

**EMOTION REGULATION IN ANXIETY AND DEPRESSION**

Examining Daily Life Use Of Strategies And Comparing Measurement Tools

by

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## Abstract

### Background

Stress is considered a risk factor for anxiety and depression, but the exact impact of stress on these conditions is unclear. Emotion regulation has been proposed as a mediating factor, but its use in daily life has not yet been investigated. Therefore, this study aims to investigate the associations between anxiety and depression symptoms and daily use of emotion regulation strategies in response to stress, by using the Experience Sampling Method (ESM). In addition, the ESM-measure will be compared with the Cognitive Emotion Regulation Questionnaire (CERQ).

### Method

48 participants engaged in an eight-day ESM procedure, in which they were asked to provide information about the occurrence of stressful events and what emotion regulation strategies they have used in response. Prior assessments measured anxiety and depression symptoms and emotion regulation strategies at trait level.

### Results

Contrary to expectations, linear regression analyses revealed no significant associations between the '*daily life use of problem solving*' or the '*daily life use of rumination*' and anxiety. Similarly, the '*daily life use of social sharing*' and the '*daily life use of distraction*' showed no significant associations with depressive symptoms. Surprisingly, the use of '*positive reappraisal*' exhibited positive associations with anxiety and depression. Comparisons between ESM items and CERQ subscales revealed a lack of correlations.

### Discussion

The study contains no evidence of an association between emotion regulation strategies in daily life and symptoms of anxiety and depression within a non-clinical sample. Moreover, the study suggests that the ESM items and the CERQ capture different aspects of emotion regulation. Although a distinction was made between anxiety and depression and how they regulate their emotions, a shared deficit in adopting a positive perspective was identified, contributing to the ongoing debate about the similarities and differences between these mental disorders.

## Samenvatting

### Achtergrond

Stress wordt gezien als een risicofactor voor angst en depressie, maar de precieze invloed van stress op deze aandoeningen is onduidelijk. Emotieregulatie wordt voorgesteld als een mediërende factor, maar het gebruik ervan in het dagelijks leven is nog niet onderzocht. Daarom heeft deze studie als doel de associaties te onderzoeken tussen angst- en depressiesymptomen en het dagelijks gebruik van emotieregulatiestrategieën in reactie op stress, door gebruik te maken van de Experience Sampling Method (ESM). Bovendien wordt de ESM-maat vergeleken met de Cognitive Emotion Regulation Questionnaire (CERQ).

### Methode

48 deelnemers namen deel aan een achtdaagse ESM-procedure, waarbij hen gevraagd werd informatie te geven over het optreden van stressvolle gebeurtenissen en welke emotieregulatiestrategieën ze gebruikten in respons hierop. Voorafgaande beoordelingen maten angst- en depressiesymptomen en emotieregulatiestrategieën op karaktertrek-niveau.

### Resultaten

Tegen de verwachting in lieten lineaire regressieanalyses geen significante associaties zien tussen het *'dagelijks leven gebruik van probleemoplossing'* of het *'dagelijks leven gebruik van ruminatie'* en angst. Ook het *'dagelijks leven gebruik van sociaal delen'* en het *'dagelijks leven gebruik van afleiding'* vertoonden geen significante associaties met depressieve symptomen. Verrassend genoeg vertoonde het gebruik van *'positieve herwaardering'* positieve associaties met angst en depressie. Vergelijkingen tussen ESM-items en CERQ-subschalen lieten een gebrek aan correlaties zien.

### Discussie

De studie bevat geen bewijs voor een verband tussen emotieregulatiestrategieën in het dagelijks leven en symptomen van angst en depressie binnen een niet-klinische steekproef. Bovendien suggereert het onderzoek dat de ESM-items en de CERQ verschillende aspecten van emotieregulatie vastleggen. Hoewel er onderscheid werd gemaakt tussen angst en depressie en de manier waarop zij hen emoties reguleren, werd er een gedeeld tekort in het aannemen van een positief perspectief geïdentificeerd, wat bijdraagt aan de voortdurende discussie over de overeenkomsten en verschillen tussen deze psychische aandoeningen.

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## **Introduction**

Anxiety and depression are enduring mental health problems that affect millions of individuals worldwide (Santomauro et al., 2021). The conditions are highly comorbid (Kalin, 2020) and stress has been identified as a significant risk factor for the development of the symptoms (Pêgo et al., 2009). Understanding the mechanisms by which stress influences anxiety and depression, which remains uncertain, is crucial for advancing the comprehension of these complex conditions.

### **The role of emotion regulation**

Barber et al (2023) propose a potential pathway between experiencing stress and symptoms involves emotion regulation. Emotion regulation, defined as the application of cognitive and behavioral strategies that modulate emotional responses (Ochsner et al., 2012), comprises both maladaptive and adaptive strategies, which are respectively linked to negative and positive outcomes (Garnefski et al., 2001). An illustration of the pathway Barber et al propose can be found in the maladaptive emotion regulation strategy of worrying, which heightens distress levels (Huang et al., 2009). This, on its turn, increases ones sensitivity to stress (Jamil & Llera, 2021) which subsequently elevates the likelihood of developing symptoms of anxiety and depression. Conversely, employing adaptive strategies contributes to resilience (Min et al., 2013) – that is the process and outcome of successfully adapting to difficult situations, such as stress (Southwick et al., 2014) – hereby acting as a protective factor against the development of anxiety and depression (Song et al., 2021). Yet, apart from stress as a contributing factor, emotion regulation itself is also known to be a risk factor. It is even argued that emotion regulation serves a transdiagnostic function, as impairments in emotion regulation are found across numerous disorders, including anxiety and depression (Everaert & Joormann, 2019; Joormann & Vanderlind, 2014). Another established impression posits that emotion regulation plays a role in the maintenance of symptoms (Barlow et al., 2004, as cited in Tortella-Feliu et al., 2010). In general, the more symptoms an individual experiences, the more likely it is they will engage in maladaptive strategies and the less likely it is they will engage in adaptive strategies (Schäfer et al., 2016). This, in turn, further exacerbates symptoms (Berking et al., 2014; Hatzenbuehler et al., 2008; Iqbal & Dar, 2015; Koval et al., 2012; Starr et al., 2016), increasing the use of maladaptive strategies and so on, highlighting the detrimental and cyclical process in these mental health conditions.

### **Patterns in emotion regulation associated with anxiety and depression**

Anxiety and depression share common challenges in adopting effective emotion regulation strategies. Individuals in each group often lean towards the maladaptive strategy of '*suppression*', whereas they fail to employ the adaptive strategy of '*cognitive reappraisal*' (Betts et al., 2009; Eastabrook et al., 2013; Lantaigne et al., 2014; Dryman & Heimberg, 2018). However, there is also a compelling rationale to believe that individuals with anxiety symptoms employ different emotion regulation strategies than those with depressive symptoms (Domaradzka & Fajkowska, 2018). Anxiety, for instance, is positively associated with the strategy of '*ruminating*', which is characterized by persistent and intrusive thoughts about distressing situations (D'Avanzato et al., 2013; Domaradzka & Fajkowska, 2018; Garnefski & Kraaij, 2007). While this strategy seemingly serves as a method for processing potential threats or uncertainties, it is often counterproductive as it tends to only exacerbate negative thoughts and emotions. Conversely, symptoms of anxiety are negatively linked to '*problem solving*' strategies (Carver et al., 1989; Garnefski et al., 2001), suggesting individuals with anxiety struggle to adopt practical and solution-oriented approaches to relieve distress. On the other hand, depression is negatively associated with '*distraction*' (Garnefski et al., 2001; Joormann & Stanton, 2016) and '*social sharing*' strategies (Kahn & Garrison, 2009; Rude & McCarthy, 2003). This implies that individuals with depressive symptoms find it difficult to divert their attention away from negative cognitions and highlights a reluctance to seek emotional support, both contributing to the social isolation often experienced by those dealing with depression. Concludingly, though depression and anxiety share common challenges in adopting effective emotion regulation strategies, specific differences in the use of strategies are also found. Further investigating the nuanced differences and commonalities between these prevalent mental health disorders, especially during their early stages, offers valuable insights into their foundational aspects which can inform early treatment opportunities.

### **Research methods investigating emotion regulation**

There is a noticeable gap in the literature when it comes to the research methods that are generally employed investigating emotion regulation. Retrospective questionnaires are widely used, and while they capture an individual's general inclination towards a strategy, using these instruments potentially compromises ecological validity (Stone & Shiffman, 2010) through the introduction of self-report biases, including recall bias (Althubaiti, 2016). Problematically, these biases are generally more prominent in individuals with anxious or depressive symptoms in the first place (Hertel, 2002). The Experience Sampling Method (ESM) circumvents these

issues to a certain degree. This method involves a structured diary approach, where individuals offer self-reports on their day to day behaviour, cognitions or emotions, typically by utilizing electronic devices in their natural environment (Trull & Ebner-Priemer, 2009). This offers insights into fleeting phenomena as emotion regulation strategies, thereon potentially mitigating recall bias and strengthening (ecological) validity (Shiffman et al., 2008). Several studies utilizing the ESM to investigate emotion (regulation) have been conducted and their findings generally align with previous results. However, they also come with certain limitations. A meta-analysis by Boemo et al. (2022) only focusses on affect and therefore does not fully grasp the concepts of anxiety or depression. Similarly, Pawluk et al.'s (2021) study exclusively centers on emotions, neglecting the broader context of emotion regulation. To the best of knowledge, there has been a notable absence of research dedicated to investigating the connection between early symptoms of anxiety and depression and the utilization of emotion regulation strategies using ESM. Furthermore, it remains unexplored whether a self-reported tendency aligns with the actual use of an emotion regulation strategy in one's daily life. Several studies have shown that outcomes derived from questionnaires and ESM data are generally similar (Fazeli & Turan, 2019; Rah et al., 2006), yet Koval et al (2023) argue this is not the case for emotion regulation.

### **Study aim and hypotheses**

This study seeks to address several gaps by examining the use emotion regulation strategies in response to stressful events using the ESM, specifically targeting individuals with subclinical symptoms of anxiety and depression. Drawing on previous research, the following hypotheses are formulated: 1) Individuals reporting higher levels of anxiety report more '*daily life use of rumination*' and less '*daily life use of problem solving*' in response to stressful events than individuals reporting fewer symptoms of anxiety and 2) Individuals reporting higher levels of depression report fewer '*daily life use of distraction*' and '*daily life use of social sharing*' in response to stressful events than individuals reporting fewer symptoms of depression. Moreover, the study investigates the potential correlation between the questionnaire employed in the ESM method and a retrospective questionnaire on emotion regulation, through an exploratory hypothesis.

## **Method**

### **Study design**

The current study is part of two larger studies (De Calheiros Velozo et al., 2021; De Calheiros Velozo et al., 2022), which together involved two laboratory sessions, multiple

baseline measures and multiple ESM measures. The current study focuses on two baseline measures and two variables originating from the ESM data, making it secondary research. Participants completed the baseline questionnaires via RedCap during the first laboratory session. That same day, participants were briefed on the ESM procedure, emphasizing the importance of fast responses to signals, while permitting the option to miss signals. Participants were also prompted to make minimal adjustments to their routines. Subsequently, participants received a research phone for eight consecutive days. The phone emitted signals at 10 semi-random times a day, prompting participants to respond to a series of questions. Instructions specified that responses should pertain to the moment immediately preceding each signal. The time intervals between each notification ranged from 15 to 90 minutes.

## **Participants**

For this study participants were recruited via flyers that were distributed online and around important areas in Leuven, Belgium, such as student campuses, train stations, supermarkets and libraries. There were no inclusion criteria. Potential participants were excluded if they were not fluent in Dutch, if they had an allergy to the ECG patch used in the laboratory session or if they had any hormonal – or cardiovascular disorders. All participants gave informed consent prior to participating in the study. Participants were rewarded 30 euros per laboratory session and fifty eurocents per ESM measure they completed. The *Sociaal-Maatschappelijke Ethische Commissie* of the Catholic University Leuven granted ethical approval for the study.

## **Measures**

### ***Retrospective measures***

***Symptoms of anxiety and depression.*** The severity of symptoms of anxiety and depression were measured using the Dutch Symptom Checklist 90 Revised (SCL-90-R). This self-report measurement comprises of eight subscales. Participants were presented different psychopathological symptoms in the form of statements, such as *‘worrying too much about things’* and *‘feeling hopeless about the future’*. Participants then indicated the extent to which they experienced these symptoms over the past seven days. They did this on a five-point Likert Scale, ranging from 0 = *‘not at all’* to 4 = *‘very much’*. For the purposes of this study, the relevant variables – *‘symptoms of anxiety’* and *‘symptoms of depression’* – were computed by calculating the mean of the anxiety and depression subscales. The subscale anxiety comprised 10 items, the subscale depression consisted out of 15 items. In the present sample, the SCL-90-



R demonstrates an overall internal consistency of .96, with subscale internal consistencies of .85 for anxiety and .89 for depression.

***Trait level use of emotion regulation strategies.*** The Cognitive Emotion Regulation Questionnaire (CERQ) was employed to measure the participants use of emotion regulation strategies. The self-report instrument specifically aims to measure an individual's general style of responding to negative life events (CERQ, n.d.). This questionnaire includes 36 items and nine subscales. Each subscale consist of four items. Participants responded to statements reflecting the use of a certain emotion regulation strategy and indicated the extent to which they employ that strategy in general. They did this on a five-point Likert Scale, ranging from 1 = 'never' to 5 = 'always'. For the purposes of this study – wherein the variables of interest are 'trait level use of... self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing and other blame' – the mean was calculated for each subscale. Example items per subscale and the internal consistency of that scale as measured in the current sample, are provided in table 1.

**Table 1**

*CERQ subscales, example items and internal consistency*

Subscale	Example item	Internal consistency current sample
Self-blame	<i>'I feel that I am the one who is responsible for what has happened'</i>	.797
Acceptance	<i>'I think I have to accept that this has happened'</i>	.756
Rumination	<i>'I am preoccupied with what I think and feel about what I have experienced'</i>	.958
Positive refocusing	<i>'I think of something nice instead of what has happened'</i>	.818
Refocus on planning	<i>'I think about a plan of what I can do best'</i>	.824
Positive reappraisal	<i>'I think that I can become a stronger person as a result of what has happened'</i>	.839
Putting into perspective	<i>'I tell myself that there are worse things in life'</i>	.780
Catastrophizing	<i>'I continually think how horrible the situation has been'</i>	.775
Other blame	<i>'I feel that others are responsible for what has happened'</i>	.861

### ***ESM measures***

***Daily life stressful events.*** To assess the occurrence of daily life stressful events participants were prompted with a single question, asking them to reflect on the most significant event that occurred since the last signal. Participants were asked to categorize that event on a seven-point Likert scale, from -3 = ‘*very unpleasant*’ to 0 = ‘*neutral*’ and 3 = ‘*very pleasant*’. This item was adopted from a study by Myin-Germeys et al. (2001). To obtain the variable relevant to this study – a dichotomous categorization of stressful events – a cut-off point was used, where all events classified from -3 to -1 are coded as unpleasant and all events classified from 0 to 3 are coded as neutral/pleasant.

***Daily life use of emotion regulation strategies.*** To measure the daily life use of emotion regulation strategies in response to stressful events, a six-item questionnaire was utilized in the ESM procedure. In this survey, each item measured the extent to which a distinct emotion regulation strategy was employed in response to a stressful event, using a seven-point Likert scale ranging from 1 = ‘*totally not*’ to 7 = ‘*very*’. The items originated from different questionnaires on coping and emotion regulation and were adapted to be fitting for the daily life aspect by the authors from the larger study (De Calheiros Velozo et al., 2021; De Calheiros Velozo et al., 2022) this study is part of. The items and their corresponding emotion regulation strategy are included in table 2. To obtain the six variables of interest – namely, ‘*daily life use of... acceptance/reappraisal, rumination, avoidance/distraction, problem solving, social sharing and expression of emotions*’, where the score reflects the average frequency an individual employs that strategy in response to stressful events – a mean score was calculated for each of the six strategies per participant, by taking the mean of the individuals responses recorded throughout the eight-day period.

**Table 2**

#### *ESM-questionnaire*

Daily life use of emotion regulation strategies	Statement
Acceptance/reappraisal	<i>‘I tried to accept it or to look at it in a different way’</i>
Rumination	<i>‘I kept thinking about it’</i>
Avoidance/distraction	<i>‘I tried to avoid it or to distract myself’</i>
Problem solving	<i>‘I tried to find a solution’</i>
Social sharing	<i>‘I spoke about it with someone’</i>
Expression of emotions	<i>‘I expressed my emotions’</i>

## Statistical analyses

All variables were calculated using Microsoft Excel. The statistical analyses were conducted using IBM SPSS version 28.0.1.0 (142). First of all, the cases were filtered based on the occurrence of stressful events, so that only those were included in which a stressful event had occurred before engaging in a specific emotion regulation strategy. Then, the four assumptions of linear regression were tested. Linearity was checked using a scatterplot. Homoscedasticity was investigated by plotting the standardized predicted values and the standardized residuals on a scatterplot. Independence between observations was assessed by performing a Durbin Watson statistic. Normality of the residuals was checked using a PP-plot. To assess the first hypothesis, which poses an association between symptoms of anxiety and the strategies of '*daily life use of rumination*' and '*daily life use of problem solving*' in response to experiencing stressful events, linear regression analyses were conducted. Anxiety served as a dependent variable, while the daily life use of emotion regulation strategies served as the independent variables. Similarly, linear regression analyses were conducted to investigate the second hypothesis, which suggests an association between symptoms of depression and the strategies of '*daily life use of distraction*' and '*daily life use of social sharing*' in response to experiencing stressful events. Depression served as a dependent variable, while the daily life use of emotion regulation strategies served as the independent variables. Within all linear regression analyses there was controlled for age, gender, nationality, level of education, marital status and work. Finally, the exploratory hypothesis, which examines the correlation between the ESM measure and the CERQ, was assessed using Pearson's correlation co-efficient. This process entailed comparing each item of the ESM questionnaire with each subscale of the CERQ. Additionally, a Bonferroni measure of correction was executed.

## Results

### Sample description

The recruiting process yielded a sample of 58 healthy participants. Four participants were excluded as they did not fill in any of the relevant measures. Six participants were excluded as they did not experience any stressful events during their participation. The final sample consisted of 48 participants, aged between 19 and 35 (mean age 24.17, SD = 3.0). Among these participants 85.4% identified as female, the remaining participants identified as male. Of the participants 93.8% had a Belgian nationality, the remaining were Dutch. 60% of the participants were university students from different fields, such as medicine, biomedical science, history and arts. The remaining 40% were working. Descriptive statistics for the

variables of interest in this study are included in table 3. Notable is the mean level of anxiety and depression, which respectively stands at 0.53 and 0.74. Various samples (Nojomi & Gharayee, 2007; Prinz et al., 2013; Tselebis et al., 2011) exhibit similar levels of symptoms, ranging between 0.44 and 1.27 for anxiety and ranging between 0.54 and 1.73 for depression.

**Table 3**

*Descriptive statistics*

Variable	Mean	Standard deviation	Min	Max
SCL-90-R				
Symptoms of anxiety	0.53	0.86	0	2
Symptoms of depression	0.74	1.05	0	2.53
ESM questionnaire				
Daily life use of rumination	3.08	1.28	1	6.5
Daily life use of avoidance/distraction	2.95	1.24	1	5
Daily life use of problem solving	3.56	1.21	1	7
Daily life use of social sharing	2.85	1.33	1	7
Daily life use of expression of emotions	2.63	1.22	1	6.5
CERQ				
Trait level use of self-blame	2.62	0.93	1	5
Trait level use of acceptance	3.55	0.80	1	5
Trait level use of rumination	3.31	1.06	1	5
Trait level use of positive refocusing	2.69	0.92	1	4.5
Trait level use of refocus on planning	3.75	0.86	2	5
Trait level use of positive reappraisal	3.39	0.98	1.25	5
Trait level use of putting into perspective	3.41	0.92	1.25	5
Trait level use of catastrophizing	1.57	0.67	1	4.5
Trait level use of other blame	1.60	0.71	1	4.75

**Assumption checks**

The four principal assumptions for linear regression were assessed prior to performing the analyses. The assumptions of linearity and normality are accepted. The assumption of homoscedasticity is violated, specifically in the case of depression while being acceptable for anxiety. This implies the variability of errors differs across levels of the independent variables, indicating the precision of the observations might be compromised. Although linear regression

is generally robust to this violation in larger sample sizes, caution is warranted in interpreting the results. Additionally, the assumption of independence between observations is violated, which challenges the validity of the linear regression. No additional measures were taken, as the sample size is presumably large enough and thus robust for these violations.

### **Hypothesis 1: anxiety and daily life use of ‘rumination’ and ‘problem solving’**

Hypothesis 1 is rejected as neither the ‘*daily life use of problem solving*’ ( $R^2 = .848$ ,  $F(1, 46) = 3.182$ ,  $p = .773$ ,  $\beta = -.023$ ) nor the ‘*daily life use of rumination*’ ( $R^2 = .848$ ,  $F(1, 46) = 3.182$ ,  $p = .516$ ,  $\beta = .057$ ) was significantly associated with symptoms of anxiety. These results suggest that greater (or lower) levels of anxiety do not predict more (or less) daily life usage of the strategies ‘*rumination*’ or ‘*problem solving*’.

### **Hypothesis 2: depression and daily life use of ‘distraction’ and ‘social sharing’**

Hypothesis 2 is rejected as neither the ‘*daily life use of social sharing*’ ( $R^2 = .882$ ,  $F(1, 46) = .4334$ ,  $p = .318$ ,  $\beta = -.106$ ) nor the ‘*daily life use of distraction*’ ( $R^2 = .882$ ,  $F(1, 46) = .4334$ ,  $p = .418$ ,  $\beta = .057$ ) was significantly associated with symptoms of depression. These results suggest that greater (or lower) levels of depression do not predict more (or less) daily life usage of the strategies ‘*social sharing*’ or ‘*distraction*’.

### **Explorative hypothesis: correlation ESM measure and CERQ**

Finally, Pearson’s correlation was conducted to examine the association between the ESM items and the CERQ subscales. The corresponding results are presented in table 4. The results regarding the strategies that are measured by both the ESM questionnaire and the CERQ are noteworthy, which involves the strategies of ‘*acceptance*’ and ‘*rumination*’. Additionally, the ESM item of ‘*problem solving*’ and the CERQ subscale of ‘*refocus on planning*’ share a conceptual overlap. This is substantiated by D’Zurilla and Goldfried’s (1971) definition of problem solving which aligns with the description of the ‘*refocus on planning*’ subscale in the CERQ (Garnefski & Kraaij, 2007). Yet despite both measures intending to assess three of the same emotion regulation strategies, there is no significant correlation between them regarding any of these strategies. Only one correlation stands out as significant, the ESM item of ‘*acceptance/reappraisal*’ positively correlates with the CERQ subscale of ‘*rumination*’. However, after performing a Bonferroni correction, this result is no longer statistically significant.

**Table 4***Correlation matrix ESM items and subscales CERQ*

Subscales CERQ	ESM items					
	Acceptance/ reappraisal	Rumination	Avoidance/ distraction	Problem solving	Social sharing	Expression of emotions
Self-blame	r = .019	r = -.043	r = -.031	r = .123	r = -.012	r = .021
Acceptance	r = .088	r = -.195	r = -.032	r = .022	r = -.143	r = -.228
Rumination	r = .394**	r = .212	r = .249	r = .201	r = .076	r = .107
Positive refocusing	r = .096	r = .094	r = -.004	r = .027	r = -.051	r = -.059
Refocus on planning	r = .226	r = .059	r = -.069	r = .265	r = -.005	r = .045
Positive reappraisal	r = .232	r = -.056	r = -.014	r = .017	r = .057	r = .126
Putting into perspective	r = -.009	r = -.230	r = -.235	r = .000	r = -.163	r = -.185
Catastrophizing	r = .130	r = .017	r = .239	r = .035	r = .077	r = .088
Other blame	r = .027	r = -.079	r = .014	r = .016	r = -.007	r = .068

\* $p < 0.05$ . \*\* $p < 0.01$ .**Post hoc analyses**

The lack of significant findings for the first two hypothesis was unexpected. This prompted a series of post hoc analyses into potential associations between symptoms of anxiety and depression and the other emotion regulation strategies as measured by the ESM questionnaire and the CERQ. The post hoc analyses concerned linear regression analyses, where symptoms of either anxiety or depression served as the dependent variable. All of the emotion regulation strategies as measured by both the ESM questionnaire and the CERQ were added to the models as independent variables. Within all linear regression analyses there was controlled for age, gender, nationality, level of education, marital status and work. The results on these measures are included in table 5. A number of results are noticeable. The use of the strategies ‘*self-blame*’ and ‘*catastrophizing*’ are significantly associated with symptoms of depression. Additionally, the use of ‘*refocus on planning*’ is significantly associated to anxiety. The correlation coefficients for these strategies are consistently positive, indicating greater levels of symptoms predict more usage of these strategies. The strategy of ‘*positive reappraisal*’ is related to both anxiety and depression, however, negatively, indicating that greater levels of symptoms predict less usage of that strategy. Notably, these results are only seen in relation to the CERQ. None of the strategies as measured by the ESM questionnaire reveal associations with symptoms.

**Table 5***Post hoc analyses*

Item / subscale	Model fit 1: anxiety		Model fit 2: depression	
	R <sup>2</sup> = .848		R <sup>2</sup> = .882	
	F (1,46) = 3.182		F (1, 46) = 4.344	
	$\beta$	SE	$\beta$	SE
ESM questionnaire				
Acceptance / reappraisal	-.025	.073	.082	.074
Rumination	.057	.086	.101	.087
Avoidance / distraction	.105	.068	.057	.069
Problem solving	-.023	.078	-.086	.079
Social sharing	-.126	.102	-.106	.104
Expression of emotions	.099	.113	-.030	.114
CERQ				
Self-blame	.114	.079	.177*	.080
Acceptance	.098	.102	.112	.103
Rumination	.071	.096	-.003	.097
Positive refocusing	-.062	.098	-.056	.100
Refocus on planning	.279*	.117	-.094	.119
Positive reappraisal	-.415**	.132	-.281*	.134
Putting into perspective	.041	.096	-.103	.098
Catastrophizing	.264	.147	.460**	.150
Other blame	-.148	.128	-.110	.130

\* $p < 0.05$ . \*\* $p < 0.01$ .

### Discussion

The aim of the current study was to identify the emotion regulation strategies individuals with anxious and depressive symptoms employ in their daily lives in response to stressful events, and to investigate how this correlates with results from a retrospective questionnaire. Notably, the findings, drawn from a non-clinical sample, diverge from prior research conducted in clinical samples. In contrast to expectations, the results demonstrate that there is no significant association between anxiety and the daily life use of ‘*problem solving*’ and ‘*rumination*’, and likewise no significant association between depression and the daily life use of ‘*social sharing*’ and ‘*distraction*’. Post hoc analyses uncovered significant associations between symptoms and other strategies. The use of the strategy ‘*positive reappraisal*’ is

significantly associated to both depression and anxiety. Remarkably, none of the strategies measured by the ESM questionnaire exhibit associations with symptoms. An exploratory comparison between the six-item ESM questionnaire and the CERQ revealed that subscales aiming to measure the same strategy do not correlate.

### **Unexpected findings**

The unexpected absence of the anticipated results in the ESM method, in contrast to established findings (Carver et al., 1989; D'Avanzato et al., 2013; Domaradzka & Fajkowska, 2018; Garnefski et al., 2001; Garnefski & Kraaij, 2007; Joormann & Stanton, 2016; Kahn & Garrison, 2009; Rude & McCarthy, 2003), raises a question about whether this discrepancy is tied to the method itself. However, the observed deviation is not unique to the ESM questionnaire, as the expected associations are also missing in the CERQ. This challenges the assumption that the findings can be solely attributed to the ESM method. Rather, these results imply a more widespread issue, as the current study does not find evidence that in the general population there is an association between the proposed emotion regulation strategies and anxiety and depression. This highlights that difficulties in emotion regulation might manifest differently in those with subclinical symptoms.

The unforeseen findings may be rooted in a potential bias in the current research. Everaert and Joormann (2019) underscore this crucial point: past studies have predominantly concentrated on the disorder level. This sustained focus on high symptomatology could have influenced the formulation of the current hypotheses, creating the misalignment of the results from the expectations, especially in relation to the low levels of symptoms as observed in the current sample. The surprising results may also be attributed to this seemingly low reported levels of anxiety and depression within the sample itself, a presumption substantiated by Shukla and Pandey (2019). The current findings align with their notion that differences in emotion regulation are not easily discerned at a subclinical level and this highlights a noticeable gap in our understanding. Clinical samples consistently demonstrate distinct patterns of emotion regulation, while the present results indicate that those with minimal symptoms display no discernable patterns or that they employ different strategies in regulating their emotions. This prompts the question; how do these trajectories develop and what occurs in between these extremes? This emphasizes the necessity for clarification, particularly in understanding the trajectory that connects the two ends of the spectrum. To achieve a thorough understanding, it is essential to investigate how emotion regulation is intricately linked to the development of symptoms. Sheppes et al.'s (2015) *'process model of emotion regulation'* proves insightful for



this purpose. This model explains that at a subclinical level of symptoms individuals may opt for a maladaptive strategy because they perceive it as positive (Dugas & Koerner, 2005). Using this maladaptive strategy provides temporary relief from negative emotions, reinforcing the positive label that initially determined the adoption of that strategy. This, in turn, heightens the likelihood of repeated use. However, persistently utilizing maladaptive strategies can generate a vicious negative cycle, where emotions are not effectively addressed, resulting in an escalation of symptoms and, eventually, the development of anxiety or depression. The utilization of longitudinal research offers a practical approach to delve into this proposed process. It allows for the investigation of the trajectory from subclinical to clinical symptoms and its interplay with emotion regulation strategies, which will inform early intervention opportunities and the prediction of progression.

### **An ongoing debate; the distinction between anxiety, depression and emotion regulation**

While the anticipated results remained elusive, the study uncovered distinct emotion regulation strategies utilized by individuals with anxiety as opposed to those with depressive complaints. This observations aligns with several studies indicating a divergence in regulation approaches between the two groups (Domaradzka & Fajkowska, 2018). Despite these differences, the current study also identified an overlap between anxiety and depression concerning the employment of the *'positive reappraisal'* strategy. This implies that individuals with symptoms of anxiety or depression both face substantial challenges in adopting a positive perspective, aligning with previous research indicating a similarity in emotion regulation between anxiety and depression (Bjureberg et al., 2015; Shukla & Pandey, 2019). Recognizing this common deficit holds implications for therapeutic interventions, specifically for the subclinical group of clients. Notably, approaches such as Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment Therapy (ACT) have demonstrated efficacy in reducing symptoms of anxiety and depression within clinical groups (Cuijpers et al., 2016; Forman et al., 2007). This effectiveness may be attributed to their emphasis on enhancing (positive) reappraisal skills (Butts & Gutiérrez, 2018; Karwoski et al., 2006), a notion reinforced by the current study's results. Considering that the deficit in (positive) reappraisal skills extends to a subclinical group, this suggests that these therapeutic approaches might extend their effectiveness to individuals with lower symptom levels. This underscores the potential broader applicability of CBT and ACT in addressing emotion regulation challenges across a spectrum of symptom severities. Overall, the findings underscore the importance of focusing on learning adaptive strategies, rather than solely targeting the unlearning of

maladaptive ones. This aligns with Berking et al.'s (2008) perspective that cultivating effective emotion regulation strategies is integral to symptom management. However, it is essential to note that this assertion is not reflected by the ESM results, leaving uncertainty about its applicability to real-life situations.

Concludingly, the study's results contribute to the ongoing discourse surrounding anxiety, depression and their potential similarities or difference in emotion regulation. The identified similarity lends support to the transdiagnostic perspective, proposing that certain emotion regulation difficulties may transcend traditional diagnostic boundaries (McLaughlin & Nolen-Hoeksema, 2011; Sloan et al., 2017). From a broader viewpoint, the findings of this study contribute to the discussion on whether anxiety and depression are different at all, beyond their connection to emotion regulation. This discourse, enduring over time, frames depression and anxiety as a single, common, indistinguishable condition that present in different forms (Costa & McCrea, 1995; Watson, 2009; Zinbarg et al., 2009, as cited in Pomerantz & Rose, 2014). The current findings both support and contradict this notion, once again highlighting the intricate relationship between anxiety and depression.

### **Measures of emotion regulation strategies: the CERQ and ESM**

In contrast to expectations derived from previous research, both the ESM data and the information from the CERQ failed to reveal any of the anticipated associations. Moreover, the two measures show minimal overlap, prompting a critical examination of the chosen methods. Primarily, the results must be approached with a commitment to take them seriously. If the lack of associations accurately reflects the emotional experiences of these individuals in their daily lives, it raises the possibility that the ESM questionnaire and the CERQ may be capturing dissimilar things. The inherent differences between retrospective questionnaires – which are affected by memory (Althubaiti, 2016) and mood (Marino et al., 2009) – and the daily assessment through ESM illustrates this notion. The former may measure one's memory on how they deal with stressful events in general, while the latter captures real-time fluctuations and nuances in emotion regulation strategies, offering a rationale for why such different results are found. Existing literature also highlights the influence personal factors on the instruments. Particularly, individuals characterized by high levels of neuroticism tend to retrospectively overestimate their experience of negative emotions and associated symptoms in questionnaires in comparison to ESM (Fazeli & Turan, 2019; Goetz et al., 2013; Perrine & Schröder, 2005; Stone et al., 2005). These insights prompts a critical assessment of the usefulness of retrospective questionnaires. Although they provide a valuable means to explore individuals'

perceptions of their emotional experiences, it is crucial to recognize their limitations in capturing real-time nuances due to biases and the influence of personal factors. However, the ESM is not without its limitations either. One of the issues pertains to participant fatigue. Although there is no evidence this problem occurred in the current sample, researchers often resort to single-item questionnaires to prevent participant burden (Dejonckheere et al., 2022). This study utilized a six-item questionnaire, where each item was dedicated to a specific emotion regulation strategy, hereby resembling the structure of a single-item questionnaire. This inherent simplification may overlook the intricate and multifaceted (Cerin et al., 2001) nature of emotion regulation, which is, on its turn, addressed in the CERQ. Conclusively, while limitations are present in both measures, they also exhibit individual strengths. Thus, users of these instruments are encouraged to critically consider these aspects to guide their choices of measurement, both in research and in clinical practice.

### **Strengths and limitations**

The current study's inherent strength lies in its dual focus on both anxiety and depression, facilitating the identification of differences and similarities between these conditions. This approach contributed to the ongoing discourse regarding the distinctions and commonalities between anxiety and depression. However, current sample also faces a noticeable gender imbalance, which limits the generalizability of the findings. The utilization of the ESM and its use in capturing the daily life deployment of emotion regulation strategies stands as a strength. The approach addresses a critical research gap in existing literature and provides a nuanced exploration that reaches beyond conventional retrospective measures. However, it is important to recognize the inherent limitations associated with ESM. Particularly participant fatigue is a noteworthy concern. In this study participants were prompted to provide data up to 80 times in total. The repetitive nature of these prompts could have reduced engagement over time, potentially leading to abnormal variations in response patterns attributed to repetitive answering or speedy responses. This could have affected the reliability of the data and while acknowledging this possibility, it is worth noting that there is no supporting evidence for this assertion. While the comparison between the ESM measure and the CERQ allowed a critical examination of both measurement tools, it is noteworthy that neither of the instruments account for the complex nature of emotion regulation. This limitation underscores the recommendation to enhance the instruments or to refine the study design, by incorporating personal and contextual factors as variables of interest. Addressing these considerations could further strengthen the precision and applicability of the study's findings.

## **Conclusion**

The primary finding of this study is a lack of evidence supporting an association between daily life use of emotion regulation strategies in response to stress and symptoms of anxiety and depression within a non-clinical sample. This absence was consistently observed in both the ESM questionnaire and the CERQ, indicating that the methodology itself may not be the source of this unexpected finding. Rather, it highlights a potential difference in how emotion regulation operates in sub-symptomatic samples. Moreover, the study underlines a lack of correlation between the ESM questionnaire and the CERQ, raising the possibility the measures may be capturing dissimilar things. Factors such as neuroticism and the oversight of the multifaceted nature of emotion regulation may have contributed to these disparities. These factors demand increased attention in refining existing instruments or in designing new studies. Despite the unexpected absence of anticipated results, the research did uncover other distinctions between anxiety and depression, emphasizing their unique characteristics as mental health conditions. Even at low symptom levels, the study underscores the importance of recognizing potential problems in emotion regulation. Notably, a shared deficit in adopting a positive perspective was identified in both anxiety and depression, reinforcing the argument that cultivating effective emotion regulation strategies is essential to symptom management. Moreover, these findings contribute to the ongoing discussion about the similarities between anxiety and depression.

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