general guidelines for VIF (Variance Inflation Factors). If *VIF* is higher than 5, the regression may be biased (Neter, Wasserman & Kutner, 1989). Also, Tolerance below .2 can indicate multicollinearity (Menard, 2002). *VIF* and *Tolerance* values for AWF seem to be the most problematic, therefore AWF was removed from the equation. After AWF was removed, *VIF* values for FI, DEM, and SD/OD were under 5, and *Tolerance* was above .2.

Subsequently, a hierarchical regression analysis was carried out to determine the effect of the irrational beliefs on savoring. (see Table 2). Once all the irrational beliefs are included in the regression equation, SD/OD remains the only significant negative predictor in the regression model. The SD/OD subscale explained the highest variance of savoring R^2 = .37; F_{change}= (1, 275) = 162.88; p = .000.

Table 2.

Summary of the hierarchical regression analysis for irrational beliefs in predicting savoring

Variable	β	t	R^2	*Sig.*	R^2_{adj}	R^2_{change}
Step 1						
SD/OD	-.61	-12.76	.37***	000	.37	.37
Step 2						
SD/OD	-.57	-6.85	.37***	.000	.37	.37
LFT	-.03	-.45	.37*	.65	.36	.000
Step 3						
SD/OD	-.57	-6.71	.37***	.000	.37	.37
LFT	.007	.72	.37*	.651	.36	.002
DEM	-.06	-.81	.37*	.41	.36	.002

Note. DEM = Demandingness; LFT = low frustration tolerance; SD/OD = self-downing/other-downing

*p > .05; ***p < .001 (2-tailed)

Mediation analysis

The first mediation analysis was conducted to investigate the hypothesis that savoring is a mediator in the relation between SD/OD and joy (see Figure 1). The results of the mediation analysis indicate that SD/OD is a significant predictor of savoring, *path a* = -.03; F (1,274) =162.88, R^2 =. 37, p = .000, and that savoring is a significant predictor of joy, *path b* = 4.73; F (2, 273) =108.06, R^2 =.44, p =.000. The total effect of SD/OD on joy was also significant, *c path* = -.24; F (1, 274) = 81.95; R^2= .23, p = .000. The direct effect was still significant, when the mediator was included in the model, but the relationship between SD/OD and joy was slightly attenuated, *c` path* = -.06, p = .02. And finally, the CI for the indirect effect did not include 0, *indirect effect* = -.17, p = .000 (95 % *CI* = -.22 to -.13), indicating that that savoring is a partial mediator between SD/OD and joy.

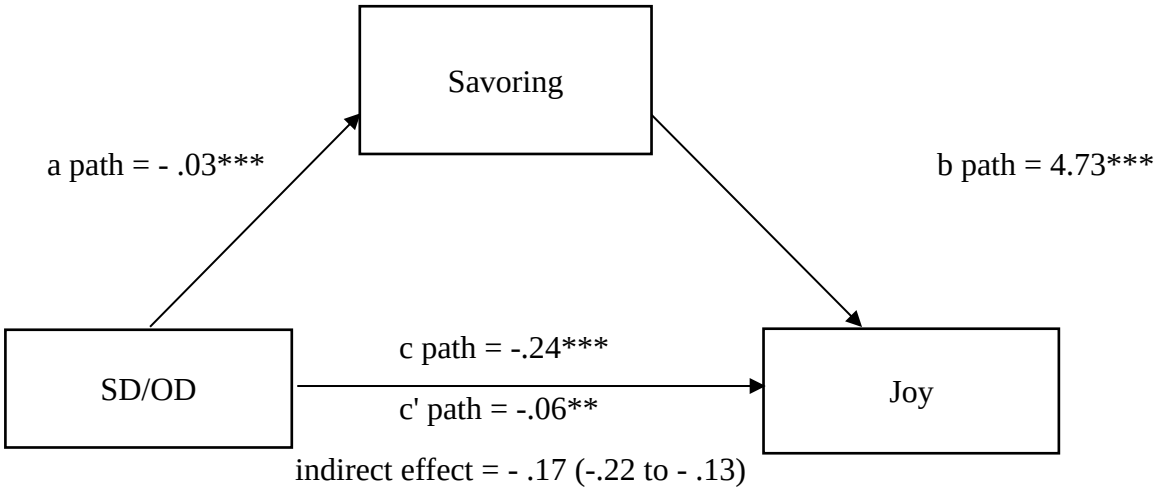

Figure 1. Standardized regression coefficients for the relationship between SD/OD and joy as mediated by savoring.
*** $p < .001$; ** $p < .05$

The second mediation analysis was conducted to investigate if savoring is a mediator in the relation between SD/OD and depression (see Figure 2). SD/OD was negatively correlated with savoring, *a path*= - .03; F (1, 274) =162.88; R^2=.37, p=.000. Also, savoring is a significant predictor for depression, *b path*= -.1.62; F (2, 273) = 109.84, R^2=.44; p =. 000. The total effect of SD/OD on depression was also significant, *c path* = .18*; F* (1, 274) =167.37; R^2= .37 p = .000. The direct effect was also significant, *c' path* = .12, p = .000, which indicate that SD/OD is still predicting depression when the mediator is added to the equation but with a smaller effect in comparison with the total effect. Finally, the CI for the indirect effect did not include 0, *indirect effect* = - .06, p=.000 (95 % *CI* = .03 to .08). This indicate that savoring is a partial mediator between SD/OD and depression.

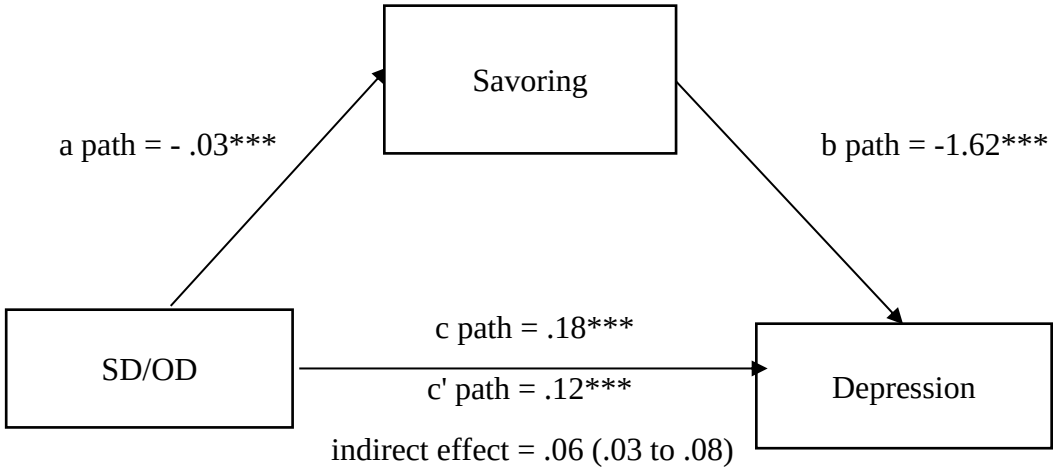

Figure 2. Standardized regression coefficients for the relationship between SD/OD and depression as mediated by savoring.
*** $p < .001$

3.3.4. Discussion

Significant negative correlations were found between all types of irrational beliefs and savoring, with the highest negative correlation between SD/OD and savoring. As expected, a positive correlation between joy and savoring and a negative correlation between depression and savoring were also found. The results of the current study are consistent with the literature supporting a negative link between depression and savoring (e.g., Bryant, 2003; Eisner et al., 2009; Nelis et al., 2015; Smith & Hollinger-Smith, 2014).

The first mediation analysis showed that savoring was a significant mediator in the relation between SD/OD and joy. The second mediation analysis showed that savoring was also a significant mediator of the relation between SD/OD and depressive symptoms. Indeed, studies have shown that individuals predisposed to depression have difficulties in maintaining and increasing their level of positive emotions (e.g., e.g., Bryant, 2003; Eisner et al., 2009; Nelis et al., 2015; Smith & Hollinger-Smith, 2014). The presence of irrational beliefs of SD/OD predicts maladaptive emotion regulation for positive emotions. Our results are consistent with the studies showing that irrational beliefs lead to dysfunctional negative emotions (Bridges & Harnish 2010; Szentagotai & Freeman 2007; Vîsla et al., 2015), and also indicate that cognitive distortions such as negative self-evaluation, predict maladaptive emotion regulation with impact on positive emotions, as well. Based on the cognitive theory framework proposed by Ellis' theory (Ellis, 1962, 1994), these primary data could lead to more detailed investigations of the impact of irrational beliefs on positive emotions, differentiating between functional positive and dysfunctional emotions.

From a theoretical perspective, the findings of this study show that irrational beliefs are relevant to savoring and that the lack of savoring could be explained by irrational beliefs. Also, our study reveals that lack of savoring plays a role in the relation between the SD/OD and depression. These results may be clinically relevant as they reveal some of the mechanisms of depression. Thus, in the case of depression, the mechanisms involved are not only related to the irrational thinking but also to the deficits in positive emotion regulation (savoring). Moreover, they also show that the relationship between SD/OD and positive emotion (joy), is influenced by savoring.

In terms of practical implications, future studies could experimentally test if the restructuring of irrational cognitions leads to improved savoring as our findings suggest. Also, our findings might be a basis for future studies investigating the combined effect of cognitive restructuring and savoring techniques on clinical populations, in developing better treatment strategies for depression.

3.4. Study 3. Positive emotion regulation in depression. A daily diary study.

3.4.1. Introduction

Studies show that individuals with depressive symptoms tend to use dampening strategies more often in order to downregulate their positive emotions (Carl et al, 2013; Gentzler et al., 2015; Nelis et al., 2011; Raes et al., 2014; Werner-Seidler et al., 2013). Feldman et al. (2008) showed that depressive symptoms are associated with ways of unhealthy thinking about positive events that lead

to suppression of positive affect (e.g., “I don’t deserve this”, “This good feeling is not going to last longer”). Depressive symptoms are negatively associated with savoring strategies as well (Bryant, 2003; Eisner et al., 2009; Ramsey & Gentzler, 2014; Werner-Seidler et al., 2013). Depressive symptoms are negatively correlated with capitalizing and behavioral display (Nelis et al.,2011). Also, Eisner et al., (2009) found that depressive symptoms predict a decreased level of savoring. A recent study showed that the relation between positive life events and hopelessness in depression is mediated by savoring (Chen & Zhou, 2017). Carver and Johnson (2009) found that depression is associated with a reduced tendency to savor positive life events. Moreover, reminiscing about positive events was associated with lower levels of depression (Pinquart & Forstmeier, 2012).

As yet, the majority of studies carried out on the issue of positive emotion regulation in depression are correlational studies conducted on nonclinical populations. Few studies have been conducted to investigate how individuals with depressive symptoms regulate their daily positive emotions. A daily diary study conducted by Carl et al. (2014) which included a transdiagnostic population consisting of individuals with symptoms of depression and anxiety reveals that these symptoms are associated with a daily tendency to downregulate positive emotions. Another recent study (Li et al., 2017) using a daily diary design reveals that depressive symptoms are associated with an increased level of dampening of positive emotions.

Even though from the studies presented above we can conclude that depression is associated with deficits in positive emotion regulation, it is not clear in what way and what strategies individuals with depressive symptoms use to reduce positive affect. For example, it is unclear why individuals with depressive symptoms diminish their positive affect once a positive emotion is elicited. Also, there are no studies investigating what specific dampening and savoring strategies they use after a positive event occurs. Studying these issues more closely, could lead to improvements in treatment strategies and to preventing positive emotion dysregulation in people at risk of developing depressive disorders. Moreover, there are no studies investigating non-depressed individuals in comparison with individuals with depressive symptoms, in order to capture differences in positive emotion regulation strategies in their daily lives.

3.4.1.1. Objective and hypothesis

The goal of the present study was to investigate positive emotion regulation in daily life in individuals with depressive symptoms compared to individuals without symptoms of depression. We used a 7-day diary design, a method chosen as it offers a greater ecological validity, being more contextually rooted (Csikszentmihalyi & Larson, 1987).

We expect individuals with depressive symptoms to have difficulties in regulating positive emotions (to use more dampening strategies and less savoring strategies) when a positive event occurs, in comparison with individuals who do not have symptoms of depression.

3.4.2. Method

3.4.2.1. Participants

A total of 111 students at Babes-Bolyai University (Cluj-Napoca) took part in our research. The sample included 92 women and 19 men, with ages ranging from 18 to 51 years (M_{age} = 26.71, *SD* = 8.16). Participants were divided into two groups based on the presence or the absence of depressive symptoms.

3.4.2.2. Baseline measures

Patient Health Questionnaire **(**PHQ-9; Löwe, Kroenke, Herzog, & Gräfe) includes 9 items that correspond to the DSM-IV diagnostic criteria of major depressive disorder (American Psychiatric Association, 1991). Participants are asked if they have experienced the described symptoms in the last 2 weeks.

The Savoring Beliefs Inventory (SBI; Bryant, 2003) includes 24 items that measure the general capacity to savor positive experiences through anticipation, present enjoyment, and reminiscence.

The Responses to positive Affect Questionnaire (RPA; Feldman et al., 2008) is a 17-item questionnaire that comprises 3 subscales: dampening, self-focus and emotion-focus. We used this questionnaire to assess participants` tendency to engage in dampening responses to positive affect.

The Positive and Negative Affect Schedule-X (PANAS-X, Watson & Clark, 1999) is a scale that measures positive and negative emotions. It consists of 60 of emotion descriptors (e.g. interest, upset, nervous). We used the subscale that measures positive emotions. This subscale includes 10 items.

3.4.2.3. Procedure and daily diary assessment

Participants filled in all questionnaires online.

In order to assed daily positive emotion regulation, we asked participants to describe a positive event that had occurred during that day. Participants received the following instructions:

"Please consider a positive event that took place today. This can be anything that has produced pleasant emotions, such as meeting someone you know, receiving good news, learning something new, getting a good grade, or receiving a compliment. Please describe any situation that has produced a positive emotion in your life today."

After describing the positive event, participants were asked to rate how joyful, happy, surprised and content they felt on a 5-point scale ranging from 1 ("not at all") to 5 ("extremely"). After participants evaluated their positive emotions regarding the positive event, they were asked to choose from a list of 8 responses how they had regulated the positive emotions after the event. Each response coded a positive emotion regulation strategy; participants were allowed to choose multiple strategies. The 8 responses were adapted from *The Emotion Regulation Profile Revised* (ERP-R; Nelis, et al, 2011) questionnaire which measures the ability to regulate positive emotions.

Participants received an e-mail every day, that reminded them to think about a positive event that had happened that day. They were then asked about the positive emotions and the positive emotion regulation strategies.

3.4.2.4. Data analysis

We used Bivariate Pearson's *r* in order to correlate baseline variables (positive emotions, depressive symptoms, dampening and savoring).

3.4.3. Results

Table 1.

Bivariate correlations at baseline

Variable	Depression	Savoring	Dampening	Positive emotions
Depression	-	-.56**	.68**	-.30**
Savoring		-	-.58**	.31**
Dampening			-	-.19*
Positive emotions				-

**Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Results (see Table 1) show that there is a significant negative correlation between symptoms of depression, savoring and positive emotions, and a positive correlation between dampening strategies and symptoms of depression.

In order to calculate between-group differences in positive emotions and positive emotion regulation strategies, we used MANOVA procedure. In order to interpret the effect sizes for the η^2(eta squared), we used Cohen`s (1988) guideline, were an effect size of .01 is considered small, an affect size of .06 is considered medium, and .14 is considered a large effect size.

Our results indicate that the overall interaction between depressive symptoms and positive emotions and positive emotion regulation strategies is significant (Wilks`Lambda = .70, F (14, 96) = 2.74, p = .001, η^2 = .29) with a large effect size.

Table 2.

Between-Subjects Effects

Variable	df	F	η2	Sig.
Joy	1	.177	.002	.67

Happiness	1	.540	.005	.46
Surprised	1	8.275*	.071	**.005**
Content	1	.981	.009	.32
Distraction	1	6.186*	.054	**.01**
Behavioral display	1	.376	.003	.54
Negative mental time travel	1	10.332*	.087	**.002**
Being present	1	14.254*	.11	**.000**
Fault finding	1	8.619*	.073	**.004**
Positive mental time travel	1	3.184	.028	.077
Capitalizing	1	.031	.000	.861
Suppression	1	8.089*	.069	**.005**
Downregulation of positive emotions	1	20.058*	.155	**.000**
Upregulation of positive emotions	1	1.240	.011	.268

*. The mean difference is significant at the .05 level.

Between-group comparisons (see Table 2) revealed that when a positive event occurred, participants with depressive symptoms felt more surprised than those without depressive symptoms F (1, 110) = .8.25, p = .005, with a medium effect size η^2= .071. Regarding positive emotion regulation strategies, we found significant between-group differences for all types of dampening strategies. For *distraction*, an F (*1,110*) = 6.18 , p = .01 with a small to medium effect size η^2= .05 was found; for *negative mental time travel*, an F (*1, 110*) = 10.33, p = .002 and a medium effect size, η^2 = .08 was observed; for *fault finding*, an F (*1, 110*) = 8.61, p = .004, and a medium effect size η^2 = .073 was found; finally, for *suppression*, an F (*1, 110*) = 8.08, p = .005, with a medium effect size η^2 = .069 was observed.

In which savoring strategies are concerned, the only significant difference we found was for *being present*, F (*1, 110*) = 14.254, p = .003, with a medium to large effect size η^2 = .11. Individuals with depressive symptoms reported that they downregulate positive emotions after using positive emotion regulation strategies F (*1, 110*), = 20.05, p < .001, indicating a large effect size η^2 = .155. We did not find a significant difference between the two groups for upregulating positive emotions.

3.4.4. Discussion

Results reveal that individuals with depressive symptoms are more surprised when a positive event occurs. We did not find significant differences between the rest of the positive emotions that we measured (joy, happiness, and content). A possible explanation for this difference is that

individuals with depressive symptoms are more surprised when a positive event occurs because they do not expect good things to happen. The fact that there are no significant differences for joy, content, and happiness after a positive event occurs shows that individuals with depressive symptoms are capable of experiencing positive emotions just like those who do not have symptoms. However, they downregulate positive emotions by using dampening strategies.

We found differences between the two groups regarding responses to positive emotions. Significant differences were observed in terms of all types of dampening strategies. People with depressive symptoms tend to suppress positive emotions after they appear, and this is consistent with other studies that found a link between depression and suppression (Gross & John, 2003, Johnson et al., 2016; Kashdan & Steger, 2006; Su et al., 2013). A significant difference between participants with depressive symptoms and those without depressive symptoms was also observed for distraction from positive events and positive emotions; this indicates difficulties in focusing on good things due to worrying and thinking about negative things that are not related to the positive event and feelings. They also focus on the things that could have been better, using fault finding strategy when a positive event occurs. Also, they use negative mental travel, thinking that the positive event will end soon. These results are in line with other studies showing that depressed individuals use negative mental time travel, and this dampening strategy was associated with depressive symptoms in other studies (Feldman et al., 2008). Regarding savoring strategies, we only found a significant difference for being present, indicating that participants with depression symptoms have difficulties in directing their attention to the pleasant experiences of the moment. We didn`t find significant differences in terms of other savoring strategies. Thus, individuals with depressive symptoms are similar to individuals with no depressive symptoms in terms of anticipating (positive mental time travel) positive experiences, of celebrating positive events with others, and of expressing positive emotions using non-verbal behavior. Also, participants with depression symptoms use significantly more dampening strategies compared to nondepressed ones.

Our our study highlights important aspects related to positive emotion regulation in depression. To our knowledge it is the first study that examines all types of savoring and dampening strategies in daily life, comparing the use of these strategies by individuals with depression symptoms and participants with no depression symptoms. We also believe that this study answers the question asked by other authors, (e.g., Li et al., 2017) referring to how people with depression reduce their positive emotions resulting from positive events. Our answer, based on the results of this study, is that individuals with depressive symptoms reduce their positive emotions by the way they relate and think about positive events and emotions. They focus on how positive events could have been better or think that they don`t deserve to have pleasant feelings or that positive feeling will not last for long. Also, they dampen positive emotions by not expressing them. Moreover, they do not savor positive emotions because they focus on other negative things and not on the present moment.

3.5. Study 4. An internet-based savoring intervention for treating depressive symptoms.

3.5.1. Introduction

There are scientifically validated interventions for treating depression, which are efficient and cost-effective such as cognitive therapies (Beck, Rush, Shaw & Emery, 1979) and behavioral activation techniques (Jacobson et al., 2001), but these types of psychotherapy treatments are primarily focused on reducing the impact of negative emotions on daily life. However, recent studies showed that the symptoms of depression are related not only to negative emotions and their poor regulation, but also to deficiencies in regulation of positive emotions. Disturbances in the regulation of positive emotions maintain, and predict depressive symptoms (Carl el al., 2014; Carl el al., 2013; Eisner et al., 2009).

Several positive emotion regulation techniques that have been tested in order to optimize positive emotion regulation. Among these, *mindfulness meditation* techniques are used to increase the daily level of positive emotions (Garland et al., 2010). Studies have shown that mindfulness can improve attention to the present moment so that positive emotions can be more vividly experienced. Moreover, studies have found that mindfulness improves the level of positive affect, well-being (Fredrickson & Joiner, 2002; Garland et al., 2010) and decreases levels of depression (Speca, Carlson, Goodey, & Angen, 2000).

Bryant and Veroff (2017) elaborate on several ways of enhancing savoring. These savoring techniques have differential effects on positive outcomes (Quoidbach et al. 2010). Studies have shown that anticipating future personal events for two weeks increases the level of happiness (Quoidbach, et al, 2009). Also, positive mental time travel techniques predict happiness and well-being (Bryant et al., 2005; Havighurst & Glasser, 1972; Lyubomirsky et al., 2006). Bryant (2005) has shown that reminiscing exercises predict higher level of positive emotions, compared to a control group. Lambert et al, (2012) have found that sharing positive events with friends or family (capitalizing) for 4 weeks contributes to a significant increasing the level of positive emotions compared to the control group (placebo). All of these interventions show that savoring exercises are beneficial in increasing the level of positive emotions and well-being (Bryant, 2003; Bryant & Veroff, 2017; Eisner et al., 2009). Additionally, Hurley and Kwon (2012) have reported that savoring strategies can be effective in reducing depressive symptoms. The authors tested savoring exercises and techniques on college students for two weeks and the results indicated that depressive symptoms were significantly reduced in the intervention group compared to the control group.

While numerous techniques for regulating positive emotions appear in the literature, there are no empirically tested interventions including multiple emotion regulation techniques targeting specific deficits in positive emotion regulation in depression. Moreover, there is a lack of intervention protocols that include psychoeducation about positive emotion regulation (Carl et al, 2013; Gross & Tompson, 2007).

3.5.1.1. Objective and hypothesis

The current study aimed to test the efficacy of an internet-based savoring intervention for improving positive emotion regulation and reducing depressive symptoms. We expected that participants in the savoring group would show a significant reduction in depressive symptoms and an improvement in regulating positive emotions (i.e., increased level of savoring strategies and decreased level of dampening strategies) compared to the placebo group. Additionally, we

hypothesized that the level of positive emotions would increase significantly in the intervention group compared to the placebo group.

3.5.2. Method

3.5.2.1. Participants

A total of 55 students at Babeș-Bolyai University, Cluj- Napoca took part in this research. The sample included 50 women and 5 men, with ages ranging from 18 to 53 (M_{age} = 27.61, *SD* = 8.02).

3.5.2.2. Measures

Patient Health Questionnaire (PHQ-9, Lowe et al, 2004) includes 9 items that reflect the DSM-IV diagnostic criteria of major depressive disorder (American Psychiatric Association, 1991). Participants are asked if they have experienced the symptoms described in the last 2 weeks.

Savoring Beliefs Inventory (SBI; Bryant, 2003) includes 24 items that measure the general capacity to savor positive experiences through anticipation, present enjoyment, and reminiscence. Participants indicate how true each item is in their case, on a seven-point scale ranging from 1 (‘‘strongly disagree’’) to 7 (“strongly agree”).

Response to positive Affect Questionnaire (RPA; Feldman et al., 2008) is a 17-item questionnaire that comprises 3 subscales: dampening, self-focus, and emotion focus. We used only the dampening subscale which includes 8 items.

Positive and Negative Affect Schedule-X (PANAS-X, Watson & Clark, 1999) is a scale that measures positive and negative emotions. It consists of 60 emotion descriptors In this study we used the subscale that measures positive emotions. This subscale includes 10 items.

3.5.2.3. Procedure and intervention

Participants filled in an online informed consent which contained information about the procedure and intervention. We included only participants who had depression scores between 5-20, representing low to medium depression on the PHQ-9 questionnaire (see Figure 6). We excluded participants who scored over 20 (severe depression) and those who reported being under psychological or psychiatric treatment. Participants were randomly assigned into the two groups. One group received treatment for improving the regulation of positive emotions and the other group was part of the placebo condition.

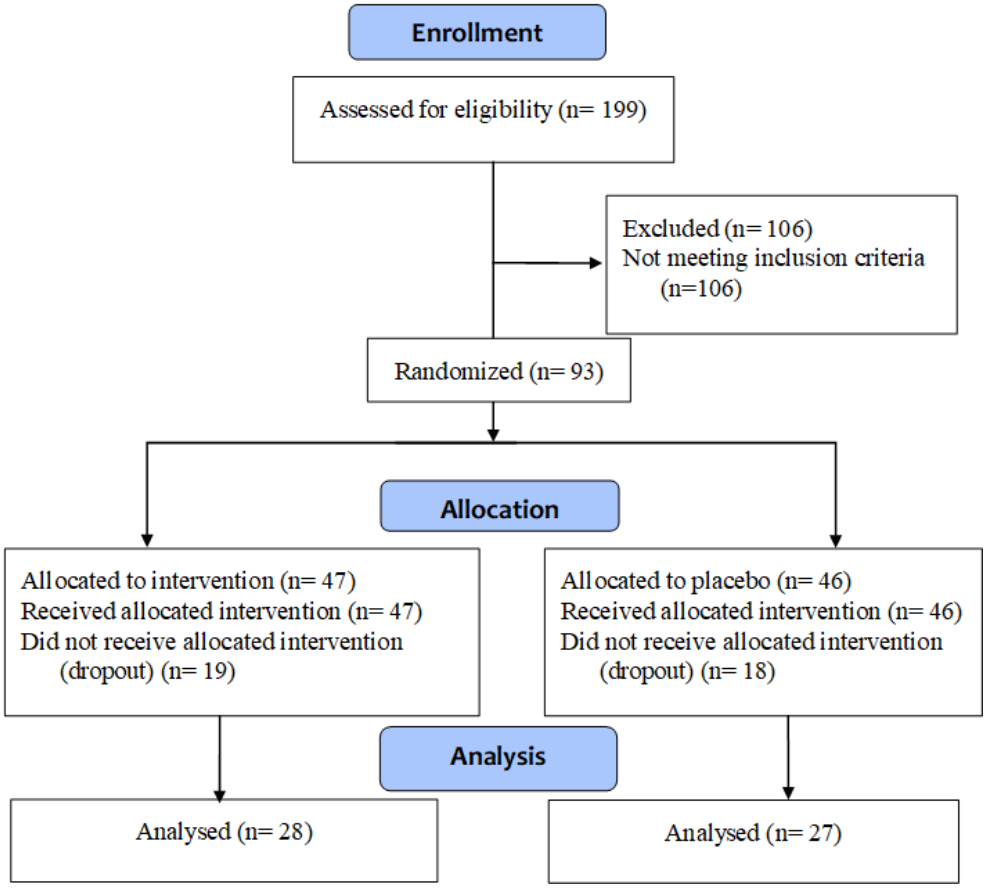

Figure 6. Flow diagram of participants included in the research

Placebo condition

The control group received a 3-week placebo intervention that was adapted from a study by Sheldon and Lyubomirsky (2006) testing an intervention to increase the level of positive emotions through expressing gratitude and visualizing best possible selves. The placebo group received the following instruction:

"You have been randomly assigned to pay more attention to the daily details of your life. 'Pay more attention to your life' means that you take notice of the ordinary details of your life that you wouldn't typically think about. These might include particular classes or meetings you attend, typical interactions with acquaintances, typical thoughts that you have during the day, or your typical schedule as you move through the day. In all of these cases, you may be helped to better identify problem areas in your life, and to take action to change them. You may not have thought about yourself in this way before, but research suggests that doing so can have a strong positive effect on your mood and life satisfaction. So, we'd like to ask you to continue thinking in this way

over the next few weeks, following up on the initial writing that you're about to do". (Sheldon & Lyubomirsky, 2006, p. 76).

During the 3 weeks of the intervention, participants received forms by e-mail in which they wrote down the daily life events that they noticed. Two weeks after attending to the details of their lives they were asked about the things they would want to change and for a few days to implement these changes.

Positive emotion regulation condition

The intervention protocol included several savoring and mindfulness techniques, delivered in 8 sessions, over 3 weeks.

1. Psycho-education related to the regulation of positive emotions in depression
2. Three positive mental time travel sessions. Participants were asked to recall positive past events and to imagine positive events that will take place in the near future (e.g., tomorrow) and also to imagine positive events that will take place in the distant future (e.g., that will take place after 2 mounts).
3. Two capitalizing techniques (i.e., share positive events with a close person and describe them)
4. Two mindfulness techniques that were meant to increase the awareness of the present moment (2 sessions).

Each task had a deadline of several days, after which participants had to report by e-mail if they had completed the task.

3.5.3. Results

Repeated-measures analysis of variance (ANOVA) was used to compare the effect of the savoring and placebo conditions on depressive symptoms, savoring, dampening, and positive emotions. Effect sizes for mean differences are reported by using partial eta squared (η^2), whereby values up to 0.01 refer to small, 0.06 to moderate, and 0.14 to large effect sizes (Cohen, 1988). Table 1 presents the means and standard deviations of the savoring and placebo interventions on depressive symptoms, positive emotions, savoring and dampening at pretest and posttest evaluation.

Group differences in depressive symptoms, savoring, dampening and positive emotions between the intervention and placebo condition were examined using a 2x2 model consisting in Condition (intervention and placebo) x time (T1-pretest, T2-posttest) repeated measures ANOVA. A significant main effect of Time, F (1, 53) = 28.88, p = .000, η^2 = .35, and a nonsignificant effect of Time x Condition interaction was observed, F (1,53) = .93, p = .338. There were no significant differences between the placebo and savoring condition in depressive symptoms.

Table 1.

Means and standard deviations for the savoring intervention and placebo effects

Measure	Treatment group (N=28)		Placebo group (N=27)	
	Pretest	Posttest	Pretest	Posttest
Depressive symptoms	9.78 (3.64)	6.32 (3.61)	8.77 (.40)	3.37 (3.87)
Savoring	4.52 (1.00)	5.02 (1.05)	4.70 (1.07)	5.38 (.91)
Dampening	22.14 (4.28)	19.53 (4.65)	17.81 (5.23)	19.07 (5.90)
Positive affect	25.85 (5.63)	30.75 (7.73)	27.85 (6.32)	33.14 (7.73)

Group differences in savoring were not significant; Time x Condition interaction, F (1,53) = .78, p = .380. A significant effect of time was observed F (1,53) = 34.51, η^2 = .39. A significant difference in dampening scores between the placebo and savoring condition was observed; Time x Condition interaction, F (1, 53) = 5.36, p = .025, η^2 = .09. The Time effect was not significant F (1,53) = .65, p = .42. Regarding positive emotions, a non-significant effect of Time x Condition, F (1, 53) = .43, p = .83, and a significant effect of Time, F (1, 53) = 27.24, p = .000, η^2 = .34 was found.

3.5.4. Discussion

No significant differences in depressive symptoms between the two groups were observed Moreover, there was no significant difference between the experimental and the control group in savoring positive emotions at post-test. However, we found significant differences between the two groups in terms of dampening strategies. Dampening was significantly reduced in the group that received the savoring intervention. Although we expected the level of savoring and positive emotions to improve significantly, results indicate a significant effect of the intervention on reducing dampening. Interestingly, although dampening strategies were significantly reduced in the intervening group, depression symptoms did not significantly reduce compared to the control group, indicating that, although dampening strategies are associated with depression as some studies have shown (Carl et al, 2013; Gentzler et al., 2015; Nelis, et al., 2011; Raes et al., 2014; Werner-Seidler et al, 2013), it is possible that symptoms of depression are maintained by other cognitive or behavioural factors beyond factors that regulate positive emotions.

The lack of significant differences between the experimental and control group in depressive symptoms, levels of savoring and positive emotions may be explained by the relatively short period of the intervention and the absence of a follow-up assessment. It is possible that the effect of the intervention becomes apparent in time, and that significant differences between groups be observed at follow-up evaluations. Further, it is possible that other savoring methods are more appropriate

for increasing savoring and reducing symptoms of depression. For example, even though, both mindfulness and savoring the moment techniques focus on current experiences, an important distinction exists between them. In savoring the moment, the goal is to become more focused on positive emotions, while mindfulness exercises were not dedicated exclusively to positive emotions, having the goal to focus the participant on any experience, emotion, or thought, be it positive, negative, or neutral. Additionally, while the goal of savoring the moment is to enhance the positive experience, in mindfulness the focus is on attending to the present experience rather than growing and intensifying the effect of the emotions. Future savoring interventions should develop mindfulness techniques that are focused on positive experiences.

CHAPTER IV. GENERAL DISCUSSION AND CONCLUSIONS

4.1. Theoretical and practical implications

The first study tried to answer our first research question which was: *how strong are the associations between positive emotion regulation strategies on the one hand, and psychopathology symptoms, positive emotions and well-being, on the other?* The results of our meta-analysis indicate medium correlations between symptoms of psychopathology and dysfunctional positive emotion regulation strategies. We also found that the correlation between adaptive strategies and psychopathology symptoms on non-clinical population is significantly higher compared to clinical samples. Also, the results of the meta-analysis indicate that dysfunctional strategies are negatively associated with positive emotions and well-being. Adaptive strategies (overall) are negatively related to symptoms of depression, anxiety, and bipolar disorder.

In terms of depression symptoms, the results of our meta-analysis confirm the results of previous research showing that depressive symptoms are associated with increased levels of dampening (Carl et al, 2013; Gentzleret al., 2015; Nelis et al., 2011; Raes et al., 2014; Werner-Seidler et al, 2013) and decreased levels of savoring (Bryant, 2003; Eisner et al., 2009; Ramsey & Getzler, 2014; Werner-Seidler et al., 2013). Our results also show that bipolar symptoms are positively related with savoring strategies and support the hypothesis that bipolar patients are unable to reduce their positive emotions effectively, due to an overuse of strategies that upregulate their positive emotions (e.g. Gruber et al., 2012; Gruber, 2011). These results pave the way for new research, testing treatment techniques aimed to reduce the overuse of strategies that upregulate positive emotions, and to cultivate healthy positive emotions more appropriately related to the context. Also, more experimental studies are needed to establish the relation between bipolar symptoms and positive emotion regulation strategies.

The results of our meta-analysis confirm previous findings showing that dampening is strongly associated with anxiety (Eisner et al, 2009). However, more experimental studies are needed to clarify the association between anxiety and positive emotions regulation strategies.

The meta-analysis also highlights important aspects regarding the associations between positive emotion regulation strategies, positive emotions, and well-being. Results show that savoring strategies are positively associated with increased levels of well-being and positive emotions, while dampening strategies are associated with decreased well-being and a low level of positive emotions.

Our second research question was related to other variables that might predict positive emotion regulation. Studies 2a and 2b looked at irrational beliefs as predictors of positive emotion regulation strategies. Study 2a showed, for the first time, to our knowledge, that irrational beliefs are predictors of dampening. SD/OD was the most relevant predictor of dampening, and dampening strategies mediated the relation between self-downing and depressive symptoms. Study 2b showed that SD/OD is also the strongest negative predictor of savoring, and that savoring mediates the relation between the SD/OD and depression, and between SD/OD and joy.

These two studies are clinically relevant as they offer information on the mechanisms of depression. Thus, results indicate that the mechanisms of depression are not only related to dysfunctional/irrational beliefs, but also to deficits in positive emotion regulation.

Also, the results from the study 2b show that positive emotions (i.e., joy) are influenced by irrational beliefs and savoring. Thus, irrational beliefs do not only influence negative emotions, but also positive emotions.

Future studies could experimentally test if the restructuring of irrational cognitions leads to improved levels of savoring and if the level of dampening decreases.

Study 3 was the first comparative study to investigate differences between individuals with and without depressive symptoms in terms of daily use of positive emotion regulation strategies over one week. A daily diary method was used, and results reveal no significant differences in positive emotions such as joy, happiness, and contentment between the two groups, except for surprise after a positive event occurs. It is interesting that there are no differences between participants with depressive symptoms and participants without symptoms of depression in the level of positive emotions experienced immediately after a positive event, and that participants with depressive symptoms downregulate positive emotions only after they occur. Specifically, individuals with depressive symptoms use significantly more dampening strategies such as *suppression, fault finding, negative mental time travel, and distraction*. The results of this study have important implications. An important contribution is related to the identification of specific positive emotion regulation strategies that people with symptoms of depression use to regulate positive emotions in daily contexts. Other important findings are that people with depression use more dampening strategies to downregulate positive emotions. while the only important difference between the two groups in the use of savoring strategies a was found only for *being present* strategies.

The last study included in this thesis (Study 4) also has important theoretical and practical implications. Even though we did not find significant differences between the group that received the savoring intervention and the placebo group in terms of depressive symptoms and the use of savoring, dampening strategies were significantly lower in the savoring group following the intervention. The lack of relation between reductions in the use of dampening and depressive symptoms indicates that, although dampening may be associated with depression (Carl et al, 2013; Gentzler et al., 2015; Neliset al. , 2011; Raes et al., 2014; Werner-Seidler et al, 2013), symptoms of depression are maintained by the interaction between dysfunctional positive emotion regulation and other factors such as irrational (dysfunctional) beliefs, as we have shown in study 2a and study 2b. Future experimental studies and clinical trials should take into account a broader range of factors that predict and maintain depression; for example, future interventions protocols could include positive emotion regulation techniques, alongside cognitive restructuring and behavioral activation.

4.2. Methodological implication

This thesis has several methodological implications for the literature on positive emotion regulation strategies.

1. The meta-analytical procedure in Study 1 allowed us to draw more reliable conclusions about the associations between specific positive emotion regulation strategies, psychopathology symptoms (i.e., depression, anxiety and bipolar symptoms) and positive

outcomes (i.e., positive emotions and well-being), that cannot be drawn from individual studies.

2. The use of mediation analysis allowed us to examine the role of positive emotion regulation strategies (dampening and savoring) in the relation between irrational beliefs and different outcomes (i.e., depression and positive emotions).
3. The daily diary method that we used in Study 3 helped us follow more closely and more ecologically how specific positive emotion regulation strategies are used in everyday life.
4. The savoring intervention that we tested in Study 4 was, to our knowledge, the first online intervention based on positive emotion regulation strategies. Even though our results were not so encouraging, future studies should test improved online interventions based on positive emotion regulation strategies, both for clinical and non-clinical populations (e.g., preventing depression and maintaining well-being).

4.3. Limitations and future directions

There are several limitations of the studies included in this thesis, but we also extorted some future research directions in the positive emotion regulation field of research.

One general limitation is related to sample representativeness. Our samples included mostly undergraduate female students, which limits the generalization of the conclusions to different social groups or different ages. In order to overcome this limitation, future studies should equally include both men and women.

Second, measures that we used for positive emotion regulation strategies were self-report scales. These measures are not always adequate in capturing all the ways positive emotions are regulated (Berking & Wupperman, 2012). There is a need for developing experimental ways to measure emotion regulation strategies that capture more fully and adequately this phenomenon.

Third, a clear limitation is related to the fact that Study 3 and Study 4 were conducted on participants from the general population, with symptoms of depression. Future studies should investigate positive emotion regulation strategies on clinical populations, and not only on depressed individuals, but also on participants suffering from anxiety and bipolar disorder.

Additionally, the Internet-based intervention that we tested in Study 4 could have a limited effect due to the lack of a therapeutic relationship. Future studies could compare the effect of internet-based savoring interventions with face-to-face interventions in order to establish which of these methods would be most effective. Additionally, the fact that the savoring intervention was not effective in reducing depressive symptoms and in increasing positive emotion levels shows that a more effective intervention would probably combine positive emotion regulation strategies with cognitive restructuring and other techniques that have proven effective.

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