Exploring Momentary Mental Resilience and State Emotional Regulation Strategies in Daily Life Using Experience Sampling Method

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Abstract

Background

Stress is a pervasive issue that significantly impacts daily life, and mental resilience plays a crucial role in coping with it. The breadth of an individual's emotional regulation (ER) repertoire, which encompasses various state strategies, is vital for effective stress management.

Aim

This study aimed to examine the association between the breadth of momentary ER repertoire, utilisation of assumed state adaptive (i.e., cognitive reappraisal, social support, and emotional expression) and maladaptive strategies (i.e., rumination and distraction) and stress recovery, conceptualised as momentary mental resilience. To address these objectives, the Experience Sampling Method (ESM) was employed.

Methods

A convenience sample of 103 participants (Mean Age = 29.931) completed the survey 10 times a day, reporting their current and recent stress levels, and the employed ER strategies for coping.

Results

Results revealed that a broader momentary ER repertoire was not significantly positively associated with higher momentary mental resilience (β = 0.11, *SE* = .08, *t* (780.25) = 1.32, p = 0.186). However, a significant positive association was found between state adaptive strategies and momentary mental resilience (β = 0.16, *SE* = .08, *t* (778.10) = 1.99, p = .047), and a non-significant relationship for state maladaptive strategies on mental resilience (β = -0.08,

SE = .10, *t* (785.94) = -0.80, *p* = .422). Lastly, using different ER strategies in the same moment (i.e., a broader momentary ER repertoire) was found to not be associated with higher momentary mental resilience than using the adaptive state ER strategies (i.e., cognitive reappraisal, emotional expression, and social support).

Discussion

These findings suggest that the quality of the momentary ER repertoire might hold greater significance than its breadth. Several factors, such as ER profile, affective flexibility, context, and individual differences, could contribute to these results. Future research should consider them when investigating momentary mental resilience in relation to employed state ER strategies.

Introduction

Stress, in its various forms such as worrying about uncontrollable events, reflecting on past experiences, or feeling apprehensive about the future, is a fundamental aspect of our lives (Morrison & Bennett, 2022). The American Institute of Stress highlights the significant impact of stress on mental health, with 33% of Americans experiencing extreme stress and 73% experiencing stress that affects their mental well-being (Patterson, 2022). This high incidence of stress-related health problems underscores the importance of exploring effective coping mechanisms. Resilience, the outcome of successful adaptation to daily adversities, not only reduces vulnerability to mental health issues but also aids in maintaining health and facilitating fast stress recovery (Rutten et al., 2013). Therefore, investigating the association between mental resilience and stress recovery is valuable for developing interventions that enhance resilience,

prevent and treat mental disorders, and ultimately promote effective stress management (Connor & Ziang, 2006).

Mental Resilience

Jacelon (1997), Richardson (2002), and Richardson & Waite (2002) suggest that resilience is the ability to grow and thrive during times of distress. As argued by Davydov et al., (2010), one's mental resilience can explain why some people do not develop psychopathology while others do, despite experiencing the same level of stress. As suggested by Fredrickson et al. (2003), resilience acts as a buffer against future adversities. Tugade & Fredrickson (2004) define mental resilience as the ability to recover effectively and quickly from stress. Hence, momentary mental resilience will be operationalized as stress recovery. It is important to note how momentary mental resilience will be measured.

Assessment techniques that rely on subjective clinical impressions and retrospective self-reports have limitations when it comes to precisely capturing the day-to-day fluctuations in mental health symptoms (Schueller et al., 2017), thus requiring more frequent and real-world monitoring of these symptoms (Nahum et al., 2017). Building on these concerns, it becomes evident that investigating momentary resilience, or how people deal with daily hassles instead of life events, may be more effective for gaining a comprehensive understanding of resilience, allowing for a more nuanced examination of resilience dynamics.

Measuring Momentary Mental Resilience

One can adequately evaluate the fluctuations of mental health-related symptoms in daily life, including momentary mental resilience, by utilising Experienced Sampling Method (ESM).

ESM involves gathering data in natural settings and at various intervals throughout the day (Baltasar-Tello et al., 2018). Several ESM studies have looked into stress recovery. Kuranova et al. (2020) researched emotional recovery from daily challenges among at-risk adolescents and found that delayed recovery predicted increased symptoms. Another ESM study conducted by Vaessen et al. (2019) looked into how individuals with psychosis recover emotionally from daily stressors and observed prolonged impacts of everyday stressors on negative emotions. In another ESM study, Calheiros Velozo et al. (2022) found that groups at risk for depression had longer recovery periods following daily-life stressors compared to healthy controls. The ESM study led by Eddington et al., (2017) reported increased resilience to stress in daily life among patients undergoing cognitive-behavioural therapy. Although a lot of ESM studies have looked into stress recovery, there are few studies exploring the association between emotional regulation strategies and stress recovery using this research method.

Emotion Regulation Strategies

In the realm of stress management, emotion regulation plays a crucial role. Emotion regulation refers to the process of monitoring, evaluating, and altering one's emotional reactions, both internally and externally (Thompson, 1991). In general, emotion-regulatory processes enable individuals to adapt to stressful situations by facilitating a rapid and effective response to stressors (Thompson, 1991). Typically, people strive to reduce negative emotions and enhance positive ones (Larsen, 2000). Emotion regulation (ER) strategies can be divided into adaptive and maladaptive ones.

Adaptive ER Strategies

ER strategies are classified as either adaptive or maladaptive based on their effects on affect, behaviour, and cognition in relation to psychopathology (Aldao & Nolen-Hoeksema, 2012). Adaptive strategies such as acceptance, problem solving, and cognitive reappraisal have been shown to lead to beneficial outcomes and a decrease in negative affect (Goldin et al., 2008) and low levels of psychopathology (Aldao & Nolen-Hoeksema, 2010).

An adaptive ER strategy is cognitive reappraisal, which involves changing one's appraisal of a situation to lessen its emotional impact (Gross, 2015). Cognitive reappraisal is one of the most commonly used ER strategies (Gresham & Gullone, 2012) and has a significant small relationship to well-being (Kraiss et al., 2020). One of the few ESM studies investigating the momentary use of reappraisal is the one led by Blanke et al. (2022) which revealed that individuals faced high levels of stress utilising the strategy of reappraisal as a coping mechanism in their daily lives effectively display reduced negative emotions following a stressful event.

Another ER strategy of interest is emotional expression. According to Berry and Pennebaker (1993), emotional expression by either verbally expressing traumatic experiences or either writing or talking about them improves physical health and boosts immunity. An ESM study led by Burgin et al. (2012) found that participants high in emotional expressivity were more likely to display high levels of positive affect and demonstrate better social functioning.

Social support is another strategy positively associated with both physical and mental health (Cohen, 2004, Cohen et al., 2000, House et al., 1988, Seeman, 1996). One of the few ESM studies on social support led by Flett et al. (1995) found that adverse effects of daily difficulties on mental well-being can be partially attributed to the reduced accessibility of social support

associated with the experience of everyday challenges. Due to their beneficial impact on overall health, cognitive reappraisal, emotional expression, and social support result in higher resilience (Min et al., 2013). Whether the momentary use of cognitive reappraisal, emotional expression, and social support have a positive effect on stress recovery in daily life has not yet been fully investigated, but there are suggestions that it might have a positive effect.

Maladaptive ER Strategies

Maladaptive strategies, such as avoidance of emotions, suppressing the experience of emotions, worrying, rumination, and distraction, have been demonstrated to lead to negative affect (Campbell-Sills et al., 2006), memory difficulties (Richards et al., 2003), and development of mental disorders such as depression (Nolen-Hoeksema et al., 2008), and anxiety disorders (Werner et al., 2011). Maladaptive strategies include rumination and distraction (Gross, 2015).

Rumination involves focusing on the emotions triggered by negative mental representations of a stressor (Nolen-Hoeksema et al., 2008) and is maladaptive because it prevents the individual from shifting focus away from the stressful cognitions (Webb et al., 2012). Research has demonstrated that individuals who engage in state rumination tend to experience less recovery from stress compared to those who do not ruminate (LeMoult et al., 2013). In a study examining daily life situations, it was observed that when individuals employed rumination as a coping strategy during a stressful event, it had a detrimental effect on reducing negative emotions, particularly when the stressor was more intense (Blanke et al., 2022).

Distraction is an ER strategy that involves deploying attention away from the emotionally salient aspects of an emotion-eliciting event (Thiruchselvam et al., 2011), which proves to be maladaptive when used as an avoidance strategy (Wolgast & Lundh, 2017). Unlike the research

conducted by English et al. (2017), an ESM study led by Brans et al. (2013) revealed that distraction was the coping strategy utilised most frequently, while reappraisal was the least commonly employed approach. Overall, previous research indicates that rumination and distraction are associated with poor mental health (Garnefski et al., 2001) and less resilience (Min et al., 2013). Whether the momentary use of distraction and rumination hinders stress recovery in daily life has not yet been fully investigated, but there are suggestions that it might have a negative effect.

Emotional Regulation Repertoire

The ER repertoire refers to the number of ER strategies an individual employs and the degree to which they use them (France & Hollenstein, 2017). There is a need to distinguish trait ER repertoire from momentary ER repertoire. While trait ER repertoire represents an overview of the strategies utilised most often in general, momentary ER repertoire is the multitude of the ER strategies used in a specific moment.

The size of the ER repertoire can be used to draw conclusions about an individual's regulatory processes and make comparisons among individuals based on the strategies they use (France & Hollenstein, 2017). Research suggests that a smaller repertoire is associated with difficulties in emotion regulation (Aldao et al., 2015), whereas a larger repertoire is associated with less anxiety and depression (Lougheed & Hollenstein, 2012) and improved well-being (Bonanno et al., 2004). Moreover, having a broad ER repertoire may be useful not only because it allows for flexible transitions between strategies but also because it enables the use of multiple strategies simultaneously (Lougheed & Hollenstein, 2012). Therefore, having a larger ER repertoire is linked to effective emotion regulation and favourable psychosocial outcomes

(France & Hollenstein, 2017). One of the few ESM studies on momentary ER repertoire led by Grommisch et al. (2020) explored momentary ER repertoire in relation to well-being, finding that individuals employing active strategies had higher well-being than those employing suppression focused strategies. Besides, this study revealed that both the width and makeup of the repertoire were important factors in determining the relationship between the ER repertoire and overall well-being. Whether the size of momentary ER repertoire results in more effective stress recovery has not yet been fully explored.

Aim of the study

The study aims to support whether there is a positive significant association between the broadness of the momentary ER repertoire and momentary mental resilience. Besides, in this study, it is of interest to explore whether in moments where individuals use adaptive strategies (i.e., cognitive reappraisal, social support, and emotional expression) they report higher levels of momentary mental resilience compared to moments where individuals use maladaptive strategies (i.e., rumination and distraction). It is expected that there will be a significant positive relationship between assumed state adaptive strategies and mental resilience and a negative significant relationship between the assumed maladaptive strategies and mental resilience. Lastly, it will be explored whether using more different ER strategies in the same moment (i.e., a broader momentary ER repertoire) is associated with higher momentary mental resilience than using the adaptive state ER strategies (i.e., cognitive reappraisal, emotional expression, and social support).

Methods

Participants

This study aimed at a sample size of 150 participants composed of English-speaking people older than 18. Participants have been able to voluntarily sign up for the study by giving out their email addresses to the researcher. Convenience sampling to the network of the individual researcher has been used. All the participants had to read the informed consent (Appendix A) to be able to participate. Besides, approval from the Ethical Committee of the University of Twente has been obtained (No. 230631). Participants were not reimbursed for this study, but upon request, they could receive a personalised overview of the measurements. More precisely, the personalised report indicated to what extent the participant used certain ER strategies. A personalised report was proposed since that might have acted as an incentive for the participants to complete all the questionnaires, and hence might have increased the questionnaire completion rate. With regards to the exclusion criteria, participants that did not complete the baseline questionnaire, together with those who did not sufficiently complete the surveys have been removed from the sample.

Procedure

The whole study had a time frame of a week. A day before the start of the study, the participants received an email announcing that the study was about to begin the next day. Besides, they have been asked to download the Ethica app to create a participant account and sign up for the study through the usage of an indicated code. After having signed up on the app, participants had to fill out a baseline questionnaire, which will be explained later.

For the study itself, participants had to complete the same questionnaire 10 times a day throughout a week. The completion of each of the questionnaires took about 2 minutes. The participants received notifications at random times throughout the day within a one-and-a-half-hour time frame announcing that a new questionnaire is ready for them. Each of the questionnaires had to be completed within a timeframe of 15 minutes after receiving the notification to provide valid state measures. At the end of the study, participants have been told about the possibility of receiving a personalised report upon request.

Measures

Demographics

In the baseline questionnaire, demographic data has been collected. Participants have been asked to mention their age. Besides, it has been required of gender and nationality to be indicated.

Experience Sampling Measures

Momentary Mental Resilience

Momentary mental resilience has been operationalized as recovery from stressful daily events. To begin with, participants were asked to think about the most important event since the last beep and rate its pleasantness on a 7-point bipolar scale ranging from -3 (very unpleasant event) to +3 (very pleasant event). All scores below 0 (neutral event) were considered indicative of the occurrence of a stressful event, operationalized as “event stress”. Next, participants indicated their current stress level on a 7-point Likert scale ranging from 1 (not at all) to 7 (very). The recovery has been calculated by subtracting the stress rating at the current state (current stress) from the stress rating at the stressful event (event stress) following moments of stressful events. That way, recovery reflected to what extent the participants bounced back from stress

after experiencing a stressful event with larger recovery values indicating more momentary resilience.

Momentary ER Repertoire Size

To assess the momentary ER repertoire size, an item containing five options corresponding with the ER strategies of interest, mainly rumination, distraction, emotional expression, social support, and cognitive reappraisal has been used. Each option could be selected as an indicator of which ER strategies have been utilised from the last beep. Therefore, the more both state assumed adaptive and maladaptive ER strategies have been selected, the broader the momentary ER repertoire. The final variable of momentary ER repertoire has been created for each participant ranging from 0 to 5, with higher scores indicating a larger momentary ER repertoire size.

Adaptive & Maladaptive ER Strategies

To measure adaptive and maladaptive emotional regulation (ER) strategies, the aforementioned item was employed. The initial two response options within the item were indicative of maladaptive strategies, namely rumination and distraction. Conversely, the remaining three response options were associated with adaptive strategies, encompassing emotional expression, social support, and cognitive reappraisal. Hence, the variable measuring maladaptive strategies reflected the number of selected options pertaining to maladaptive strategies, with a maximum score of 2. On the other hand, the variable assessing adaptive strategies had a maximum value of 3, reflecting the number of selected options corresponding to adaptive ER strategies.

Statistical Analysis

For the data analysis, a multilevel regression model was used. The multilevel regression analysis was executed with the use of the statistical software R Studio (version 2022.01.1). Name was controlled for in all the analyses, accounting for the individual factor. To answer the first hypothesis, a multilevel regression analysis with momentary mental resilience as a dependent variable and state ER repertoire as the independent variable was conducted. For the statistical analysis of the second hypothesis, a multilevel regression model with state adaptive strategies and maladaptive strategies as independent variables and state mental resilience as a dependent variable was run. For the third hypothesis, a multilevel regression model with state ER repertoire size and state adaptive strategies as the independent variables and state mental resilience as the dependent variable was conducted.

Results

Participants

A convenience sample of 103 participants (Mean Age = 29.931) completed the survey. However, 15 people have been excluded from the study due to insufficient completion of the surveys and baseline questionnaire, leaving a final sample of 88 participants. Participants ranged in age from 19 to 81 (M = 29.931, SD = 13.637). From all the participants, there were 49 (56.32%) males, and 38 (43.68%) females. All participants gave written informed consent before participating (see Appendix A). The research was approved by the ethical committee of the University of Twente (No. 230631). The participants have been informed about the guidelines of the study before participating and gave their written consent.

Descriptive Statistics

The descriptive statistics provide a general overview of the stress level perceived by participants during the whole study, as well as how they recovered from the stress. This can be seen through the values of current stress, event stress, and recovery stress in Table 1. Additionally, the mean score, standard deviation, and range of the momentary ER repertoire, adaptive and maladaptive momentary ER strategies can be seen in Table 1.

Table 1

Descriptive Statistics of State ER Strategies

Measurements	N	*M*	*SD*	Range
Momentary ER repertoire	789	1.27	0.73	0 - 5
Adaptive State ER Strategies	789	0.66	0.69	0 - 3
Maladaptive State ER strategies	789	0.61	0.6	0 - 2
Event Stress	789	4.61	0.69	4 - 6
Current Stress	789	3.36	1.72	1 - 7
Recovery Stress	789	1.24	1.63	-3 - 5

Measures of Emotional Regulation Repertoire

Looking at the momentary ER repertoire, participants had between 0 and 5 strategies in their momentary ER repertoire ($M = 1.27$, $SD = 0.73$), meaning participants used one strategy on average. Besides that, participants had either between 0 and 3 strategies when it comes to the adaptive ($M = 0.66$, $SD = 0.69$) and between 0 and 2 when it comes to maladaptive state ER strategies ($M = 0.61$, $SD = 0.6$). The mean values for both adaptive and maladaptive strategies indicate that participants do not use one adaptive or maladaptive strategy on average. By looking at the mean values for the adaptive and maladaptive state strategies, it can be observed that participants used slightly more adaptive than maladaptive strategies.

Stress Measures

Some information regarding the stress level of the participants can be seen in Table 1. The current stress of the participants ranged between 1 and 7 ($M = 3.36$, $SD = 1.72$). The scores for the event stress ranged from 4 to 6 ($M = 4.61$, $SD = 0.69$). Lastly, the values for the recovery stress experienced, which reflects momentary mental resilience, ranged from -3 to 5 ($M = 1.24$, $SD = 1.63$).

Analysis Outcome

Hypothesis 1

In Table 2, the analysis results for the first hypothesis can be seen. According to the model for the first hypothesis, there was a non-significant relationship between momentary ER repertoire size and momentary mental resilience. The results indicate that using a larger range of state ER strategies is not associated with a higher momentary mental resilience than having a narrower state repertoire of momentary ER strategies. Hence, the first hypothesis is rejected.

Table 2

Results of the Multilevel Regression Model for the Relationship Between Momentary Mental Resilience and ER Repertoire

	Estimate	Std. Error	df-value	t-value	p-value
Intercept	1.07	0.15	210.45	6.89	<.001***
Repertoire	0.11	0.08	780.25	1.32	0.186

Note. Asterisks indicate statistical significance (*p < .05, ** p < 0.01, *** p < .001).

Hypothesis 2

In Table 3 and Table 4, the analysis results for the second hypothesis can be seen. For Hypothesis 2, there was a significant positive relationship observed for state adaptive strategies on momentary mental resilience and a non-significant relationship for state maladaptive strategies on mental resilience. The hypothesis that using state adaptive strategies results in higher momentary mental resilience than using assumed state maladaptive strategies is partially supported. Assumed state adaptive strategies were found to have a significant positive association with momentary mental resilience, suggesting that individuals who utilise more state adaptive strategies tend to have higher momentary resilience levels. However, the analysis did not find a significant effect of assumed state maladaptive strategies on momentary mental resilience.

Table 3

Results of the Multilevel Regression Model for the Relationship Between Momentary Mental Resilience and Assumed Adaptive ER Strategies

	Estimate	Std. Error	df-value	t-value	p-value
Intercept	1.10	0.13	112.53	112.53	<0.001
Adaptive	0.16	0.08	778.10	1.99	0.047

Note. Asterisks indicate statistical significance (*p < .05, ** p < 0.01, *** p < .001).

Table 4

Results of the Multilevel Regression Model for the Relationship Between Momentary Mental Resilience and Assumed Maladaptive Strategies

	Estimate	Std. Error	df-value	t-value	p-value
Intercept	1.25	0.13	121.17	9.60	<.001***
Maladaptive	-0.08	0.10	785.94	-0.80	0.422

Note. Asterisks indicate statistical significance (*p < .05, ** p < 0.01, *** p < .001).

Hypothesis 3

In Table 2 and Table 3, the analysis results for the third hypothesis are presented. According to the analysis run for the third hypothesis, there was a significant effect of adaptive strategies on momentary mental resilience, and a non-significant effect of the size of the

momentary ER repertoire on momentary mental resilience. Based on these results, the third hypothesis that using more different ER strategies in the same moment (a broader momentary ER repertoire) is associated with higher momentary mental resilience compared to using adaptive state ER strategies is not supported. The analysis did not find a significant association between the size of the momentary ER repertoire and momentary mental resilience. However, the use of adaptive strategies was found to be significantly associated with higher momentary mental resilience.

Discussion

Aim of the study

The purpose of this study was to see the association between the broadness of ER repertoire and momentary mental resilience. Another goal was checking whether applying assumed adaptive (i.e., strategies cognitive reappraisal, social support, and emotional expression) are associated with higher momentary mental resilience than assumed state maladaptive strategies (i.e., rumination and distraction), with a significant association expected for both, while positive for the adaptive and negative for the maladaptive. Lastly, this study aimed at checking if a broader ER repertoire is better than using adaptive state ER strategies cognitive reappraisal, emotional expression, and social support for higher mental resilience.

There was a non-significant association between the broadness of the momentary ER repertoire and momentary mental resilience. Additionally, in moments where individuals used adaptive strategies (i.e., cognitive reappraisal, social support, and emotional expression) they reported higher levels of momentary mental resilience compared to moments where individuals used maladaptive strategies (i.e., rumination and distraction). While there was a positive

significant association between assumed state adaptive strategies and momentary mental resilience, there was a non-significant association between assumed state maladaptive strategies and momentary mental resilience. Lastly, using more different ER strategies in the same moment (i.e., a broader momentary ER repertoire) was not associated with higher momentary mental resilience than using the adaptive state ER strategies (i.e., cognitive reappraisal, emotional expression, and social support).

ER profile

In line with the first hypothesis, an ESM study led by Grommisch et al. (2020) outlined the idea that not only the size of the ER repertoire might be important, but also the makeup of the ER profile. The ER repertoire consisting of active strategies is more associated with well-being than the ER profiles focused on suppression strategies (Grommisch et al., 2020), leading to the idea that a momentary ER repertoire composed of adaptive state ER strategies might be superior to a larger momentary ER repertoire consisting of mainly maladaptive state strategies.

Although the topic of state adaptive and maladaptive strategies is under-researched, few ESM studies prove the effectiveness of state adaptive strategies in stress recovery and the inefficiency of state maladaptive coping. State cognitive reappraisal is known to help individuals in reducing negative emotions following a stressful event (Blanke et al., 2022), state emotional expressivity is known to boost positive affect (Burgin et al., 2012), while a lack of engagement in state social support might alter mental health (Flett et al., 1995). Additionally, state rumination hinders stress recovery (LeMoult et al., 2013; Blanke et al., 2022), while an ESM study led by Yasinski et al. (2016) found that engaging in state distraction was associated with a decrease in negative emotion. This leads to the idea that although maladaptive strategies might be associated

with lower mental resilience, they can be adaptive for a short-term period, depending on the context when they are being used.

Context

According to Aldao et al. (2015), the adaptiveness of emotion regulation (ER) strategies is determined by their alignment with specific contextual goals. Previous research conducted by Cheng (2001) also supports the idea that problem-focused coping is adaptive in controllable situations, while emotion-focused coping is adaptive in uncontrollable contexts. However, this study did not consider the perceived control over the situation as a determinant. It becomes evident that the appropriateness of different momentary strategies can be influenced by the level of perceived control an individual has over their circumstances. Therefore, understanding the contextual factors, such as the degree of control or controllability, becomes essential for accurately assessing the relationship between state ER strategies and momentary mental resilience. It is important to note that ER adaptability is closely related to ER flexibility, which refers to the ability to implement suitable ER strategies based on contextual demands (Aldao et al., 2015).

Flexibility

A factor explaining that there is no association between the size of the state ER repertoire, assumed state maladaptive strategies and higher mental resilience might be emotional regulation flexibility. Flexibility in this regard is defined as a variability in the use of coping strategies over situations (Bonanno et al., 2011). Specifically, affective flexibility has been proposed to play a role in emotion regulation success (Ochsner & Gross, 2007). Besides, research supports that greater flexibility tends to be associated with adaptation to the

environment and better mental health (Aldao et al., 2015). Cheng (2001) found that participants displaying higher flexibility were able to better adapt to a specific situation. Moreover, people with a bigger ER repertoire might be able to implement adaptive strategies flexibly, and might thus benefit from them to a larger extent (Aldao and Nolen-Hoeksema, 2012; Aldao et al., 2014). To add, flexibility might explain why there has been found a significant relationship between assumed state maladaptive strategies and momentary mental resilience. According to Aldao et al. (2015), successful ER is not determined by the types of strategies utilised, but rather by the flexibility in their application depending on context. Therefore, affective flexibility might be a great factor to account for concerning mental resilience, since it promotes the adaptive utilisation of coping strategies and allows individuals to effectively respond to varying situational demands, ultimately contributing to higher levels of mental resilience.

Individual Differences

Individual differences play a crucial role in understanding the obtained results. Bonanno and Burton (2014) highlighted that individuals vary in their sensitivity to context, utilisation of emotion regulation (ER) strategies, and responsiveness to feedback. Moreover, individual differences exist in recognizing and adapting to specific circumstances, modifying cognitive and behavioural repertoires, maintaining balance across life domains, self-awareness, and commitment to personal values (Kashdan & Rottenberg, 2010). Cognitive control, which is associated with effective emotion regulation, also exhibits individual differences (Pruessner, 2020). The use of ER strategies has been linked to variations in cognitive control, involving the inhibition of automatic responses and the ability to shift mental states, ultimately impacting affective flexibility (Pruessner, 2020). This might be in line with the results from the first hypothesis by implying that simply having a larger repertoire of ER strategies does not guarantee

higher resilience if individuals do not effectively utilise or adapt these strategies to specific circumstances.

Additionally, gender may influence emotion regulation processes. Nolen-Hoeksema (1987) noted that women are approximately twice as likely as men to experience clinically relevant symptoms of depression. This gender difference could be attributed to women's tendency to employ passive and emotion-focused coping strategies more frequently than men (Thoits, 1995). Furthermore, women tend to engage in higher levels of rumination, which can contribute to prolonged distress (Nolen-Hoeksema, 1987). Studies have also found that women report higher levels of catastrophizing and rumination compared to men (Garnefski et al., 2004). These individual differences and gender-related factors contribute to the complexity of emotion regulation processes and can influence the observed outcomes. Gender-related factors, such as differences in coping strategies, may also contribute to the observed associations.

Limitations & Strengths of the Study

The study holds some limitations. The first limitation of this study is that there were some technical difficulties with the Ethica app. This eventually caused a higher dropout rate among the participants. The aforementioned limitation caused another one, which is the lack of statistical power of the sample. At first, it was intended for 150 students to participate, while 88 participants took part in this study at the end. As fewer subjects have been involved, it can be concluded that the statistical power lowered and the results are less reliable (Akobeng, 2016). Next, the representativeness of the sample is another concern of this study. As participation in this study has been voluntary and convenience sampling to the network of the individual researcher has been used, there was no randomised selection of the participants. In other words,

the conclusions driven from the sample could not be valid for the whole population (Maxwell, 2021).

The current study possesses some strong points as well. First of all, besides exploring the association between the broadness of the momentary ER repertoire and momentary mental resilience, it has also been researched whether a broader momentary ER repertoire is associated with higher momentary mental resilience than using assumed adaptive strategies cognitive reappraisal, emotional expression, and social support. Taking into account that the latter has not been researched, this study could potentially fulfil a gap in the literature.

Another strength of the study is its design since the Experienced Sampling Method (ESM) has been used. ESM is known to hold various benefits such as contributing to understanding deeper psychopathological phenomena, capturing variability in symptoms over time, and enabling to investigate the interaction between the individual and the environment in real-life situations (Myin-Germeys et al., 2018). Besides, using ESM helps in combating the problem of retrospective recall bias, which might increase the validity of the results (Myin-Germeys et al., 2018). To add, the study design is original, as few studies are exploring the association between the state ER strategies used and stress recovery by using ESM.

Conclusion

In summary, the study found no link between a wider range of emotional regulation strategies and increased momentary mental resilience. Moreover, moments when individuals employed adaptive strategies were associated with higher levels of momentary mental resilience compared to moments when maladaptive strategies were used. Additionally, the study showed

that employing a greater number of strategies in the moment did not lead to higher momentary mental resilience compared to using adaptive strategies alone.

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Appendix A

Informed consent

Dear participant,

Thank you for agreeing to be part of this research project conducted by students of the University of Twente. The data collection will take place from xx/04/2023 until xx/04/2023. This project aims at investigating mental resilience in relation to multiple factors [e.g. affective wellbeing, spirituality, emotional regulation] in your daily life in normal settings. When agreeing to participate in this study, you agree to contribute your responses to this research. There are no risks involved in participating in this study.

Participation in this research requires active involvement for a duration of a week. As a participant, you would have to first download an app on your phone, from which a short questionnaire will be made available. The completion of the questionnaire takes about 2 minutes. You will receive 10 notifications per day. It is required that you complete the short questionnaire within a timeframe of 30 minutes after receiving each notification.

Keep in mind that there are no right or wrong answers. This research relies solely on your experience. Therefore, we kindly ask you to honestly answer all questions. This will help the researchers get valuable and valid information for further conclusions.

After submitting the questionnaire and finalising the measurements via the application, your responses will be anonymised and handled with confidentiality. This ensures that the data cannot be traced back to you as a participant. The data will solely be used by the researchers and will not be shared with other parties. The retention of research data will take place until 01/08/2023.

In case of withdrawal from the study, feel free to contact one of the researchers mentioned below.

The study was approved by the BMS Ethics Committee.

If you have any questions after participating, please feel free to contact one of the researchers:
j.libosan@student.utwente.nl
v.barbaros@student.utwente.nl
m.mertens@student.utwente.nl
k.potter@student.utwente.nl
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h.unger@student.utwente.nl

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Consent Form for The Research on Mental Resilience

Please tick the appropriate boxes	**Yes**	**No**
Taking part in the study		
I have read and understood the study information dated [DD/04/2023]. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	☐	☐
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	☐	☐
I understand that I do not have to commit to all ten notifications, especially when operating machines or being unable due to various reasons.	☐	☐
Use of the information in this study	☐	☐
I understand that the information I provide will be used for research purposes, mainly investigating the interrelatedness between mental resilience and other variables [e.g. affective wellbeing, spirituality, emotional regulation].		
I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared beyond the study team and will be handled with confidentiality.	☐	☐
Future use and reuse of the information by others		
I give permission for the data that I provide to be archived as an anonymised survey database so it can be used for research.		

Signatures

_____	_____	_____
Name of participant [printed]	Signature	Date

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

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