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Ph.D. THESIS ABSTRACT

EMOTION REGULATION CHOICE AND

AFFECTIVE INTENSITY

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CHAPTER I

THEORETICAL BACKGROUND

1.1. Introduction and research topic

Emotions are complex subjective, physiological, cognitive, and behavioral processes that have the goal to direct people's attention and appraise internal and external events in everyday people's context (Gross, 2007). Usually, emotions motivate important goals for the organism (Gross, 2007; Levenson, 1994; Seligman, Railton, Baumeister, & Sripada, 2013). When emotions interfere with individual's goals, people use emotion regulation processes to reduce, amplify or modulate emotions in different contexts of daily live. There are different emotion regulation strategies identified in theoretical and empirical studies that people use to impact the nature, valance, intensity and duration of emotions (Gross, 1998; Webb, Miles, & Sheeran, 2012; Optiz, Cavanagh, & Urry, 2015). The most popular emotion regulation family strategies from Gross's process model of emotion regulation (1998) are: situation selection, situation modification, attention deployment, cognitive change, and response modulation.

There are many individual differences studies of how people choose, use and implement emotion regulation strategies (Parkinson & Totterdell, 1999), that showed systematic variations between individuals and between emotional episodes of an individual (Sheppes şı al., 2012).

The process model of emotion regulation Gross (1998) shows what people usually do when they try to modulate their emotions (Aldao, Sheppes, & Gross, 2015; McRae & Gross, 2020). Emotions are usually regulated when they interfere with desirable behaviors and goals (Gross, 1998; 2013; Aldao şı al., 2015). The model of emotion regulation Gross (1998; 2015) includes several families of emotion regulation strategies that differ in their primary temporal impact in the processes of emotion generation and emotion regulation. There are antecedent focused strategies (situation selection, situation modification, attentional deployment, cognitive change) and response focused strategies (response modulation) (Gross, 1998).

Most emotion regulation studies focused on consequences of instructed emotion regulation strategies, thus investigating the implementation stage of emotion regulation process (Gross, 2001; Sheppes & Gross, 2011; McRae, 2013; McRae & Gross, 2020). Studies of emotion regulation strategies or use have been usually operationalized as how often someone chooses to use a strategy (Sheppes şı al., 2011; McRae & Gross, 2020). One of the most investigated strategy is reappraisal, and it has been frequently associated with emotion regulation success because of efficient consequences on emotion subjective modulation (Gross, 1998; Jackson, Malmstadt, Larson, & Davidson, 2000), on peripheric physiology (Denson, Grisham, & Moulds, 2011; Ray, McRae, Ochsner, & Gross, 2010), and neural measures of emotion regulation (Chang, Gianaros, Manuck, Krishnan, & Wager, 2015; Ochsner, Bunge, Gross, & Gabrieli, 2002).

A frequent use of reappraisal has been associated with good physical health (Appleton, Buka, Loucks, Gilman, & Kubzansky, 2013; Appleton, Loucks, Buka, & Kubzansky, 2014; McRae & Gross, 2020), good academic performance (Davis & Levine, 2013; Ivcevic & Brackett, 2014), positive social behaviors (English, John, Srivastava, & Gross, 2012), a good mental health (Gross & John, 2003) less psychopathological symptoms (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Cludius, Mennin, & Ehring, 2020).

Distancing is a type of cognitive reappraisal strategy focused on the self (detached reappraisal) that tries to change the personal relevance and impact of a stimulus or event (Gross, 2015; Ochsner & Gross, 2005). It has been associated with modulations in positive and negative emotions (Beauregard, Levesque, & Bourgouin, 2001; Ochsner & Gross, 2004; Koenigsberg & al., 2009; McRae, Ciesielski, & Gross, 2012).

There are few studies that have been interested in separating the mechanisms of emotion regulation strategy choice from the stage of implementing these strategies (Cosme, Mobasser, Zeithamova, Berkman, & Pfeifer, 2018; McRae & Gross, 2020). Some line of research that investigated emotion regulation choice (Sheppes & al., 2011; Sheppes, 2020) or emotion regulation flexibility (Bonnano & Burton, 2013) have also focused on concepts of emotion regulation engaging or disengaging. Based on a classification emotion regulation strategies (Parkinson & Totterdell, 1999; Roth & Cohen, 1986; Thayer & Lane, 2000) it has been suggested that strategies that imply engaging with emotional information processing are adaptive, while strategies that imply disengaging from emotional information processing are maladaptive (Janoff-Bulman, 1992; Silver, Boon, & Stones, 1983; Bonnano, 2013; Sheppes, 2020).

There were few studies inserted in emotion regulation choice of various emotional context (Sheppes & al., 2011). Some studies demonstrated that greater flexibility towards alternating between amplifying or suppressing emotions are associated with long term adaptive health (Bonnano, Papa, Lalande, Westphal, Coifman, 2004). But in these studies, the strategies were chosen by the experimenter, thus not offering information about the process of emotion regulation choice (Sheppes, 2020).

The extended model of emotion regulation (Gross, 2015) shows that emotion regulation has different stages that precede and follow strategy implementation (Sheppes, 2020). Implementing engaging and disengaging emotion regulation strategies (Parkinson & Totterdele, 1999) implies recruiting different executive control mechanisms that modify emotional information processing at two temporal points, referring to selective attention and semantic meaning (Gross & Thompson, 2007; Sheppes & Gross, 2011; Sheppes, 2020).

Mechanism of selective attention implies attentional disengagement for the emotional information processing before the information is represented in the working memory (Sheppes, 2020). Semantic meaning implies attentional engagement towards emotional information processing, and it is represented in the working memory, while its semantic meaning is modulated (Sheppes & Gross, 2011). The benefits of attentional disengagement from emotional information include a strong affective modulation of high intensity emotions (Sheppes & Meiran, 2007). The long-term motivational costs this strategy is that emotional information cannot be processed, and it can have recurrent future impact (Sheppes & Gross, 2011, 2012; Sheppes, 2020). On the other hand, the benefits of engagement strategies are that although they are not so effective in modulation if high intensity affective, emotional information can be processed, and its impact in future situations is reduced Sheppes, 2020.

3.2 Regulation Stages

The extended model of emotion regulation has suggested some regulation stages others than implementation (Bonnano & Burton, 2013; Gross, 2015; Ochsner & Gross, 2014; Sheppes, Suri, & Gross, 2015; Webb, Schweiger Galo, Miles, Gollwitzer, & Sheeran, 2012).

Au fost sugerate patru stadii reglatorii principale care operează în funcție de diferiți parametri interni și externi în modelul descris de Sheppes (Gross, 2015; Sheppes, 2020). Primul stadiu se referă la identificarea reglatorie și se referă la luarea deciziei inițiale de a regla sau nu o emoție. Eșecuri sau erori în procesul de reglare emoțională pot apărea în fiecare stadiu sau substadiu (Gross, 2015). În stadiul de *identificare* dacă este detectată perceptiv o emoție, aceasta este apoi evaluată pentru a stabili dacă este suficient de negativă sau pozitivă pentru a activa reglarea. Dacă aceste condiții sunt îndeplinite este activată reprezentarea scopului de a regla emoția.

Activarea unui scop de reglare emoțională duce la pasul următor de *selecție* a unei strategii de reglare emoțională ce urmează a fi implementată (Gross, 2015; Sheppes, 2020). Astfel, sunt reprezentate potențiale strategii de reglare emoțională din propriul repertoriu, care apoi sunt evaluate în funcție de factori contextuali precum resursele cognitive (Urry & Gross, 2010) sau fiziologice (Beedie & Lane, 2012) sau în funcție de tipul și intensitatea impulsului emoțional (Sheppes & Gross, 2011). Ulterior este activat scopul de a utiliza o strategie particulară (Gross, 2015). Succesul procesului de selecție reglatorie poate depinde astfel de repertoriul de strategii al individului.

După ce în stadiul de selecție este reprezentată o strategie de reglare emoțională este inițiat stadiul de *implementare* în care strategia este transformată în tactici potrivite pentru situația specifică, ca apoi tactica evaluată ca fiind cea mai potrivită este selectată pentru a fi implementată (Gross, 2015). Prin tactici a se înțelege ce fac oamenii efectiv atunci când utilizează o strategie (McRae, Ciesielski, & Gross, 2012).

Succesul implementării poate depinde astfel de repertoriul de tactici, prin care se înțeleg experiențe anterioare în situații similare cu diverse strategii, de abilitatea de a le reprezenta și transfera între contexte noi și diferite, de capacitatea de a le evalua acurat în funcție de aprecierea unor variabile contextuale cum ar fi tipul și intensitatea emoției (Sheppes și al., 2011) sau resursele disponibile necesare implementării (Gross, 2015). Dinamica întregului proces este ulterior *monitorizată* pentru a vedea dacă și cum trebuie ajustată o strategie activă implementată (Sheppes, 2020). Monitorizarea poate astfel detecta erori la toate stadiile anterioare.

Prin urmare, rezultatele stadiului de monitorizare pot consta în menținerea, schimbarea sau oprirea implementării unei anumite strategii de reglare emoțională (Sheppes, 2020).

3.3 Emotion regulation choice

Sheppes (2014) defines selection in emotional choice as the selection of different emotion regulation strategies in different contexts, when regulation is required and when more than one strategy option in the strategy repertoire is active.

However, this is not the only approach to investigating the use or selection of emotional regulation strategies (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015). Studies investigating the frequency of strategy use can be of several kinds, including those that used questionnaires (John & Gross, 2007) or laboratory measurements of spontaneous emotional regulation (Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010; Gruber, Harvey, & Gross, 2012).

While it would have been necessary to measure the strategies that individuals spontaneously implement, most studies required participants to implement strategies for which they were instructed (Egloff, Schmukle, Burns, & Schwedtfeger, 2006; Ehring and al., 2010; Gruber and al., 2012; Sheppes, Scheibe, Suri, & Gross, 2011). This has interfered with the development and understanding of the mechanisms by which individuals naturally select strategies. Moreover, the results of studies investigating the spontaneous selection of strategies underline their importance (Egloff and al, 2006; Sheppes and al., 2011; Gruber and al., 2012). Investigating the spontaneous selection of strategies is useful to focus both on the daily use of emotional regulation strategies in ecological life contexts and in paradigmatic contexts similar to studies that provided instructions on various strategies for participants to implement them (Aldao, 2013). This would provide information about how participants deviate from the use of instructions received, for example using multiple strategies, in addition to those for which they have been instructed. The context is also like the psychotherapeutic one, in which individuals frequently encounter difficulties in practicing the implementation of strategies received as homework (Mennin & Fresco, 2010; Roemer, Orsillo, & Salters-Pedneault, 2008).

Investigating the use of multiple strategies and interactions between strategies is an important contextual factor (Aldao, 2013). Individuals most likely possess a repertoire of strategies acquired over the course of their lives, from which the selection of strategies is likely to influence the selection, impact, absence or omission of other strategies. There is also empirical data that show that individuals can simultaneously implement several strategies (Demaree, Robinson, Pu & Allen, 2006; Wolgast and al., 2011). For example, participants who failed to reduce their aversive emotions by using reassessment or engaged rather in the use of avoidance strategy (Wolgast and al., 2011). This suggests the biphasic feature of the use of hiring and disengagement in the use of strategies.

Another study also showed that participants who were asked to suppress their facial expression in response to a video stimulus used a single cognitive strategy, compared to those who had to exaggerate their facial expression, the two strategies having the effect of reducing the negative effect (Demaree and al., 2006).

The behavioural paradigm developed by Sheppes and al. (2011) involves the following procedure. Initially participants go through a learning phase of the differences between several regulation strategies, and then they go through a training phase on how to implement each strategy accurately. They are then informed that they will be exposed to a series of emotional stimuli whose nature may vary depending on the experimental decision and for which they will freely choose between emotional regulation strategies. Participants will practice strategy selection. During the challenge, participants will go through a series of sequences involving a brief overview of the emotional stimulus, followed by the screen on which they will select the preferred regulation strategy. After a short period of preparation, the presented stimulus reappears, and participants must implement the selected strategy. After the stimulus disappears, participants report how they feel (Sheppes, 2020).

The predictive factors of selection in emotional regulation identified by Sheppes (2020) can be affective, cognitive, motivational, individual, social, cultural, developmental or clinical. The decision-making architecture in most selection studies using the paradigm proposed by Sheppes (2020) involved decisions between two regulation options (Sheppes & Levin, 2013; Sheppes and al., 2011). Sheppes' studies mainly involved choices between cognitive regulation strategies (distraction) and cognitive modification strategies (sheppes and al., 2011; Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe and al., 2014; Murhpy & Young, 2018; Young & Suri, 2020). Other pairs of strategies were examined, including reassessment and acceptance (Mehta, Young, Wicker, Barber, & Suri, 2017), distraction and rumination (Millgram al., 2019)

or avoidance and distancing (Sai and al., in preparation). The main dependent variable in these studies is the proportion of selection (obtained by pressing a key on the screen showing the options) of a regulation strategy of two options available in each experimental condition (Sheppes, 2020). To assess the accuracy and grip of participants, they are asked to say out loud how they implemented the selected strategy (Dorman-Ilan and al., 2019; Sheppes and al., 2011). In these studies, the authors start from the assumption that individuals can take into account the costs and benefits associated with implementing each regulation option in different contexts, thus adapting the chosen regulation selections (Sheppes, 2014; Sheppes & Levin, 2013).

There are several regulation selections dimensions that support the assumptions of the mechanisms of regulation strategies based on differentiated cost-benefit profiles (Sheppes, 2020). First, the affective intensity of emotional stimuli is an important factor for the selection in regulation and implementation of strategies of attentional disengagement or engagement in change of meaning (cognitive change) (Sheppes & Gross, 2011, 2012).

Thus, for selection in emotional regulation, in situations of high intensity is preferred attentional disengagement because it provides immediate affective modulation. In low-intensity situations, however, it is preferred to engage in cognitive modification as it provides long-term modulation, which means that its effects are also maintained in future situations (Sheppes, 2020). The affective intensity of emotions has two dimensions valence and locus (internal and external). The independent variable handled in most experimental studies investigating regulation selection included external negative intensity by dichotomizing on the basis of normative data of aversive images in low and high intensity images, examining its influence on the selection between attentional disengagement and cognitive modification (Sheppes and al., 2014; Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe, and al., 2014). Studies examining the influence of external negative intensity on selection in emotional regulation provided robustness to predictions, with a large size of effect (Cohen $d = 2$), with more than 90% of participants showing disengagement preferences for high intensity and low intensity engagement (Sheppes, 2020).

Another factor that determines the selection in emotional regulation is that present at the cognitive level by three constructs: the degree of disengagement/engagement with the processing of emotional information (Sai and al., in preparation; Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe, and al., 2014), the degree of cognitive effort or the cost of resources (Milyavsky al., 2019; Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe, and al., 2014) and opportunities (affordances) for the two families of strategies that are inherent in emotional stimuli (Suri al., 2018; Young & Suri, 2020). Attentional disengagement strategies do not involve the processing of emotional information, require minimal cognitive resources, their operation does not depend on the opportunities of emotional stimulus. Strategies for engaging in cognitive modification involve processing emotional information, require cognitive resources, and the operation of neutral reinterpretations depends semantically on the opportunities of emotional stimulus. Thus, for example, reduced hiring, high cognitive effort or limited opportunities will lead to a reduced selection of re-evaluation (Sheppes, 2020).

Empirical data in favor of the cognitive disengagement/engagement factor come from both studies that investigated the influence of affective intensity on the selection of strategies, and a study that examined the selection of strategies on a disengagement-engagement continuum (Sai and al., in preparation). The authors examined avoidance strategies (in which the image is not present; Vujovic, Optiz, Birk, & Urry, 2014), distraction (the image is present but attention is disengaged; Sheppes et al., 2011), distancing (the image is present, there is attentional engagement with the image, the reinterpretation consists in adopting a detached

mental set, objective to the content of the emotional image; Ochsner and al., 2004), and situation-centered reassessment (present image, attention engaged, reinterpretation of the specific content of emotional images; Sheppes and al., 2011).

The results showed that individuals prefer in low-intensity situations the strategy most engaged in pairs with the most disengaged strategy, and in high-intensity situations prefer the most disengaged strategy in pairs with the most engaged strategy (Sai and al., in preparation; Sheppes, 2020).

Of the motivational factors, in addition to directional or temporal purposes, financial rewards can influence selection decisions (Sheppes and al., 2014). Thus, the coupling of rewards with regulation strategies shows that there is an influence on the selection of strategies. But the influence of affective intensity on preferences for disengagement versus engagement strategies has proven its robustness even when it conflicts with financial reward, in high-intensity situations disengagement is preferred, even if for the hiring strategy the financial offer was higher (Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe, and al., 2014).

Under the working model proposed by Sheppes (2020) and Gross (2015), the identification decision will be determined by maximising the cost benefits for different regulation strategies relative to not adjusting at all. Although few, studies that have examined the regulation identification stage, i.e. when a decision is to be made between adjusting or not adjusting an emotion, have found that due to an inertia effect (an implicit state), individuals do not disclose their preferences to adjust emotions or not (Sheppes, 2020). More specifically, if they are given as an option a default state (default) not to adjust their emotions compared to adjusting them, or in another context if the default state is to adjust them, individuals tend out of inertia under both conditions to choose predominantly in most sequences of the behavioral paradigm, the default state (Suri and al., 2015). A single recent study that examined regulation identification (Amit, Schwartz, Bachar-Avnieli, Tamir, & Sheppes, in the review) and using two emotional contexts (negative images and electric shocks), found that a preference or motivation for regulation was evident only in one combination, namely between conditions that included personally high-intensity emotionally relevant events (electric shocks) when participants had the option to engage attention (Sheppes, 2020).

Although in a combination of conditions where individuals prefer to choose regulation, in about a third of the sequences they chose not to adjust their emotions, even if they were faced with intense and personally relevant electric shocks, and even though they had the option to choose very effective attentional disengagement, they still decided to a significant extent to freely "allow" their emotions (Sheppes, 2020). Furthermore, the participants did not show any preference for the cognitive modification strategy, both in the case of electric shocks as a stimulus and for intense images containing mutilations, an explanation recently provided being the cognitive effort required to implement cognitive change (Milyavsky and al., 2019; Sheppes, 2020).

In other news, psychological flexibility is crucial for mental health (Kashdan & Rottenberg, 2010), especially flexibility in emotional regulation (Aldao et al., 2015; Bonanno & Burton, 2013; Hollenstein, Lichtruck-Aschoff, & Potworowski, 2013). For example, flexibility in implementing emotional regulation through the ability to successfully execute different strategies according to certain instructions is associated with long-term healthy adaptation (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Westphal, Seivert, & Bonanno, 2010) also has a protective role (Gupta & Bonanno, 2011). Flexibility in the regulation selection in the behavioural paradigm in question refers to the ability to choose flexibly between regulation strategies by taking due account of the central costs and benefits

associated with each regulation strategy in different contexts (Sheppes and al., 2014; Sheppes & Levin, 2013). A study that included firefighters who experienced repeated exposures to traumatic events showed that increased traumatic exposure is associated with increased post-traumatic stress symptoms only for individuals with reduced flexibility in regulation selection (Levy-Gigi and al., 2016). Moreover, individuals with post-traumatic stress generally exhibit a selection flexibility in lower regulation (Fine and al., in preparation). If for flexibility in regulation selection involving increased preferences for attentional deployment when intensity increases, the associated post-traumatic stress symptoms are reduced, for post-traumatic growth it is suggested that higher preferences for cognitive modification would be required for increased levels of intensity (Orejuela – Davila, Levens, Sagui-Henson, Tedeschi, & Sheppes, 2019). For example, depression, flexibility in reduced regulation selection associated with high depressive symptomatology compared to healthy individuals (Milligramm and al., 2019) was observed in individuals with depression.

CHAPTER II RESEARCH OBJECTIVES AND OVERALL METODOLOGY

Although the process model of emotion regulation (Gross, 1998) states that people use multiple emotion regulation strategies when they deal with emotional situation, there are few empirical studies in this direction (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon et al., 2015).

As research literature has focused more on testing and comparing instructed emotion regulation, the more complex processes of selecting and implementing different emotion regulation strategies received less attention (Egloff, Schmukle, Burns, & Scwerdtfeger, 2006; Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010; Aldao & Nolen-Hoeksema, 2013).

There are some preliminary empirical data that suggest that the process of implementing emotion regulation strategies required more testing and trying as is represent in the emotion regulation literature (Aldao & Nolen-Hoeksema, 2013).

One study asked participant to suppress their emotion facial expression in response to a video stimulus, and showed that participants not only used expressive suppression, but they also engaged in a form of cognitive change (Demaree, Robinson, Pu, & Allen, 2006). Another study that asked participants to implement reappraisal, showed that when reappraisal failed to reduce negative affect, they also used avoidance instead (Wolgast, Lundh, & Viborg, 2011).

The goals of the studies in the present thesis focused on spontaneous use of emotion regulation strategies in low and high affective intensity situations. We also investigated emotion regulation choice of strategies that were not compared before, and we focused on the use of adaptative and also maladaptive emotion regulation strategies in ecological situations of enhanced external validity for to dimensions of everyday life, more specifically on academical performance and interpersonal relationships situations.

We were interested to investigate the way in which individuals use and select different emotion relation strategies in different contextual factors like affective intensity. In the first study we investigated the use of one versus multiple emotion regulation strategies in spontaneous emotion regulation in response to disgust in low and high intensity situations.

Previous studies that exanimated flexibility (Bonanno & Burton, 2013), choice (Sheppes et al., 2014) or implementation (Gross, 2015) of emotion regulation strategies used instructed emotion regulation strategies that were chosen by the experimenter. In these studies participants received instructions to use and implement specific emotion regulation strategies like reappraisal or suppression (Gross, 1998; Richard & Gross, 2000).

However, even that previous studies were based on the assumption that when instructed participants will use a single emotion regulation strategy in response to an emotional stimulus, new empirical studies showed that even when instructed, participants use more than one strategy in response to different stimuli (Aldao & Nolen-Hoeksema, 2013; Ehring et al., 2010; Optiz et al., 2015). One study that explored the spontaneous use of emotion regulation strategies in response to disgust (Aldao & Nolen-Hoeksema, 2013), showed that two thirds of participants used multiple emotion regulation strategies to regulate their negative affect.

Based on these results, in the first study we were interested to investigate the use of one versus multiple emotion regulation strategies in response to aversive images of disgust of low and high emotional intensities. In this study we used affective intensity as an affective determinant of emotion regulation choice, using as an emotional context affective images that induce disgust. Moreover, we were also interested to investigate the use of different emotion regulation strategies (Dixon-Gordon et al., 2015).

There is a methodological, conceptual and empirical distinction between different emotion regulation strategies like situational strategies (situation selection and situation modification), cognitive strategies (attentional deployment, cognitive modification) and behavioral strategies (response modulation) (Gross, 1998).

Based on the temporal dynamics of attentional deployment strategies and cognitive modification strategies, early filter processes require less cognitive effort and are more efficient in modulation of high intensity affect, compared with later semantic stages processes (Sheppes et al., 2014). This suggest that there is a continuum of emotion regulation strategies. Detached reappraisal or distancing operates by a mental set of objective and detached appraisal of the situations, seems to lie between attentional deployment and semantical modification (Ochsner & Gross, 2005) and is able to recruit attentional or semantical engagement based on affective intensity (Moodie, Suri, Goerlitz, Mateen, Sheppes, McRae, Lakhan-Pal, Thiruchselvam, & Gross, 2020) .

In the next studies we were interested to investigate emotion regulation choice using the behavioral paradigm of Sheppes et al., (2011; 2014) by comparing acceptance and distancing preferences in low and high intensity context. From the determinant's factors of emotion regulation choice (Sheppes et al., 2014) we also were interested to investigate the associations of contextual factors life affective flexibility (Malooly et al., 2012), individual differences in affective style afectiv (Hofmann & Kashdan, 2010), expressive flexibility (Burton & Bonanno, 2016) or emotion diversity (Phillippot, Schaefer, & Herbette, 2003) with emotion regulation choice (Sheppes et al., 2014).

Moreover, as acceptance and distancing could be considered adaptive strategies, we were also interested in investigating emotion regulation choice of maladaptive strategies like suppression and rumination.

In the last study we extended our investigation of emotion regulation strategies use in a more ecological way. Therefore, participants were asked to report diverse stressful situations that they encounter in everyday life during a stressful situation. We examined the use and strategies choice of student participants during their midterm exam session. Participants were asked to report using online forms different situations in which they experienced moderate and high intensity negative emotions and the strategies that they used in these situations. The reported situations were also required to reflect performance or interpersonal relations situations. For this study we were interested in the number of strategies use in moderate performance and interpersonal relations situation versus performance and interpersonal relations in high intensity situations. We were also interested if participants use more disengagement or engagement strategies in moderate versus high intensity situations.

CAPITOLUL III. ORIGINAL RESEARCH

Study 1

Use of Multiple Emotion Regulation Strategies in Spontaneous Emotion Regulation ¹

3.1.1 Introduction

In recent years, the field of emotion regulation has begun addressing the question of how individuals select among different available emotion regulation strategies (Aldao & Nolen-Hoeksema, 2013; Sheppes, Scheibe, Suri, & Gross, 2011; Suri, Sheppes, & Gross, 2012; Sheppes, Scheibe, Suri, Radu, & Blechert, 2014). Traditionally, experimental research has investigated emotion regulation processes by attempting to isolate the effect of a single emotion regulation strategy in response to emotion-eliciting stimuli, an approach largely based on Gross's process model of emotion regulation (Gross, 1998). For example, studies often instruct participants to use an emotion regulation strategy like suppression or cognitive reappraisal, and then compare the impact of these strategies on emotional responding to determine their relative efficacy (Gross, 1998, Richard and Gross, 2000).

Such an approach assumes that when instructed to use a particular emotion regulation strategy, individuals rely exclusively on that strategy. Recent evidence suggests, however, that individuals often spontaneously use multiple strategies even in the context of explicit instructions to use a single strategy (Aldao & Nolen-Hoeksema, 2013; Ehring, Tuschen-Caffier, Schülle, Fischer & Gross, 2010; Optiz, Cavanaugh, & Urry, 2015). For instance, Optiz and colleagues (2015) examined four studies in which participants were instructed to use cognitive reappraisal in response to emotional pictures, and found that approximately one quarter to one half of participants used a different emotion regulation strategy, either in addition to or instead of cognitive reappraisal.

The use of multiple emotion regulation strategies may be even more prevalent in the absence of explicit instructions to regulate emotion in a particular way. Aldao and Nolen-Hoeksema (2013) conducted a study in which participants viewed a disgust-inducing film clip without specific instructions on how to regulate their emotions and found that 65% of the sample endorsed using multiple emotion regulation strategies. Furthermore, some emotion regulation strategies were found to be preferred over others. Acceptance was the most common regulation strategy, endorsed by 68.5% of the sample, whereas suppression (37.8%), reappraisal (36.9%) and distraction (32.4%) were less common. Evidence for preferential use of certain emotion regulation strategies has also come from retrospective accounts of emotion regulation use, specifically in response to previous experiences of anxiety, sadness, and anger (Dixon-Gordon, Aldao, & De Los Reyes, 2015). Results showed that participants were significantly more likely to recall using acceptance, reappraisal and problem solving compared to self-criticism, expressive suppression and experiential avoidance, and preferred problem solving and worry/rumination over reappraisal.

As is the case with most psychological phenomenon, however, emotion regulation preferences are affected by contextual variables. (Aldao & Nolen-Hoeksema, 2012; Aldao, 2013; Bonanno & Burton, 2013). A number of emotion regulation frameworks have been proposed in recent years that highlight the importance of context and other factors in determining how individuals regulate emotion, as well as the effectiveness of their chosen

¹ This study was published in: Szasz, P. L., Coman, M., Curtiss, J., Carpenter, J. K., & Hofmann, S. G. (2018). Use of multiple regulation strategies in spontaneous emotion regulation. *International Journal of Cognitive Therapy*, 11(3), 249–261. <https://doi.org/10.1007/s41811-018-0026-9>.

strategies (Aldao, 2013; Bonnano & Burton, 2013; Kashdan & Rottenberg, 2010; Aldao, Sheppes, & Gross, 2015).

One of the more important contextual factors impacting emotion regulation choice is emotion intensity. Unsurprisingly, individuals endorse greater use of any type of emotion regulation strategy in the context of higher intensity emotional contexts (Dixon-Gordon et al., 2015). More specifically, it has been shown that individuals prefer to use reappraisal for lower emotion intensities, whereas for higher emotion intensities they are more likely to use disengagement strategies like distraction (Sheppes, Scheibe, Suri, & Gross, 2011; Sheppes et al., 2014). This pattern has been demonstrated in response to different types of emotional stimuli (e.g. negative pictures, electric shock; Sheppes et al., 2011), and has even been shown to hold when participants are offered monetary incentives to use the less preferred strategy (Sheppes et al., 2014). Furthermore, the preference for non-reappraisal strategies has also been found when participants provide open-ended responses about the way they regulate emotions following cognitive reappraisal instructions (Optiz et al., 2015). Importantly, the decreased likelihood of reappraisal in high intensity contexts appears to result from the amount of regulatory effort required by such a strategy (Sheppes & Levin, 2012). If alternative appraisals are pre-generated for participants, for instance, they are more likely to use reappraisal even in high-intensity contexts, suggesting that the cognitive complexity of generating appraisals is an important determinant of preference for other strategies in the context of higher intensity emotions (Sheppes et al., 2014).

The type of emotion being regulated provides another important context that can influence emotion regulation strategy. For instance, Dixon-Gordon and colleagues (2015) found that individuals reported more overall emotion regulation use when recalling how they regulated experiences of sadness compared to experiences of anger. Furthermore, emotion type and intensity appeared to have an interactive effect on type of regulation strategy used. Dixon-Gordon and colleagues (2015) found that while expressive suppression was a less commonly used strategy in many contexts, it was employed much more frequently in the context of high-intensity sadness. In addition, despite the evidence suggesting reappraisal to be a less popular strategy in high intensity contexts (Sheppes et al., 2011), reappraisal was employed more than expressive suppression in high-intensity anxiety and sadness contexts (Dixon-Gordon et al., 2015). However, the study of Dixon-Gordon et al. (2015) involved recalling of an emotion regulation strategy which may be prone to retrospective bias.

Given that the impact of emotion intensity can vary depending on the type of emotion being elicited, it is important to broaden the investigation of emotion regulation choice to different emotional contexts. Disgust is a commonly-experienced and relatively understudied emotion, which plays a role in a wide array of domains ranging from moral judgments (Chapman & Anderson, 2013) to the development and maintenance of several psychological disorders (McNally, 2002; Olatunji, Cisler, McKay, Phillips, 2010). Disgust reactions have also been shown to respond differentially to certain emotion regulation strategies compared to other emotions like fear (Olatunji, Berg, & Zhao, 2017), and thus represents an important arena for which to investigate emotion regulation choice.

Aldao and Nolen-Hoeksema (2013) first investigated the way in which individuals freely regulate their emotions in response to disgust stimuli, but did not examine the extent to which emotion regulation choice varied based on emotion intensity. Building off such research, the present study sought to investigate how the intensity of negative emotional stimuli (high vs. low) affects 1) the number of emotion regulation strategies used and 2) the frequency of different strategies used in response to a series of images designed to elicit disgust.

Beyond the nature of emotion regulation choice, a secondary aim of this study was to investigate the relationship between choice of regulation strategy (one vs. many strategies) and strength of disgust response. Aldao and Nolen-Hoeksema (2013) found that the use of multiple emotion regulation strategies was associated with greater ratings of disgust, possibly because the use of multiple strategies in response to a single stimulus might reflect greater difficulty with effectively implementing a single strategy, or because of decreased regulatory effort. Such a relationship may be impacted by the intensity of the emotional stimuli, thus the present study sought to investigate the relationship between number of strategies and disgust ratings for both high and low-intensity stimuli. We were interested in the effects of emotion intensity on two constructs that Aldao (2013) proposed to quantify spontaneous emotion regulation: extent of regulatory effort and implementation of emotion regulation. Regulatory effort reflects the average use of all strategies, and implementation of emotion regulation is calculated by dividing the sum of the extent to which each strategy was used by the number of strategies used. (Aldao, 2013; Aldao & Nolen-Hoeksema, 2013). A number of hypotheses were tested in the current study. Consistent with Aldao and Nolen-Hoeksema (2013), we hypothesized that greater levels of disgust would be associated with use of multiple emotion regulation strategies. Furthermore, we would expect that greater emotional intensity would result in elevated regulatory effort, and that one strategy would be implemented to a greater extent than multiple strategies regardless of emotional intensity. Finally, it was hypothesized that greater strategy implementation will also result in lower levels of disgust. In their study, Aldao and Nolen-Hoeksema (2013) only measured emotion regulation strategies at the end of the film clip. In the present study, we used an online measure of strategies, enabling us to investigate the temporal dynamics of strategy use.

3.1.2. Methods

Participants

We recruited 127 Romanian undergraduate students (106 females) from Babeş-Bolyai University in Romania. Participants' ages ranged from 18 to 39 (mean age = 21.14, SD = 2.85). Age was non-normally distributed with skewness of 3.59 ($SE=0.28$) and kurtosis of 17.51 ($SE=0.43$). Participants received course credits for participating in and informed consent was obtained from each participant prior to the experiment.

Materials

Emotion regulation task

For the emotion regulation task, we followed procedures used by Hay, Sheppes, Gross, & Gruber (2014) and Sheppes et al. (2011, 2014) and adapted the task to our purposes. Instead of using IAPS images, negative images depicting the target emotion (disgust) were selected from the Nencki Affective Picture System (NAPS; Marchewka, Zurawski, Jednorog, & Grabowska, 2014). In the emotion regulation task participants were presented with a total of 80 high and low-intensity negative images. The high-intensity negative, and low-intensity negative images were each presented separately in sets of 40 images for each condition. Within each condition, blocks of 10 images were presented in random order. Each image remained on the screen for 5 seconds with an inter-stimulus-interval of 800 milliseconds. Furthermore, ratings of strategies and disgust were collected via paper and pencil and were not included in the task. Negative pictures were determined to be either low or high intensity based on normative ratings for valence and arousal (see for similar procedure, Hay, Sheppes, Gross, & Gruber, 2014; Sheppes et al., 2011, 2014) (*high-intensity pictures*: mean valence = 4.51; range from 3.69 to 5.71; mean arousal = 4.56; *low-intensity pictures*: mean valence = 2.02; range from 1.8 to 2.27; mean arousal= 3.22). High-intensity pictures from the NAPS

present images depicting themes representing humans, faces or animals in suffering or mutilated conditions. Low-intensity images, on the other hand, were more diverse in content, representing humans, different places or objects depicting daily basis themes of disgust (see Sheppes et al., 2014).

Procedure

Upon arrival at the laboratory, participants were invited to sit in front of a computer and were told that they would have to perform two computerized tasks involving the presentation of different positive and negative images. Positive images were also presented to participants but data was not included as part of the present research. The *emotion regulation task* were presented. Participants completed the experimental conditions (low-intensity negative, high-intensity negative) in random order, and provided ratings of positive and negative affect before the first block in each condition and after every 10 images within all blocks. Ratings of emotion regulation strategy use were also completed after each 10 images. Blocks were started manually by each participant pressing the <space> key on the computer keyboard after finishing completing the affect and emotion regulation ratings.

Ratings of negative affect were collected using a scale that asked participants to indicate on a 5-point Likert scale from 1 to 5 (for the negative affect, cronbach's alpha $\alpha = .73$ in low-intensity condition; cronbach's alpha $\alpha = .83$ in high-intensity condition), the extent to which they experienced *disgust* (target emotion), *happiness*, *anxiety*, *anger* and *sadness*. For the two negative emotion conditions, participants rated the extent to which they used the emotion regulation used in Aldao & Nolen-Hoeksema (2013): *acceptance* (“allow and accept your emotions”); *distraction* (“thinking about something neutral or positive to take my mind off images”); *problem solving* (“thinking about ideas on how to change or solve the situation”); *detached reappraisal* (for a description see Shiota & Levenson, 2009) (“altering emotional impact by taking an objective and detached perspective”); *reappraisal* (“thinking about the situation differently in order to change your feelings”); *suppression* (“not allowing to experience any feelings”). As in Aldao & Nolen-Hoeksema’s (2013) study, participants rated these strategies on a 4-point rating scale ranging from 0 “not at all” to 3 “a lot” (cronbach's alpha $\alpha = .71$ in low-intensity condition; cronbach's alpha $\alpha = .69$ in high-intensity condition).

3.1.3. Results

Manipulation check

We first verified that the images from the two conditions (low-intensity negative pictures, high-intensity negative pictures) induced the intended target emotion (i.e., disgust). A one way repeated measures ANOVA was conducted to examine changes in disgust levels across the four time points. As our sample consisted mostly of female students, we only include age as a co-variate. Age was non-normally distributed with skewness of 3.59 ($SE=0.28$) and kurtosis of 17.51 ($SE=0.43$). Square root transformation was performed. No significant impact of age was observed. The results revealed a significant main effect of time in low-intensity negative pictures condition (Greenhouse-Geisser adjusted $F(3.12, 389.95) = 34.25, p < .001, \eta_p^2 = .22$) and a significant linear effect ($F(1, 125) = 77.92, p < .001, \eta_p^2 = .38$). Pairwise comparisons using Bonferroni correction showed that changes from baseline were statistically significant with a linear increase in disgust (Time 1: $M_{\text{difference}} = 0.45, p < .001$; Time 2: $M_{\text{difference}} = 0.49, p < .001$; Time 3: $M_{\text{difference}} = 0.87, p < .001$; Time 4: $M_{\text{difference}} = 1.02, p < .001$). For the high-intensity negative pictures condition, there was a significant main effect of time (corrected Greenhouse-Geisser, $F(3.29, 415.1) = 210.58, p < .001, \eta_p^2 = .62$), a significant linear effect ($F(1, 126) = 360.08, p < .001, \eta_p^2 = .74$), and a significant

quadratic effect ($F(1, 126) = 247.24, p < .001, \eta_p^2 = .66$). Bonferroni corrected pairwise comparisons showed that all changes from baseline were statistically significant. There was a large increase in levels of disgust from baseline (Time 1: $M_{\text{difference}} = 2.12, p < .001$; Time 2: $M_{\text{difference}} = 2.45, p < .001$; Time 3: $M_{\text{difference}} = 2.52, p < .001$; Time 4: $M_{\text{difference}} = 2.53, p < .001$).

In the low intensity condition, disgust ratings ($M = 2.11; SE = 0.6$) were significantly stronger than other emotions (anxiety, sadness and anger; $M = 1.5; SE = 0.3; t(126) = 9.61, p < .001$). This was also the case in the high intensity condition (disgust: $M = 3.71; SE = 0.8$; other: $M = 2.21; SE = 0.7; t(126) = 19.05, p < .001$). Emotion ratings were all normally distributed (skewness range = -0.49 to 0.74; kurtosis range = -0.48 to 0.96).

Number of Emotion Regulation Strategies Used

To compute the number of strategies used following procedure described in Aldao and Nolen-Hoeksema (2013), participants rated strategies use on a 4-point Likert scale. If a participant rated 0 or “not at all” for strategies, then that means the participant did not endorse any strategy and was coded with “0”. If a participant rated “a little”, “somewhat”, or “a lot”, then that means the participant endorsed at least one strategy and was coded with “1” for each strategy. Similar to Aldao and Nolen-Hoeksema (2013), summing these coded ratings would give us different categories with scores ranging from 0 to 6: (1) ‘0’ if none of the strategies was reported; (2) ‘1’ if only one strategy was endorsed; (3) ‘2’ to ‘6’ if two or more strategies were endorsed. Extent of strategy use for all strategies was normally distributed in both conditions, with skewness values ranging from -0.46 to 0.96, and kurtosis values ranging from -1.01 to 0.27.

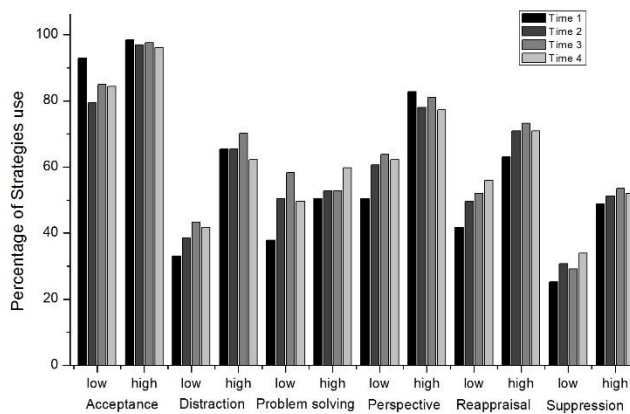


Figure 1. Percentages of strategies use in low and high intensity negative conditions.

For the low-intensity negative pictures, a very small percentage of participants denied using any emotion regulation strategy (2.55%) across all four time points. Among the participants who regulate their emotions in response to the stimuli, less than one third (21.75%) reported using one strategy, whereas the majority of participants (78.25%) reported using multiple strategies while watching the 40 low-intensity negative pictures.

In the high-intensity negative pictures condition, less than 1% of the participants denied using any type of emotion regulation strategy. Among those who did regulate their emotions in response to the stimuli, most employed multiple strategies (91.7%), whereas a small minority of the participants relied on only one emotion regulation strategy (8.3%).

The same pattern of strategy selection occurred in both negative picture conditions. In the low-intensity condition, the three most frequently used strategies were acceptance (85.42%), detached reappraisal (59.25%), and suppression (29.73%). Likewise, in the high-intensity condition, acceptance (90.68%), detached reappraisal (68.36%) and suppression (39.34%) were the most frequently used strategies. See Figure 1 for other strategies.

Levels of disgust were significantly higher in the high-intensity condition compared to low-intensity condition ($t(126) = 20.11, p < .001, M = 3.71; SE = 0.8, M = 2.11; SE = 0.6$). Because number of strategies was collected at four time points we could not compute averages, so levels of disgust were compared at each time point, for the two conditions for one versus multiple strategies. Participants who reported using more than one strategy experienced significantly elevated levels of disgust compared to those using only one strategy in the low-intensity condition, except at Time 3 (Time 1: $t(125) = -2.39, p = .018, M = 1.97; SE = 0.09, M = 1.55; SE = 0.13$; Time 2: $t(119) = -2.06, p = .041 (M = 1.98; SE = 0.08, M = 1.58; SE = 0.17)$; Time 3: $t(123) = 0.31, p = .76 (M = 2.25; SE = 0.9, M = 2.33; SE = 0.24)$; Time 4: $t(120) = -2.5, p = .014 (M = 2.51; SE = 0.9, M = 1.96; SE = 0.21)$). In the high-intensity condition there were no significant differences in disgust levels between participants reporting using one strategy and those using multiple strategies (Time 1: $t(125) = 1.82, p = .071, M = 3.38; SE = 1.06, M = 4.11; SE = 0.35$; Time 2: $t(119) = 0.69, p = .486 (M = 3.74; SE = 0.10, M = 4.01; SE = 0.39)$; Time 3: $t(123) = 1.34, p = .18 (M = 3.78; SE = 0.11, M = 4.33; SE = 0.28)$; Time 4: $t(125) = 1.02, p = .308 (M = 3.79; SE = .11, M = 4.14; SE = 0.25)$).

Aldao (2013) proposed several scores to quantify spontaneous emotion regulation. One such measure is regulatory effort, which reflects the average use of all strategies. To compare regulatory effort, average use for all strategies in each condition was computed and a paired t-test was performed. In accordance with our hypothesis, results revealed that participants endorsed greater regulatory effort in the high intensity condition than in low-intensity condition: $t(126) = 8.98, p < .001 (M = 1.31; SE = 0.04, M = .94; SE = 0.04)$.

Additionally, we were interested in whether the number of regulatory strategies varies as a function of time. A one way repeated measure ANOVA was conducted with number of strategies used at each time point as dependent variable. In the low-intensity condition, there was a significant main effect, $F(3, 124) = 5.65, p < .001, \eta_p^2 = .12$ and a significant linear effect, $F(1, 126) = 14.74, p < .001, \eta_p^2 = .11$. An increase in the number of strategies was observed at Time 3 ($M_{\text{difference}} = .51, p < .001$) and Time 4 ($M_{\text{difference}} = .47, p < .004$). We also performed repeated measure ANOVAs with disgust and strategy use as dependent variables; however, no significant main effects of time were found.

We also performed a one way repeated measure ANOVA for number of strategies in the high-intensity condition, but we found no significant effect $F(3, 123) = 1.03, p = .382, \eta_p^2 = .02$. These results indicate that there was no change in the number of strategies participants reported across the four time measures, which may suggest that participants consistently used an increased number of strategies when presented with high intensity pictures (Mean = 4.15).

In accordance with Aldao and Nolen-Hoeksema (2013), we explored the extent to which individuals implemented emotion regulation strategies in the two conditions by comparing participants who used a single strategy to those using multiple strategies. The implementation score is computed by dividing the sum of the extent to which each strategy was used by the number of strategies used (also see Aldao and Nolen-Hoeksema, 2013). In the low-intensity negative affect condition, a series of *t*-test's for each time measure revealed that participants who used only one strategy implemented that particular strategy to a greater

extent than those who reported using multiple strategies, except during Time 3 in which we found no significant differences (Time 1: $t(125) = 6.94, p < .001, M = 2.56; SE = 0.12, M =$

	Number of strategies				Strategy use			
	Low		High		Low		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Acceptance	3.66 _b	0.61	3.89 _a	0.37	8.66 _b	2.71	9.17 _a	2.62
Distraction	2.09 _b	1.61	2.63 _a	1.48	3.45 _b	3.35	4.47 _a	3.38
Problems Solving	2.08	1.62	2.15	1.71	3.31	3.18	3.46	3.32
Detached Reappraisal	2.78 _b	1.51	3.19 _a	1.26	5.29 _b	3.74	6.35 _a	3.49
Reappraisal	2.39 _b	1.55	2.77 _a	1.43	3.99 _b	3.31	4.89 _a	3.31
Suppression	1.62 _b	1.68	2.05 _a	1.71	2.41 _b	2.77	3.01 _a	2.78

1.8; $SE = 0.05$; Time 2: $t(119) = 8.9, p < .001 (M = 2.79; SE = 0.12, M = 1.77; SE = 0.04)$; Time 3: $t(119) = 0.44, p = .658 (M = 2.27; SE = 0.2, M = 2.13; SE = 0.13)$; Time 4: $t(120) = 6.58, p < .001 (M = 2.27; SE = 0.2, M = 2.13; SE = 0.13)$; We found converging evidence in the high-intensity negative affect condition, as participants who endorsed a single strategy implemented it to a greater extent than those using multiple strategies (Time 1: $t(125) = 7.56, p < .001, M = 3; SE = 0, M = 1.9; SE = 0.03$, Time 2: $t(123) = 4.75, p < .001, M = 2.6; SE = 0.22, M = 1.8; SE = 0.04$; Time 3: $t(124) = 6.68, p < .001, M = 2.89; SE = 0.11, M = 1.84; SE = 0.04$).

Extent of emotion regulation strategy implementation significantly predicted levels of disgust such that greater implementation was associated with lower levels of disgust in the low-intensity condition ($\beta = -.35, t(125) = -4.19, p < .001, R^2 = .12, F(1, 125) = 17.58, p < .001$) and in the high-intensity condition ($\beta = -.19, t(125) = -2.18, p < .031, R^2 = .04, F(1, 125) = 4.78, p < .031$).

Comparison of Strategy Use

We next conducted a MANOVA to examine whether the number of strategies used and the extent of strategy use varied across condition and strategy type. We observed a significant main effect of strategy type (Wilks' Lambda), $F(5, 247) = 94.48, p < .001, \eta_p^2 = .66$, a significant main effect of condition, $F(1, 256) = 32.86, p < .001, \eta_p^2 = .12$, and a significant strategy type by condition interaction, $F(5, 247) = 3.7, p < .003, \eta_p^2 = .07$. To further examine this interaction effect, we conducted Bonferroni corrected t -tests. With the exception of problem solving, for which no significant differences emerged for number of strategies used or extent of use, all other strategies (acceptance, distraction, detached reappraisal, reappraisal, and suppression) were used to a greater extent in the high-intensity negative condition compared to the low negative-intensity condition (see Table 1). In addition, overall emotion regulation strategy use was greater in the high-intensity negative condition compared to the low-intensity negative condition.

Table 1. Comparison of strategy use among negative conditions.

Note. The table shows number of strategies used in each condition and strategy use, which reflects regulatory effort for the two conditions. Different subscripts indicate significant differences in strategy use at $p < .001$ of the Bonferroni corrected t-tests comparisons.

We also computed inter-correlations of individual strategy use in both the low and high-intensity negative conditions (Table 2). In the low-intensity negative condition, average acceptance use was negatively correlated with disgust, $r(125) = -.51, p < .001$. In the high-intensity condition, average detached reappraisal use was negatively correlated with disgust $r(125) = -.34, p < .001$.

Table 2. Intercorrelations between emotion regulation strategies use and mean levels of disgust in negative conditions.

	Low-intensity						High-intensity					
	1	2	3	4	5	6	1	2	3	4	5	6
1. Acceptance												
2. Distraction												
3. Problem solving												
4. Detached Reappraisal												
5. Reappraisal												
6. Suppression												
7. Disgust												

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

3.1.4. Discussion and Conclusions

The present study investigated spontaneous emotion regulation following exposure to multiple stimuli of different emotional intensities (i.e., negative images of low intensity and negative images of high intensity). Overall use of multiple emotion regulation strategies was greater in the high-intensity condition relative to the low-intensity condition, which is in accordance with previous studies (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon et al., 2015). Furthermore, results demonstrated increased regulatory effort in the high intensity condition relative to the low intensity condition. We also observed that the number of strategies increased over time in the low-intensity condition, whereas, in the high-intensity condition, it remained almost constant at a high level of use. An explanation of our results might be that experiencing negative stimuli of high intensity prompts individuals to implement a broader emotion regulation repertoire. The results also indicated that greater strategy implementation was associated with lower levels of experienced disgust. Collectively, these results suggest that the emotional intensity represents an important contextual factor that influences spontaneous emotion regulation in response to disgust.

Of note, less than one third of participants reported using one strategy, whereas more than two thirds of participants used two or more emotion regulation strategies. This is consistent with previous research which found similar patterns of emotion regulation

engagement (Aldao & Nolen-Hoeksema, 2013). In the current study, acceptance and detached reappraisal were the most frequently endorsed regulatory strategies in the high-intensity condition. Likewise, Volokhov and Mearee (2010) demonstrated that exposure to negative video clips elicited higher levels of spontaneous emotion regulation and greater implementation of reappraisal strategies relative to suppression. It is of note that no significant differences were revealed across conditions for problem solving. Given the present laboratory setting, this strategy might not be efficient when experiencing negative images of events that cannot be modified by way of problem solving.

Although one third of participants in Aldao and Nolen-Hoeksema's study (2013) reported not engaging in any regulation effort, only a very small percent reported not using any emotion regulation strategy in the present study (2.55% in the low-intensity condition and less than 1% in the high-intensity condition). This difference across studies may be a consequence of different methodologies (i.e., the use of video stimuli versus image stimuli). The negative images used in the current study were consistent with the stimuli validated in previous studies (Sheppes et al., 2011). Although the images used within each condition shared similar content, it is possible that the large number of stimuli presented in each condition did not afford adequate opportunity to engage in any form of emotion regulation.

An interesting result is the elevated use of acceptance in both the low and high intensity negative conditions, which is consistent with prior literature (Aldao & Nolen-Hoeksema, 2013). Bonnano and Burton's (2013) regulatory flexibility model posits that the choice of emotion regulation strategies is influenced by the strategies that make up one's regulatory repertoire, and thus one explanation of these results is that acceptance is commonly accessible part of individuals' regulatory repertoires. Participants might also have elected to use acceptance in the low-intensity condition because this strategy would be relatively successful in addressing low levels of disgust. Indeed, acceptance was negatively correlated with disgust only in the low-intensity condition, but not in the high-intensity condition. Prior research has demonstrated that reappraisal strategies foster more adaptive emotion regulation in the context of high levels of disgust (Olatunji et al., 2015). Likewise, the results of the current study suggested that detached reappraisal was negatively correlated with disgust in the high-intensity condition. It will be important for future research to investigate differential strategy preferences across low-intensity versus high-intensity emotional contexts. Overall, results of the present study accord with previous work revealing a tendency to use multiple strategies in high-intensity emotional contexts (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon et al., 2015). Future research might investigate the relative effectiveness of one strategy versus multiple strategies across different emotional contexts.

Certain limitations also warrant mention. The laboratory settings of the present study and format of the stimuli might make it difficult to generalize these results to real world encounters. For instance, we dichotomized emotional stimuli in to high and low intensity in order to create a clear distinction between the conditions of our independent variable, but using a continuous range of low to high intensity stimuli might better map on to real-world encounters of emotional stimuli. In addition, operationalizing emotion regulation strategies by providing a brief description of the strategy and rating strategy use with a Likert scale is not optimal. Another limitation is that we are not able to control for any possible effects of some participants completing the shifting task (data not analyzed in this study) prior to the emotion regulation task. However, this study's experimental manipulation of different emotional contexts is consistent with prior studies and enables us to examine the relationship between emotional intensity and emotion regulation more rigorously (Aldao & Nolen-Hoeksema, 2013). Furthermore, the current operationalization of regulatory effort

corresponds to the number of strategies used. Future research on regulatory effort would benefit from incorporating measurements of cognitive effort as an index of one's ability to regulate an emotional response.

Furthermore, it might be beneficial to replicate these findings by way of ecological momentary assessment, which would allow for the analysis of more time intensive data and foster greater ecological validity. Future directions might also include examining whether certain patterns of spontaneous emotion regulation are related to severity of emotional disorders as well as self-report measures of emotion regulation strategy use. Such information would provide convergent validity and have valuable clinical implications by identifying adaptive and maladaptive patterns of spontaneous emotion regulation. Overall, the current study provided initial evidence that spontaneous emotion regulation use is dependent on contextual factors such as emotional intensity.

Study 2

Choice of Distancing and Acceptance and Affective Flexibility²

3.2.1 Introduction

The way individuals make the selection of emotional regulation strategies is influenced by various determinants (Sheppes al., 2011; Sheppes and al., 2012; Sheppes, 2020). This selection depends on the context, resulting in various responses (Cheng, 2001; Gross, 2007; Kashdan & Rottenberg, 2010; Koole, 2009). Some studies have examined the role of flexibility in emotional regulation (Cheng, 2001; Kashdan & Rottenberg, 2010; Bonanno and al., 2004; Bonanno & Burton, 2013; Aldao, Sheppes & Gross, 2015), and how emotional regulation strategies are selected (Sheppes and al., 2011; 2012). Recent research has shown that an adaptive state can be achieved when individuals flexibly choose between different emotional regulation strategies according to the specific requirements of the situation (Bonanno, 2005; Kashdan & Rottenberg, 2010; Troy & Mauss, 2011). These studies underline the importance of flexible selection of emotional regulation in order to achieve adaptive state and resilience (Bonanno, 2005; Troy & Mauss, 2011). Sheppes and colleagues' studies (2011, 2012, 2014) investigated the selection of emotional regulation, specifically how individuals choose which emotional regulation strategy to use, as well as the impact of the mechanisms that determine it. Sheppes and al. (2011) were the first to show that healthy individuals flexibly select between engagement strategies in low-intensity emotional contexts, which are rather costly but allow the development of emotional information processing (e.g. reappraisal) and disengagement strategies in high-intensity emotional contexts. The latter may block emotional information from getting into the spotlight or further processed into working memory (e.g. distraction). Sheppes and al. (2011, 2014) showed that individuals may have different preferences for emotional regulation strategies, depending on the initial impact of the strategy in the temporal sequence of the emotion generation process in the antecedent emotional regulation category (Gross, 1998).

Both reappraisal and distraction have inherent limits and costs when used in different emotionally charged contexts (Sheppes and al., 2011; 2012). Sheppes and al. (2014) have suggested that assessing the degree to which the individual intends to engage or disengage in emotional processing would better explain the choice of emotional strategy. However, the authors found support for the premise that the engagement-disengagement dimension is the mechanism by which individuals switch preferences for the selection of emotional regulation when faced with low-intensity stimuli versus high-intensity stimuli. Thus, the cognitive factor of engagement or disengagement in the processing of emotional information explains the preference for distraction strategies in high-intensity situations, due to the efficiency of modulating intense emotions through attentional distraction and the preference for low-intensity engagement strategies, due to the long-term benefits of these strategies (Sheppes and al., 2014; Sheppes, 2020).

Only one study investigated the selection of emotional regulation between reappraisal and acceptance (Mehta, Young, Wicker, Barber, & Suri, 2017). Contrary to the results of Sheppes and al. (2011), this study showed that for an Indian sample compared to an American one, reappraisal was preferred more frequently for high-intensity images, while preferences for

² Parts of the present study was sent for publication, Szasz, Moskow, Kallay, Coman, & Hofmann, Choice of Adaptive and Maladaptive Emotion Regulation Strategies

acceptance were similar between the two samples, where the religious factor for selection preferences was defined.

We specifically examined distancing (Moodie and al., 2020), which apparently relies more on executive control and is less expensive in terms of cognitive resources (Shiota & Levenson, 2009; Ochsner and al., 2004; Schmeichel and al., 2008; Optiz and al., 2012; Liang and al. 2017; Qi and al., 2017). Given that Sheppes's studies and colleagues (2014) showed that forms of disengagement reappraisal such as 'reality change' (McRae et al., 2012) are preferred in a context of high intensity compared to more elaborate forms of reappraisal, this study compared detached reappraisal with acceptance (Eifrent & Heffner, 2003; Hayes & Wilson, 2003). Moreover, the distancing (Ochsner and al., 2004) implies less engagement compared to the situation-centered reappraisal (Sai and al., in preparation; Sheppes, 2020). Distance involves the perception of stimulus and attentional engagement with emotional stimulus, but what distinguishes it from more elaborate forms of reappraisal is how to reinterpret the stimulus, a detached and objective general mental set being less costly than reinterpretation based on the specific content of the emotional stimulus that may have difficulties in generating specific reinterpretations (Sheppes and al. , 2011; Sheppes, 2020).

This study investigated the selection of distance and acceptance strategies as well as the association of the selection of emotional regulation with affective flexibility (Malooly, Genet, & Siemer, 2012). Distancing is considered a specific form of reappraisal (McRae et al., 2012) involving deliberate focus of attention on non-emotional aspects of the situation in order to reduce the emotional reaction by altering the relationship with it by adopting an objective and detached mental set from it (Shiota & Levenson, 2009; Ochsner and al., 2004). Analyses of the temporal dynamics of these strategies have shown that distancing takes place before positive reappraisal, requires less cognitive effort and effectively reduces negative valence and arousal (Schonfelder, Kanske, Heissler, & Wessa, 2014). Compared to distraction, distancing has long-term benefits in effective attenuation of the arousal, allowing neutral stimuli processing (Qi and al., 2017).

Although the reassessment was associated with minimal cognitive costs compared to suppression (Gross & Thompson, 2007), it was shown that in intense emotional situations it could become quite costly (Hofmann and al., 2012; Ortner et al., 2016). It seems that in high-intensity situations it would be more difficult to get over the original assessment of the situation, there is a semantic conflict between the assessments (Ortner et al., 2016). Revaluation may be less effective in reducing the negative effect (Sheppes & Meiran, 2007) which is also determined by certain difficulties in generating situation-specific reinterpretations, and may lead to a reduced preference in order to prefer reappraisal (Brans and al., 2013; Sheppes and al., 2014; Suri and al., 2014).

A strategy often compared to reappraisal is acceptance, although associated with short-term positive effects on emotional experiences, does not seem to have an obvious effect on negative emotions (Levitt et al., 2004; Wolgast and al., 2011; Dan-Glauser & Gross, 2013; Kohl and al., 2012). Previous studies have suggested that acceptance may be less costly requiring fewer cognitive resources than reappraisal (Shallcross al., 2013; Troy and al., 2017). Acceptance could be seen as a form of engagement strategy, centered on the answer (Gross, 1998) close to the perspective of one's own person and an immersed self (Ayduk & Kross, 2008; Kross & Ayduk, 2009), which could sometimes also have counterproductive consequences (Dunn al., 2009).

Mental switching predicts changes in distancing, subjective experience and cardiac responses (Liang, Huo, Kennison, & Zhou, 2017). Affective flexibility is an important factor

specific to the person to be considered and may be a cognitive factor that can influence selection in regulation. This refers to the individual's ability to flexibly switch between affective and neutral stimulus information processing (Malooly and al., 2012). Affective flexibility predicts the use of cognitive reappraisal (Hofmann al., 2012; McRae and al., 2012; Malooly and al., 2012). More specifically, Malooly and al. (2012) showed that the switching costs observed in the affective flexibility paradigm that occur when individuals switch from the affective rule to the non-affective rule in the case of a negative image and are associated with the ability to re-evaluate in modulating the negative effect.

Based on these results, we expected the selection of distancing (detached reappraisal) to be associated with affective flexibility, the non-affective switching costs being associated with the selection of distancing. Still based on previous research (Sheppes and al., 2011; Mehta and al., 2017; Liang and al., 2017; Troy and al., 2017; Murphy & Young, 2017; Ghafur and al., 2018) we expected acceptance to be preferred in situations of low emotional intensity, while distancing is selected more frequently in situations of high emotional intensity. We also tested the robustness of previous preferences for emotional regulation strategies in different emotional contexts using a reward stimulus to choose the opposite strategy (Sheppes and al., 2014). For control were measured and two variables, the general negative affect and emotional reactivity.

This study investigated whether the selection of acceptance and distancing under low and high intensity conditions will remain the same even if the reward (e.g. hours of practice) is introduced in order to choose the other emotional regulation strategy. We predicted according to previous results (Sheppes and al., 2014) that although the reward stimulus will influence the choice of participants, they will still prefer to choose acceptance in low-intensity contexts and distancing in high-intensity contexts.

Methods

Participants

We recruited 42 Romanian undergraduate students (37 females) from Babeş-Bolyai University, Romania. Participants' ages ranged from 19 to 34 years (mean age =21.31, SD =2.59). Participants received a fixed amount of course credits for participating in the study, and as a reinforcer, they were offered the possibility to earn supplementary course credits. Supplementary credits could help students get closer to the total amount of course credits needed throughout the entire academic year for their practicum activity. Informed consent was obtained from each participant prior to the experiment and the study was approved by Babes-Bolyai Institutional Review Board.

Self-report measures

Positive and Negative Affect Schedule: (PANAS; Watson et al., 1988). For the present study, the instructions asked participants to rate the degree to which they *generally* felt each emotion. The PANAS showed good internal consistency in the current sample (PANAS-N: $\alpha = .82$; PANAS-P: $\alpha = .83$).

Emotion Reactivity Scale: (ERS; Nock et al., 2008). The ERS is a 21-item scale that measures individuals' subjective experience of emotion reactivity. Participants were asked to rate on a 0 to 4 Likert scale (0 = *not at all like me* and 4 = *completely like me*) how they experience emotions on a regular basis (e.g., "I tend to get emotional very easily," "When I experience emotions, I feel them very strongly/intensely," "When I am angry/upset, it takes me much longer than most people to calm down") ($\alpha = .94$).

Affective switching task

Affective flexibility was measured using an affective switch-task previously designed by Malooly et al. (2012) based on a similar task used by Genet and Siemer (2011). The task required participants to shift between affective and descriptive categorization rules, which implied inhibiting the previous rule (e.g., processing affective or neutral properties of a stimulus) and switching from the previous rule to the new rule (switching from processing affective or neutral information to processing neutral or affective information, respectively) in the presence of an affective state determined by a stimulus (see Malooly et al., 2012 for a description).

Emotion regulation choice task

We used a similar emotion regulation choice task as Sheppes et al. (2011, 2012) using the underlying framework with the following updates. Participants were presented with a total of 80 pictures that would elicit different levels of negative emotions (forty pictures for *low emotional intensity* and forty for *high emotional intensity*) (Lang, Bradley, & Cuthbert, 2008). Before applying the task, participants completed an emotion regulation training by first reading the instructions for *detached reappraisal* and *acceptance* (see full instruction in the *Procedure* section). The task consisted of six practice trials (three for each intensity level) and 80 choice trials. The images in the practice and choice trials were selected from *NAPS* system (*NAPS - Nencki Affective Picture System*; Marchewka et al., 2014). Like in other previous procedures (Sheppes et al., 2011, 2014), pictures were divided into two equal sets with different levels of emotion intensity (low and high) based on normative ratings for valence (1 = very unpleasant; 9 = very pleasant) and arousal (1 = low; 9 = high). This resulted in one set of 40 low-intensity pictures (mean valence = 2.97; mean arousal = 3.88), and one set of 40 high-intensity pictures (mean valence = 4.49; mean arousal = 4.56).

Procedure

Participants first completed the *PANAS* and the *ERS*. The affective switching task and the emotion regulation choice task were counterbalanced across participants. For the affective switching task, the procedure was similar to Malooly et al. (2012). Switch costs were calculated by computing the difference in reaction times between the switch and repetition trials.

For the emotion regulation choice task, participants received instructions on the computer screen and from the experimenter. Participants were informed that they would be presented with several negative images, and each image would appear for a brief preview on the computer screen. After seeing the image, they will have to consider either acceptance or detached reappraisal and choose strategy to implement in order to reduce negative reactivity. Just as in the procedure used by Sheppes et al. (2014), participants were also told to consider the amount of course credits offered and weight both strategy and the reinforcer. They were told they would receive a supplementary course credit at the end of the experiment, by randomly selecting one trial. Participants began with a six-trial training procedure for each of the two regulation strategies. Subjects read each of the regulation instructions for acceptance and detached reappraisal and then looked at three negative pictures applying detached reappraisal instructions and three negative pictures applying acceptance instructions. Participants were also told that it was important to look at the picture the entire time it appeared on the screen and implement the chosen strategy following the instructions they would receive, otherwise it would be considered that they made use of other strategies, such as distracting away from the image. Following suggestions from Aldao (2013), we specifically instructed participants not to use other regulation strategies other than instructed.

In the training phase, low and high-intensity images were counterbalanced. Participants were asked to talk out loud when implementing detached reappraisal or acceptance instructions and they were corrected by the experimenter when need it.

Each emotion regulation choice trial started began with a cue that was presented on a black screen for 1500 ms, followed by a brief preview of the pictures for 700 ms. A black screen followed and remained for 500 ms, after which the reinforcer incentives were presented on a separate screen before each regulatory choice option. For each emotional intensity category, subjects were offered five course credits to accept and 10 course credits to reappraise in half the trials, and in the other half they were offered 10 course credits to accept and five course credits to reappraise. Participants were asked to press the space bar to advance to the next screen, where they could then press either key A for acceptance or key R for detached reappraisal. After making the choice, a preparation screen followed for 5000 ms in order to allow participants to prepare for how to implement the chosen strategy. Participants were videotaped using a web camera mounted on the top of the computer display during the trials in order to make sure participants were looking at the presented image. They implemented the chosen strategy while the initial picture was presented again and remained on the screen for 5000 ms. After viewing each picture, participants were asked to rate how negative they felt on a 7-point Likert scale (1 = *not at all*; 7 = *very negative*). Finally, as a manipulation check, participants were asked to give two examples for how they implemented each of the two strategies.

Results

We examined whether negative affect, emotion reactivity and age had any effect on emotion regulation choice. To do this we performed a multiple regression analysis on each of the differential scores of emotion regulation choice for the two emotion intensity conditions (we subtracted the number of choices of reappraisal from the total of choosing acceptance in the low intensity condition, and subtracted acceptance scores from reappraisal scores in the high intensity condition). We found no significant relationships between negative affect, age or emotion reactivity with emotion regulation choice (all $ps > .05$; for the low intensity condition, $R^2 = .01$, $F(3,35) = .16$, $p = .922$, for the high intensity condition, $R^2 = .12$, $F(3,35) = 1.63$, $p = .200$) (see Table 1).

Table 1. Means and standard deviations of negative affect, emotion reactivity, age, switch costs, and strategies choice.

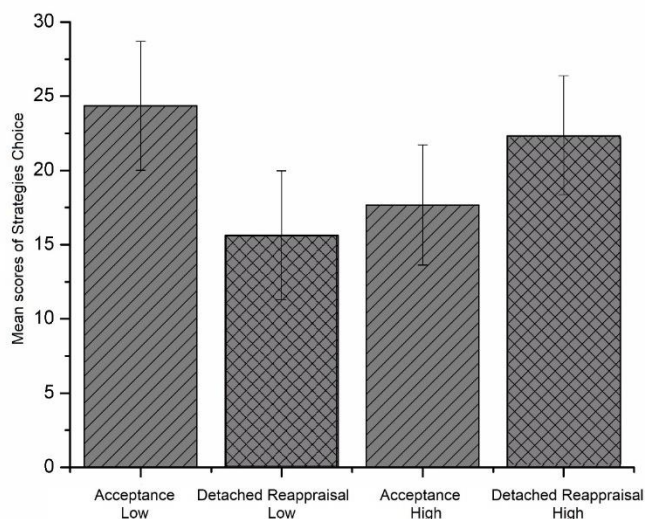
	Mean	SD
Negative Affect	14.41	4.66
Emotion Reactivity	24.57	9.21
Age	21.30	2.58
AFT switch cost to A/N	206.18	144.91
AFT switch cost to A/P	182.14	180.36
AFT switch cost to NA/N	304.86	167.78

AFT switch cost to NA/P	267.95		143.72	
	Low	High	Low	High
Acceptance	24.36	17.67	4.34	4.05
Detached Reappraisal	15.64	22.33	4.34	4.05

Next, we tested if supplementary course credits influenced participants' choices. A repeated measure 2 x 2 ANOVA revealed a significant interaction effect of Strategy (Acceptance and Detached Reappraisal) and Magnitude (5, 10 course credits) in the low intensity condition, $F(1, 41) = 44.27, p < .001, \text{partial } \eta^2 = 0.52$.

Further exploring this interaction revealed that in the low-intensity condition, participants used acceptance more frequently when offered more course credits to accept, $t(41) = 11.45, p < .001, \text{Cohen's } d = 1.76$, and they used reappraisal more often when offered more course credits to reappraise, $t(41) = 2.69, p < .001, \text{Cohen's } d = 0.41$. We also found a Strategy by Magnitude significant interaction effect in the high intensity condition, $F(1, 41) = 13.86, p < .001, \text{partial } \eta^2 = 0.25$. Further exploring the interaction showed that in the high-intensity condition, participants used acceptance more frequently when offered more course credits to accept, $t(41) = 2.64, p < .012, \text{Cohen's } d = 0.41$, and more frequently used reappraisal when offered more course credits to reappraise, $t(41) = 7.29, p < .001, \text{Cohen's } d = 1.12$. Although supplementary course credits had an effect on participants' choices, they chose to employ acceptance to a higher extent in the low intensity condition (60.89%, CI: [46.14, 75.61]) and detached reappraisal to a higher extent in the high intensity condition (55.83%, CI: [40.77, 70.89], $F(1, 41) = 73.06, p < .001, \text{partial } \eta^2 = 0.64$) (see Figure 1).

Figure 1. Emotion regulation choice of acceptance and detached reappraisal in study 1 for low and high negative emotion intensity.



For the affective switching task, we tested the properties of the pictures used. A valence by number of humans ANOVA with valence ratings as the dependent variable showed a significant main effect for valence, $F(1,38) = 1972.78, p < .0001, \eta^2 = .98$, no main

effects for number of humans, $F(1,38) = .19, p = .66$, and no effects for valence human interaction, $F(1,38) = 1.01, p = .32$.

Results from a multiple regression analysis showed that non-affective negative switch costs significantly predicted choosing detached reappraisal in the high intensity condition, $R^2 = .26, F(4.37) = 3.22, p < .023, \beta = .38, p < .012$. As predicted, we found no association between acceptance and affective switching (see Table 2).

Table 2. Intercorrelations between emotion regulation choice and affective and non-affective switch costs.

	1	2	3	4	5	6	7	8
1. Low Acceptance								
2. Low Detached Reappraisal	-.1**							
3. High Acceptance	.27	-.27						
4. High Detached Reappraisal	-.27	.27	-.1**					
5. AFT switch cost to A/N	.22	-.22	.17	-.17				
6. AFT switch cost to A/P	.01	-.01	.02	-.02	.17			
7. AFT switch cost to NA/N	-.06	.06	-.37*	.37*	.09	-.08		
8. AFT switch cost to NA/P	-.12	.12	-.26	.26	.11	.23	.06	

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

Discussion

The present study investigated emotion regulation choice acceptance and detached reappraisal. As predicted, acceptance was mostly preferred in low emotion intensity situations, whereas detached reappraisal was mostly preferred in high intensity situations. These effects even remained when reinforcers were used for choosing the other strategy (Sheppes et al., 2014) providing robustness to our findings. We also investigated if executive control in the form of affective switching predicts emotion regulation choice. Results did not reveal any significant relation between affective switching and acceptance. However, detached reappraisal choice in high intensity context was predicted by non-affective switch cost. Faster switching toward processing descriptive or non-affective properties of negative stimuli appeared to predict detached reappraisal choice.

Study 3

Choice of Distancing and Acceptance, Expressive Flexibility and Affective Style³

3.3.1. Introduction

The objective of this study was to replicate the investigation of emotion regulation choice of detached reappraisal and acceptance from the first study and to examine whether emotion regulation flexibility (Aldao, Sheppes, & Gross, 2015; Bonanno & Burton, 2013, 2015; Kashdan & Rottenberg, 2010), emotion diversity (Quoidback et al., 2014) or affective style (Hofmann & Kashdan, 2010) are related to emotion regulation choice. We examined whether emotion diversity predicts emotion regulation choice (i.e., whether subjects choose acceptance in low intensity situations, and detached reappraisal in emotional context of high intensity). Compared to concealing or accepting emotions, an adjusting affective style (managing, adjusting and working with emotions) has been shown to be most adaptive (Hofmann & Kashdan, 2010). We examined here whether an adjusting affective style would influence emotion regulation choice. We also examined the association between flexibly choosing emotion regulation strategies and expressive flexibility (Bonanno & Burton, 2013).

Methods

Participants

The participants in this study were 28 Romanian undergraduate students (2 male) from Babeş-Bolyai University, Romania. Participants were different from those in the first study. Participants' ages ranged from 19 to 24 (mean age =20.57, SD =1.26). Participants received course credits for participating and informed consent was obtained from each participant prior to the experiment.

Self-report measures

Affective Style Questionnaire (ASQ; Hofmann & Kashdan, 2010) is a 20-item instrument that measures individual differences in emotion regulation. The questionnaire consists of three subscales: *Concealing* (referring to habitual attempts to conceal or suppress affect), *Adjusting* (a general ability to manage, adjust, and work with emotions as needed), and *Tolerating* (an accepting and tolerant attitude toward emotion). The scale has good internal consistency (*Concealing* $\alpha = .74$, *Adjusting* $\alpha = .81$, *Tolerating* $\alpha = .69$).

Flexible Regulation of Emotional Expression (FREE; Burton & Bonanno, 2016). We used this scale to measure participants' ability to modulate emotional expression. The scale consists of a total of 16 items which are grouped into four subscales measuring the ability to enhance and suppress positive and negative emotions. Participants were asked to rate different scenarios (e.g., "A coworker gets a promotion and wants to talk about it") by either indicating "how well they would be even more expressive than usual" or "how well would they be able to conceal how they are feeling." Following Burton and Bonanno (2016), we computed an expressive flexibility score, where higher scores indicated greater flexibility in the regulation of emotional expressions.

Differential Emotion Scale: (mDES; Philippot, Schaefer, & Herbette, 2003). Emotion diversity or tendency to experience positive and negative emotions was measured using the mDES. The scale consists of 18 items, with groups of three emotional adjectives (e.g., anger = angry, irritated, mad) consisting of nine positive emotions (alertness, amusement, awe,

³ Parts of the present study were sent for publication, Szasz, Moskow, Kallay, Coman, & Hofmann, Choice of Adaptive and Maladaptive Emotion Regulation Strategies

contentment, joy, gratitude, hope, love, and pride) and nine negative emotions (anger, sadness, embarrassment, fear, disgust, guilt, shame, contempt, and anxiety). Participants indicated how much they experienced these emotions on a five-point Likert scale. An emotion diversity index was computed following procedure described in Quoidback et al., (2014).

Emotion regulation choice task

The same emotion regulation choice task from the Study 1 (Sheppes et al. 2011; 2012) was used, except the reinforcer incentives and the screens offering supplementary course credits were removed from the task.

Procedure

Participants first completed the self-report questionnaires, the *ASQ*, *mDES*, and the *FREE*. Next, participants performed the modified emotion regulation choice task similar to the task in Study 1, receiving the same emotion regulation instructions, except the reinforcer incentives choice screen was removed.

Results

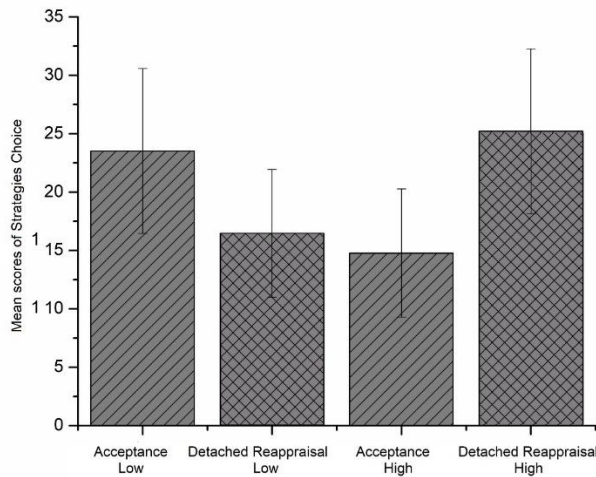
In order to test if self-report measures predict emotion regulation choice, we ran a multiple regression analysis with age, expressive flexibility, emotion diversity and the affective style factors, concealing, adjusting and tolerating as independent variables. Results showed that predictors explained 82% of the variance ($R^2 = .67$, $F(6,21) = 7.16$, $p < .001$). We found that expressive flexibility ($\beta = .51$, $p < .01$) and adjusting affective style ($\beta = .45$, $p < .01$) significantly predicted choosing detached reappraisal in the high intensity condition. All other predictions were non-significant (all $ps > .05$) (Table 3).

Table 3. Means and standard deviations of age, expressive flexibility, emotion diversity, affective style and strategies choice.

	Mean	SD		
Age	20.57	1.26		
Expressive Flexibility	7.20	1.37		
Emotion Diversity	91.59	5.72		
Concealing	25.75	5.25		
Adjusting	24.39	4.81		
Tolerating	20.11	2.93		
	Low	High	Low	High
Acceptance	23.53	14.78	7.06	5.49
Detached Reappraisal	16.46	25.21	5.49	7.06

We also found a significant Strategy by Condition interaction effect by investigating emotion regulation choice, $F(1, 27) = 23.36, p < .001$, partial $\eta^2 = 0.46$. Results revealed as predicted and similar to the results from the study 1, that participants preferred to a greater extent to choose acceptance in the low intensity condition (58.83%, CI: [42.27, 73.72]), and detached reappraisal in the high intensity condition (63.03%, CI: [46.33, 77.27]) (see Figure 2).

Figure 2. Emotion regulation choice of acceptance and detached reappraisal in study 2 for low and high negative emotion intensity.



Discussion

Results from the first study showed that, as predicted, participants preferred choosing acceptance in low intensity situations, but chose detached reappraisal in high intensity situations. These results replicated results from the first study. Among the self-report measures, expressive flexibility or the ability to both suppress and enhance positive and negative emotions, predicted choosing detached reappraisal in high intensity situations. Moreover, as expected, having an adjusting affective style, which refers to a propensity to use reappraisal in general to regulate emotions, also predicted choosing detached reappraisal in high intensity situations.

Study 4

Choice of Suppression and Rumination⁴

3.4.1. Introduction

In the third study, we investigated how people choose between putatively maladaptive strategies (Aldao & Nolen-Hoeksema, 2012), namely suppression (Gross, 1998) and rumination (Nolen-Hoeksema, 1991, 2000). Recent research has associated suppression with successful outcomes (Dunn et al., 2009), and to predict better long-term adjustment and lower levels of distress following extreme negative events (Bonanno, 2004; Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Westphal, Seiert, & Bonanno, 2010).

Suppression and rumination can be considered two response-focused strategies (Gross, 1998). Suppression involves attempts to disengage by self-distancing (i.e., trying not to think about negative thoughts or feel negative emotions) (Gross, 2007). Rumination is a maladaptive perseverative negative self-focused style of thinking about failure and depressed mood (Nolen-Hoeksema, 1991; Teasdale, 1999) which was associated with development and maintenance of several psychopathological disorders such as depression, anxiety, borderline personality disorder, and eating disorders (Aldao et al., 2010; Watkins, 2008).

Habitual use of suppression and rumination have been positively linked to psychopathology symptoms (Aldao et al., 2010). Studies have also shown that suppression could have adaptive outcomes in the short term (Bonanno, 2004; Bonanno et al., 2004; Dunn et al., 2009; Westphal et al., 2010) and recent research (Chen et al., 2018) has found that high suppression ability is associated with reduced symptoms of depression and anxiety. We expected that, compared to rumination (Nolen-Hoeksema, 1991), people will more frequently choose suppression in high-intensity context.

Whereas some authors have concluded that putatively maladaptive strategies might be less context-dependent and therefore these strategies could be characterized by more inflexible implementation (Aldao & Nolen-Hoeksema, 2010), we expected that rumination is preferred in low intensity situations. Similar to the second study, we examined again the influence of affective styles (Hofmann & Kashdan, 2010), emotion diversity (Quoidback, et al., 2014), and whether emotion expressive flexibility (Burton & Bonanno, 2016) predicts emotion regulation choice.

Methods

Participants

Participants in this study comprised 25 Romanian undergraduate students (4 male) from Babeş-Bolyai University in Romania. They were different participants than those in the first and second studies. Participants' ages ranged from 20 to 26 (mean age =21.76, SD =1.73). Participants received course credits for participating and informed consent was obtained from each participant prior to the experiment.

Procedure

As in the second study, participants first completed the self-report measure of *ASQ*, *mDES*, and the *FREE*. Participants performed the emotion regulation choice task described in the second study, however this time participants had to choose between suppression and

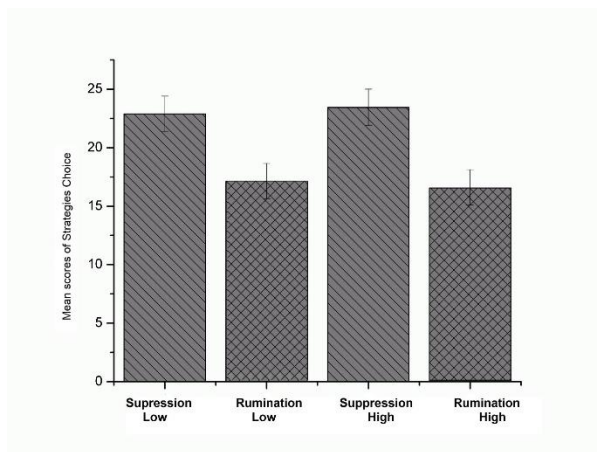
⁴ Parts of this study were sent for publication, Szasz, Moskow, Kallay, Coman, & Hofmann, Choice of Adaptive and Maladaptive Emotion Regulation Strategies

rumination. Participants were instructed to suppress thoughts about the images and suppress negative emotions and not to use other strategies to control their thoughts and emotions. Participants were also instructed when choosing rumination to ruminate about the images and negative emotions about the pictures without using any other strategy.

Results

A multiple regression analysis with age, affective styles, emotion diversity and emotion expressive flexibility showed that a concealing affective style predicted choosing suppression in the high intensity condition. Results showed that the predictors explained 54% of the variance ($R^2 = .54$, $F(5,19) = 4.6$, $p < .006$). Concealing ($\beta = .6$, $p < .002$) predicted choosing suppression in the high intensity situation. All other predictions were non-significant (all $ps > .05$).

Figure 3. Emotion regulation choice of suppression and rumination in study 3 for low and high negative emotion intensity.



A Strategy (Suppression, Rumination) by Condition (low, high intensity) repeated measure ANOVA revealed a significant Strategy effect, $F(1, 24) = 5.49$, $p < .028$, partial $\eta^2 = 0.18$. The Strategy by Condition interaction effect was non-significant, $F(1, 24) = .13$, $p = .064$, partial $\eta^2 = 0.006$. We further explored participants' emotion regulation choice and found that suppression was preferred to a higher extent both in the low intensity condition (57.2%, CI: [40.27, 72.32]), and in the high intensity condition (58.6%, CI: [42.05, 73.52]) (see Figure 3). The differences between participants' choices was significant for suppression versus rumination, only in the high intensity condition ($t(24) = 2.19$, $p < .038$, Cohen's $d = 0.44$, for high intensity, $t(24) = 1.88$, $p = .072$) (Table 4).

Table 4. Means and standard deviations of age, expressive flexibility, emotion diversity, affective style and strategies choice.

	Mean	SD
Age	21.76	1.73
Expressive Flexibility	7.43	1.62

Emotion Diversity	94.05	4.40		
Concealing	23.12	4.38		
Adjusting	24.36	4.22		
Tolerating	19.76	3.14		
	Low	High	Low	High
Suppression	22.88	23.44	7.65	7.82
Rumination	17.12	16.56	7.65	7.82

Discussion

We were interested in investigating emotion regulation choice among maladaptive emotion regulation strategies. Results did not reveal a significant difference in participants' preferences in low intensity condition, but suppression was significantly preferred compared to rumination in the high intensity condition. Moreover, even if differences in choice were non-significant, suppression was preferred to a greater extent in the low intensity condition.

The present studies investigated how people choose emotion regulation strategies in high and low intensity contexts. Previous work (Sheppes et al., 2011, 2012, 2014) showed there is a relative preference for choosing engagement strategies as reappraisal in low intensity situations and choosing disengagement strategies like distraction in high intensity situations. In fact, there is empirical support for the premise that engagement-disengagement dimension is the underlying mechanism by which people shift in emotion regulation choice preferences when confronted with low versus high intensity stimuli (Sheppes et al., 2014). In the present studies, we were interested in investigating strategy preferences for detached reappraisal, which involves disengaging with emotions, and acceptance which involves engaging with emotions. In high intensity conditions, participants preferred choosing detached reappraisal. Results from the first study indicated that participants preferred choosing acceptance in low intensity situations, despite being offered course credits as potential reinforcers for choosing the other strategy. These results were replicated in our second study, where acceptance was preferred for low intensity conditions and detached reappraisal for high intensity conditions. Expressive flexibility (Bonanno et al., 2004) and an adjusting affective style (Hofmann & Kashdan, 2010) also predicted detached reappraisal choice in high intensity negative emotional contexts. In our third study, after inspecting preferences for maladaptive strategies, results showed that there is a relative preference for choosing suppression in high intensity situations when participants choose between rumination and suppression. Although the present studies focused on how people choose from different emotion regulation strategies, the results are in line with previous research showing that in specific contexts, suppression can be effective, especially in the short term (Dunn, Billotti, Murphy, & Dalgleish, 2009). Affective switching or faster switching towards neutral aspects of negative stimuli also predicted detached reappraisal choice in high intensity situations, which was in line with previous findings that associated detached reappraisal with cognitive control (Liang, et al., 2017).

Although the emotion regulation strategies we chose cannot be clearly described as engagement or disengagement strategies, our results provided robust evidence that acceptance are often chosen in low intensity contexts, while detached reappraisal are chosen in high intensity contexts. Gross's model of emotion regulation (Gross, 1998) assumes that disengagement strategies overlap with antecedent-focused strategies because they are triggered at the moment when strategies that involve attention-deployment or distraction are likely to be engaged. Later stages of emotion regulation process are mainly response-focused strategies, when the emotion is fully experienced. Our present findings provide evidence that individuals have a preference for detached reappraisal in high intensity contexts and that individuals who engage in affective switching have switch costs toward neutral aspects predict detached reappraisal choice in high intensity situations.

These studies focused on regulatory choices between engagement and disengagement strategies (Parkinson & Totterdell, 1999) that were not previously investigated, such as detached reappraisal and acceptance, which are newer strategies being investigated in the literature. We also focused on regulatory choices between maladaptive strategies such as suppression and rumination, which were found to be linked to many psychopathologies. We investigated whether several factors, such as expressive flexibility, emotion diversity, affective style, or affective flexibility play a role in emotion regulation choice. While previous research (Sheppes et al., 2011, 2014) has shown that generally people prefer engagement strategies like reappraisal in low intensity contexts and disengagement strategies like distraction in high intensity contexts, we extended this line of research by investigating emotion regulation choice between other strategies, but also between maladaptive strategies.

One important conclusion from this line of research is that the engagement-disengagement dimension is an important mechanism (Sheppes, et al., 2014). Our results showed that in low intensity contexts, acceptance, which can be considered an engagement strategy, is preferred, while a disengagement strategy such as detached reappraisal is preferred in high intensity contexts. Moreover, engagement strategies such as rumination were preferred in low intensity contexts, and suppression which clearly involves disengagement was chosen in high intensity contexts.

One limitation of our research is that our samples consisted mainly of college students, so our research may not be able to be applied broadly to all populations at this time. Future studies should consider investigating emotion regulation choice of these strategies also in different group ages. While previous studies showed that some types of reappraisal are preferred in low intensity context (Sheppes, et al., 2014), our results showed that reappraisal can also be used in high intensity context. Futures studies should consider looking at reappraisal strategies as the emotion regulation strategy that provides best flexibility for many contexts.

Study 5

Contextual engaging and disengaging in emotion regulation choice

3.5.1 Introduction

People try to change their emotions either by modulation emotional experience or by changing the way they express them. Contextual variability play an important role in short affective modulation or in habitual tendencies to use various emotion regulation strategies (Aldao, 2013; Bonanno & Burton, 2013; Dixon-Gordon, Aldao, & De Los Reyes, 2015).

For example, the effort involved may vary depending on the context, with more intense emotions requiring greater effort to adjust emotionally, while less intense emotions may require less effort (Barrett, Gross, Christensen, & Benvenuto, 2001). In other words, emotional intensity is a critical emotional dimension and is a context associated with the selection of emotional regulation strategies.

Individuals use different emotional adjustment strategies spontaneously in the laboratory (Aldao & Nolen-Hoeksema, 2013) in response to disgust stimuli that vary in affective intensity. In this study we expanded this exploration into a greener space, aiming to use affective intensity strategies (Sheppes, and al., 2011) into two different individual ecological fields, academic performance (Harley, Pecrun, Taxer, & Gross, 2019) and interpersonal relationships during the exam session.

Emotions related to academic performance and results are emotions that arise in situations related to achieving skill and quality standards in testing or evaluation situations and that play an important role in students' learning and school performance, and can influence grades, assessments, various indicis and results such as future socio-economic status (Ashkanasy & Humphrey, 2011; Pecrun, 2006; Ekrun & Linnenbrink-Garcia, 2014). Emotions in such situations can support performance, influencing motivation, concentration of attention and cognitive resources involved in performance-related activities and academic results by promoting information processing and self-regulation required for these situations (Pecrun & Perry, 2014; Harley and al., 2019). Although negative emotions in such situations can also have useful effects on academic results and performance in some situations (Pecrun, 2006; Tumer & Schallert, 2001), they can generally also have a negative impact on performance, affecting interest and motivation (Pecrun & Perry, 2014) and consuming cognitive resources (Meinhardt & Pecrun, 2003).

As stated, an affective stimulus situation may or may not cause a decision for the individual that aims to achieve a desired affective state or solve a problem, by modulating the emotion (Gross, 2015; Sheppes, 2020). Once a negative emotion that requires intervention as well as the appearance of the purpose of the adjustment are identified, various strategies are selected from the available repertoire, from which a strategy is selected either to decommit attention or engage in cognitive modification, which is subsequently implemented and then monitored (Sheppes, 2020). In this vein, the dimension of attention-seeking and engagement in cognitive change has received substantial empirical support (Sheppes, and al., 2011; 2012) There is a preference for strategies for decommitment of attention in high-intensity affective situations and a preference for engagement strategies in emotional information processing in low-intensity emotional situations (Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe and al., 2014). In this study we set out to investigate whether such preferences for the use of various strategies also manifest themselves in performance situations and academic results.

Emotions are also an important factor in social functioning and interpersonal relationships, while relationships serve a role in regulating emotions (English, John & Gross, 2013). The use of suppression has been associated in interpersonal relationships with worse functioning, and the use of re-evaluation with better functioning (English, John & Gross, 2013). However, the social context can have a considerable impact on emotional adjustment. At the same time individual trends being stable over time, individuals can usually select those situations or social contexts congruent with their affective style. For example, individuals who frequently use suppression can create those social contexts that are less emotional and offer less emotional support (English, John & Gross, 2013). For example, the mere presence of a romantic partner can serve as a function of regulating stress at the subjective, neurophysiological and neural level (Coan, Schaefer, Davidson, 2006; Diamond, Hicks, & Otter-Henderson, 2008).

In this study we set out to investigate the use of emotional adjustment strategies for attentional disengagement or engagement in cognitive modification, varying the affective context through the intensity of emotion but also the type of situation at the individual level, in performance situations, respectively situations related to interpersonal relationships.

Unlike the study conducted in the laboratory, for this study participants were asked to report over the course of 21 days during the session, four situations in which they experienced negative emotions, two for each academic performance field and two involving interpersonal relationships, and for each of them, one situation was of high intensity, and a situation is of moderate intensity. Although these reports may also be influenced by biases, it has been shown that when individuals report on affective states experienced within 2 hours, these reports tend to be based on episodic or experiential knowledge, being less susceptible to biases than semantic memory (Robinson & Clore, 2002).

Although the design of this study is an exploratory one and does not involve investigating the implementation of strategies or an active decision in order to be able to examine the selection of adjustment strategies, we were interested in exploring whether at the level of use of strategies, thus in the step of activating strategies in our own repertoire to be selected (Sheppes, 2020), the preference for strategies of decommitment in high-intensity situations and strategies of employment in moderate intensity situations is maintained. One aspect to mention is that unlike the paradigm used by Sheppes and al., (2011) or Aldao & Nolen-Hoeksema (2013), we cannot track the number of strategies used or the active selection of strategies. Given that it is arbitrary, the distinction of situations of high intensity versus moderate may be reflected in different results, which could subject it to biases and assessments that cannot respect the normative properties of some laboratory stimuli (e.g. images). However, a variation in moderate versus high intensity was used in similar studies (Dixon-Gordon al., 2015) that investigated the selection of strategies by context using retrospective methods for identifying emotional situations. Also, in this study (Dixon-Gordon and al., 2015), participants were also asked to refer to stressful or performance-related social situations, but this differentiation was not maintained in subsequent analyses.

3.5.2 Methods

Participants

Participants in this study consisted of 118 Romanian undergraduate students (100 women) from Babeş-Bolyai University in Romania. The ages of the participants were in the range of 18 and 33 years (mean age = 21.48, SD = 0.71). Participants received hours of practice for participation, and prior to the experiment signed informed consent.

Procedure

For this study, participants were asked to report four situations as soon as possible after experiencing them over 21 days, using some online forms on the Google Forms platform in exchange for hours of practice. They had to communicate four situations, two of which contained situations related to academic performance during the session, and two concerning situations of interpersonal relationships and in which they experienced negative emotions, either of high intensity or of low intensity. Participants reported online for each situation, the description of the situation, the type of situation they relate to (academic performance or interpersonal relationships) and the assessment of the intensity of emotions experienced, as well as the use of strategies.

Negative emotions were reported using a scale that required participants to indicate on a Likert scale of 5 points 1 to 5 (in the condition of moderate intensity alpha Cronbach $\alpha = .77$, in the high intensity condition alpha Cronbach $\alpha = .81$), the degree to which they felt *anxiety*, *anger* and *sadness*. In the two conditions of negative emotions, participants reported the degree to which they used emotional adjustment strategies also used by Aldao and Nolen-Hoeksema (2013), but which we grouped into disengagement strategies (distraction, problem solving, distancing, suppression) and engagement strategies (reassessment, acceptance) (Sheppes and al., 2011; Sheppes, 2020): *acceptance* ("you can afford and accept emotions"), *distraction* ("think of neutral or positive to distract you from images"), *problem solving* "think about ideas on how to change or resolve the situation"), *distancing* (for description see Shiota and Levenson 2009) ("emotional impact mitigation taking an objective and detached perspective"), *reassessment* ("think differently about the situation to alter emotions"), and *suppression* ("don't allow any *emotion*"). As in the study of Aldao and Nolen-Hoeksema (2013) participants evaluated these strategies on a likert scale of 4 points between 0 "not at all" and 3 "much" (Cronbach $\alpha = .72$ in the moderate intensity condition; Cronbach $\alpha = .78$ in high intensity condition).

3.5.3 Results

An ANOVA 2 x 2 with repeated measurements showed a significant main effect for the domain (performance and interindividual relationships), $F(1, 117) = 72.32, p < .001$, partially $\rho^2 = 0.861$ and a significant effect on affective intensity (high versus moderate), $F(1, 117) = 19.43, p < .001$, partially $\rho^2 = 0.142$. The results showed that in situations of high affective intensity, the emotions reported by the participants were significantly higher than those in situations of moderate intensity, $t(117) = 26.89, p < .001$. And in performance situations the reported emotions were significantly higher than in interpersonal relationships, $t(117) = 4.41, p < .001$.

To calculate the number of strategies used following the procedure described in Aldao and Nolen-Hoeksema (2013) participants reported the strategies used on a 4-step Likert scale. If a participant reported 0 or "not at all" for the strategies, then this meant that the participant did not use any strategy and was coded "0". If a participant reported "little," "much," or "very much" then the participant used at least one strategy and was encoded with "1" for each strategy. As in Aldao and Nolen-Hoeksema (2013), adding these encodings will result in different categories with scores from 0 to 6: (1) "0" if no strategy has been reported, (2) "1" if a single strategy has been used, and (3) from "2" to "6" if two or more strategies have been used.

With regard to the usability of strategies in the four types of situations, on average in high-intensity situations more strategies were used compared to moderate intensity situations (performance situations, $t(117) = 6.02, p < .001$; interpersonal relationship situations, $t(117)$

= 3.78, $p < .001$). Thus, if in high-intensity and moderate-intensity performance situations approximately 99% of participants reported using two or more strategies, in the situation of high-intensity interpersonal relationships 5% of participants reported using a single strategy, the rest using two or more strategies, and in the situation of moderate-intensity interpersonal relationships, 3.4% of participants reported that they did not use any strategy, 7.6% of participants reported using a single emotional adjustment strategy, the remaining 89% of participants using two or more emotional adjustment strategies.

Given the design nature of this study, namely that there was no behavioural evidence to investigate an active selection of strategies, we were able to test whether participants used predominantly high-intensity disengagement strategies and moderate-intensity engagement strategies, only by comparing the average use of strategies in the same condition or situation. For this we arbitrarily grouped the strategies, the *disengagement* strategies being mainly distancing, distraction, problem solving and suppression, and the *engagement* ones being mainly reappraisal and acceptance.

Table 5. Means and standard deviations for engagement and disengagement strategies in high- and moderate-intensity performance situations, i.e. high- and moderate-intensity interpersonal relationships.

	Performance		Performance moderate intensity		Relations high intensity		Relations moderate intensity	
	High Intensity		Mean	SD	Mean	SD	Mean	SD
Disengagement	1,64	0,55	0,67	0,43	0,77	0,26	0,58	0,28
Engagement	0,86	0,67	0,93	0,17	0,67	0,33	0,72	0,31

However, the results showed that for high-intensity performance situations, participants used more disengagement strategies on average compared to employment strategies, $t(117) = 9.53$, $p < .001$. In moderate-intensity performance situations, participants mainly used more hiring strategies than disengagement strategies, $t(117) = 6.32$, $p < .001$. In situations of high-intensity interpersonal relationships, they used more disengagement strategies on average compared to engagement strategies, $t(117) = 2.82$, $p < .006$. And in moderate-intensity interpersonal relationships, participants used on average more hiring strategies than disengagement strategies, $t(117) = 4.29$, $p < .018$ (Table 5). Also, by comparing disengagement strategies between the two areas, they have been used more in performance situations compared to those relating to social relations $t(117) = 12.17$, $p < .001$.

3.5.4 Discussion and Conclusions

Based on the model of emotion regulation it has been established that emotional adjustment is a multi-stage process, and in high intensity situations individuals prefer the use of disengagement strategies, whereas in situations of low affective intensity, individuals prefer employment strategies (Sheppes and al., 2011; Sheppes, 2020). In this study we have sought to investigate whether in environmentally friendly life situations involving stressful events,

such as the exam session, the preference for high-intensity decommitment strategies and the preference for moderate-intensity employment strategies in individual areas of life, such as those related to academic performance or interpersonal relationships, are maintained. Emotions experienced in performance situations were significantly higher compared to those of interpersonal relationships, which is probably also due to the measurement context. Although high-intensity situations showed significantly higher levels of negative affect than in moderate-intensity situations, participants reported in a high proportion that they used more than one emotional adjustment strategy in all four combinations of situations. This is contrary to previous studies (Szasz and al., 2018) which have shown that in low-intensity situations participants may prefer about one-third of the use of a single emotional adjustment strategy, with multiple strategies reporting only in high-intensity situations. These results may also be due to the fact that the high-intensity versus moderate distinction was made arbitrated by participants by their reports on the level of negative emotions experienced in the experimental situations described. Moderate-intensity situations were used for this study instead of low-intensity situations. This decision was taken to avoid situations where participants reported that they had not engaged at all in emotional adjustment. Moreover, a slightly higher percentage of participants reported using a single emotional regulation strategy only in situations reported by participants that related to moderate-intensity interpersonal relationship content.

With regard to the cognitive dimension of disengagement/engagement of the use of strategies, which is a determining factor of selection in emotional regulation (Sheppes, 2020) in affective contexts varying in intensity, the results of this study supported this difference. Specifically, in performance or high-intensity situations, the results showed that participants reported using more disengagement strategies on average in emotional information processing than employment strategies. However, experimental studies including behavioural measurements including an active selection decision are needed (Sheppes and al., 2011; 2014; Sheppes, 2020) of strategies for disengagement and engagement in academic performance situations in order to be able to robustly achieve these results by comparing the strategies investigated in pairs on the disengagement-employment continuum.

To the same extent, the method used in this study may have only caught the engaging of individuals' own repertoire in the strategy activation step. Not being involved in an active decision, the study could not capture the assessment step of these strategies based on the costs and benefits of selecting and implementing these strategies as supported by the model proposed by Sheppes (2020) based on contextual affective variables, such as affective intensity, so that they can be clearly differentiated in disengagement versus engagement strategies.

CHAPTER IV

GENERAL DISCUSSIONS AND CONCLUSIONS

One approach for investigating emotion regulation choice is the behavioral paradigm proposed by Sheppes (2020). This approach states that emotion regulation is a multi-stadial process which includes several stages that precede and follow instant emotion regulation implementation (Gross, 2015; Sheppes, 2020). The extended model of Gross (2015) and later Sheppes (2020) includes four stages that are sequential in cyclic based of different parameters at the perceptive, appraisal and action levels (Gross, 2015). When an emotion regulation goal is activated in the identification stage, the selection of one or more emotion regulation strategies of which one or more strategies will be later implemented (Gross, 2015; Sheppes, 2020).

In laboratory studies and everyday life people may encounter different situations in which they tend to use multiple emotion regulation strategies. One reason for that is that activating multiple strategies can be an advantage for reaching the emotion regulation goal, or it can be a compensation strategy because other early strategies may had failed (Aldao și Nolen-Hoeksema, 2012; Optiz și al., 2015).

One study which explored the spontaneous use of emotion regulation strategies (Aldao și Nolen-Hoeksema, 2012) showed that a major percent of participants (65%) used multiple emotion regulation strategies to modulate their emotions of disgust. A following study (Dixon-Gordon și al., 2015), showed that there is a tendency to use multiple emotion regulation strategies mostly in high intensity emotional context (Optiz și al., 2015).

Based on these results, in the first study we were interested to investigate the spontaneous use of emotion regulation strategies in response to multiple emotional stimuli in high and low intensity negative emotional situations. Our results showed that in the high intensity condition participants used more than one strategy compared with the low intensity situations. These results are in line with previous studies (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon și al., 2015). In the low intensity condition, from the participants that engaged in emotion regulation, one third reported that they used a single emotion regulation strategy, while two thirds of the participants used two ore more emotion regulation strategies. In the high intensity condition, more than two thirds of participants used multiple emotion regulation strategies, and only a small percent used a single emotion regulation strategy.

Comparing our results with previous results (Aldao și Nolen-Hoeksema, 2013), in our study only a small percent of participants did not engage in any form of emotion regulation, maybe because we used multiple pictorial stimuli, while previous studies used a single video stimulus (Aldao și Nolen-Hoeksema, 2013).

Given that images containing scenes that could mainly generate disgust were used as stimuli, the percentage of participants who did not engage in an emotional adjustment effort was very low. The negative images used in this study were similar in content with stimuli validated in previous studies (Sheppes and al., 2011), however, the large number of stimuli presented in each condition may not have provided adequate employment opportunities in the emotional adjustment process.

Analyzing these results through the prism of the working model proposed by Gross (2015) and Sheppes (2020), a situation in which an emotional adjustment goal is not activated may be due either to the fact that the emotion has not been made aware (Taylor, 1994; Samson and al., 2012), either because the emotion has been misrated as being too little to require

adjustment, or because certain beliefs about the malleability of emotions can put individuals in a situation where they believe that emotions cannot be altered (Mauss & Tamir, 2014). Because the design of this study, like those in previous studies (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015) sought to capture the use of emotional regulation strategies and not the effectiveness or implementation of strategies, and the methodology used may only be surprised by the steps to identify and activate individual strategies (Sheppes, 2020). Furthermore, the study procedure did not involve an active decision between strategies (Sheppes and al., 2012; Sheppes and al., 2014; Sheppes, 2020) which does not provide us with information about the finality of the process of selecting emotional regulation strategies, thus not being able to determine the disengagement/engagement dimension of emotional regulation strategies.

This explains the results of the study related to the number of use of strategies according to affective intensity. Thus, in the low emotional intensity condition, the fact that one third of the participants reported using a single emotional regulation strategy in response to images of disgust may be due either to the fact that they in the past used a single strategy in such contexts and as a result of the cost and benefit assessment (Sheppes, 2020) or because the available cognitive resources allowed them (Urry & Gross), 2012), activated only one strategy, which may or may not have been effective (Gross, 2015). However, the result may also have been due to a limited repertoire of strategies, but also to certain contextual factors (Aldao, 2013).

On the other hand, reporting the use of multiple emotional regulation strategies in the high intensity condition but also in the low intensity condition may be due to the activation of a large number of regulation strategies from their own repertoire of strategies, either due to the complexity and intensity of the emotional stimulus (e.g. the content of the images in the high intensity condition contained images of corpses, accidents or mutilated persons), or due to the misassessment of the mismanagement and cost-benefit of the strategies. Furthermore, the use of multiple strategies in the high-intensity condition as measured in this study could have captured the activation of the individual repertoire of strategies without including the actual selection and implementation of a strategy or strategy, as the decision-making or active selection of strategies (Sheppes, 2020) is not present. Moreover, previous studies have shown that surprisingly, if study participants do not receive specific regulation instructions, they tend to remain in an implicit state due to an inertia effect (Suri al., 2015). Moreover, previous studies have shown that it is very possible that under high intensity conditions, even if participants are trained to use a particular strategy (Optiz al., 2015), or if they do not receive any regulation instructions at all, they tend to use multiple emotional regulation strategies spontaneously, either separately or in combination with the strategy for which they have received instructions, to try to cope with the stimulus they face (Aldao & Nolen-Hoeksema, 2013; Aldao, 2013).

The results of this study showed that the emotional regulation effort (Aldao & Nolen-Hoeksema, 2013) was significantly higher in the high intensity condition compared to that of low intensity, and the degree of implementation of the strategies showed that participants who used a single emotional regulation strategy implemented it to a greater extent than those who used multiple strategies. This may suggest that those who reported a single emotional regulation strategy have already passed the active selection of strategies, while those who have used multiple emotional regulation strategies may not have found and have still selected the most effective strategy for the disgust stimuli to which they have been exposed. Moreover, the results of this study showed that a higher degree of implementation of strategies was associated with lower levels of disgust.

Future studies could investigate the step of monitoring or flexible selection between multiple strategies of high-intensity emotional regulation to capture the consequences of using multiple emotional regulation strategies.

In conjunction with the results of previous studies that showed that revaluation strategies would be more effective in the context of high levels of disgust (Olatunji et al., 2015), in this study, the posting revaluation or distance strategy was negatively correlated with disgust in the high intensity condition. As regards the acceptance strategy, it has been widely used both in the low-intensity condition and in the high intensity condition. Acceptance may be relatively effective in regulating low levels of disgust, which are preferred and negatively correlated with disgust in the low-intensity condition.

Another important limitation of this study is the operationalization of emotional regulation strategies by providing a brief description of them by measuring their use on a Likert scale, which is not an optimal way. However, the use of predefined scales of strategies would have loaded the experiment procedure and would not have allowed the investigation of several strategies at the same time. The results depended on how accurately emotional regulation strategies were defined and measured. For example, some strategies may not have been well differentiated, for example reassessment and distancing or acceptance. The problem-solving strategy may also have been inadequately assessed. Some strategies may involve a higher level of difficulty that has not been incorporated into the design of the study. Experimental manipulations of variable affective contexts in this study are consistent with previous studies and have allowed us to rigorously examine the relationship between emotional intensity and emotional regulation (Aldao and Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015). The descriptions used to operationalize these strategies were also used in the previous literature (Aldao and Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015; Ehling and al., 2010) and showed predictive validity through significant associations with different areas of psychopathology (Dixon-Gordon and al., 2015).

The purpose of this study was to investigate the use of emotional regulation strategies in the context of specific categories of emotional stimuli (images representing scenes of disgust) varying the affective intensity. In future studies, these results can be replicated using ecological measurements that could allow the analysis of more intensive time data and increase ecological validity. Future research could also examine whether certain patterns of spontaneous emotional regulation are associated with the severity of emotional disorders identifying adaptive and disadaptive patterns of spontaneous emotional regulation, as well as with various behavioral measurements of the use and selection of emotional regulation strategies.

Given that the previous study aimed to change the number of emotional regulation strategies according to affective intensity, but without being able to have an active selection of strategies, in the following three studies we investigated the selection of emotional regulation strategies according to the degree of disengagement/engagement in the processing of emotional information, focusing on pairs of strategies considered presumptively adaptive or presumptively disadaptive. Thus, in the following two studies we investigated the selection of the pair of distancing versus acceptance strategies, mainly because from the previous study data these two strategies were noted by the significant association with the level of disgust in the two experimental conditions of low intensity and high intensity. And in the next study we turned off our focus on investigating the pair of strategies suppression versus rumination.

As mentioned before, when faced with an emotion that requires regulation, based on an assessment of the implementation of available strategies, individuals can select between different emotional regulation strategies and tend to prefer high-intensity decommitment

strategies that immediately modulate emotions and involve low cognitive costs, and prefer low-intensity employment strategies that offer long-term benefits, even if they are more costly (Sheppes, and al., 2011; 2012; 2014; 2014; Sheppes and al., 2020). Thus, in the second study, selection preferences were compared between posting revaluation (Ochsner and al., 2004) or distance and acceptance strategy. In the high intensity condition, the distance strategy was mainly preferred, being a strategy on a continuum between reassessment and distraction (Moodie al., 2020). Distance, operates by separating the person from the reality of the situation, involving both attention shifting and cognitive change, being a strategy that overlaps with both distraction and reassessment (Ochsner & Gross, 2005; Moodie and al., 2020). Given that attention and self-reference regions are recruited preferentially by both distraction and the distance strategy (Moodie al., 2020), having this overlap with regions associated with attention-giving disengagement, this shows that distance cannot simply be subsumed to the revaluation strategy (Moodie and al., 2020). The three strategies place on an axis that represents a single dimension of cognitive emotional regulation, but they exhibit attentional and/or semantic engagement differentiated according to affective intensity (Moodie al., 2020).

Furthermore, the preference for distancing in high-intensity situations has been associated with affective switching. Thus, faster switching costs, thus lower switching costs towards neutral aspects of negative stimuli, predicted the preference for distancing in high-intensity situations. These results are similar to previous studies that associated revaluation by posting (distancing) with cognitive control (Lian and al., 2017). In low-intensity situations, participants mainly chose the acceptance strategy. Also, higher preferences for distancing in high intensity and acceptance situations in low-intensity situations have also been preserved even though rewards have been offered to choose the other strategy, providing robustness to the results. The use of emotional regulation strategies by individuals may be motivated by strong tendencies to select those strategies that work best for them. It may probably be easier and more effective for people to implement those strategies that they have more experience with and have been more successful with in the past. Thus, the results suggest that the intrinsic motivation to reduce negative emotions can be a priority for both additional rewards offered and possible other emotional regulation strategies offered by instructions by the experimenter. Reassessment by detachment or distancing involves the attentional engagement with the stimulus image, but reinterpretation consists in adopting a detached and objective mental set. Acceptance Strategies are a central element of Acceptance and Engagement Therapy (ACT – Hayes, Strosahl, & Wilson, 1999) and involve "an active and conscious embrace of private events", but "without unnecessary attempts to change the shape of these events". This may mean that there may be similarities between the two emotional regulation strategies, in the sense that they could be quite close or occupy equidistant positions on the disengagement – employment continuum. However, the study results suggest that distance is closer to disengagement than acceptance, given participants' preferences for the two strategies based on affective intensity. Future studies could compare different strategies to include them in pairs. Reassessment by posting, or as it is called in certain studies (Sheppes, 2020), distance, is a strategy in the family of revaluation strategies (Gross, 2015) involving cognitive processing, but also focusing attention on the non-emotional aspects of stimuli (Shiota & Levenson, 2009). Moreover, the association of distance with the executive switching function has been observed in other previous studies (Shiota & Levenson, 2009; Liang and al., 2017).

Expressive flexibility (Bonanno al., 2004) and an affective regulation style (Hofmann & Kashdan, 2010) also predicted the selection of distance in high-intensity negative emotional situations.

The results of the study comparing the pair of distance and acceptance strategies were also replicated in the third study, providing robustness to preference for distancing in high-intensity situations and preference for acceptance in low-intensity situations. Compared to previous studies (Sheppes and al., 2011, 2014) that compared distraction versus reevaluation pairs and whose results showed participants' preference for choosing predominantly reevaluation in low-intensity situations mainly due to the high cognitive costs of this strategy, the results of our study add to the reevaluation strategy, showing that certain forms of reassessment can also be selected in high-intensity situations. Moreover, previous studies of the selection of regulation strategies have shown that when controlling factors affecting the cognitive effort of this strategy, for example, certain forms of reassessment are used, such as that of change in reality, there is an increase in preferences for the selection of re-evaluation in contexts of high emotional intensity (Sheppes, Brady, & Samson, 2014; Sheppes, Scheibe, and al., 2014).

By investigating preferences for presumptively disadaptive strategies, the results showed a relative preference for using suppression in high-intensity situations when individuals are made to choose between suppression and rumination. These results are consistent with the results of previous studies which have shown that in some contexts, although a strategy considered counterproductive, suppression may be effective, especially in the short term (Dunn, Billoti, Murphy, & Dalglish, 2009). Also, as expected, an affective style of suppression was positively associated with the selection of suppression in high-intensity situations. Although the differences were not significant, there was also a predominant preference for the selection of suppression compared to rumination and low intensity condition. Insignificant results for rumination may also be due to the nature of the stimuli, and it may be possible that for disgust emotions a strategy such as rumination is not evaluated as effective by individuals, rather strategies of disengagement with stimulus, which can be considered adaptive in case of disgust.

The latest study focused on the use of emotional regulation strategies in potentially stressful situations, such as exams during the session. Exploring the selection of measured emotional regulation strategies in previous studies (Aldao and Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015) in two important ecological dimensions, showed that the level of negative emotions experienced by participants were higher for performance situations compared to retrospective situations reported for interpersonal relationships. Also, as expected the level of negative emotions reported was higher for situations of high intensity compared to those of moderate intensity.

The reporting of the level of emotions experienced cannot be relative to the normative parameters, since the participants chose situations of high intensity themselves compared to those of moderate intensity. Thus, the distinction of high-intensity versus moderate situations is susceptible to biases and retrospective reporting. Although these reports may also be influenced by biases, it has been shown that when individuals report on affective states experienced within 2 hours, these reports tend to be based on episodic or experiential knowledge, being less susceptible to biases than semantic memory (Robinson & Clore, 2002). A variation in moderate versus high intensity was used in similar studies (Dixon-Gordon al., 2015) that investigated the selection of strategies by context using retrospective methods for identifying emotional situations.

Although the variation in the intensity of stimulus situations was relative to the subjectivity of participants to classify situations, the results showed that in high-intensity situations more strategies were used compared to moderate intensity situations for both performance and interpersonal relationships. These results are similar to previous studies

(Aldao and Nolen-Hoeksema, 2013; Dixon-Gordon and al., 2015; Optiz and al., 2015) but also with the results of the first study in this paper. These results suggest that there is a tendency for individuals to use, testing and trying, more strategies when faced with situations of high emotional intensity, perhaps in an attempt to offset the advantage of more chances to ensure their success in emotional regulation.

Although we cannot directly corroborate the results of the first and last study in this paper, it can be observed that with the increase in the affective intensity of the situations there is a tendency to use more strategies. For example, if the results showed that in the first low-intensity study, about one third of participants used an emotional regulation strategy, in the last study the percentage of participants who reported using a single emotional regulation strategy in retrospective interpersonal relationships was less than one third. Moreover, previous studies that varied the intensity of the stimulus, the presence or absence of eye orientation, or the age of the participants, showed that participants spontaneously used and implemented in significant proportions emotional regulation strategies for which they were not instructed to use them (Optiz and al., 2015). The spontaneous strategies used were also largely multiple and manifested mainly in high-intensity situations, even though the study paradigm was those in which participants explicitly received specific instructions for using a strategy (Optiz and al., 2015).

In this vein, an important conclusion of our studies is that individuals spontaneously use multiple emotional regulation strategies as a "compensatory maneuver" when faced with stimuli or high-intensity situations, both in laboratory and life situations.

Investigating the degree of disengagement versus engagement of the strategies used by the participants in the last study, the results showed that in high-intensity performance situations they preferred more decommitment strategies than employment strategies. The preference for disengagement has also been maintained for the field of interpersonal relations in the case of high intensity. And in retrospective situations reported by the participants, employment strategies were mainly preferred compared to those of disengagement for both performance and interpersonal relations. Then, as expected given that the level of negative emotions experienced in performance situations was higher than in interpersonal relationships, and disengagement strategies were used to a greater extent in performance situations regardless of affective condition (intense or moderate). These results are similar to previous studies that have shown that individuals tend to use multiple strategies for high-intensity emotions (Aldao & Nolen-Hoeksema, 2013; Dixon-Gordon, 2015; Optiz and al., 2015). Our results also show that these multiple strategies, probably used as a compensatory measure of the success of emotional regulation, could be predominantly decommitment strategies.

The employment dimension – disengagement is a cognitive determinant of selection in emotional regulation (Sheppes, 2020). Although the model proposed by Gross (2015) and Sheppes (2020) describe the steps of emotional regulation as linear, sequential and cyclical, this does not mean that there are no interactions between different strategies. Similarly, the model does not suggest that the preference for low- or moderate-intensity employment strategies and the preference for high-intensity decommitment strategies determine the temporal sequence of this cognitive dimension. Both the model of emotional regulation selection (Sheppes, 2020) and the behavioral paradigm proposed by Sheppes and al. (2011; 2012; 2014) present these steps sequentially or treat some dimensions selectively to increase experimental rigour and internal validity. The results of the latest study captured individuals' preference for predominantly low-intensity affective engagement strategies and preference for disengagement strategies in high-intensity affective situations in contexts of increased external validity. Moreover, most likely in everyday life, the use of employment or disengagement

strategies follows the temporal dynamics of emotion generation, which are probably selected according to the degree to which they provide the hedonic or instrumental goals of emotional regulation of individuals.

Gross's procedural model of emotional regulation (1998) assumes that decommitment strategies overlap with antecedent emotional regulation strategies because they are triggered when strategies involving attention implementation or distraction are likely to be engaged. Later stages of the emotional regulation process are the response-focused regulation strategies, when emotions are fully felt. Our current results provide evidence that individuals have a preference for distancing in high-intensity contexts and that individuals who engage in affective switching may have lower switching costs toward neutral aspects of stimuli that predict the use of distance in high-intensity situations.

These studies focused on regulatory selections between employment and decommitment strategies (Parkinson & Tutterdell, 1999) that were not previously investigated, such as distance and acceptance. Selections of regulation strategies between disadaptive strategies such as suppression and rumination, which have been associated with various psychopathologies, were also investigated. We also investigated whether various factors such as expressive flexibility, emotional diversity and affective style or affective flexibility play a role in the selection of emotional regulation.

An important conclusion that can be underlined from this line of research is that the employment-disengagement dimension is an important determinant (Sheppes and al., 2014). Our results have shown that acceptance is preferred under low-intensity conditions, which can be considered a hiring strategy, while a disengagement strategy such as posting revaluation or distancing is preferred in high-intensity contexts. Moreover, an employment strategy such as rumination is preferred in low-intensity contexts, and suppression involving disengagement has been selected predominantly in high-intensity contexts.

A limit of the present studies is that our samples were made up of students at the university, which implies that the results of these studies cannot be applied broadly to all population categories at this time. Future studies will be able to consider investigating the selection of these emotional regulation strategies for other age groups as well.

While previous studies have shown that certain types of revaluation are preferred in low-intensity contexts (Sheppes and al., 2014), the results of present studies have shown that some form of revaluation can be used in high-intensity contexts. Future studies might consider reappraisal strategies as emotional regulation strategies that offer the best adaptive flexibility in a wide variety of contexts.

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