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► **To cite this version:**

Marine Paucsik, Carla Nardelli, Catherine Bortolon, Rebecca Shankland, Christophe Leys, et al..
Self-compassion and emotion regulation: testing a mediation model. *Cognition and Emotion*, 2022,
10.1080/02699931.2022.2143328 . hal-03850726

HAL Id: hal-03850726

<https://hal.science/hal-03850726v1>

Submitted on 5 Sep 2024

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Self-compassion and emotion regulation : testing a mediation model

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Abstract

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Self-compassion (SC) seems to play an important role in improving Emotion Regulation (ER). Nevertheless, the results of previous studies regarding the links between SC and ER are not consistent, especially facing diverse models of ER (strategy-based vs skill-based). The goal of this prospective study was to evaluate the links between these three concepts, by testing the predictive roles of SC and ER skills on both ER adaptive and maladaptive strategies, using standardized questionnaires and visual analog scales. Results of regression analysis showed that self-compassion positively predicts cognitive reappraisal, acceptance, problem solving, relaxation, self-support, tolerance and ER skills and negatively predicts behavioral avoidance, expressive suppression and ruminations. Results also showed that ER skills positively predict cognitive reappraisal, expression, acceptance, relaxation, self-support and tolerance and negatively predicts behavioral avoidance, expressive suppression and ruminations.. Results from a mediation model are also promising regarding both the role of ER skills on the effect of SC on adaptive ER strategy use. Even if this study can be associated with common limits of self-report measures, it highlights the role of SC in a model of ER.

Keywords: self-compassion, emotion regulation, emotion regulation strategies, emotion regulation skills.

Introduction

Emotion regulation

The understanding and development of emotion regulation (ER) are one of the main interests in clinical psychology (Berking & Wupperman, 2012) due to its key implication in mental health and its disorders (Aldao et al., 2010). ER refers to a set of processes by which individuals tend to control the nature and intensity of their emotions (Gross, 1998). Among several models on ER, two major models exist. The first refers to a "Strategies-based Model" and the other to a "Skills-based model". The first model considers that efficient ER will depend on the use of strategies categorized as "adaptive", and to less reliance on maladaptive strategies. This traditional classification is based on the correlations between specific mental health (Aldao & Nolen-Hoeksema, 2010; Hu et al., 2014). For example, it has been shown that maladaptive strategies (i.e., distraction, behavioral avoidance, expressive suppression, consumption, and rumination) were associated with higher levels of psychopathology, whereas adaptive strategies (i.e., cognitive reappraisal, emotional expression, acceptance, problem solving, social and self-support and tolerance) were associated with good mental health (Aldao & Nolen-Hoeksema, 2010). More recently, studies have gone beyond this dual categorization and have demonstrated that the ability to effectively use a wide range of strategies (i.e., having a large repertoire of both adaptive and maladaptive strategies) in different contexts was the most adaptive (Bonanno & Burton, 2013; Orcutt et al., 2013).

Second, the Adaptive Coping with Emotion model (ACE) - developed by Berking and Whitley (2014) – is an example of a skills-based model. It conceptualizes adaptive ER as the interplay of several *skills* which would facilitate the implementation of ER strategies. These general skills include (a) the awareness of one's emotional experiences, (b) the ability to identify and label perceived emotions; (c) the ability to interpret body sensations correctly, (d) the understanding of the circumstances that may have led to and maintained those emotions, (e) the ability to modify the intensity or duration of one's emotions, (f) to accept and tolerate undesired

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emotions, (g) to confront certain situations, and finally (h) to be able to provide self-support (e.g., self-kindness). Developing these skills would allow individuals to select adaptive strategies for ER. Indeed, Berking et al. (2012) showed that the effect of ER skills on mental health would be mediated by the use of strategies to modify emotion. In that sense, ER skills would be important for mental health because they involve using ER strategies to modify emotions. More specifically, good levels of ER skills could lead to greater use of adaptive ER strategies and lower use of maladaptive ER strategies. Some studies already support this hypothesis. For example, high emotional regulation skills are positively correlated with the use of adaptive strategies such as cognitive reappraisal (e.g., Fujisato et al., 2017). Other studies have shown that deficits in ER skills predict more maladaptive strategies, such as the use of consumption of alcohol (e.g., Berking et al., 2011).

Several meta-analyses have shown the importance of ER strategies and skills to reduce the risk of several mental disorders (e.g., Aldao et al., 2010; Visted et al., 2018; Webb et al., 2012). ER is now considered as a processual and transdiagnostic factor (Aldao et al., 2016; Aldao & Nolen-Hoeksema, 2010; Cludius et al., 2020). The challenge in clinical psychology research is, therefore, to identify the factors and practices that would enable the development of strategies and skills of ER (Berking et al., 2008; Moyal et al., 2015; Rottenberg & Gross, 2007).

Self-compassion and emotion regulation

Self-compassion has been suggested to be an important factor in facilitating learning and use of ER skills and strategies (e.g., Inwood & Ferrari, 2018). Self-compassion is an emotionally positive self-attitude (Neff, 2003). Three components define it: (a) self-kindness (i.e., being kind and understanding toward oneself in times of pain or failure rather than being self-critical), (b) common humanity (i.e., perceiving one's experiences, even difficult ones, as

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part of the larger human experience rather than seeing them as stigmatizing and isolating), and (c) mindfulness (i.e., approaching one's painful thoughts and emotions in balanced awareness (i.e., observing them without being overwhelmed) rather than over-identifying with them) (Neff, 2003). This positive attitude toward oneself is associated with reduced negative affect and emotional reactivity in response to difficult everyday situations (Leary et al., 2007). Thus, self-compassion is a key resilience mechanism in mental health (Trompetter et al., 2017).

If some studies consider self-compassion as a strategy of ER (Diedrich et al., 2014), research is now focusing on a more precise understanding of how self-compassion allows for better ER by looking at the link between self-compassion and certain ER strategies and skills. In a strategy-based perspective, results showed that self-compassion was negatively associated with ruminative strategies (Oudou & Brinker, 2014), and positively associated with cognitive reappraisal (Allen & Leary, 2010; Chishima et al., 2018). Other studies focused more on the link between self-compassion and ER skills. Results of the self-compassion model of ER tested by Finaly-Jones and colleagues (2015) showed that self-compassion negatively predicted ER difficulties. Specifically, their results showed that ER is one of the mediators of the effect of self-compassion on stress and that self-compassion negatively predicted difficulties in terms of acceptance, goal commitment, impulsivity, clarity, or access to ER strategies. However, recent studies showed that self-compassion might not be crucial to all ER skills. The results of Diedrich et al.'s (2017) study showed that among the different ER skills, only tolerance to negative emotions mediated the relationship between self-compassion and depression. These contrasting results have led some authors to define new paths between self-compassion and ER strategies. For example, Hansen and colleagues (2021) conceptualize self-compassion as a self-regulating strategy. On the basis of all these studies, the links between self-compassion and ER remain to be specified. Therefore, the main purpose of this study was to analyse more precisely

the links between self-compassion and ER by integrating the two models of ER, i.e., by evaluating both ER strategies and skills.

Goals and Hypotheses

In summary, this research aimed to analyse the predictive role of self-compassion on ER skills and ER strategies (both adaptive or maladaptive), as well as the predictive role of ER skills on ER strategies. Strategies were considered as adaptive or maladaptive according to their association with mental health indicators (Aldao et al. 2010). For example, Aldao et al.'s meta-analysis (2010) revealed an association between rumination and psychopathology, whereas the use of strategies such as reappraisal has been associated with mental health. Based on these results, we will subsequently test a mediation model with ER skills as a mediator in the effect of self-compassion on ER strategies.

We draw four hypotheses. First, self-compassion at Time 1 would positively predict adaptive ER strategies at Time 2 (i.e., cognitive reappraisal, problem-solving, acceptance, social support, relaxation, self-support, tolerance), and negatively predict maladaptive ER strategies at Time 2 (i.e., distraction, behavioral avoidance, suppression of emotional expression, consumption, and rumination). Second, we hypothesized that self-compassion at Time 1 would positively predict ER skills at Time 2 (i.e., attention, sensations, clarity, understanding, modification, acceptance, tolerance, confronting situations, self-support). Third, we expected that ER skills at Time 1 would positively predict adaptive ER strategies and negatively predict maladaptive ER strategies at Time 2. Finally, we wished to test a preliminary mediation model, and expected that ER skills would mediate the relation between self-compassion and ER strategies. In other words, we hypothesized that self-compassion would enable individuals to better use their ER skills, which in turn, would increase the use of adaptive ER strategies, and decrease the use of maladaptive ones.

Method

Transparency and openness

This study's design and its analysis were pre-registered on Open Science Framework (OSF, https://osf.io/yjm9a/?view_only=50021e2c65e24260a07be97424974815). All data, analysis code and research materials are available on the OSF Project. This study initially included a secondary goal regarding the evaluation of the psychometric properties of the VASs. The study, therefore, involved other questionnaires for the evaluation of psychometric qualities of these VASs. Materials and results are also presented on OSF. The authors, in agreement with the reviewers, decided to separate the two sub-goals and to focus the present manuscript on the relationship between self-compassion and ER.

Participants

This study was approved by the local university ethics committee (approval number: CERGA-Avis-2020-1-amendement-2021-4). Informed consent was given for the two measurement times of this online prospective study which collected data on two occasions at 1-month intervals. The study began on December 3, 2021, and the second measurement time was on January 4, 2022. Participants were recruited using the Prolific platform. Participants were included if they were French speakers and at least 18 years old. Conversely, they were excluded if they failed two or more attentional checks dispersed throughout the online survey as a way to control for careless responders. A total of 300 participants were recruited at T1, and 281 of them completed the same questionnaires at T2 (one month after T1). The sample comprised 138 women, 150 men and 12 others-identified participants, with a mean age of 29.21 years ($SD = 9.45$, range: 18–64). Among the participants, 96% had a bachelor's degree or

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higher, 37.3% of them were without a professional activity. Among the participants with a professional activity, 94 were working at their workplace, 40 were teleworking, and the remaining participants were sometimes teleworking and sometimes in the workplace. One hundred eighty-eight of the participants were single, 93 were in a couple, and among them, 45 had at least one child. Finally, 12.3% of the participants had a current psychiatric diagnosis, including 12 participants with a diagnosis of depression, 13 with a diagnosis of anxiety disorder, 4 with bipolar disorder, 2 with a personality disorder, and 6 with another diagnosis.

Measures

Demographic measures. Participants were asked to indicate their gender, age, education level, employment status, and whether they had a current psychiatric diagnosis and if so, which one.

Visual Analogue Scales (VASs) of Emotion Regulation strategies. Thirteen single items measuring ER strategies (i.e., reappraisal, distraction, behavioral avoidance, expressive suppression, emotional expression, acceptance, problem solving, social support, relaxation, consumption, rumination, self-support, tolerance) were initially designed by the second author as VAS (see Supplementary material Table 1 for single items development). The general instruction for each strategy was: “In general, when faced with a difficult situation or unpleasant emotions, to what extent do you try to apply the following strategies?” Each of the strategies was then proposed on a scale from 0 (not at all) to 10 (very much). These VASs have already been pre-tested and have shown moderate test-retest correlation with standardized scales (Nardelli et al., 2022).

Emotion Regulation Skills. The Emotion Regulation Skills Questionnaire (ERSQ, Berking & Znoj, 2008) comprised 27 items measuring ER skills as defined by Berking and

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Whitley's ACE model (Berking & Whitley 2014) through nine factors: awareness (e.g., I was able to consciously pay attention to my feelings), sensations (e.g., I had a clear physical perception of my feelings), clarity (e.g., I could have labelled my feelings), understanding (e.g., I understood my emotional reactions), modification (e.g., I was able to consciously bring about positive feelings), acceptance (e.g., I was able to accept my negative feelings), tolerance (e.g., I was able to endure my negative feelings), confrontation with situations (e.g., I did what I wanted to do, even if I had to face negative feelings on the way), and self-support (e.g., I tried to reassure myself during distressing situations). Each item is assessed using a Likert scale ranging from 0 "Not at all" to 4 "Almost always". Each subscale is composed of three items. While each skill can be evaluated by computing the average of the corresponding items belonging to each subscale, a general ER skills score can be calculated by computing the average of the entire questionnaire. Internal consistency of the total scale was .96 in the original version. Cronbach's alphas were .66 for attention, .73 for sensations, .82 for clarity, .80 for understanding, .73 for modification, .64 for acceptance, .80 for tolerance, .78 for confrontation, .82 for self-support and .94 for the total scale.

Self-compassion. Self-compassion was measured with the Self-Compassion Short Form Scale (SCS-SF, Raes et al., 2011). The SCS-SF is a 12-item instrument with six subscales assessing elements of self-compassion: (1) self-kindness (e.g., I try to be understanding and patient toward those aspects of my personality I don't like), (2) self-judgment (e.g., I'm disapproving and judgmental about my own flaws and inadequacies), (3) common humanity (e.g., I try to see my failings as part of the human condition), (4) isolation (e.g., When I'm feeling down, I tend to feel like most other people are probably happier than I am), (5) mindfulness (e.g., When something painful happens I try to take a balanced view of the situation) and (6) overidentification (e.g., When I fail at something important to me, I become consumed by feelings of inadequacy). Cronbach's alphas were .64 for self-kindness, .83 for

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self-judgment, .60 for common humanity, .65 for isolation, .73 for mindfulness, .71 for over-identification and .86 for the total scale.

Procedure

Prolific software was used for this study to recruit participants. The first part of the study was paid 2.20\$, and the second 3.10\$. For the first time point (T0), participants created their anonymous code (first two letters of their name, day of birth, number of brothers/sisters, number of their home address, e.g., “CA2423”) and then completed the following questionnaires which were randomly presented: sociodemographic and clinical data (i.e., sex, age, level of education, professional activity, current place of work (teleworking or not), living alone or not, current diagnosis, past diagnosis), ERSQ, VAS Questionnaire and SCS. Five attentional checks were also inserted into the questionnaire and participants were asked to respond with a number named in the item. One month later, they were invited to complete the same questionnaires except for the sociodemographic questions.

Statistical analysis

Sample size

The sample size was calculated using effect sizes from related publications (e.g., Diedrich et al., 2014) with G*Power statistical software version 3.1 (Faul et al., 2007). The power analysis gave an approximate value of a minimum of 135 participants for the correlation tests when we expected a medium effect size of $d = .3$ with and $\alpha = .003$ (Bonferroni corrections: .05/13) and a power, 80%. For multiple linear regression, the power analysis gave an approximate value of a minimum of 167 participants when we expected a medium effect size of $d = .3$ with and $\alpha = .0006$ (Bonferroni corrections: .05/8) and a power of 80%. All variables were tested for normality prior to conducting analyses using a Shapiro-Wilk test.

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All variables were tested for normality prior to conducting analyses using a Shapiro-Wilk test. The ERSQ-total score and the SCS-total score were normally distributed and at T1 and T2 ($p > .05$).

Before conducting the analyses to test our hypotheses, one-way ANOVAs were conducted to investigate associations between demographic (gender, self-report presence of current diagnosis) and outcomes variables at baseline (VASs, ERSQ and SCS). We tested these two demographic variables since previous studies have shown levels of self-compassion, and emotional regulation differed between men and women (e.g., Yarnell et al., 2015, 2019), but also according to the presence of psychological disorders (e.g., Athanasakou et al., 2020). For the one-way ANOVA, we conducted the Welch ANOVA by default (Delacre et al., 2020). Finally, we also conducted bivariate correlation between VASs, ERSQ and SCS at T1.

Association between self-compassion and emotion regulation

To test the first three hypotheses, according to which (1) self-compassion at T1 would positively predict adaptive ER strategies at T2 and negatively predict maladaptive ER strategies at T2, (2) self-compassion at T1 would positively predict ER skills at T2; and (3) ER skills at T1 would positively predict adaptive ER strategies at T2 and negatively predict non-adaptive ER strategies at T2, several linear regression analyses were performed using JAMOVI Version 1.2.27 (The Jamovi Project, 2020). The first step in each analysis included each dependent variable (the ER strategy or ER skills) at T1 as a control for initial levels. In the second step of the regression analysis, we added self-compassion at T1 or ER skills at T1 as a predictor to observe the additional variance explained.

To test the model, strategies were mean into either adaptive or maladaptive categories in accordance with results of previous studies (e.g., Aldao et al., 2010). Thus, we explored

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factorial analysis and investigated the internal consistency of both adaptive and maladaptive dimensions using Cronbach alphas. Given those results (see Results section), we decided to conduct a simple mediation model using the open statistical software R (R Core Team, 2017), function *mdt_simple* from the package *JSmmediation* (Yzerbyt et al., 2018). We used the joint-significant method implemented by Muller et al. (2005), as this method is associated with a lower risk of false positives (Yzerbyt et al., 2018). Here, we report the relevant paths for the analysis (see Muller et al., 2005). In this analysis, we investigated whether the effect of self-compassion (total score of the SCS) on the use of adaptive strategies (mean score of the adaptive ER strategies) was mediated by ER skills (total score of the ERSQ).

Results

Descriptive statistics and correlations at baseline.

Results showed a significant effect of gender on several VASs as for reappraisal, $F(2,29.9) = 4.04, p = .028$, emotional expression, $F(2,29.3) = 40.22, p < .001$, problem solving, $F(2,29.4) = 3.69, p = .037$, social support, $F(2,29.5) = 5.27, p = .011$, relaxation, $F(2,30.2) = 5.01, p = .013$ and ruminations, $F(2,30.4) = 5.9, p = .007$ and on ERSQ, $F(2,30.5) = 6.57, p = .004$ and SCS, $F(2,30.4) = 10.39, p < .001$. Results also showed that presence of self-reported diagnosis had a significant effect on several VASs, more precisely on reappraisal, $F(1,45.1) = 4.33, p = .04$, behavioral avoidance, $F(1,52.4) = 16.87, p < .001$, problem solving, $F(1,44) = 4.44, p = .04$ and consumption, $F(1,47.9) = 5.28, p = .03$ and on SCS, $F(1,48.5) = 11.4, p = .001$. Table 1 shows descriptive statistics for all variables at baseline and T2. Table 2 presents bivariate correlations between VASs, ERSQ and SCS at baseline.

[Table 1 about here]

[Table 2 about here]

Self-compassion, ER skills and strategies.

According to our first and second hypotheses, the results of linear regression analyses presented in Table 3 showed that self-compassion at T1 positively predicts VASs of adaptive ER strategies (except for the expression and social support strategies) at T2 and negatively predicts VASs of maladaptive ER strategies at T2 (except for the distraction and consumption strategies). Self-compassion explains between 1 and 7% of additional variance depending on the strategy predicted at T2 when controlling for that same strategy at T1, gender and the presence of diagnosis (Table 3). Regarding ER Skills, the initial regression step combining T1 ER Skills was significant, accounting for 52% of the variance in T2 ER Skills. Adding the variable self-compassion on a subsequent step explained an additional 1% of the variance in T2 ER Skills.

Regarding our third hypothesis, the results showed that general ER skills significantly positively predict VASs adaptive strategies (except social support) at T2 and significantly negatively predict VASs maladaptive strategies at T2 (except distraction and consumption, see Table 4). ER Skills explain between 1% and 5% of additional variance depending on the strategy type at T2 when controlling for that same strategy at T1 and for gender and current diagnosis (Table 4).

[Table 3 about here]

[Table 4 about here]

Preliminary testing of a mediation model

Exploratory factorial analysis showed adaptive ER strategies are represented by one factor explaining 27.6% of the variance. We excluded items of acceptance and emotional

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expression because their load was $< .3$ (Cohen et al., 2003). Cronbach's α was $.77$ which represents a good internal reliability. Exploratory factorial analysis in maladaptive ER strategies showed that one factor explained them explaining 23.2% of variance. We also excluded items of distraction and consumption because their load was $< .3$ (Cohen et al., 2003). Nevertheless, cronbach's α was $.56$, which is considered as a poor internal consistency, we therefore decide not to include maladaptive ER strategies in the mediation model.

Therefore, we conducted a mediation analysis considering only adaptive strategies (i.e., cognitive reappraisal, self-support, tolerance, problem solving, social support, and relaxation) as dependent variable, self-compassion as a predictor and ER skills as a mediator. As hypothesized, results from the mediation analysis indicated that the relationship between self-compassion at T1 and ER strategies at T2 was significantly and partially mediated by ER skills at T1. The analysis showed the following indirect effect: $SCS\ T1 \times ERSQ\ T1 \times Adaptive\ ER\ strategies\ T2 = .04$, $SE = .01$, $z = 5.82$, $p < .001$. Results of the mediation are presented in Figure 1.

[Figure 1 about here]

Discussion

Self-compassion has been identified as a promising factor influencing adaptive ER (Berking & Whitley, 2014). Likewise, more general ER skills have been highlighted as necessary to apply ER strategies adaptively (e.g., Berking & Whitley, 2014). However, very few studies have tried to elucidate relationships between self-compassion, ER skills and ER strategies (Amy Louise Finlay-Jones, 2017; Inwood & Ferrari, 2018). Thus, the aim of this study was to investigate the association between these three variables and test a preliminary mediation model.

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Our findings extend the literature exploring the link between self-compassion and ER (e.g., Finlay-Jones, Rees, & Kane, 2015; Inwood & Ferrari, 2018; Paucsik et al., 2020) and showed that self-compassion predicts better ER in terms of both skills and strategies, even after controlling for the effect of gender and self-reported diagnosis.

In other words, these findings suggest that individuals who are more self-compassionate tend to be more aware of their emotions, approaching them with more clarity, understanding, acceptance, and tolerance. They also seem to more accurately identify physical sensations associated with emotions, remain committed to their goals no matter what emotion is present, and soothe and reassure themselves when necessary. These findings are in line with previous research (e.g., Finlay-Jones, 2017; Neff et al., 2007) showing, for instance, that self-compassion allowed one to develop a balanced awareness of one's emotion by motivating one to confront (rather than avoid) painful thoughts and feelings, but without exaggeration, drama, or self-pity.

If self-compassion predicts ER skills, our results also showed that people with higher self-compassion scores tend to use more adaptive strategies, such as reappraisal or problem solving and less maladaptive strategies such as behavioral avoidance or rumination. These results are also consistent with previous studies indicating that rumination and worry, two well-known maladaptive ER strategies, mediate the relationship between self-compassion and symptoms of depression and anxiety (Krieger et al., 2013; Raes, 2010). However, our results provide a better understanding of the relation between self-compassion and ER and suggested that self-compassion does not predict all ER strategies. Our analyses showed that self-compassion does not predict distraction, emotional expression, social support, and consumption strategies. Replication of these analyses in future systemic studies involving subclinical and clinical samples would allow for better targeting of therapeutic interventions. For example, a person adopting consuming strategies (e.g., drinking or eating) to regulate his emotions would not benefit from an intervention focused on self-compassion, or at least not at first. These results

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are also in line with previous research. For example, in Neff's (2003) study assessing the psychometric qualities of the self-compassion scale, the results showed no correlation between self-compassion and emotional expression (Neff, 2003). She concluded that emotional expression involves communicating one's emotions to others, whereas self-compassion is an internal process (Neff, 2003). Our results also showed that self-compassion tends to decrease the use of expressive suppression, which is in line with the results of recent studies (e.g., McBride et al., 2022). Thus, it appears that self-compassion reduces the use of expressive suppression strategies without increasing the use of expression during an emotional event. Considering that our results showed that emotional expression and expressive suppression are moderately correlated strategies, it could be that the absence of one does not necessarily imply the presence of the other. Moreover, it is interesting to note that while our results do not indicate an effect of self-compassion on expression, they do reveal that this strategy is predicted by ER skills and gender. Specifically, women were more likely to use emotional expression than men. These results are also consistent with previous studies (Chaplin, 2014). A recent study showed that women consistently used more strategies and implemented them more flexibly than men (Goubet & Chrysikou, 2019). However, our results showed no effect of gender over time on ER skills. In that sense, individuals, irrespective of gender, appear to develop similar ER skills but use different ER strategies.

Reliability analysis conducted before the mediation model has shown that the aggregation of maladaptive ER strategies is not internally consistent and therefore cannot be treated as a single factor representing maladaptive ER strategies. These results are relevant given the literature highlighting the importance of the context in characterizing the adaptability of a strategy. Indeed, studies have shown that the type of strategy is not the only predictor of the adaptability of ER; the context in which the strategy is selected and used seems to be as relevant (Amelia Aldao, 2013; Bonanno & Burton, 2013). Indeed, adaptive ER strategies tend

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to be implemented with more cross-situational variability than maladaptive ER strategies (Aldao & Nolen-Hoeksema, 2012). As shown by Bonanno et al. (2004), maladaptive strategies can contribute to a functional ER if they are implemented in specific contexts and in a flexible way.

Exploratory factorial analyses and internal consistency analyses showed satisfactory factorial structure for the adaptive ER strategies (excluding emotional expression and acceptance), which was used for testing the mediation model. The mediation analysis showed that self-compassion predicts more ER skills and enables the use of more adaptive strategies, partly thanks to these ER skills. Findings suggest that ER, and more precisely ER skills, may represent one of explanatory mechanisms underlying the link between self-compassion and psychological health more broadly. In that sense, self-compassion seems to promote a more peaceful connection with one's emotions, allowing individuals to engage with them rather than avoiding or becoming entrenched in them (Neff, 2003). Moreover, by being more connected to their emotions and remaining more engaged in their initial goal, self-compassionate individuals use more adaptive strategies to regulate their emotions and move toward their initial goal. Indeed, it seems that self-compassion is positively associated with variables that predict action-oriented coping such as optimism, curiosity, exploration, and personal initiative (Neff et al., 2007a) (Neff et al., 2007). These results suggest that self-compassionate people are more engaged in their environment to achieve their goals. Overall, self-compassion could be considered as an important foundation for developing other competencies such as ER skills and that could facilitate the use of adaptive strategies. In addition, results of mediation analysis showed that ER skills are implicated and partly explain the effect of self-compassion on adaptive ER strategies use. Referring to Bonanno's work cited above, it is possible that this effect can also be explained by the context and the variability in which the strategy is used. Future studies that take into account context and variability in the choice of strategies are

therefore needed to determine whether self-compassion and ER skills result in better ER and psychological health more broadly.

Importantly, our results also need to be moderated considering the small effect sizes. Indeed, besides showing the importance of self-compassion for the development of ER skills and, subsequently, the use of adaptive ER strategies, our results leave space for many other psychological processes. For instance, psychological flexibility is nowadays identified as a decisive factor for ER because it will allow a flexible use of the different ER strategies according to the situational requirements (Bonanno et al., 2004; Cheng, 2001; Kashdan & Rottenberg, 2010). Nevertheless, research on flexible ER is still recent and very complex to evaluate (Aldao et al., 2015)

Limitations

This study is not without limitations. First, our study involved a non-clinical sample, which precludes our results from being generalized to other populations. Indeed, the use of maladaptive ER strategies may not be problematic in non-clinical samples but may be problematic when they contribute to the maintenance of psychopathological disorders (Amelia Aldao & Nolen-Hoeksema, 2010; Eftekhari, Zoellner, & Vigil, 2009) (Aldao et al., 2010; Eftekhari et al., 2009). Indeed, it is not the strategies themselves that are problematic but rather the pattern they are used and combined (Daros & Williams, 2019; Eftekhari et al., 2009).

Second, research on self-compassion, ER skills and strategies suffer from an overlap between concepts, such as self-support. Self-support is defined by “the ability to support oneself effectively when struggling to cope with difficult emotions” (Grant, Salsman, & Berking, 2018)(Grant et al., 2018). In our study, it has been operationalized as an ER skills assessed by ERSQ as well as an ER strategy assessed by the VAS. Moreover, self-support is also quite

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similar to the definition of the self-kindness sub-dimension of self-compassion defined by “the tendency to be caring and understanding with ourselves rather than harshly critical or judgmental” (Neff, 2003). This overlap illustrates the lack of consensus or the lack of specific operationalisation of SC, ER Skills and strategies to a point that relations between factors might reflect more the lack of operationalisation than actual relations.

Finally, another limitation concerns the use of VASs to assess each of the ER strategies. Although the psychometric qualities of the VASs have been previously evaluated (Nardelli et al., 2022), their validity remain to be assessed. The use of single items is common in research on ER and remains an important challenge for EMA research (e.g., Heiy & Cheavens, 2014; McMahon & Naragon-Gainey, 2019; Stumpp et al., 2021). Indeed, as indicated in the article of Medland et al. (2020) (Medland, De France, Hollenstein, Mussoff, & Koval, 2020), no validated short scale for comprehensively assessing all ER strategies exists. Studies assessing ER strategies therefore either measure them by focusing on one or two strategies using validated questionnaires (e.g., Brockman et al., 2017; Nezlek & Kuppens, 2008) or by creating several single items to assess a range of ER strategies (e.g., Brans et al., 2013; Heiy & Cheavens, 2014). Thus, this is the choice we made in this study to assess all the ER strategies identified in the literature. Nevertheless, single-item measures have several limitations because they often have low content validity and standard approaches cannot estimate their reliability (Schuurman & Hamaker, 2019; Weidman et al., 2017). In addition, grouping of items assessing adaptive ER strategies have shown satisfactory but not extremely robust results. In addition, grouping of items assessing adaptive ER strategies have shown satisfactory but not extremely robust results. It is of note that some specific strategies have higher factor loadings than others (e.g., cognitive reappraisal). This may influence the validity of our proposed binomial categories.

Therefore, there is still a clear need for a brief, reliable and valid scale to measure all the repertoire of adaptive and maladaptive ER strategies (Medland et al., 2020).

Conclusion

Overall, the results of this study shed light on the importance of developing self-compassion so as to further develop general ER skills, both of them resulting in potential better ER strategies application. In that perspective, self-compassion appears to be a relevant motivation to develop as a solid background toward the improvement of ER skills and later adaptive ER strategies used. These findings are promising, especially because of the transdiagnostic nature of ER. Still, ER is a difficult process to capture. Furthermore, this study provides for the first time a model of ER with self-compassion. If the present mediation model can be confirmed, this will allow the design of clinical interventions targeting both self-compassion and ER skills that will be relevant to a wide range of mental disorders. Overall, self-compassion could be considered as a necessary basis, enabling the development and improvement of ER skills, themselves required to an adaptive choice and implementation of ER strategies.

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Acknowledgements: The authors would like to thank all the participants who contributed to this study and Adrien Teinturier for his contribution to this study.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Grenoble Alpes University (Number of approval : CERGA-Avis-2020-1-amendement-2021-4)

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data supporting the conclusions of this study as well as the Ethics Committee's advice and the questionnaire are openly available at the Center for Open Science (OSF) at the following address:

https://osf.io/yjm9a/?view_only=50021e2c65e24260a07be97424974815

Conflicts of Interest: The authors declare no conflict of interest.

Authors Contributions: Conceptualization, methodology, Investigation, validation, data curation, writing – original draft and visualization, M.P. and C.N., formal analysis, M.P., C.N. and C.L., writing – re-view, editing and project administration, M.P., C.N., C.Bo., R.S., and C.Ba.; supervision, C.Bo., R.S., and C.Ba. All authors have read and agreed to the published version of the manuscript.

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Tables

Table 1

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Means and Standard deviations of all the outcomes at baseline and time 2.

Outcomes	T1	T2
	M (SD)	M (SD)
Emotion Regulation Skills Questionnaire	88.7 (17.7)	88.9 (17.7)
VAS reappraisal	5.77 (2.53)	5.82 (2.32)
VAS distraction	7.28 (2.05)	7.40 (2.02)
VAS behavioral avoidance	6.28 (4.20)	6.21 (2.64)
VAS expressive suppression	7.05 (3.92)	6.67 (2.69)
VAS emotional expression	5.03 (8.55)	3.82 (2.77)
VAS acceptance	5.20 (4.80)	4.72 (2.42)
VAS problem solving	6.25 (3.32)	6.04 (2.30)
VAS social support	5.82 (8.73)	4.19 (2.88)
VAS relaxation	5.61 (5.98)	5.10 (2.92)
VAS consumption	5.40 (4.91)	4.78 (3.22)
VAS rumination	6.66 (4.15)	6.09 (2.36)
VAS self-support	5.99 (2.41)	6.04 (2.28)
Self-Compassion Scale	33.4 (8.5)	33.9 (8.45)

Notes.

¹VAS = Visual Analogue Scale

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Table 2

Pearson's correlations between self-compassion, ER Skills and ER Strategies at T1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Self-compassion	-														
2. ER ¹ skills	.53***	-													
3. Cognitive Reappraisal	.5***	.44***	-												
4. Distraction	.07	.14*	.22***	-											
5. Behavioral Avoidance	-.28***	-.28***	-.13*	.2***	-										
6. Expressive Suppression	-.25***	-.23***	-.03	.09	.24***	-									
7. Expression	-.05	.07	-.02	.06	-.05	-.4***	-								
8. Acceptance	.24***	.27***	.09	-.1	-.07	-.2***	.22***	-							
9. Problem-Solving	.45***	.44***	.51***	.06	-.32***	-.13*	-.005	.13**	-						
10. Social Support	.2***	.26***	.26***	.06	-.08	-.45***	.39***	.18**	.28***	-					
11. Relaxation	.28***	.26***	.27***	.11	-.14*	-.14*	-.06	.05	.31***	.16**	-				

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12. Consumption	-.25***	-.13*	-.1	.04	.17**	.11	.06	-.05	-.08	-.03	.02	-			
13. Rumination	-.42***	-.2***	-.26***	.1	.24***	.07	.16**	-.09	-.21***	.1	-.11	.23***	-		
14. Self-support	.46***	.42***	.57***	.31***	-.12*	-.14*	.11	.15*	.47***	.36***	.25***	-.05	-.14*	-	
15. Tolerance	.38***	.44***	.36***	.1***	-.1	-.09	.04	.34***	.33***	.24***	.14*	-.07	-.11	.5***	-

Notes. * $p < .05$, ** $p > .01$, *** $p < .001$

¹ER = Emotion regulation

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Table 3

Linear regression analysis between self-compassion and ER Skills and Strategies

	β	t	p	R^2	F
ER ¹ strategies					
Cognitive Reappraisal T2					
Step 1 : Cognitive reappraisal T1	.543	12.68	<.001	.36	161
Step 2 : Gender	.133	.69	.49	.37	80.5
Step 3 : Current diagnosis	.7	2.1	.04	.37	55.8
Step 4 : SCS T1	.07	4.73	<.001	.42	50.7
Distraction T2					
Step 1 : Distraction T1	.49	9.27	<.001	.24	86
Step 2 : Gender	-.007	-.04	.97	.24	42.9
Step 3 : Current diagnosis	.15	.48	.63	.24	28.6
Step 4 : SCS T1	-.005	-.378	.71	.24	21.4
Behavioral Avoidance T2					
Step 1 : Avoidance T1	.40	7.17	<.001	.15	51.3
Step 2 : Gender	-.29	-1.15	.25	.16	26.4
Step 3 : Current diagnosis	.35	.78	.44	.16	17.7
Step 4 : SCS T1	-.08	-4.7	<.001	.22	19.9
Expressive Suppression T2					
Step 1 : Suppression T1	.47	9.42	<.001	.24	88.8
Step 2 : Gender	.13	.54	.6	.24	44.4
Step 3 : Current diagnosis	-.14	-.33	.74	.24	29.6
Step 4 : SCS T1	-.04	-2.8	.005	.26	24.7
Expression T2					
Step 1 : Expression T1	.61	14.43	<.001	.43	208
Step 2 : Gender	-.68	-2.92	.004	.44	111
Step 3 : Current diagnosis	-.56	-1.48	.14	.45	75.2

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Step 4 : SCS T1	.02	1.67	.1	.45	57.4
Acceptance T2					
Step 1 : Acceptance T1	.48	9.58	<.001	.25	91.7
Step 2 : Gender	.12	.54	.59	.25	45.9
Step 3 : Current diagnosis	.68	1.8	.07	.28	31.9
Step 4 : SCS T1	.05	3.59	<.001	.28	54.3
Problem Solving T2					
Step 1 : Problem Solving T1	.51	10.49	<.001	.28	110
Step 2 : Gender	.12	.58	.56	.28	55.1
Step 3 : Current diagnosis	.71	2.01	.05	.29	38.4
Step 4 : SCS T1	.05	3.39	<.001	.32	32.8
Social Support T2					
Step 1 : Social Support T1	.66	16.19	<.001	.48	262
Step 2 : Gender	-.25	-1.14	.25	.49	132
Step 3 : Current diagnosis	.23	.6	.55	.49	87.8
Step 4 : SCS T1	.005	.35	.72	.49	65.7
Relaxation T2					
Step 1 : Relaxation T1	.59	12.49	<.001	.36	156
Step 2 : Gender	.09	.39	.69	.36	77.8
Step 3 : Current diagnosis	.48	1.12	.26	.36	52.3
Step 4 : SCS T1	.07	4.17	<.001	.40	45.9
Consumption T2					
Step 1 : Consumption T1	.7	16.5	<.001	.49	272
Step 2 : Gender	.25	1.06	.29	.5	137
Step 3 : Current diagnosis	-.41	-.68	.33	.5	91.4
Step 4 : SCS T1	-.01	-.68	.5	.50	68.6
Rumination T2					
Step 1 : Rumination T1	.41	8.69	<.001	.21	75.6
Step 2 : Gender	-.27	-1.22	.22	.22	38.6

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Step 3 : Current diagnosis	.3	.77	.44	.22	25.9
Step 4 : SCS T1	-.07	-4.21	<.001	.27	25
Self-support T2					
Step 1 : Self-support T1	.57	12.99	<.001	.38	169
Step 2 : Gender	-.25	-1.15	.25	.49	132
Step 3 : Current diagnosis	.23	.6	.55	.49	87.8
Step 4 : SCS T1	.04	2.66	.008	.39	89.8
Tolerance T2					
Step 1 : Tolerance T1	.52	11.46	<.001	.32	131
Step 2 : Gender	.37	2.05	.04	.33	68.5
Step 3 : Current diagnosis	.69	2.22	.03	.34	48
Step 4 : SCS T1	.04	3.51	<.001	.37	40.5
Total ER ¹ Skills T2					
Step 1 : ER skills T1	.71	17.38	<.001	.52	302
Step 2 : Gender	-.66	-.52	.6	.52	151
Step 3 : Current diagnosis	.5	.22	.82	.52	100
Step 4 : SCS T1	.29	2.85	.005	.53	79.1

Notes.

ER = Emotion regulation

SCS = Self-Compassion Scale

Step 1 = controlling each initial ER strategy or ER skill at T1

Step 2 and 3 = controlling gender and current diagnosis

Step 4 = addition of the predictor self-compassion

Table 4

Linear regression analysis between ER Skills and Strategies

	β	t	p	R^2	F
ER ¹ strategies					
Cognitive Reappraisal T2					
Step 1 : Reappraisal T1	.543	12.68	<.001	.37	161
Step 2 : Gender	.13	.69	.5	.37	80.5
Step 3 : Current diagnosis	.7	2.09	.03	.38	55.8
Step 4 : ERSQ T1	.03	4.82	<.001	.42	51
Distraction T2					
Step 1 : Distraction T1	.48	9.27	<.001	.24	86
Step 2 : Gender	-.007	-.04	.97	.24	42.9
Step 3 : Current diagnosis	.15	.49	.63	.24	28.6
Step 4 : ERSQ T1	.007	1.12	.26	.24	21.8
Behavioral Avoidance T2					
Step 1 : Avoidance T1	.39	7.17	<.001	.15	51.3
Step 2 : Gender	-.29	-1.15	.25	.16	26.4
Step 3 : Current diagnosis	.35	.77	.44	.16	17.7
Step 4 : ERSQ T1	-.02	-2.36	.02	.18	14.9
Expressive Suppression T2					
Step 1 : Suppression T1	.47	9.42	<.001	.24	88.8
Step 2 : Gender	.13	.54	.59	.54	44.4
Step 3 : Current diagnosis	-.14	-.33	.74	.24	29.6
Step 4 : ERSQ T1	-.02	-2.04	.04	.25	23.5
Expression T2					
Step 1 : Expression T1	.61	14.43	<.001	.43	208
Step 2 : Gender	-.68	-2.92	.004	.44	111
Step 3 : Current diagnosis	-.56	-1.48	.14	.45	75.2
Step 4 : ERSQ T1	.02	2.43	.02	.46	58.9

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Acceptance T2					
Step 1 : Acceptance T1	.48	9.58	<.001	.25	91.7
Step 2 : Gender	.12	.54	.59	.25	45.9
Step 3 : Current diagnosis	.68	1.8	.07	.26	31.9
Step 4 : ERSQ T1	.02	2.75	.006	.28	26.4
Problem-Solving T2					
Step 1 : Problem-Solving T1	.51	10.49	<.001	.28	110
Step 2 : Gender	.12	.58	.56	.28	55.1
Step 3 : Current diagnosis	.71	2.01	.05	.29	38.4
Step 4 : ERSQ T1	.03	4.02	<.001	.33	34.5
Social Support T2					
Step 1 : Social Support T1	.66	16.19	<.001	.48	262
Step 2 : Gender	-.25	-1.14	.25	.49	132
Step 3 : Current diagnosis	.23	.6	.55	.49	87.8
Step 4 : ERSQ T1	.01	1.27	.2	.49	66.4
Relaxation T2					
Step 1 : Relaxation T1	.59	12.49	<.001	.36	156
Step 2 : Gender	.09	.39	.69	.36	77.8
Step 3 : Current diagnosis	.48	1.12	.26	.36	52.3
Step 4 : ERSQ T1	.03	4.23	<.001	.40	46.1
Consumption T2					
Step 1 : Consumption T1	.7	16.5	<.001	.49	272
Step 2 : Gender	.25	1.06	.29	.49	137
Step 3 : Current diagnosis	-.41	-.98	.33	.5	91.4
Step 4 : ERSQ T1	.7	-1.34	.18	.50	69.2
Rumination T2					
Step 1 : Rumination T1	.41	8.69	<.001	.21	75.6
Step 2 : Gender	-.27	-1.22	.22	.22	38.6
Step 3 : Current diagnosis	.3	.77	.44	.22	25.9

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Step 4 : ERSQ T1	-.01	-2.32	.02	.23	21.1
Self-support T2					
Step 1 : Self-support T1	.57	12.99	<.001	.38	169
Step 2 : Gender	-.16	-.85	.39	.39	84.7
Step 3 : Current diagnosis	.72	2.23	.03	.39	58.9
Step 4 : ERSQ T1	.02	3.67	<.001	.41	48.7
Tolerance T2					
Step 1 : Tolerance T1	.52	11.46	<.001	.32	131
Step 2 : Gender	.37	2.05	.04	.33	68.5
Step 3 : Current diagnosis	.69	2.22	.03	.34	48
Step 4 : ERSQ T1	.03	5.36	<.001	.40	46.8

Notes.

ER = Emotion regulation

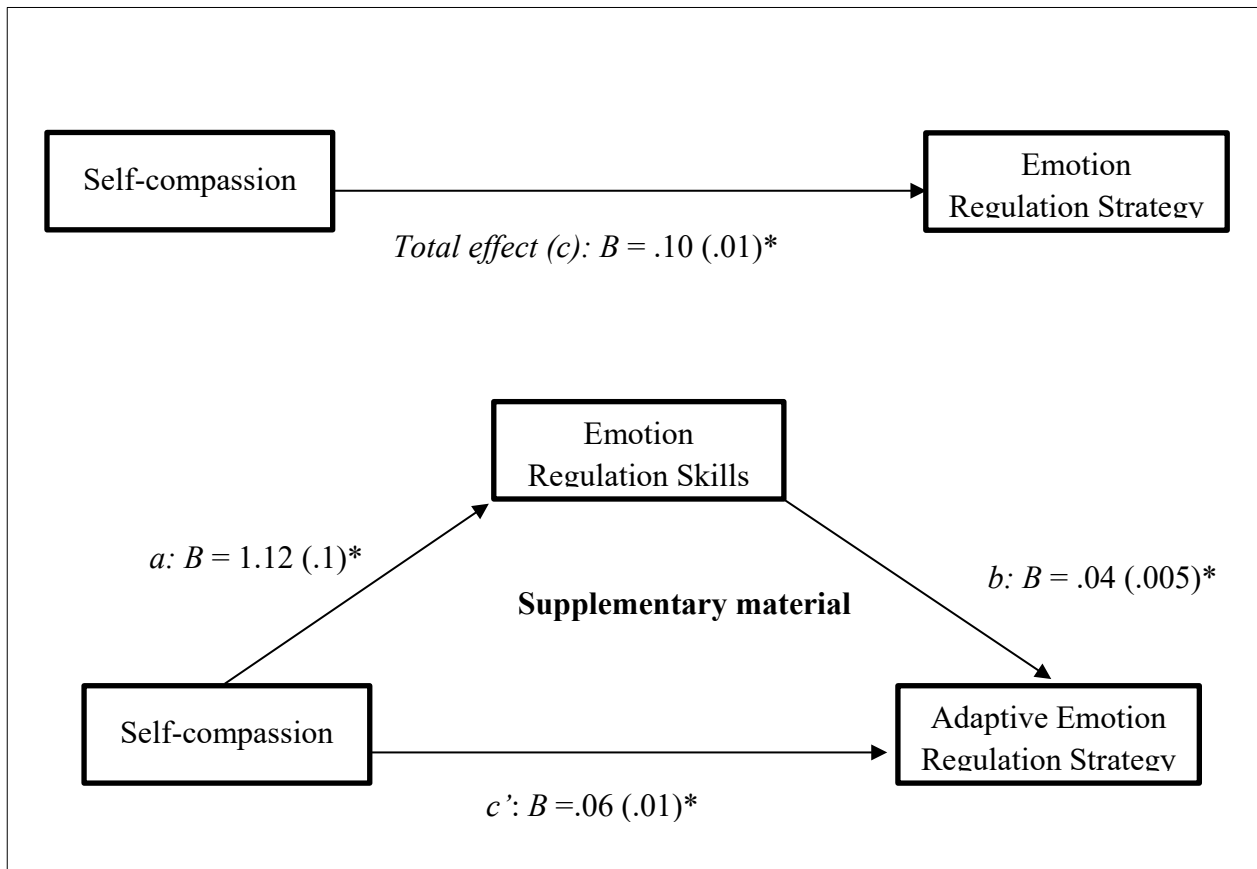
Step 1 = controlling each initial ER strategy

Step 2 and 3 = controlling gender and current diagnosis

Step 4 = addition of the predictor ER skills

Figure

Figure 1. Mediation model results



Notes. *a*: association between self-compassion and ER skills; *B*: association between ER skills and adaptive ER strategies; *c*: total effect between self-compassion and ER; *c'*: direct effect between self-compassion and adaptive ER strategy. Standard errors are in brackets. *: $p < .001$

Supplementary material

Table 1

Single Items development

Strategies	Item	Adapted from
Cognitive reappraisal	“I try to change the way I perceive the situation I am in”	ERQ (Gross & John, 2003)
Distraction	“I try to distract myself”	MPFI24 (Grégoire et al., 2020)
Behavioural avoidance	“I try to avoid situations, people or activities, to defer the tasks I have to do”	MEAQ-15 (Gamez et al., 2011)
Suppression of emotional expression	“I try not to let other people know my emotions”	ERQ (Gross & John, 2003)
Emotional expression	“I express my emotions, for example by crying, shouting, etc.”	ERQ (Gross & John, 2003)
Acceptance	“I embrace the thoughts and emotions related to the situation, without trying to change them”	MPFI24 (Grégoire et al., 2020)
Problem-solving	“I focus my efforts on resolving the situation I am in”	Brief COPE (Carver et al., 1997)
Social support	“I look for support from others (emotional, advice, help, etc)”	Brief COPE (Carver et al., 1997)
Relaxation	“I try to relax physically (sport, relaxation, breathing, meditation, etc)”	Brief COPE (Carver et al., 1997)
Consumption	“I have consumption behaviors (food, shopping, alcohol, cigarettes, etc.) to help me get through the situation”	Brief COPE (Carver et al., 1997)
Rumination	“I cannot stop thinking about the situation and/or how I feel”	CERQ (Garnefski, 2001)
Self-support	“I try to reassure myself, to boost my spirits, to comfort myself in the situation”	ERSQ (Berking & Whitley, 2014)
Tolerance	“I try to support, to tolerate my emotions”	ERSQ (Berking & Whitley, 2014)

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Table 2

Exploratory factor analysis of adaptive ER strategies

Strategies	Factor 1	Uniqueness
Cognitive reappraisal	0.7740	0.401
Self-support	0.7354	0.459
Tolerance	0.6310	0.602
Problem-solving	0.6282	0.605
Social support	0.3377	0.886
Relaxation	0.3191	0.898
Acceptance	0.2410	0.942
Emotional expression	0.0853	0.993

Table 3

Exploratory factor analysis of maladaptive ER strategies

Strategies	Factor 1	Uniqueness
Behavioural avoidance	0.838	0.297
Suppression of emotional expression	0.423	0.821
Rumination	0.405	0.836
Consumption	0.288	0.917
Distraction	0.177	0.969