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Examining a regulatory flexibility framework of psychological distress: Integrating distress tolerance, emotion differentiation, and emotion regulation flexibility

Germaine Yue Qi TNG
Singapore Management University, germainetng.2020@phdps.smu.edu.sg

Examining a Regulatory Flexibility Framework of Psychological Distress: Integrating Distress Tolerance, Emotion Differentiation, and Emotion Regulation Flexibility

Germaine Y.Q. Tng

Singapore Management University

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Abstract

Several theoretical accounts identify emotion regulation (ER) difficulties, including poor abilities to withstand or distinguish negative emotions, as a transdiagnostic risk factor for symptoms of psychological distress. Considering this, nascent evidence hints that ER flexibility may be a mediating mechanism that explains the relationship between specific ER abilities (i.e., distress tolerance, negative emotion differentiation) and distress symptoms. Across time-lagged (Study 1) and three-wave longitudinal (Study 2) investigations of college-aged adults, a *regulatory flexibility framework of distress* was examined in which ER flexibility mediates the respective pathways from distress tolerance and negative emotion differentiation to psychological distress symptoms. Furthermore, we explored a reverse mediation account wherein bidirectional associations between psychological distress and ER abilities are mediated by ER flexibility (Study 2). In Study 1, self-reported, rather than task-based, ER flexibility mediated the respective pathways from distress tolerance and negative emotion differentiation to social anxiety symptoms. When ER flexibility was assessed through experience sampling in Study 2, ER flexibility (i.e., mean between-strategy variability) mediated the reversed pathway from social anxiety symptoms to negative emotion differentiation abilities. By employing a multi-method approach to assessing ER flexibility, these findings provide preliminary evidence for the proposed theoretical framework and highlight the importance of considering reciprocal associations among ER abilities, ER flexibility, and psychological distress via longitudinal designs.

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Keywords: negative emotion differentiation; emotional distress tolerance; emotion regulation flexibility; psychological distress

1. Introduction

The college years constitute a stage of heightened vulnerability for the onset of mental health difficulties, due to academic stressors and transitions in social and physical environments (Acharya et al., 2018; Byrd & Mckinney, 2012; Ketchen Lipson et al., 2015). Specifically, 'distress symptoms'—which include depressive, generalized anxiety, and social anxiety symptoms (Mennin & Fresco, 2015)—are commonly observed among college-aged adults, with the pooled prevalence of depression and anxiety symptoms ranging from 29.3% to 37.8%, and 34.6% to 43.4%, respectively (Liu et al., 2019; Luo et al., 2021; Soet & Sevig, 2006). These encompass symptoms such as losing interest in enjoyable activities, feeling worthless, withdrawing from social activities, and being in a constant state of nervous tension (Li et al., 2022). Further, as these symptoms tend to co-occur (Bitsika & Sharpley, 2012; Jenkins et al., 2021; Kessler et al., 1999), there is growing empirical attention to identify transdiagnostic processes (i.e., phenotypic characteristics underlying multiple symptomatology; Nolen-Hoeksema & Watkins, 2011) that contribute to their development and maintenance (e.g., Allan et al., 2014; Brandt et al., 2013; Thompson et al., 2017).

To this end, deficits in emotion regulation abilities have been identified as a key transdiagnostic risk factor for psychological distress symptoms (Hofmann et al., 2012; Mennin et al., 2005; Mennin & Fresco, 2015). Based on abilities-based models of emotion regulation (e.g., Berking et al., 2008; Gratz & Roemer, 2004), emotion regulation abilities are considered higher-order capacities that shape the type and effectiveness of regulatory strategies used, and include a) negative emotion differentiation and b) emotional distress tolerance (Tull & Aldao, 2015). Negative emotion differentiation is the ability to make nuanced classifications of negative emotional experiences into discrete categories (Barrett et al., 2001); while emotional distress tolerance refers to an individual's capacity to experience and withstand negative emotions (Bardeen et al., 2013; Leyro et al., 2010; Zvolensky et al., 2010). Of note, both these ER abilities—emotion differentiation and distress tolerance—have been linked to depressive (e.g., Buckner et al., 2007; Demiralp et al., 2012; Dennhardt & Murphy, 2011; Elhai et al., 2018; Erbas et al., 2014; Holliday et al., 2016; Macatee et al., 2016; McDermott et al., 2019; Starr et al., 2017; Willroth et al., 2020) and generalized or social anxiety symptoms (e.g., Brandt et al., 2013; Intrieri & Newell, 2022; Keough et al., 2010; Matt et al., 2016; Thompson et al., 2017). Considering emerging evidence that ER flexibility serves as a potential mediator underlying these associations (e.g., Barrett et al., 2001; Kashdan et al., 2015; Kalokerinos et al., 2019; Keough et al., 2010; Leyro et al., 2010), we sought to examine a regulatory flexibility framework of distress in which emotion regulation (ER) flexibility mediates the respective relationships between these ER abilities (i.e., negative emotion differentiation, distress tolerance) and distress symptoms.

ER flexibility: An overview

ER flexibility is conceptualized as the ability to variably employ regulatory strategies in accordance with contextual demands of emotional situations, such as emotional intensity and emotion type. In line with dominant models (Aldao et al., 2015; Bonanno & Burton, 2013), regulatory flexibility comprises four components (i.e., context sensitivity, repertoire, feedback responsiveness, covariation) though we focus on three of these components in the present examination. a) *Context sensitivity* involves the ability to evaluate contextual cues in emotional situations and select appropriate strategies accordingly; while b) *repertoire* involves the ability to employ a diverse suite of regulatory strategies to manage various contextual demands. In addition, as proposed by Aldao et al. (2015), ER flexibility also involves the c) *covariation* of strategy variability (i.e., variation of one’s regulatory responses across emotional situations) with contextual variability (i.e., variation in contextual demands across emotional situations).

In particular, context sensitivity involves adaptive situation-strategy fit—i.e., evaluating emotional demands in a given situation and determining an appropriate regulatory strategy accordingly. This can be assessed based on Sheppes et al.'s (2014) conceptual framework of emotion regulation choice, wherein flexible situation-strategy fit is characterized by an increased use of disengagement strategies (e.g., distraction, avoidance) in response to higher-intensity emotions; and an increased use of engagement strategies (e.g., problem-solving, cognitive reappraisal) in response to lower-intensity emotions (Dixon-Gordon et al., 2015; Martins et al., 2016; Naragon-Gainey et al., 2017; Sheppes et al., 2011; Wilms et al., 2020). In high-intensity situations, strategies involving disengagement from stimuli (e.g., distraction) can successfully block emotional information before it undergoes elaborated processing, thus modulating high-intensity emotions before they gather force (McRae et al., 2010; Shafir et al., 2016). In contrast, engagement strategies involve elaborative processing and evaluation of emotional stimuli (e.g., via generating alternative interpretations), which has been shown to successfully modulate emotional responses of manageable intensity levels.

Emotion regulation abilities and ER flexibility

Empirical literature hints at emotion regulation (ER) flexibility as a plausible mediator in the associations between key ER abilities (negative emotion differentiation, emotional distress tolerance) and psychological distress. Two major lines of evidence support the respective associations of poor negative emotion differentiation and emotional distress tolerance with difficulties in ER flexibility. First, drawing on the feelings-as-information perspective (Schwarz, 1990; Schwarz, 2011) and extended process model of emotion regulation (Gross, 2015; Sheppes et al., 2015), the differentiation of discrete negative emotions provides critical contextual insight into emotional experiences, also known as emotion knowledge (Barrett et al., 2001), which guide flexible regulatory responses (Izard et al., 2011). Individuals with higher, compared to lower, emotion differentiation abilities are better able to distinguish their emotional experiences based on emotional intensity/type (e.g., "I am feeling *a little sad*") (Barrett et al., 2001; Feldman, 1995; Kashdan et al., 2010). By discerning fine-grained information regarding type(s) of emotion experienced and/or emotional intensity, emotion differentiation is thought to promote access to emotion knowledge including emotional causes (e.g., being anxious about *something*), emotional goals (i.e., what a person wants to feel), and actions such as regulatory responses required to fulfil these goals (Clore et al., 1994). In turn, more highly activated emotion knowledge guides the flexible selection of context-appropriate ER strategies to address specific experiences of distress (Barrett et al., 2001; Kashdan et al., 2015; Kalokerinos et al., 2019; Thompson et al., 2021). In contrast, difficulties in distinguishing emotions (e.g., perceiving emotions in a global, undifferentiated fashion) may limit emotion knowledge needed to accurately appraise a stressor, thus hindering abilities to flexibly regulate distress in different situations.

Poor emotional distress tolerance is another factor purported to impede flexible emotion regulation processes. In line with the conceptualization of distress tolerance as a higher-order individual difference comprising one's evaluations of and responses to emotions, poor distress tolerance is thought to manifest in a) tendencies to appraise negative emotional states as more intense and aversive and b) efforts to avoid or rapidly alleviate negative emotions due to perceptions that they are too unbearable to manage (Simons & Gaher, 2005). Hence, low distress tolerance is thought to involve rigid or persistent appraisals of negative emotional states as intense and intolerable, thus impairing one's ability to detect or distinguish changing contextual demands (e.g., situations that are less versus more emotionally intense). Furthermore, since low distress tolerance involves tendencies to pursue negative reinforcement opportunities which allow the rapid alleviation of distressing states, this likely shapes difficulties with varying one's strategy use as a function of changing contextual demands. In particular, poor distress thresholds may implicate the persistent use of disengagement strategies (e.g., experiential avoidance) even when not contextually appropriate and possessing a smaller repertoire of available strategies in response to negative emotions (see Keough et al., 2010; Leyro et al., 2010). Accordingly, individuals with lower distress tolerance likely experience difficulties with ER flexibility, including evaluating contextual demands, varying their regulatory responses accordingly, and implementing a diverse range of strategies (Bonanno & Burton, 2013). In sum, prior literature points to difficulties in negative emotion differentiation and distress tolerance, respectively, as contributing factors of weaker ER flexibility.

ER flexibility and psychological distress

According to theories of emotion dysregulation in affective distress (Hofmann et al., 2012; Mennin et al., 2002, 2005), difficulties with emotion inhibitory processing play a central role in contributing to distress symptoms including depression and anxiety (Gotlib & Joorman, 2010; Mathews & MacLeod, 2005). Given that ER flexibility enables the down-regulation of emotional responses by adapting regulatory strategies to specific contextual demands, emerging evidence identifies poor regulatory flexibility as a potential mechanism explaining the maintenance and augmentation of affective distress (Aldao & Nolen-Hoeksema, 2012; Coifman & Summers, 2019; Kashdan & Rottenberg, 2010). Specifically, distress symptoms in both clinical and nonclinical samples have been associated with the rigid or excessive reliance on certain strategies—such as rumination, experiential avoidance, and expressive suppression—across varying emotional contexts. For instance, a wealth of evidence has identified the excessive use of suppression (i.e., persistent concealment of negative emotions) as a contributing factor to depressive symptoms (Aldao et al., 2010; Gotlib & Joormann, 2010; Nolen-Hoeksema et al., 2008; Moore et al., 2008; Nezlek & Kuppens, 2008; Wang et al, 2021; Wang et al., 2023). Further, generalized anxiety symptoms are theorized to be explained by pervasive, uncontrollable worrying to suppress emotional experiences (McLaughlin et al., 2007; Mennin et al., 2007) while social anxiety symptoms are associated with a rigid reliance on expressive suppression and experiential avoidance across contexts to conceal emotional experiences deemed to be unacceptable or intolerable (see Dryman & Heimberg, 2018). Indeed, there is growing evidence that ER inflexibility is a transdiagnostic risk factor for a range of psychological distress symptoms including depressive, generalized anxiety, and social anxiety symptoms (Chen & Bonanno, 2021; Conroy et al., 2020; Goodman et al., 2021; Levin & Rawana, 2022; Monsoon et al., 2022; O'Toole et al., 2017; Southward & Cheavens, 2017; Specker & Nickerson, 2023; Tng et al., 2023; Wang et al., 2021; Wang et al., 2023). In cross-sectional studies of community and college-aged adults, lower self-reported ER flexibility has been associated with higher levels of depression and anxiety symptoms (Levin & Rawana, 2022; Monsoon et al., 2022). Further, experience sampling studies indicate that poorer ER flexibility, indicated by weaker flexibility of regulatory responses according to contextual demands (e.g., emotional intensity) across occasions, is associated with greater levels of depressive, generalized anxiety, and social anxiety symptoms in samples of college students and community adults (Goodman et al., 2021; O'Toole et al., 2017; Tng et al., 2023; Wang et al., 2021; Wang et al., 2023). In sum, extant evidence suggests that difficulties with distress tolerance and emotion differentiation hinder the flexible implementation of regulatory strategies which, in turn, may explain distress symptoms including depressive, generalized anxiety, and social anxiety symptoms.

Bidirectional associations: Exploring a reverse mediation account

Furthermore, it is plausible that our mediation framework applies in its reverse order, wherein distress symptoms predict weaker ER flexibility which then reinforce lower emotion differentiation and distress tolerance abilities. Drawing on Milyavsky et al.'s (2018) application of cognitive energetics theory to emotion regulation (Kruglanski et al., 2012), psychological distress associated with depression or anxiety symptoms may serve as a driving force for individuals to rapidly down-regulate negative emotional states. Given that emotion regulation is the outcome of driving forces (e.g., how important it is to regulate an emotion) in combination with restraining forces (e.g., how difficult it is to regulate an emotion), heightened psychological distress is thought to increase the importance of down-regulating negative emotions to reduce discrepancies between one's current and desired emotional state. This may motivate excessive or inflexible reliance on disengagement-oriented regulatory responses, or the haphazard use of multiple, ineffective strategies, to downregulate distress as quickly as possible (Blanke et al., 2020; Daniel et al., 2023). Indeed, nascent longitudinal research by Dawel et al. (2021) suggests that community adults' depression and anxiety levels prospectively account for greater emotional suppression; in a similar vein, psychological distress symptoms may account for less flexible ER processes.

Pathways from ER flexibility to ER abilities of emotion differentiation and distress tolerance are potentially bidirectional as well. Prior longitudinal studies hint that rigid regulation processes, such as a persistent reliance on certain regulatory responses (e.g., emotional suppression), may hinder elaborative processing of emotional information (Sheppes et al., 2011) and attentiveness to one's emotional experiences (Van der Gucht et al., 2019). In turn, a lack of elaborative emotional processing or mindfulness toward emotional experiences limits opportunities for people to develop an adequate understanding of diverse emotional experiences (i.e., emotion knowledge; Izard et al., 2011), thus fostering difficulties with negative emotion differentiation. Similarly, based on Veilleux's (2023) momentary model of distress tolerance, perceived abilities to tolerate distress, or distress tolerance self-efficacy (Zvolensky et al., 2010), may be honed through repeated patterns of flexible regulation processes which indicates a keen understanding of how different strategies can be utilized to reduce distress to a manageable level. Conversely, repeated patterns of regulatory inflexibility (e.g., the persistent use of ineffective strategies), indicating difficulties with downregulating distress, can foster perceptions of oneself as being unable to manage distress. For instance, repeated patterns of excessive avoidance-focused coping can coalesce into a person who views themselves as being incapable of withstanding or coping with distress (e.g., "I do not have the capacity to process or sit with my feelings right now"). Hence, inflexible ER may potentially foster difficulties with distress tolerance. Taken together, there is reason to examine a reverse mediation account of our framework of distress; in which ER flexibility mediates bidirectional associations between distress symptoms and ER abilities (negative emotion differentiation, emotional distress tolerance). In so doing, the present examination seeks to address several conceptual and methodological limitations of previous work.

Limitations of previous work

First, there is insufficient empirical investigation into the mediating role of ER flexibility in the associations between ER abilities (i.e., emotion differentiation, distress tolerance) and distress symptoms. A handful of studies have suggested intermediary mechanisms underlying the association between emotional distress tolerance and psychological distress—including personalized psychological flexibility (i.e., ability to adaptively respond to obstacles in the pursuit of personalized life goals; Akbari et al., 2021), perseverative thinking (i.e., repetitive and sustained attention on negative emotions and thoughts; McDermott et al., 2019), and emotion dysregulation (Brandt et al., 2013). As argued above, emotion differentiation and distress tolerance abilities may explain ER flexibility processes (Barrett et al., 2001; Kashdan et al., 2015; Kalokerinos et al., 2019; Keough et al., 2010; Leyro et al., 2010), which in turn account for distress symptoms (Conroy et al., 2020; Coifman & Summers, 2019; Wang et al., 2021). In spite of this, a dearth of empirical research has examined ER flexibility as a potential mediator which accounts for the associations between ER abilities and psychological distress.

Second, potentially bidirectional influences among ER abilities, ER flexibility, and psychological distress warrant greater empirical attention. The majority of prior studies have examined correlations between ER flexibility and distress symptoms at a single time-point through cross-sectional or experience sampling work (e.g., Chen & Bonanno, 2021; Conroy et al., 2020; Goodman et al., 2021; O'Toole et al., 2017; Wang et al., 2021) or the predictive effects of ER flexibility on psychological outcomes through experimental studies (e.g., Specker & Nickerson, 2023). While prior work emphasizes emotion regulation deficits as a contributing factor to distress symptoms (e.g., Hofmann et al., 2012; Mennin et al., 2005), the notion that emotion dysregulation may also be a consequence of distress symptoms has been overlooked (see Dawel et al., 2021). In the context of our regulatory flexibility framework of distress, longitudinal designs are required to explore the mediating role of ER flexibility in potentially reciprocal influences among ER abilities, ER flexibility, and distress symptoms across multiple time points.

Third, past studies have emphasized the need for multi-method assessments of ER flexibility, utilizing self-report, task-based and experience sampling measures. To date, most studies examining the association between ER flexibility and psychological distress have primarily relied on a single method such as static, self-report measures (e.g., Chen & Bonanno, 2021; Conroy et al., 2020; Monsoon et al., 2022), task-based measures (e.g., Scheibe et al., 2015; Sheppes et al., 2011), or experience sampling or behavioural measures (e.g., Battaglini et al., 2022; Socastro et al., 2022; Goodman et al., 2021). However, each measurement method has its own strengths and limitations. For instance, while task-based measures may utilise emotional stimuli that lack ecological validity (English & Eldesouky, 2020), they allow researchers to manipulate emotional contexts to reliably assess individual differences in regulatory flexibility. In addition, although experience sampling measures do not allow researchers to manipulate emotional contexts and may be confounded by participants' meta-awareness to report on their daily emotional experiences and regulatory strategies, they allow an individual's emotion regulation processes to be observed across a wide variety of naturalistic contexts in close to real time (Saraiya & Walsh, 2015). Self-report measures may also introduce recall inaccuracies and social desirability biases (e.g., social desirability biases (DeVellis, 2003). Hence, to enhance construct validity and circumvent limitations of a single method of measurement, it is important that ER flexibility is measured through the triangulation of multiple methods, including self-report, task-based, and behavioural (i.e., experience sampling) measures (Seeley et al., 2015).

Fourth, a paucity of studies has operationalized ER flexibility holistically by drawing on both of the dominant ER-flexibility theories proposed by Bonanno and Burton (2013) and Aldao et al. (2015). As previously mentioned, regulatory flexibility comprises inter-related components including context sensitivity, repertoire, as well as the covariation of variability in regulatory strategy use with variability in emotional demands across occasions. However, extant studies examining the relation between emotion regulation flexibility and psychological distress have primarily focused on measuring Bonanno and Burton's (2013) components of ER flexibility (e.g., Chen & Bonanno, 2021; Southward & Cheavens, 2017), affective styles (i.e., concealing, tolerating, or adjusting; Conroy et al., 2020) or variability of strategy use across occasions (Blanke et al., 2020; Wang et al., 2021) as isolated indices of regulatory flexibility. In line with complementary theories positing ER flexibility as a multi-faceted process (Aldao et al., 2015; Bonanno & Burton, 2013), there is reason to account for distinct components of ER flexibility through their varying operationalizations.

Present study

To address these gaps in the literature, our over-arching research goals were threefold. First, we sought to examine our hypothesized path model (H1a and H1b)—in which ER flexibility mediates the association between regulatory abilities (i.e., negative emotion differentiation and emotional distress tolerance) and distress symptoms—across both time-lagged and longitudinal studies. Second, we sought to examine bidirectional relationships among negative emotion differentiation, emotional distress tolerance, ER flexibility, and distress symptoms across multiple timepoints in a three-wave longitudinal study (H2a and H2b). Third, we aimed to assess ER flexibility using a multi-method approach, whereby regulatory flexibility is assessed across self-report, task-based, and experience sampling; and operationalized using both Bonanno and Burton (2013) and Aldao et al.'s (2015) theoretical conceptualizations. In line with our proposed regulatory flexibility framework of distress, we hypothesized that:

H1a. Poorer negative emotion differentiation will predict lower ER flexibility which, in turn, will predict greater severity of each distress symptom subtype (depressive symptoms, generalized anxiety symptoms, social anxiety symptoms). There will be a significant indirect effect of negative emotion differentiation on subsequent distress symptoms via ER flexibility.

H1b. Poorer emotional distress tolerance will predict lower ER flexibility which, in turn, will predict greater severity of each distress symptom subtype. There will be a significant indirect effect of emotional distress tolerance on subsequent distress symptoms via ER flexibility.

H2a. Greater distress symptoms will predict weaker ER flexibility which, in turn, will predict poorer negative emotion differentiation. There will be a significant negative indirect effect of distress symptoms on subsequent negative emotion differentiation via ER flexibility.

H2b. Greater distress symptoms will predict weaker ER flexibility which, in turn, will predict poorer emotional distress tolerance. There will be a significant negative indirect effect of distress symptoms on subsequent emotional distress tolerance via ER flexibility.

In all analyses, we accounted for key covariates—gender (Li et al., 2022; Liu et al., 2019), socioeconomic status (i.e., household income; Nunes et al., 2022), subjective social class (Rubin, 2020), and personality traits of neuroticism and extroversion (Liu et al., 2019; Lyon et al., 2020; Shi et al., 2015; Yang et al., 2023)—as these have been linked to psychological distress symptoms including depressive, generalized anxiety, and social anxiety symptoms. For instance, based on the NewMood dataset comprising a 264-large community sample, variance in the severity levels of anxiety and depressive symptoms were primarily explained by extroversion personality facets (i.e., positive emotion, assertiveness) and neuroticism facets (i.e., demotivation) (Lyon et al., 2020).

Study 1

2. Methods

2.1 Participants

We recruited an initial sample of 165 undergraduates from Singapore Management University in exchange for two course credits or monetary compensation. Informed consent was obtained prior to the commencement of the study. Based on an *a priori* power analysis, a minimum sample size of 136 was determined for the proposed structural equation models (Soper, 2023). Following prior evidence of small-to-medium correlations of distress tolerance (Laposa et al., 2015; Michel et al., 2016) and negative emotion differentiation (Liu et al., 2020; Thompson et al., 2017) with young adults' distress symptoms, effect size was estimated at .25. See Table 1 for full descriptive statistics of our sample.

Table 1. *Descriptive statistics of all predictors, criterion variables, mediators, and covariates.*

	n	**M**	**SD**	**Min.**	**Max.**	**Skewness**	**Kurtosis**
Predictor							
Distress tolerance	162	45.154	12.104	20	75	.149	-.604
Negative emotion differentiation	162	25.809	5.146	9	35	-.297	.027
Criterion Variables							
Depressive symptoms	156	22.064	11.536	1	58	.521	.082
Generalized anxiety symptoms	156	7.897	5.569	0	21	.477	-.499
Social anxiety symptoms	156	36.558	17.702	1	79	.192	-.676
Mediator							
Strategy-switching	132	0.325	0.197	0	0.80	.387	-.718
Strategy-maintenance	132	0.954	0.077	0.53	1.00	-2.476	8.179
ER flexibility	160	33.431	7.694	13	50	-.233	-.430
Covariates							
Age	162	20.870	1.557	18	29	1.118	3.717
Gender (% female)[1]	162	77.2%					
Income[2]	162	6.820	2.707	2	11	.135	-1.090
Subjective social class	162	5.780	1.266	3	10	.539	.216
Extroversion	162	11.940	4.292	4	20	.123	-1.042
Neuroticism	162	12.850	3.844	4	20	-.322	-.335

Note. [1]Gender was coded as 1 for females and 2 for males.
[2]Combined annual income was rated on a 17-point scale with $10,000 intervals (0 = *$1, 000 and below*, 1 = *$1, 001 - $3, 000*, 2 = *$3, 001 - $5, 000*, 3 = *$5, 001 - $7, 499*, 4 = *$7, 500 - $9, 999*, 5 = *$10, 000 - $12, 499*, 6 = *$12, 500 - $14, 999*, 7 = *$15, 000 - $17, 499*, 8 = *$17, 500 - $19, 999*, 9 = *more than $20, 000)*

2.2 Measures

Negative emotion differentiation. To assess participants' abilities to differentiate negative emotions, we adapted seven items from the 'Differentiation' subscale of the Range and Differentiation of Emotional Experiences Scale (RDEES; Kang & Shaver, 2004). Participants rated each item on a 5-point Likert-type scale from 1 = *Does not describe me at all* to 5 = *Describes me very well* (e.g., "I tend to draw fine distinctions between negative feelings"; α = .894), with higher scores indicating stronger differentiation abilities.

Emotional distress tolerance. Emotional distress tolerance was assessed using the 15-item Distress Tolerance Scale (DTS; Simons & Gaher, 2005; α = .910). This measure comprised four subscales measuring a) the ability to tolerate emotional distress (e.g., "I can't handle feeling distressed or upset"), b) subjective appraisals of distress (e.g., "My feelings of distress or being upset are not acceptable"), c) absorption of attention by negative emotions (e.g., "When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels") and d) regulation efforts to quickly alleviate distress (e.g., "When I feel distressed or upset, I must do something about it immediately"), respectively. Items were rated on a 5-point Likert-type scale (1 = *strongly agree,* 2 = *mildly agree*, 3 = *agree and disagree equally*, 4 = *mildly disagree*, 5 = *strongly disagree*), with higher scores indicating greater distress tolerance.

ER choice task. To measure ER flexibility, a computer-based Emotion-Regulation (ER) Choice task (Birk & Bonanno, 2016; Scheibe et al., 2015; Sheppes et al., 2011; Toh & Yang, 2023) was administered to assess participants' choices between reappraisal and distraction in response to negatively-valanced images. Tapping on context sensitivity abilities, the ER choice task required participants to assess the intensity of negative emotions elicited by pictorial stimuli and select their regulatory response (i.e., distraction or reappraisal) accordingly.

During an initial training phase, the use of “Reframe” and “Distract” strategies was explained and practiced with eight sample trials. “Reframe” required thinking about the image in a way that attenuated its negative meaning (e.g., imagining how the situation could improve or identifying aspects of the situation that are not as negative as they seem), whereas “Distract” required shifting of one’s attention from a more negatively-valanced target image to neutral images at the four corners of the screen. In the actual choice task, participants were tasked to view negatively-valanced images in a randomized order across 30 trials. All images in the choice task were selected from the International Affective Picture System (Lang et al., 2008); these included 15 target images of low intensity (valence = 3.41; arousal = 5.01) and 15 target images of high intensity (valence = 2.02; arousal = 5.93). In each of the 30 trials, participants viewed a fixation point (1s), followed by an instruction to “Reframe” (2s), and a target image presented in the middle of the screen (total of 11s). After the target image was presented for 5 seconds, participants heard a beep tone (100ms) which indicated that they can switch to distraction by pressing the spacebar or continue using reappraisal (by not pressing any key), depending on which strategy they perceive to be more effective in helping them feel less negative. If participants choose to switch from reappraisal to distraction, four neutral images were presented for the remainder of the trial (up to 6s depending on when the spacebar was pressed), and participants were instructed to attend to these neutral images instead of the target image. If participants chose to maintain their use of reappraisal, then the target picture remained on the screen for the remainder of the trial (up to 6s). At the end of each trial, participants were asked to report their negative affect (“How negative do you feel?” 1 = *not at all*, 7 = *very negative*). Between each trial, participants viewed a screen that read “Relax” (1 to 3s). ER flexibility was indexed by the frequency (i.e., proportion) of strategy maintenance and strategy switching for low-intensity and high-intensity conditions, respectively.

ER flexibility measure. We also measured ER flexibility via the 10-item Emotion Regulation Flexibility Scale (Monsoon et al., 2022; α = .902). In line with dominant conceptualizations of ER flexibility (Aldao et al., 2015; Bonanno & Burton, 2013), this measure asked about participants' sensitivity of strategy use to contextual cues; (e.g., "I use different emotion regulation strategies depending on the type or intensity of the emotion) and their repertoire of strategies (e.g., "I use a wide range of different strategies to help regulate my emotions"). Participants indicated the extent to which each statement was true of them on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*), with higher scores indicating better ER flexibility.

Depressive symptoms. Depressive symptoms was assessed with the Center for Epidemiologic Studies Depression Scale (CES-D; α = .923; Radloff, 1977). This measure comprised 20 items evaluating the frequency of depressive symptoms over the past week (e.g., "I thought my life had been a failure"). Each item was rated on a 4-point Likert-type scale ranging from 0 (*rarely or none of the time; less than 1 day*) to 3 (*most or all of the time; 5-7 days*), with higher scores indicating more severe depressive symptoms.

Generalized anxiety symptoms. The Generalized Anxiety Disorder Questionnaire-7 (GAD-7; α = .931; Spitzer et al., 2006) evaluated the frequency of core generalized anxiety symptoms across the past week, including: "feeling nervous, anxious, or on edge" and "not being able to stop or control worrying". Participants were instructed to rate each item on a 4-point Likert-type scale (0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, 3 = *nearly every day*). Higher scores corresponded to a greater severity of anxiety symptoms.

Social anxiety symptoms. Social anxiety symptoms, or anxieties related to social interactions, were evaluated using the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998; e.g., "When mixing socially, I am uncomfortable"). Each of the 20 items (α = .949) was rated on a 5-point Likert scale ranging from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). Higher scores indicated greater social anxiety symptoms.

Covariates. We obtained participants' gender and socioeconomic status using a demographics questionnaire. Participants rated their combined monthly household income on a 10-point Likert type scale (0 = *$1, 000 and below*, 1 = *$1, 001 - $3, 000*, 2 = *$3, 001 - $5, 000*, 3 = *$5, 001 - $7, 499*, 4 = *$7, 500 - $9, 999*, 5 = *$10, 000 - $12, 499*, 6 = *$12, 500 - $14, 999*, 7 = *$15, 000 - $17, 499*, 8 = *$17, 500 - $19, 999*, 9 = *more than $20, 000*"). They also indicated their subjective socioeconomic status via the MacArthur Scale of Subjective Social Status (1 = *lowest subjective socioeconomic status*, 10 = *highest subjective socioeconomic status*; Adler et al., 2000). Personality traits were assessed using the corresponding neuroticism (e.g., "I see myself as someone who worries a lot"; α = .832) and extroversion (e.g., "I see myself as someone who is outgoing and sociable"; α = .882) subscales of the 20-item Big Five Inventory (BFI-20; John & Srivastava, 1999; Tucaković & Nedeljković, 2023). Participants were instructed to report their agreement with each statement on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*).

2.3 Procedure

Data was collected at three time points, each spaced one to two weeks apart. At Time 1 (T1), we assessed emotional distress tolerance, negative emotion differentiation, and all covariates—gender, household income, subjective social status, and personality traits. Our mediator of interest, ER flexibility, was measured at T2 via both task-based and self-report measures. Psychological distress symptoms (i.e., depressive symptoms, generalized anxiety symptoms, social anxiety symptoms) were then measured at T3. Upon completion, participants were thanked and debriefed. All study materials and procedures were approved by the university's institutional review board (IRB-23-136-A101 (923)).

2.4 Analytic plan

In preparation for structural equation modelling, we ascertained the fit of our measurement model in which distress tolerance and distress symptoms were represented by latent variables while self-reported ER flexibility and negative emotion differentiation were represented by observed variables. Guided by theoretical frameworks of distress tolerance (Simons & Gaher, 2005; Zvolensky et al., 2010) and consistent with the proposed factor structure of the 15-item Distress Tolerance Scale, the latent factor for emotional distress tolerance was specified by tolerance, absorption, appraisal, and regulation subscale scores. To construct the remaining latent factors for emotion differentiation, ER flexibility, and distress, corresponding items from each measure were aggregated into four parcels and used as indicators for each factor, following the item-to-construct technique proposed by Little et al. (2002). As each latent construct was measured by more than four manifest indicators (i.e., items), this parcelling procedure allowed for the creation of item parcels (i.e., aggregate-level indicators comprising the average of multiple items) that have balanced factor loadings onto the latent variable (Matsunaga, 2008). Compared to item-level indicators, parcelling offered improved psychometric properties (e.g., reducing the influence of various sources of measurement errors associated with individual items, greater scale communality) and more parsimonious model properties which is particularly advantageous with a relatively smaller sample (Little et al., 2002; Rioux et al., 2020). Overall fit of our measurement model was evaluated using the following criteria: root mean square error of approximation (RMSEA) below 0.06; comparative fit index (CFI) and Tucker Lewis index (TLI) values close to 0.95; and standardized root mean squared residual (SRMR) less than 0.09 (Hu & Bentler, 1999).

In order to examine our hypotheses that emotional distress tolerance and negative emotion differentiation would indirectly predict distress symptoms through the mediating role of ER flexibility, structural equation models were specified with ER flexibility operationalized via two task-based indices (i.e., proportion of strategy-maintenance in low-intensity conditions and proportion of strategy-switching in high-intensity conditions) and a latent construct of self-reported ER flexibility indicated by four item parcels. For each index of ER flexibility, psychological distress outcomes (i.e., depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms) were concurrently examined as criterion variables.

In each mediation model, the T2 ER flexibility index was regressed onto T1 negative emotion differentiation and distress tolerance indices (i.e., the “a-paths” of each mediation model). In addition, each T3 distress symptom factor (i.e., depressive symptoms, generalized anxiety symptoms, social anxiety symptoms) was regressed onto T2 emotion regulation flexibility (i.e., the “b-paths” of each mediation model). Each distress symptom factor was also regressed on T1 negative emotion differentiation and distress tolerance indices (i.e., the direct effects or “c’-paths”) in each model. We examined the unadjusted path models without any covariates, followed by adjusted models that accounted for covariates. A bias-corrected bootstrap approach with 1,000 resamples was used to derive 95% confidence intervals for the indirect effects of interest (Preacher & Kelley, 2011). For each mediation model, the strength of mediation was also assessed by calculating the P_M effect size index (i.e., ratio of the indirect effect relative to total effect), together with the total effect c (Shrout & Bolger, 2002). Given that the indirect effects (*ab*) and direct effects (*c’*) were both negatively valanced in our mediation models, the presentation of these effect size indices are recommended as they allow for “meaningful evaluation of the mediation effect size” (Wen & Fan, 2015, p. 199). To adjust for family-wise error rates in multiple mediation hypotheses testing, the nominal significance levels for all indirect effects of interest were corrected according to the Holm-Bonferroni procedure (Holm, 1979). All analyses were conducted in Mplus 8.11 (Muthén & Muthén, 2021), with missing data estimated using full information maximum likelihood (Enders & Bandalos, 2001).

3. Results and discussion

3.1 Preliminary analyses

At the initial timepoint (T1), *n* = 162 participants provided complete data. This number reduced to 156 at T3. Thus, the effective T3 response rate was 96.30% (i.e., 3.7% attrition). According to Bennett (2001) and Dong and Peng (2013), less than 5% of missing data has a negligible impact on statistical results. Following Birk and Bonanno (2016), we excluded participants (*n* = 28) who showed no variation in strategy-switching across all ER choice task trials (i.e., did not switch to distraction at all or switched to distraction in all trials). In line with previous studies which showed that reappraisal and distraction are preferred for low- and high-intensity emotional stimuli, respectively (Sheppes et al., 2011, 2014), frequency of strategy-switching was higher across the high-intensity (*M* = 4.87, *SD* = 2.95), compared to low-intensity, trials (*M* = .688, *SD* = 1.148); t(127) = 6.773, $p < .001$.

3.2 Model fit of measurement models

An overall measurement model was specified that included latent constructs for distress tolerance, emotion differentiation, ER flexibility, depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms. This overall model showed good fit to the data, $\chi^2(236) = 318.354$, $p < .001$, RMSEA = .046, 90% CI [.032, 058], CFI = .974, TLI = .969, SRMR = .057. All manifest variables loaded solidly on their respective latent factors (*ps < .001*), with standardized factor loadings ranging from .554 to .955. Consistent with modification indices and the observed pattern of indicator correlations, additional covariance was specified between the error residuals of tolerance and regulation indicators of the distress tolerance latent factor. See Table 2 for full measurement model fit indices.

Table 2. *Confirmatory factor analysis (CFA) model fit indices.*

	χ^2(df)	***p***	**CFI/TLI**	**RMSEA**	**SRMR**
Overall	318.354 (236)	<.001	.974/.969	.046	.057
Distress tolerance	1.159 (1)	.282	1.000/.997	.031	.011
Negative emotion differentiation	0.906 (1)	.341	1.000/1.000	.000	.006
ER flexibility	3.519 (2)	.172	.996/.987	.069	.014
Depressive symptoms	2.348 (2)	.309	.999/.998	.033	.007
Generalized anxiety symptoms	8.872 (2)	.118	.988/.963	.148	.014
Social anxiety symptoms	7.545 (2)	.023	.992/.975	.133	.009

Note. Factor in bold refers to the most parsimonious model. CFI = Comparative Fit Index; TLI = Tucket Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

3.3 Examination of path models

3.3.1 Mediation models including distress tolerance as focal predictor

To examine whether indices of task-based ER flexibility and self-reported ER flexibility mediated the pathway from distress tolerance to various distress symptoms, we performed mediational SEM without covariates and with key covariates (gender, household income, subjective social class, extroversion, neuroticism) to ensure the robustness of mediating effects above and beyond the effects of potentially confounding variables.

Task-based ER flexibility. In separate structural models, task-based indices of ER flexibility were included as mediators including a) proportion of strategy-switching in high-intensity trials and b) proportion of strategy maintenance in low-intensity trials. The model including proportion of strategy-switching as its focal mediator showed good fit to the data

(χ^2(107) = 145.182, *p* = .008, RMSEA = .047, 90% CI [.025, .065], CFI = .984, TLI = .979, SRMR = .061). Distress tolerance had a nonsignificant association with proportion of strategy-switching (β = -.089, SE = .096, 95% CI [-.278, .100]), which, in turn, was associated with social anxiety symptoms (β = .244, SE = .079, 95% CI [.089, .400]) but not generalized anxiety symptoms (β = .169, SE = .088, 95% CI [-.003 .341]) or depressive symptoms (β = -.018, SE = .093, 95% CI [-.201, .165]).

The model including proportion of strategy-maintenance as its focal mediator provided acceptable fit to the data (χ^2(107) = 148.844, *p* = .005, RMSEA = .049, 90% CI [.028, .067], CFI = .982, TLI = .977, SRMR = .063). Distress tolerance had a nonsignificant association with proportion of strategy-maintenance (β = -.179, SE = .095, 95% CI [-.008, .367]), which, in turn, was associated with social anxiety symptoms (β = -.167, SE = .082, 95% CI [-.327, -.007]) but not depressive (β = .067, SE = .095, 95% CI [-.121, .254]) or generalized anxiety symptoms (β = -.069, SE = .091, 95% CI [-.247, .109]). We did not find any indirect effects of distress tolerance on distress symptoms through strategy-switching (β_{dep} = .002, SE = .009, 95% CI [-.015, .019]; β_{ga} = -.016, SE = .018, 95% CI [-.050, .019]; β_{sa} = -.025, SE = .028, 95% CI [-.079, .030]) or strategy-maintenance indices (β_{dep} = .012, SE = .019, 95% CI [-.025, .049]; β_{ga} = -.012, SE = .017, 95% CI [-.045, .021]; β_{sa} = -.030, SE = .022, 95% CI [-.074, .014]). These results remained unchanged when we included covariates as exogenous predictors of distress symptoms.

Self-reported ER flexibility. Structural paths were estimated from the latent construct of distress tolerance to the latent construct of self-reported ER flexibility, and ER flexibility to respective latent constructs for depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms (see Figure 1a). This model provided good fit to the data (χ^2(159) = 230.043, *p* = .0002, RMSEA = .052, 90% CI [.036, .066], CFI = .974, TLI = .969, SRMR

= .064). Distress tolerance had a significant positive association with ER flexibility (β = .328, SE = .080, 95% CI [.172, .485]), that, in turn, had a significant negative association only with social anxiety symptoms (β = -.440, SE = .074, 95% CI [-.585, -.296]) and not depressive (β = .003, SE = .086, 95% CI [-.165, .172]) or generalized anxiety symptoms (β = .020, SE = .087, 95% CI [-.150, .190]). Critically, the indirect effect of distress tolerance on social anxiety symptoms was significant through self-reported ER flexibility (β = -.145, SE = .043, 95% CI [-.229, -.060]). To quantify the strength of this mediation effect, P_M = 40.845% of the total effect of distress tolerance on social anxiety symptoms was accounted for by ER flexibility. The direct path from distress tolerance to social anxiety symptoms remained significant after accounting for ER flexibility in the model (β = -.210, SE = .077, 95% CI [-.361, -.059]). This path model accounted for 29.9% of the variance in social anxiety symptoms, 21.3% of the variance in depressive symptoms, 19.0% of the variance in generalized anxiety symptoms, and 10.8% of the variance in ER flexibility. The significant mediation effect of ER flexibility on the association between distress tolerance and social anxiety symptoms remained when we accounted for demographic covariates of gender, income, subjective social class, and personality traits of extroversion and neuroticism (β = -.061, SE = .030, 95% CI [-.120, -.002], P_M = .484). Consistently, indirect effects of distress tolerance on depressive (β = .030, SE = .032, 95% CI [-.032, .092]) and generalized anxiety symptoms (β = .028, SE = .032, 95% CI [-.036, .091]) remained nonsignificant. All *p*-values and adjusted alpha-levels (Holm, 1979) for indirect effects of interest are included in Table 3.

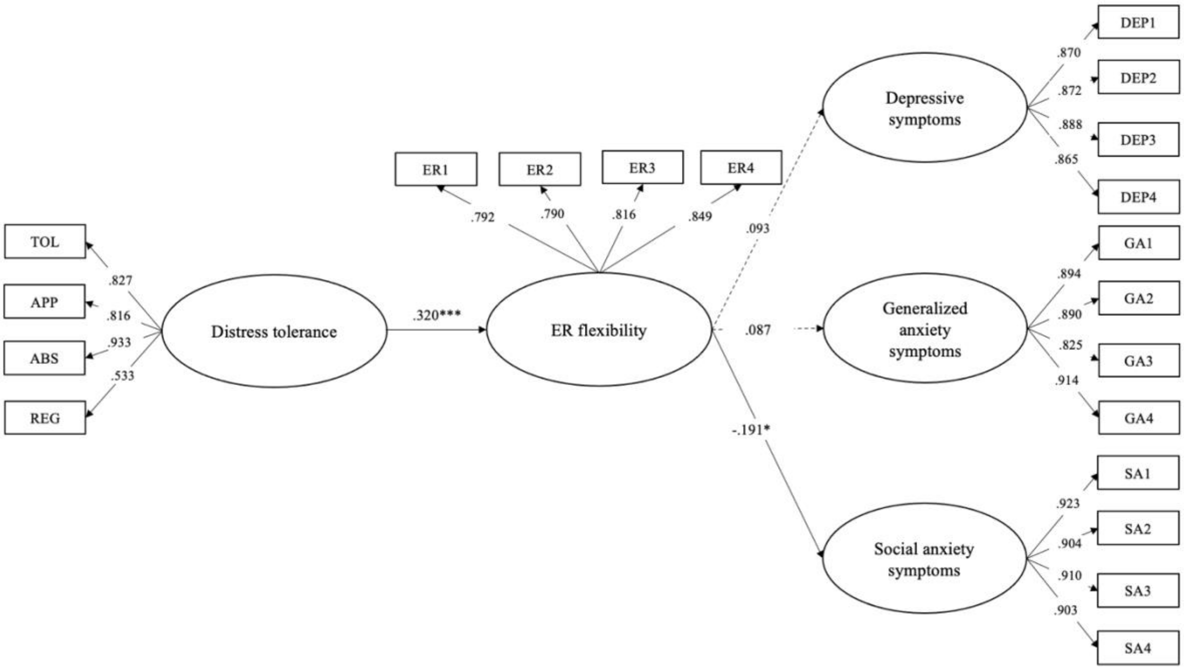
3.3.2 Path models including negative emotion differentiation as focal predictor

Task-based ER flexibility. All structural equation analyses were repeated with negative emotion differentiation as the focal predictor. The model including proportion of strategy-switching as its focal mediator showed good fit to the data ($\chi^2(107)$ = 107.212, *p*

= .476, RMSEA = .004, 90% CI [.000, .041], CFI = 1.000, TLI = 1.000, SRMR = .032). Negative emotion differentiation had a nonsignificant association with proportion of strategy-switching (β = -.077, SE = .090, 95% CI [-.253, .100]), which, in turn, was associated with greater generalized anxiety symptoms (β = .210, SE = .090, 95% CI [.033, .386]) and social anxiety symptoms (β = .279, SE = .076, 95% CI [.131, .427]) but not depressive symptoms (β = .014, SE = .097, 95% CI [-.175, .204]). Similarly, in the model including proportion of strategy-maintenance (χ^2(107) = 108.085, *p* = .453, RMSEA = .008, 90% CI [.000, .041], CFI = 1.000, TLI = .999, SRMR = .035), negative emotion differentiation was not associated with proportion of strategy-maintenance (β = .105, SE = .090, 95% CI [-.072, .282]), which in turn was associated with social anxiety symptoms (β = -.171, SE = .081, 95% CI [-.330, -.011]) but not depressive (β = -.018, SE = .099, 95% CI [-.213, .176]) or generalized anxiety symptoms (β = -.146, SE = .094, 95% CI [-.330, .038]). There were no significant indirect effects of negative emotion differentiation on distress symptoms through strategy-switching (β_{dep} = -.001, SE = .007, 95% CI [-.016, .014]; β_{ga} = -.016, SE = .020, 95% CI [-.055, .023]; β_{sa} = -.021, SE = .026, 95% CI [-.072, .029]) or strategy-maintenance indices (β_{dep} = -.002, SE = .011, 95% CI [-.023, .019]; β_{ga} = -.015, SE = .017, 95% CI [-.048, .017]; β_{sa} = -.018, SE = .018, 95% CI [-.053, .017]).

Self-reported ER flexibility. Finally, the latent construct of self-reported ER was specified as the focal mediator (see Figure 1b; χ^2(158) = 187.770, *p* = .053, RMSEA = .034, 90% CI [.000, .051], CFI = .989, TLI = .987, SRMR = .044). We found a significant positive association between emotion differentiation and self-reported ER flexibility (β = .472, SE = .073, 95% CI [.330, .614]). In turn, ER flexibility was negatively associated with social anxiety symptoms (β = -.391, SE = .087, 95% CI [-.561, -.221]) and not depressive (β = -.140, SE = .102, 95% CI [-.340, .061]) or generalized anxiety symptoms (β = -.115, SE = .102, 95% CI [-.315, .085]). Consistently, the indirect effect of negative emotion differentiation on social anxiety symptoms was significant through self-reported ER flexibility (β = -.185, SE = .051, 95% CI [-.284, -.085]; P_M = .108). Further, the direct path from emotion differentiation to social anxiety symptoms was reduced to nonsignificance after accounting for ER flexibility as a mediator (β = -.146, SE = .087, 95% CI [-.316, .024]). This path model (see Figure 1b) accounted for 22.8% of the variance in social anxiety symptoms, 2.10% of the variance in depressive symptoms, 1.50% of the variance in generalized anxiety symptoms, and 22.3% of the variance in ER flexibility. Notably, the mediation effect of ER flexibility on the association between emotion differentiation and social anxiety symptoms remained significant when key covariates were accounted for (β = -.090, SE = .042, 95% CI [-.173, -.006]; P_M = .558). See Table 4 for *p*-values and Holm-Bonferonni adjusted alpha-levels for indirect effects of interest. Using the correlation matrix procedure suggested by Bagozzi et al. (1991), we found that all correlations among latent constructs were less than 0.90 (see Table S1 in Appendix), thus indicating that common method variance was not a substantial issue in our analyses.

a)



b)

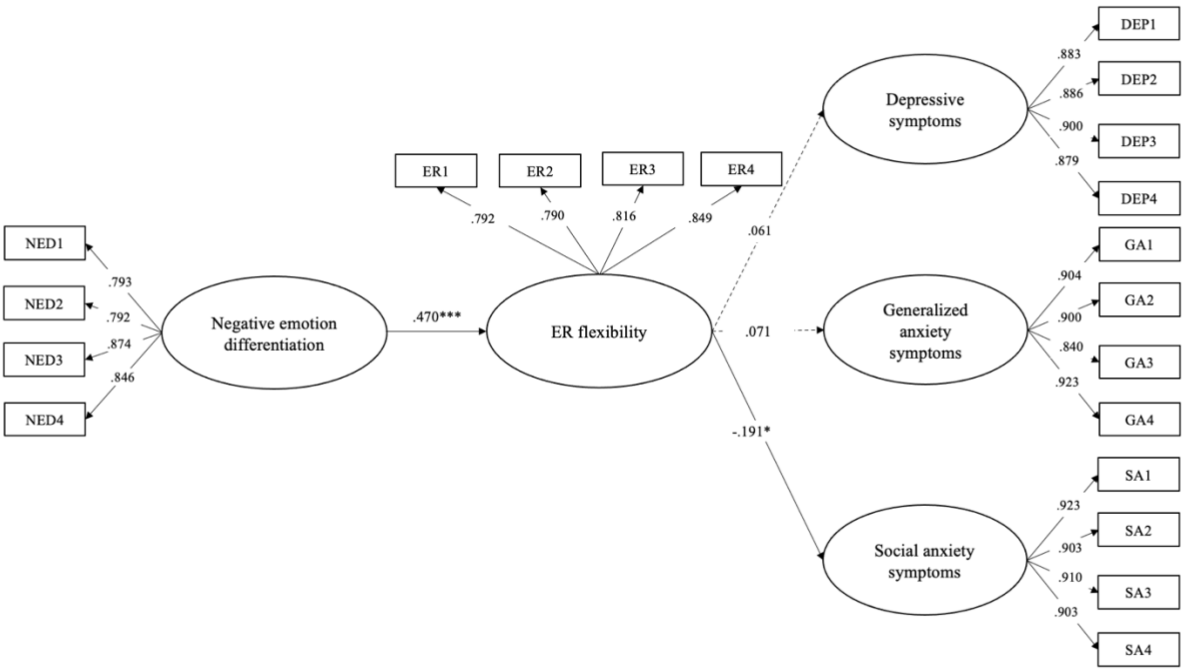


Figure 1. Structural equation models of self-reported ER flexibility mediating the pathways from negative emotion differentiation and distress tolerance to indices of distress symptoms: a) depressive symptoms, b) generalized anxiety symptoms, and c) social anxiety symptoms. Panel a illustrates the model that includes distress tolerance as the focal predictor; and Panel

b illustrates the structural model that includes negative emotion differentiation as the focal predictor. Circles represent latent factors for distress tolerance, negative emotion differentiation, ER flexibility, depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms. Rectangles represent manifest variables or indicators. TOL, APP, ABS, and REG represent subscale-based indicators for distress tolerance; NED1-NED4 represent parcel-based indicators for negative emotion differentiation; ER1-ER4 represent parcel-based indicators for ER flexibility; DEP1-DEP4 represent parcel-based indicators for depressive symptoms; GA1-GA4 represent parcel-based indicators for generalized anxiety symptoms; and SA1-SA4 represent parcel-based indicators for social anxiety symptoms. All factor loadings are significant at $p < .001$. Covariates (gender, household income, subjective social class, extroversion, neuroticism) are not depicted for brevity. Values on the longer, single-headed arrows signify path coefficients. All coefficients shown are standardized. Dotted lines indicate nonsignificant pathways. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3. *Total effects, direct effects, indirect effects for mediational models with distress tolerance as focal predictor*.

	Effect of IV on mediator (a)	**Effect of mediator on outcome (b)**	**Direct effect**	**Total effect**	**Indirect effect (ab)**	**95% CI**	**Adjusted alpha value**
Mediator: Strategy-switching							
Depressive symptoms	-.097 (.320) *p* = .320	-.018 (.093) *p* = .849	-.462 (.070), *p* < .001	-.460 (.069) *p* < .001	.002 (.009) *p* = .855	[-.017, .020]	.05
Generalized anxiety symptoms	-.097 (.320) *p* = .320	.169 (.088) *p* = .054	-.418 (.071) *p* < .001	-.435 (.070) *p* < .001	-.016 (.018) *p* = .351	[-.051, .018]	.05
Social anxiety symptoms	-.097 (.320) *p* = .320	.244 (.079) *p* = .002	-.325 (.076) *p* < .001	-.349 (.076) *p* < .001	-.024 (.026) *p* = .352	[-.074, .026]	.05
Mediator: Strategy-maintenance							
Depressive symptoms	-.170 (.096) *p* = .076	-.076 (.096) *p* = .429	-.241 (.116) *p* = .037	-.229 (.115) *p* = .048	.013 (.019) *p* = .489	[-.024, .049]	.025
Generalized anxiety symptoms	-.170 (.096) *p* = .076	.070 (.094) *p* = .458	-.228 (.117) *p* = .051	-.240 (.116) *p* = .039	-.012 (.017) *p* = .479	[-.045, .021]	.025
Social anxiety symptoms	-.170 (.096) *p* = .076	-.167 (.082) *p* = .023	.024 (.084) *p* = .775	.004 (.085) *p* = 967	-.021 (.016) *p* = .212	[-.053, .012]	.025
Mediator: Self-reported ER flexibility							
Depressive symptoms	.470 (.072) *p* < .001	.061 (.096), *p* = .527	.074 (.088) *p* = .401	-.461 (.069) *p* < .001	.029 (.046) *p* = .529	[-.054, .057]	.017
Generalized anxiety symptoms	.470 (.072) *p* < .001	.071 (.100), *p* = .478	.029 (.092) *p* = .752	-.436 (.070) *p* < .001	.033 (.047) *p* = .481	[-.049, .062]	.017
Social anxiety symptoms	.470 (.072) *p* < .001	-.191 (.084) *p* = .023	.006 (.074) *p* = .937	-.355 (.075) *p* < .001	-.090 (.042) *p* < .001	[-.229, -.060]	.017

Note. *p<.05, **p<.01, ***p<.001.

Table 4. *Total effects, direct effects, indirect effects for mediational models with negative emotion differentiation as focal predictor.*

	Effect of IV on mediator (a)	**Effect of mediator on outcome (b)**	**Direct effect**	**Total effect**	**Indirect effect (ab)**	**95% CI**	**Adjusted alpha value**
Mediator: Strategy-switching							
Depressive symptoms	-.068 (.091) *p* = .458	.024 (.098) *p* = .807	-.071 (.087), *p* = .412	-.073 (.086) *p* = .400	-.002 (.007) *p* = .815	[-.015, .012]	.05
Generalized anxiety symptoms	-.068 (.091) *p* = .458	.206 (.091) *p* = .023	-.054 (.085) *p* = .528	-.068 (.086) *p* = .433	-.014 (.020) *p* = .480	[-.053, .025]	.05
Social anxiety symptoms	-.068 (.091) *p* = .458	.253 (.081) *p* = .002	-.316 (.076) *p* < .001	-.333 (.077) *p* < .001	-.017 (.024) *p* = .472	[-.064, .029]	.05
Mediator: Strategy-maintenance							
Depressive symptoms	-.106 (.090) *p* = .239	.019 (.099) *p* = .852	-.071 (.087) *p* = .418	-.072 (.086) *p* = .401	-.002 (.011) *p* = .853	[-.023, .019]	.025
Generalized anxiety symptoms	-.106 (.090) *p* = .239	.146 (.093) *p* = .118	-.052 (.086) *p* = .546	-.068 (.086) *p* = .433	-.016 (.017) *p* = .348	[-.048, .017]	.025
Social anxiety symptoms	-.106 (.090) *p* = .239	-.171 (.081) *p* = .023	-.318 (.078) *p* < .001	-.333 (.077) *p* < .001	-.016 (.016) *p* = .339	[-.047, .016]	.025
Mediator: Self-reported ER flexibility							
Depressive symptoms	.472 (.073) *p* < .001	-.142 (.102) *p* = .165	-.006 (.101) *p* = .949	-.073 (.087) *p* = .396	-.067 (.050) *p* = .177	[-.164, .030]	.017
Generalized anxiety symptoms	472 (.073) *p* < .001	-.115 (.102) *p* = .260	-.016 (.101) *p* = .871	-.071 (.086) *p* = .413	-.054 (.049) *p* = .268	[-.150, .042]	.017
Social anxiety symptoms	472 (.073) *p* < .001	-.446 (.083) *p* < .001	-.128 (.088) *p* = .144	-.338 (.077) *p* < .001	-.210 (.052) *p* < .001	[-.313, -.108]	.017

Note. *p<.05, **p<.01, ***p<.001.

3.3 Study 1 discussion

In partial support of hypotheses 1a and 1b, time-lagged associations from a) negative emotion differentiation and b) emotional distress tolerance to distress symptoms were mediated by self-reported, rather than task-based ER flexibility. Specifically, poorer emotion differentiation and distress tolerance abilities were associated with weaker ER flexibility abilities which, in turn, were related to greater social anxiety symptoms. When ER flexibility was assessed via the ER Choice task, strategy-switching (i.e., proportion of switching to distraction in high-intensity conditions) was associated with greater social anxiety symptoms while strategy-maintenance (i.e., proportion of maintaining reappraisal in low-intensity conditions) was associated with milder social anxiety symptoms. This corroborates existing accounts that social anxiety symptoms may be reinforced by avoidant-oriented regulatory responses (Hayes et al., 2006; 1996), including tendencies to disengage from both negative emotional experiences of both high and low intensities. However, these indices of ER flexibility were not associated with distress tolerance or negative emotion differentiation, a discrepancy which may be attributable to different measures employed for ER flexibility. Specifically, it is plausible that self-rated ER flexibility captured individuals' abilities to attend to contextual demands, select context-sensitive strategies, and utilize a wide range of strategies based on their subjective perceptions of these abilities in their daily life, thus elucidating their associations with selected ER abilities. In contrast, we note two major limitations of the ER choice task. First, as the ER choice task captured abilities to flexibly select between two strategies (distraction and reappraisal), this constrained the assessment of participants' repertoire of strategies which could be more keenly assessed through the self-report measure (e.g., "I have a lot of strategies that I can pick from to manage my emotions"; Monsoon et al., 2022). The second limitation is that the use of either high-intensity or low-intensity unpleasant images from the IAPS (Lang et al., 2008) may not have represented emotional conditions in real-world settings which often show more complex variation in their intensity levels, emotion types, and social contexts (Blanke et al., 2020; English & Eldesouky, 2020). In addition, unlike real-world emotional events, participants were prompted to regulate their emotions in a specific time frame within each trial. Hence, owing to the lack of ecological validity, participants' regulatory choices in response to task-based pictorial stimuli may not have generalized to their regulatory flexibility abilities in real-world settings.

To circumvent these limitations, Study 2 employed an experience sampling measure (ESM), rather than static or laboratory-based assessments of ER flexibility. This ESM methodology repeatedly captured emotional experiences and regulatory responses as real-world situations unfold over a five-day period, thus bolstering ecological validity when assessing ER flexibility (Bolger et al., 2003; Lischetzke & Könen, 2020; Shiffman et al., 2008). Considering previous evidence that young adults tend to employ a diverse range of regulatory strategies across negative emotional situations over time (e.g., Aldao & Dixon-Gordon, 2014; Heiy & Cheavens, 2014; Naragon-Gainey et al., 2017), this ESM measure evaluated ER flexibility more comprehensively by assessing a wider range of engagement-focused and disengagement-focused regulatory strategies, including experiential avoidance, expressive suppression, acceptance, and problem-solving. To provide a more ecologically valid index of negative emotion differentiation, Study 2 also utilized experience sampling data to assess participants' differentiation of negative emotions (i.e., how similarly negative emotions were perceived over time) in line with previous experience sampling studies (Barrett et al., 2001; Brown et al., 2021; Kalokerinos et al., 2019). Finally, as our time-lagged design precluded inferences about bidirectional relationships among constructs, Study 2 leveraged on repeated waves of measurement in a three-wave longitudinal study to assess both forward and reverse mediation accounts of the proposed framework.

Study 2

4.1 Participants

We recruited an initial sample of 210 undergraduates from Singapore Management University in exchange for four course credits or monetary compensation of S$20. In line with prior simulation studies of cross-lagged panel modelling (e.g., Wu et al., 2017), a minimum sample size of 200 was determined based on Monte Carlo simulations with 1000 iterations, to detect longitudinal indirect effects (*ab* = .30) with at least 80% power. Power analyses were performed using the *powRICLPM* package (Mulder, 2023) in R version 3.8.2 (R Core Team, 2020). See Tables 5a and 5b for full descriptive statistics of participant-level and occasion-level variables, respectively.

Table 5a. *Descriptive statistics of all participant-level variables in each measurement wave.*

	N	M (or %)	SD	Range	Skewness	Kurtosis
Participant-level						
Distress tolerance						
Wave 1	198	46.495	11.669	18.00 – 74.00	-.252	-.395
Wave 2	165	46.303	11.641	17.00 – 72.00	-.181	-.345
Wave 3	160	46.056	11.801	18.00 – 71.00	-.147	-.502
Neg emotion differentiation						
Wave 1	144	.976	1.044	-3.11 – 1.96	-1.844	3.322
Wave 2	116	.975	1.040	-3.39 – 1.78	-2.501	6.677
Wave 3	111	1.016	1.033	-2.62 – 1.94	-1.825	2.793
Depressive symptoms						
Wave 1	197	20.487	10.649	2.00 – 55.00	.508	-.373
Wave 2	165	14.661	7.135	4.00 – 51.00	1.359	3.707
Wave 3	159	22.849	11.577	2.00 – 55.00	.350	-.296
Generalized anxiety symptoms						
Wave 1	197	8.284	5.526	0.00 – 21.00	.575	-.353
Wave 2	165	8.382	5.469	0.00 – 21.00	.559	-.153
Wave 3	159	8.824	5.816	0.00 – 21.00	.389	-.656
Social anxiety symptoms						
Wave 1	196	35.612	17.428	0.00 – 78.00	.107	-.708
Wave 2	165	36.861	15.884	4.00 – 72.00	-.067	-.681
Wave 3	158	36.462	16.827	0.00 – 74.00	.029	-.568

Mediator						
Between-strategy variability						
Wave 1	149	1.402	.410	.03 – 2.21	-.470	.092
Wave 2	120	1.352	.442	.29 – 2.37	-.155	-.602
Wave 3	113	1.289	.446	.15 – 2.48	-.057	-.256
Covariation index						
Wave 1	135	0.560	.302	.05 – 1.000	.049	-1.135
Wave 2	109	0.504	.284	.01 – 1.000	.101	-.936
Wave 3	103	0.581	.277	.02 – 1.000	-.251	-.892
Covariates						
Age	195	21.985	1.682	19.00 – 30.00	1.114	2.697
Gender[1]	195	78.5%[2]				
Income	195	4.530	2.885	0 - 9	.178	-1.191
Subjective social class	195	6.190	1.486	2 - 10	-.454	.205
Extroversion	195	11.887	3.803	4.00 – 20.00	.162	-.630
Neuroticism	195	12.051	3.691	4.00 – 20.00	-.026	-.495

Note. [1]Gender dummy coded as *female = 1, male = 0*. [2]Percentage of female participants.

Table 5b. *Descriptive statistics of all occasion-level variables in each measurement wave.*

	N	M	SD	Range	Skewness	Kurtosis
Emotional intensity						
Average intensity						
Wave 1	2118	1.379	.992	0.00 – 5.00	.143	-1.355
Wave 2	1864	1.360	.980	0.00 – 5.00	.629	.000
Wave 3	1692	1.385	.990	0.00 – 5.00	.442	-.632
Anger						
Wave 1	2118	1.280	1.458	0.00 – 5.00	.875	-.361
Wave 2	1864	1.180	1.418	0.00 – 5.00	.996	-.142
Wave 3	1692	1.120	1.384	0.00 – 5.00	1.035	-.062
Sadness						
Wave 1	2118	1.350	1.524	0.00 – 5.00	.795	-.612
Wave 2	1864	1.240	1.435	0.00 – 5.00	.860	-.462
Wave 3	1692	1.270	1.458	0.00 – 5.00	.833	-.513
Guilt						
Wave 1	2118	1.140	1.406	0.00 – 5.00	1.005	-.154
Wave 2	1864	1.200	1.434	0.00 – 5.00	.933	-.306
Wave 3	1692	1.220	1.440	0.00 – 5.00	.860	-.505
Worry						
Wave 1	2118	2.030	1.610	0.00 – 5.00	.144	-1.206
Wave 2	1864	2.020	1.550	0.00 – 5.00	.067	-1.213
Wave 3	1692	2.030	1.574	0.00 – 5.00	.105	-1.215
Shame						
Wave 1	2118	.930	1.333	0.00 – 5.00	1.368	.834
Wave 2	1864	0.980	1.333	0.00 – 5.00	1.208	.334
Wave 3	1692	1.040	1.347	0.00 – 5.00	1.046	-.120
Irritation						
Wave 1	2118	1.960	1.596	0.00 – 5.00	.224	-1.160
Wave 2	1864	1.870	1.643	0.00 – 5.00	.325	-1.184
Wave 3	1692	1.810	1.580	0.00 – 5.00	.314	-1.159
Anxiety						
Wave 1	2118	1.860	1.660	0.00 – 5.00	.312	-1.220
Wave 2	1864	1.820	1.584	0.00 – 5.00	.291	-1.185
Wave 3	1692	1.900	1.591	0.00 – 5.00	.192	-1.252
Fear						
Wave 1	2118	1.260	1.493	0.00 – 5.00	.899	-.415
Wave 2	1864	1.270	1.466	0.00 – 5.00	.825	-.546
Wave 3	1692	1.360	1.490	0.00 – 5.00	.695	-.828
Jealousy						
Wave 1	2118	.580	1.153	0.00 – 5.00	2.169	3.936
Wave 2	1864	0.650	1.170	0.00 – 5.00	1.880	2.680
Wave 3	1692	0.730	1.218	0.00 – 5.00	1.647	1.646
Strategy use						
Distraction						
Wave 1	2118	2.230	1.821	0.00 – 5.00	.143	-1.355
Wave 2	1864	2.240	1.779	0.00 – 5.00	.133	-1.307
Wave 3	1692	2.400	1.794	0.00 – 5.00	.025	-1.323
Behavioural avoidance						

Wave 1	2118	1.580	1.647	0.00 – 5.00	.654	-.826
Wave 2	1864	1.640	1.649	0.00 – 5.00	.587	-.920
Wave 3	1692	1.770	1.664	0.00 – 5.00	.469	-1.036
Experiential avoidance						
Wave 1	2118	1.910	1.589	0.00 – 5.00	.340	-.983
Wave 2	1864	1.940	1.542	0.00 – 5.00	.296	-.930
Wave 3	1692	2.050	1.561	0.00 – 5.00	.232	-.956
Expressive suppression						
Wave 1	2118	2.900	1.779	0.00 – 5.00	-.301	-1.243
Wave 2	1864	3.020	1.736	0.00 – 5.00	-.369	-1.148
Wave 3	1692	2.970	1.754	0.00 – 5.00	-.345	-1.197
Acceptance						
Wave 1	2118	3.000	1.554	0.00 – 5.00	-.382	-.831
Wave 2	1864	2.870	1.555	0.00 – 5.00	-.318	-.854
Wave 3	1692	2.870	1.579	0.00 – 5.00	-.299	-.886
Cognitive reappraisal						
Wave 1	2118	2.280	1.590	0.00 – 5.00	.061	-1.029
Wave 2	1864	2.240	1.572	0.00 – 5.00	.075	-1.029
Wave 3	1692	2.250	1.556	0.00 – 5.00	.053	-.982
Problem-solving						
Wave 1	2118	2.580	1.648	0.00 – 5.00	-.136	-1.103
Wave 2	1864	2.580	1.620	0.00 – 5.00	-.163	-1.064
Wave 3	1692	2.550	1.613	0.00 – 5.00	-.119	-1.042
Mindfulness						
Wave 1	2118	1.870	1.570	0.00 – 5.00	.376	-.910
Wave 2	1864	2.010	1.610	0.00 – 5.00	.261	-1.062
Wave 3	1692	2.080	1.562	0.00 – 5.00	.194	-1.008

Note. N refers to the total number of observations.

4.2 Measures

Variables assessed in Study 2 were categorized into participant-level and occasion-level variables. Participant-level variables were assessed at the baseline (i.e., Day 1) survey, while occasion-level variables were measured in each of the ESM surveys conducted from Days 2 to 6 of our study. The five-day ESM protocol was based on prior experience sampling research which examined emotion regulation processes in relation to psychological distress across a similar duration (e.g., Socastro et al., 2022).

4.3 Occasion-Level Variables

During each ESM survey, participants were asked to recall a negative emotional event they had experienced since the previous ESM survey: "Think about a negative event that you have experienced since the last survey. This can be any event that elicited mild to intense negative emotions (e.g., neighbours' noise disruption, interpersonal conflicts, encountering an inconsiderate stranger, academic stressors)" (see Haines et al., 2016; Socastro et al., 2022). When administering the first ESM survey, this item was amended to: "Think about a negative event that you have experienced today".

4.3.1 Contextual features of emotional events

Based on the emotional experience, participants then responded to a series of questions pertaining to emotional intensity and emotion type(s). In each ESM survey, participants rated the intensity to which they had experienced nine negative emotions—including anger, sadness, guilt, worry, shame, irritation, anxiety, fear, and jealousy (e.g., "Thinking back to this emotional event, how *anxious* did you feel?"; 0 = *not at all*, 10 = *extremely*) (see Brown et al., 2021; Feldman & Freitas, 2021; Goodman et al., 2021; Socastro et al., 2022). Average emotional intensity for each event was then obtained by averaging the nine type-specific intensity ratings.

4.3.2 Emotion regulation strategies

To assess regulatory responses to each emotional event, participants rated their use of each regulatory strategy ("How did you manage your emotions in response to this event?") on a 6-point Likert scale (0 = *not at all*, 5 = very much). In line with aforementioned meta-analytic work (Aldao & Nolen-Hoeksama, 2010; Naragon-Gainey et al., 2017), eight regulatory strategies were assessed, comprising four 'Disengagement' strategies (distraction, behavioral avoidance, experiential avoidance, expressive suppression) and four 'Adaptive engagement' regulatory strategies (acceptance, cognitive reappraisal, problem-solving, mindfulness). Consistent with prior experience sampling measures of regulatory strategy use (e.g., Battaglini et al., 2022; English et al., 2017; Goodman et al., 2021; Heiy & Cheavens, 2014; Socastro et al., 2022), the use of each regulatory strategy was assessed with single-item measures to reduce participant burden and improve compliance throughout the 5-day ESM protocol.

Disengagement. *Distraction* was assessed with the item "I tried to keep my mind off the situation by thinking about or doing something else", derived from the Responses to Stress Questionnaire (Connor-Smith et al., 2000; see also Battaglini et al., 2022). *Behavioral avoidance* was measured with the item: "I tried to physically avoid the situation, people, or place(s) that would make me feel negative emotions", derived from the Cognitive Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). *Experiential avoidance* was measured with the following item: "I tried to avoid thinking about the situation and/or my feelings", derived from the Coping Responses Inventory (Moos, 2004) and Multidimensional Experiential Avoidance Questionnaire (Gámez et al., 2011). *Expressive suppression* was measured with the item: "I tried to keep my emotions to myself", drawn from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) (see also Battaglini et al., 2022).

Adaptive engagement. *Acceptance* was measured with the item: "I tried to accept the situation and/or my emotions", derived from acceptance and mindfulness measures (Baer et al., 2004; Brown & Ryan, 2003; see also Heiy & Cheavens, 2014). *Cognitive reappraisal* was measured with the item: "I tried to think about the situation in a different way to feel less negative emotion", derived from the Emotion Regulation Questionnaire (ERQ) reappraisal subscale (Gross & John, 2003; also see Battaglini et al., 2022; Heiy & Cheavens, 2014). *Problem-solving* was assessed with the item: "I tried to think of different ways to improve the situation", derived from the Responses to Stress Questionnaire (RSQ; Connor-Smith et al., 2000; see also Battaglini et al., 2022). *Mindfulness* was assessed with the item: "I tried to notice any thoughts, feelings, or physical sensations without thinking of them as good or bad", derived from the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004) and Mindful Attention and Awareness Scale (MAAS; Brown & Ryan, 2003).

4.4 Participant-level variables

4.4.1 Distress tolerance

Consistent with Study 1, the 15-item Distress Tolerance Scale (DTS; Simons & Gaher, 2005) was administered during the baseline sessions of each measurement wave (α_{W1} = .900; α_{W2} = .905; α_{W3} = .908). All items of the DTS were rated using a 5-point Likert scale (5 = *strongly disagree*, 1 = *strongly agree*), with higher scores indicating greater distress tolerance.

4.4.2 Psychological distress symptoms

Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; α_{W1} = .900; α_{W2} = .881; α_{W3} = .912); generalized anxiety symptoms were assessed using the Generalized Anxiety Disorder Questionnaire-7 (GAD-7; Spitzer et al., 2006; α_{W1} = .908; α_{W2} = .927; α_{W3} = .935); and social anxiety symptoms were assessed with the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998; α_{W1} = .944; α_{W2} = .937; α_{W3} = .943).

4.4.3 Covariates

Demographic covariates of gender, household income, and subjective social class were obtained via the self-report measures used in Study 1. Personality covariates of extroversion and neuroticism were measured using the 20-item Big Five Inventory (BFI-20; John & Srivastava, 1999; Tucaković & Nedeljković, 2023; $\alpha_{extroversion} = .810$; $\alpha_{neuroticism} = .773$), with higher subscale scores indicating higher levels of each personality trait.

4.5 Procedure

In line with recent longitudinal work on emotion regulation and distress symptoms (e.g., Dawel et al., 2021), this study comprised three measurement waves (i.e., Waves 1, 2, and 3) at 1-month intervals, At each measurement wave, participants completed a baseline questionnaire as well as a five-day ESM protocol. Prior to the commencement of the initial measurement wave, all participants were briefed via email about the entire study procedure. Participants were then tasked to complete a 12-minute baseline questionnaire via the Qualtrics platform. This baseline session measured participant-level variables including distress tolerance, psychological distress symptoms, demographic information (i.e., gender, socio-economic status, subjective social class), and personality traits. Upon completion of the baseline session, participants were comprehensively briefed on how to set up and complete the experience sampling method (ESM) protocol on the *ExpiWell* application for the subsequent ESM phase of the study. After a two-day interval, the five-day ESM protocol was administered from Monday to Friday to assess ER flexibility across day-to-day emotional events. In line with prior ESM research that examined temporal changes in ER strategy use (e.g., Battaglini et al., 2022; Socastro et al., 2022; Heiy & Cheavens, 2014), the ESM paradigm comprised app-based prompts three times daily for five days to collect a representative sample of emotional events each day. Following each prompt, participants were tasked to complete a 2-minute ESM survey within pre-specified six-hour intervals throughout the anticipated waking hours of each day (7am – 1pm, 1pm – 7pm, 7pm – 1am); notifications occurred at random timings between 7am to 8am; 1pm to 2pm; and 7pm to 8pm for each interval, respectively. This study protocol (i.e., baseline session and 5-day ESM protocol) was repeated across three measurement waves. Upon completion of all three measurement waves, participants were debriefed via an online form which explained the actual purpose of the study and reimbursed with either four course credits or S$20 cash. Participants were allowed to withdraw from the study at any point in time without incurring any penalty.

4.6 Analytic Plan

4.6.1 Operationalization of negative emotion differentiation

Following prior work (Barrett et al., 2001; Brown et al., 2021; Kalokerinos et al., 2019), we computed the average intraclass correlations (ICC(*2,k*)) with absolute agreement between negative emotion items for each participant across all recorded emotional events, which can be interpreted as how similarly various negative emotions were rated across events. Negative ICCs were removed as these values were considered unreliable (Erbas et al., 2018). ICCs were then transformed using a Fisher *Z*' transformation, and subtracted from 1 so that higher values indicate greater differentiation of negative emotions.

4.6.2 Operationalization of ER flexibility

ER flexibility was operationalized using person-level indices of *repertoire* and *covariation of contextual variability and strategy variability*.

Repertoire. In line with previous experience sampling research (e.g., Battaglini et al., 2022; Blanke et al., 2020; Eldesouky & English, 2018), repertoire was operationalized using a mean between-strategy variability index (i.e., variability in the degree to which different ER strategies are used in a given occasion). Between-strategy variability was indexed by the SD with which different regulatory strategies were used in a given occasion. To compute a person-level mean between-strategy variability index, SDs calculated at the occasion level were averaged across measurement occasions *t*. Higher between-strategy variability indicated that, in a given situation, an individual endorsed different strategies to varying extents (i.e., prioritized certain strategies and inhibited certain strategies). This was calculated as follows:

$$M_{SD(between)i} = \frac{1}{N_i}\sum_{t=1}^{N_i} SD_{(between)ti}$$

Covariation. In line with prior analytic recommendations (Aldao et al., 2015), ER flexibility was also operationalized as the degree of covariation between strategy variability and variability in contextual demands across occasions. Strategy variability was assessed using the mean within-strategy variability index. This was computed by taking the SD with which each strategy (i.e., experiential avoidance, expressive suppression, distraction, acceptance, cognitive reappraisal, mindfulness, acceptance, problem-solving) was endorsed across measurement occasions *t* for each participant *i*, averaged across the eight considered strategies. A higher mean within-strategy variability index indicated that an individual used the eight strategies more variably across occasions. This was calculated as follows:

$$M_{SD(within)i} = \frac{1}{L}\sum_{s=1}^{L} SD_{(within)si}$$

Variability in contextual demands was indexed by the SD of average negative emotional intensities (across emotion types) across measurement occasions *t* for each participant *i*. To index the covariation of variability in strategy use with variability in contextual demands, we computed Pearson correlation coefficients of day-level variability in strategy use with day-level variability in contextual demands, across five days of the ESM protocol, for each participant *i*. Considering that contextual variability and strategy variability relied on the assessment of multiple measurement occasions, these indices could only be obtained at the person-level, whereby higher correlation coefficients indicated stronger covariation of contextual variability and strategy variability (Aldao et al., 2015).

4.6.3 Analytic plan

Model fit of measurement models. As latent constructs were specified in subsequent cross-lagged panel modelling, the initial step of our analyses involved testing the fit of measurement models at each of the three waves of measurement. Consistent with our analyses for Study 1, emotional distress tolerance and each distress symptom subtype were modelled as latent constructs; while negative emotion differentiation and ER flexibility were modelled as manifest variables. Latent factors for distress tolerance were each specified by four indicators based on tolerance, absorption, appraisal, and regulation subscale scores, and latent factors for depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms were each specified by four item parcels as indicators (Little et al., 2002). The fit of each measurement model was evaluated using the following criteria: root mean square error of approximation (RMSEA) below 0.06; comparative fit index (CFI) and Tucker Lewis index (TLI) values close to 0.95; and standardized root mean squared residual (SRMR) less than 0.09 (Hu & Bentler, 1999).

Establishing measurement invariance. Thereafter, invariance testing was conducted to ascertain metric invariance of latent constructs across the three measurement waves; this was necessary prior to testing longitudinal associations between constructs in our cross-lagged panel models (Byrne et al., 1989; Cole & Maxwell, 2003; Vandenberg & Lance, 2000). We compared the model fit of two alternative models with differing parameter restrictions, using corrected chi-square difference tests (Satorra & Bentler, 2001). A longitudinal confirmatory factor model (i.e., unrestrictive model) was specified that included all observed and latent variables from each timepoint with freely estimated parameters (see Little et al., 2007). We then compared the fit of this unrestrictive model to that of a more restrictive longitudinal model which specified equal factor loadings within constructs across the three time points. Partial measurement invariance, or metric invariance, across the three waves could be ascertained by comparing the fit of the two alternative measurement models using corrected chi-square difference testing.

Cross-lagged panel modelling. Cross-lagged panel modelling (CLPM) was used to examine the directionality of influences among variables and longitudinal mediation effects (e.g., Chan et al., 2023; Krauss et al., 2019; Masselink et al., 2018). Model fit of the CLPM (Figure 3) was evaluated using the following criteria: CFI and TLI values close to 0.95, and SRMR and RMSEA less than 0.08 (Hu & Bentler, 1999). Cross-lagged panel models were examined that include bidirectional, cross-lagged relationships among ER abilities, ER flexibility, and distress symptoms over the three waves of measurement, while controlling for autoregressive within-construct relationships over time. For each of the two indices of ER flexibility (mean between-strategy variability and covariation of strategy-variability and contextual variability), separate panel models were specified that concurrently included three psychological distress outcomes—i.e., depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms. Each variable was allowed to predict subsequent follow-up measurements of the same construct, reflecting autoregressive pathways. Further, “forward” unidirectional paths were specified for relationships in the direction from ER abilities to ER flexibility, and from ER flexibility to distress; this included paths from T1 ER abilities to T2 ER flexibility, from T1 ER flexibility to T2 distress symptoms, from T2 ER abilities to T3 ER flexibility, and from T2 ER flexibility to T3 distress symptoms. “Reverse” unidirectional paths were also specified, including paths from T1 distress symptoms to T2 ER flexibility, from T1 ER flexibility to T2 ER abilities, from T2 distress symptoms to T3 ER flexibility, and from T2 ER flexibility to T3 ER abilities. Bidirectional direct effects between ER abilities and distress symptoms across waves were also specified, and residuals of all included constructs were correlated within measurement waves. To allow for meaningful longitudinal comparisons of latent constructs, factor loadings within each construct were constrained to equivalence across the three measurement waves.

To examine our hypotheses that ER flexibility mediates associations between ER abilities and subsequent distress symptoms, we examined relevant indirect effects (a) from T1 negative emotion differentiation to T3 distress symptoms via T2 ER flexibility and (b) from T1 distress tolerance to T3 distress symptoms via T2 ER flexibility (H1a and H1b). In addition, to test reverse mediation effects, we evaluated indirect effects (a) from T1 distress symptoms to T3 negative emotion differentiation via T2 ER flexibility and (b) from T1 distress symptoms to T3 distress tolerance via T2 ER flexibility (H2a and H2b). All indirect effects were tested using bias-corrected bootstrapping with 1,000 resamples (Preacher & Kelley, 2011), and effect sizes were quantified via the P_M and total effect size indices (Wen & Fan, 2015). Adjusted path models were examined which included covariates (gender, income, subjective social class, neuroticism, extroversion) as exogenous predictors of Wave 2 and Wave 3 distress outcomes. Full information maximum likelihood (FIML) estimation was used to account for missing data (Enders & Bandalos, 2001); all CLPM analyses were conducted in Mplus 8.11 (Muthén & Muthén, 2021).

5. Results and discussion

5.1 Preliminary analyses

Data was collected from 198 respondents (21.0% male, 78.5% female, 0.5% non-binary) at Wave 1 (mean age = 21.98 years, *SD* = 1.68 years). Of these 198 original respondents, 165 participated in Wave 2, and 161 participated in Wave 3, constituting a

81.3% participation rate. In the ESM procedure of Wave 1, a total of 2,118 events were recorded out of a maximum of 2970. Over the 5-day sampling period, participants submitted an average of 12.243 (SD = 3.481) reports. Subsequently, a total of 1,864 events (*M* = 12.788, *SD* = 2.868) were recorded at Wave 2 and a total of 1,692 events (*M* = 12.261, *SD* = 3.197) were recorded at Wave 3.

5.2 Model fit of the measurement models

We examined the fit of the measurement model, including latent constructs for distress tolerance and each distress symptom subtype, across measurement waves. Fit indices of measurement models at Wave 1 (*N* = 198), $\chi^2(93) = 143.974$, p < .001, RMSEA = .053, CFI = .981, TLI = .975, SRMR = .039; Wave 2 (*N* = 165), $\chi^2(93) = 184.332$, p < .001, RMSEA = .077, CFI = .957 TLI = .945, SRMR = .048; and Wave 3 (*N* = 160), $\chi^2(98) = 148.169$, p < .001, RMSEA = .057, CFI = .978 TLI = .973, SRMR = .037, suggested good-to-acceptable model fit at each time point.

5.3 Establishing measurement invariance

Thereafter, we conducted measurement invariance testing in which the fit of two alternative measurement models were compared using the corrected chi-square difference test (Satorra & Bentler, 2001). The longitudinal confirmatory factor model with freely estimated parameters (i.e., unrestrictive model) showed good model fit: *N* = 198, $\chi^2(979) = 1428.459$, *p* < .001, RMSEA = .047, CFI = .948 TLI = .940, SRMR = .050; all manifest variables loaded significantly on their respective latent factors (*ps <.001*). When equal factor loadings within constructs were specified across the three measurement waves in a more restrictive longitudinal metric invariance model, good model fit was consistently observed, $\chi^2(1003) = 1458.287$, *p* < .001, RMSEA = .047, CFI = .947 TLI = .941, SRMR = .052. Corrected chi-square difference testing showed that the model fit of the more restrictive metric invariance longitudinal model was not significantly worse than that of the unrestrictive longitudinal model, $\Delta\boldsymbol{\chi}^2(24) = 29.829$, *p* = .191, thus confirming partial metric invariance in the measurement model across all waves. See Table 6 for model fit indices of individual latent constructs and full measurement invariance testing results.

Table 6. *Comparison of configural and metric invariance longitudinal confirmatory factor models over three measurement waves.*

Model	χ^2(df)	***p***	**CFI/TLI**	**RMSEA**	**SRMR**	**Ref.**	$\Delta\chi^2$(df)	***p***
Overall								
M_{CI}: configural	1428.459 (979)	< .001	.948/.940	.047	.050	-	-	-
M_{MI}: metric	1458.287 (1003)	< .001	.947/.941	.047	.052	M_{CI}	29.829 (24)	.191
Distress tolerance								
M_{CI}: configural	65.561 (37)	.003	.982/.967	.061	.039	-	-	-
M_{MI}: metric	72.055 (43)	.004	.981/.971	.057	.051	M_{CI}	6.494 (6)	.370
Depressive symptoms								
M_{CI}: configural	109.766 (48)	< .001	.964/.951	.079	.039	-	-	-
M_{MI}: metric	127.461 (54)	< .001	.957/.948	.082	.054	M_{CI}	17.695 (6)	.007
GA symptoms								
M_{CI}: configural	39.704 (31)	.136	.996/.991	.037	.024	-	-	-
M_{MI}: metric	42.701 (37)	.239	.997/.995	.027	.026	M_{CI}	2.998(6)	.809
SA symptoms								
M_{CI}: configural	56.190 (40)	.046	.994/.990	.045	.016	-	-	-
M_{MI}: metric	63.590 (46)	.044	.993/.991	.043	.026	M_{CI}	7.399(6)	.286

Note. CFI = Comparative Fit Index; TLI = Tucket Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual. *GA = Generalized anxiety; SA = Social anxiety.*

5.3 Cross-lagged panel models

5.3.1 Cross-lagged panel models including distress tolerance as focal predictor

Between-strategy variability. In cross-lagged panel models with distress tolerance as their focal predictor, ER flexibility was indexed using mean between-strategy variability and covariation in separate models (see Figure 3). Model 1a, which indexed ER flexibility using between-strategy variability, observed good fit indices, $\chi^2(1351) = 1873.081$, $p < .001$, RMSEA = .045, CFI = .942, TLI = .935, SRMR = .079. All forward mediation pathways were nonsignificant: Wave 1 distress tolerance was not associated with Wave 2 between-strategy variability (β = .126, SE = .099, 95% CI [-.068, .320]), which, in turn, was not associated with depressive (β = -.087, SE = .072, 95% CI [-.229, .054), generalized anxiety (β = .093, SE = .076, 95% CI [-.055, .242]), or social anxiety symptoms (β = -.032, SE = .054, 95% CI [-.137, .073]) at Wave 3. Regarding reversed pathways, Wave 1 social anxiety symptoms—but not depressive (β = .200, SE = .134, 95% CI [-.063, .464]) or generalized anxiety symptoms (β = -.002, SE = .124, 95% CI [-.244, .240])—were negatively associated with Wave 2 between-strategy variability (β = -.167, SE = .071, 95% CI [-.305, -.028]). However, between-strategy variability at Wave 2 was not associated with distress tolerance abilities at Wave 1 (β = .019, SE = .057, 95% CI [-.093, .131]).

Covariation. ER flexibility was then indexed using covariation between contextual variability and within-strategy variability (Model 1b; $\chi^2(1347) = 2339.972$, $p < .001$, RMSEA = .061, CFI = .893, TLI = .879, SRMR = .089). All forward mediation pathways of interest were nonsignificant (see Table 7 for standardized cross-lagged path coefficients). In the reversed mediation model, Wave 1 generalized anxiety symptoms were associated with weaker Wave 2 covariation (β_{genanx} = -.432, SE = .216, 95% CI [-.855, -.010]) which, in turn, was associated with Wave 3 distress tolerance (β = .161, SE = .081, 95% CI [.002, .321]). However, the indirect effect of Wave 1 generalized anxiety symptoms on distress tolerance through Wave 2 covariation did not reach significance (β = -.070, SE = .055, 95% CI [-.177, .038]).

5.3.2 Cross-lagged panel models including negative emotion differentiation as focal predictor

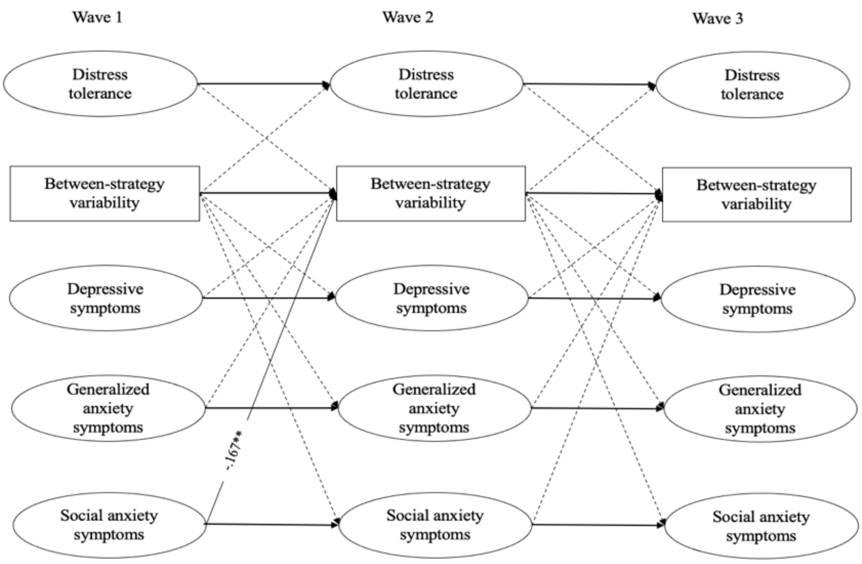
Between-strategy variability. In the next set of cross-lagged panel models, negative emotion differentiation was entered as the focal predictor (see Figure 4). In Model 2a, between-strategy variability was entered as the mediator (χ^2(895) = 1249.192, *p* < .001, RMSEA = .042, CFI = .953, TLI = .944, SRMR = .064). All forward mediation pathways were nonsignificant (see Table 8 for standardized cross-lagged path coefficients). Regarding reversed pathways, greater Wave 1 social anxiety symptoms was associated with weaker Wave 2 between-strategy variability (β = -.205, SE = .069, 95% CI [-.340, -.070]) which, in turn, was associated with lower emotion differentiation at Wave 3 (β = .324, SE = .090, 95% CI [.147, .502]). Using maximum likelihood estimation with bias-corrected bootstrapping with 1000 samples, we found a significant indirect effect of social anxiety symptoms on negative emotion differentiation through ER flexibility indexed by between-strategy variability (β = -.067, SE = .029, 95% CI [-.123, -.010]) when accounting for all covariates.

Covariation. When ER flexibility was indexed by covariation (Model 2b: χ^2(835) = 1117.265, *p* < .001, RMSEA = .042, CFI = .959, TLI = .952, SRMR = .094), negative emotion differentiation at Wave 1 was not related to ER flexibility at Wave 2 (β = .049, SE = .177, 95% CI [-.299, .396]). Wave 2 ER flexibility was associated to lower generalized anxiety symptoms (β = -.296, SE = .141, 95% CI [-.573, -.019]), but not depressive symptoms (β = -.289, SE = .168, 95% CI [-.619, .041]) or social anxiety symptoms (β = .136, SE = .116, 95% CI [-.362, .091]) at Wave 3. However, we did not observe any significant reversed mediation pathways of interest. See Table 9 for *p*-values and Holm-Bonferonni adjusted alpha-levels for indirect effects of interest.

Figure 3. Cross-lagged panel models of distress tolerance, ER flexibility, and distress symptoms (depressive symptoms, generalized anxiety symptoms, social anxiety symptoms) assessed across three waves of measurement. Panel a illustrates the cross-lagged panel model

that indexes ER flexibility using between-strategy variability; and Panel b illustrates the cross-lagged panel model that indexes ER flexibility using covariation of contextual variability and strategy variability. Rectangles represent manifest variables; circles represent latent factors for distress tolerance (indicated by four subscale scores), depressive symptoms (indicated by four item parcels), generalized anxiety symptoms (indicated by four item parcels), and social anxiety symptoms (indicated by four item parcels). Autoregressive paths are represented by horizontal arrows, and cross-lagged paths are represented by diagonal arrows. Dotted arrows indicate nonsignificant pathways at the *p* < .05 level. Coefficients of relevant forward and reverse mediation pathways are standardized. For diagrammatic clarity, correlations between variables at each wave (see Table S2 in Appendix) and bidirectional direct effects between distress tolerance and distress symptoms are omitted from the figure. Covariates (gender, household income, subjective social class, neuroticism, extroversion) are not depicted for brevity. **p* < .05, ***p* <.01.

a.



b.

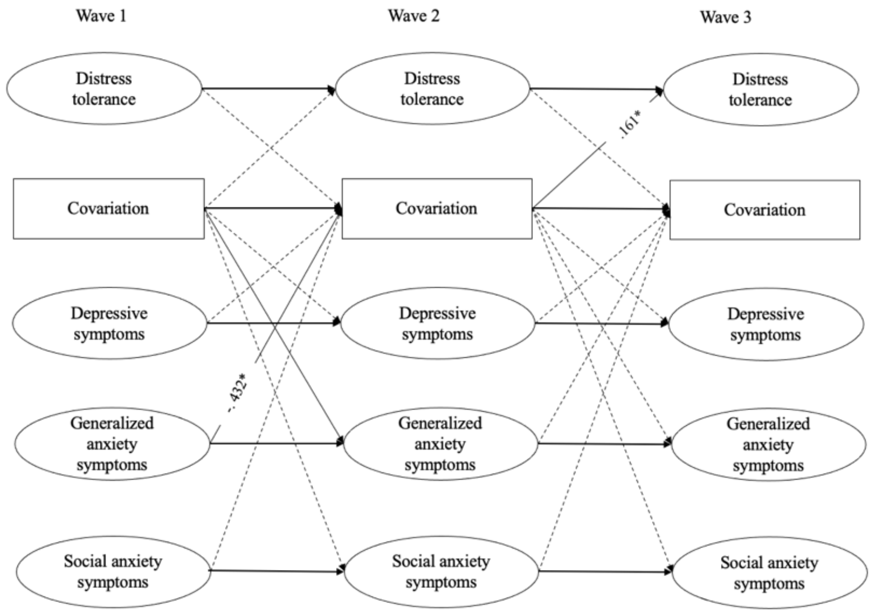
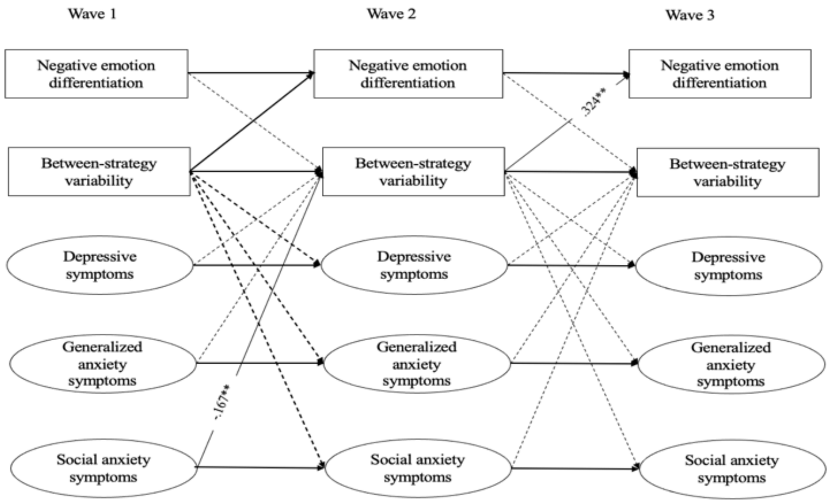


Figure 4. Cross-lagged panel models of negative emotion differentiation, ER flexibility, and distress symptoms (depressive symptoms, generalized anxiety symptoms, social anxiety symptoms) assessed across three waves of measurement. Panel a illustrates the cross-lagged panel model that indexes ER flexibility using between-strategy variability; and Panel b illustrates the cross-lagged panel model that indexes ER flexibility using covariation of contextual variability and strategy variability. Rectangles represent manifest variables; circles represent latent factors for depressive symptoms (indicated by four item parcels), generalized anxiety symptoms (indicated by four item parcels), and social anxiety symptoms (indicated by four item parcels). Autoregressive paths are represented by horizontal arrows, and cross-lagged paths are represented by diagonal arrows. Dotted arrows indicate nonsignificant pathways at the $p < .05$ level. Coefficients of relevant forward and reverse mediation pathways are standardized. For diagrammatic clarity, correlations between variables at each wave (see Table S2 in Appendix) and bidirectional direct effects between negative emotion differentiation and distress symptoms are omitted from the figure. Covariates (gender, household income, subjective social class, neuroticism, extroversion) are not depicted for brevity. $^{*}p < .05$, $^{**}p < .01$.

a.


Wave 1
Wave 2
Wave 3
Negative emotion differentiation
Negative emotion differentiation
Negative emotion differentiation
Between-strategy variability
Between-strategy variability
Between-strategy variability
.324**
Depressive symptoms
Depressive symptoms
Depressive symptoms
Generalized anxiety symptoms
Generalized anxiety symptoms
Generalized anxiety symptoms
-.167**
Social anxiety symptoms
Social anxiety symptoms
Social anxiety symptoms

b.

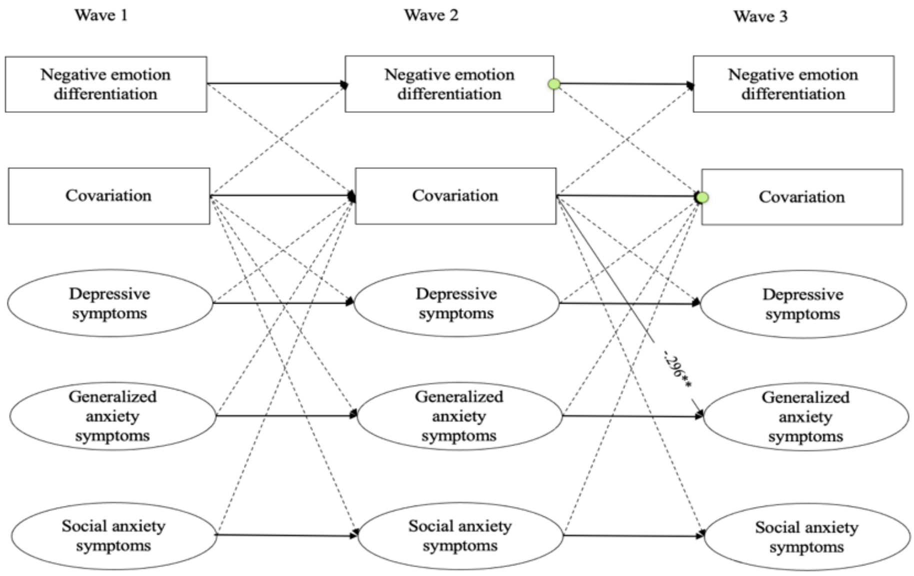

Wave 1
Wave 2
Wave 3
Negative emotion differentiation
Negative emotion differentiation
Negative emotion differentiation
Covariation
Covariation
Covariation
Depressive symptoms
Depressive symptoms
Depressive symptoms
-.296**
Generalized anxiety symptoms
Generalized anxiety symptoms
Generalized anxiety symptoms
Social anxiety symptoms
Social anxiety symptoms
Social anxiety symptoms

Table 7. *Standardized estimates for cross-lagged panel models for the associations of between-strategy variability (Model 1a) and covariation (Model 1b) with distress tolerance, depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms.*

Model 1a	**W2 DT**	**W2 BSV**	**W2 DEP**	**W2 GAS**	**W2 SAS**	**W3 DT**	**W3 BSV**	**W3 DEP**	**W3 GAS**	**W3 SAS**
Predictors	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
W1 DT	.800 (.064) $p < .001$	.126 (.099) $p = .203$	.088 (.100) $p = .380$	-.172 (.100) $p = .087$	.088 (.061) $p = .151$	-	-	-	-	-
W1 BSV	.094 (.053) $p = .077$	.200 (.134) $p = .135$	-.006 (.065) $p = .928$	-.085 (.069) $p = .218$	.028 (.047) $p = .549$	-	-	-	-	-
W1 DEP	.070 (.108) $p = .520$	-.002 (.124) $p = .989$	.774 (.072) $p < .001$	-	-	-	-	-	-	-
W1 GAS	-.086 (.099) $p = .386$	-.167 (.071) $p = .018$	-	.560 (.080) $p < .001$	-	-	-	-	-	-
W1 SAS	-.103 (.059) $p = .079$	-	-	-	.813 (.049) $p < .001$	-	-	-	-	-
W2 DT	-	-	-	-	-	.836 (.057) $p < .001$	.140 (.077) $p = .070$	-.322 (.096) $p = .001$	-.253 (.095) $p = .008$	-.155 (.065) $p = .017$
W2 BSV	-	-	-	-	-	.019 (.057) $p = .738$	.763 (.044) $p < .001$	.002 (.076) $p = .976$	.093 (.076) $p = .219$	.019 (.055) $p = .721$
W2 DEP	-	-	-	-	-	.027 (.086) $p = .753$	.237 (.091) $p = .009$	.517 (.075 $p <.001$	-	-
W2 GAS	-	-	-		-	-.055 (.086) $p = .521$	-.204 (.088 $p = .021$	-	.574 (.100) $p <.001$	-
W2 SAS	-	-	-	-		-.103 (.052) $p = .047$	.068 (.057) $p = .230$	-	-	.724 (.057) $p <.001$
Model 1b	**W2 DT**	**W2 COV**	**W2 DEP**	**W2 GAS**	**W2 SAS**	**W3 DT**	**W3 COV**	**W3 DEP**	**W3 GAS**	**W3 SAS**
Predictors	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
W1 DT	.817 (.062) $p <.001$	.132 (.209) $p = .528$	.047 (.100) $p = .640$	-.158 (.092) $p = .085$	.141 (.063) $p = .026$	-	-	-	-	-

W1 COV	.055 (.079) *p* = .488	.180 (.196) *p* = .359	-.114 (.119) *p* = .336	-.216 (.092) *p* = .019	-.045 (.069) *p* = .519	-	-	-	-	-
W1 DEP	.066 (.103) *p* = .523	.389 (.221) *p* = .079	.742 (.076) *p* < .001	-	-	-	-	-	-	-
W1 GAS	-.094 (.091) *p* = .301	-.424 (.191) *p* = .026	-	.515 (.077) *p* < .001	-	-	-	-	-	-
W1 SAS	-.086 (.062) *p* = .165	.104 (.150) *p* = .488	-	-	.899 (.043) *p* < .001	-	-	-	-	-
W2 DT	-	-	-	-	-	.879 (.060) *p* < .001	-.065 (.229) *p* = .778	-.317 (.085) *p* < .001	-.142 (.097) *p* = .145	-.158 (.065) *p* = .016
W2 COV	-	-	-	-	-	.169 (.083) *p* = .041	.041 (.176) *p* = .815	-.186 (.087) *p* = .032	-.120 (.102) *p* = .239	-.037 (.079) *p* = .638
W2 DEP	-	-	-	-	-	.015 (.082) *p* = .854	.307 (.249) *p* = .218	.501 (.075) *p* < .001	-	-
W2 GAS	-	-	-	-	-	.014 (.081) *p* = .867	-.193 (.203) *p* = .342	-	.669 (.111) *p* < .001	-
W2 SAS	-	-	-	-	-	-.106 (.050) *p* = .036	.097 (.149) *p* = .516	-	-	.789 (.050) *p* < .001

Note. DT = Distress tolerance; BSV = Between-strategy variability; COV = Covariation; DEP = Depressive symptoms; GAS = Generalized anxiety symptoms; SAS = Social anxiety symptoms. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.
**p*<.05, ***p*<.01, ****p*<.001.

Table 8. *Standardized estimates for cross-lagged panel models for the associations of between-strategy variability (Model 2a) and covariation (Model 2b) with negative emotion differentiation, depressive symptoms, generalized anxiety symptoms, and social anxiety symptoms.*

Model 2a	**W2 NED**	**W2 BSV**	**W2 DEP**	**W2 GAS**	**W2 SAS**	**W3 NED**	**W3 BSV**	**W3 DEP**	**W3 GAS**	**W3 SAS**
Predictors	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
W1 NED	.667 (.079) *p* < .001	.015 (.076) *p* = .848	.116 (.089) *p* = .193	.130 (.081) *p* = .106	.000 (.053) *p* = .997	-	-	-	-	-
W1 BSV	-.235 (.100) *p* = .019	.705 (.053) *p* < .001	-.035 (.076) *p* = .643	-.120 (.074) *p* = .103	.043 (.053) *p* = .419	-	-	-	-	-
W1 DEP	.063 (.204) *p* = .757	.157 (.134) *p* = .241	.809 (.070) *p* < .001	-	-	-	-	-	-	-
W1 GAS	-.077 (.203) *p* = .706	-.018 (.128) *p* = .891	-	.648 (.077) *p* < .001	-	-	-	-	-	-
W1 SAS	.012 (.093) *p* = .895	-.205 (.069) *p* = .003	-	-	.815 (.048) *p* < .001	-	-	-	-	-
W2 NED	-	-	-	-	-	.614 (.067) *p* < .001	-.036 (.057) *p* = .533	-.097 (.096) *p* = .311	-.044 (.092) *p* = .636	-.115 (.062) *p* = .061
W2 BSV	-	-	-	-	-	.324 (.090) *p* < .001	.825 (.033) *p* < .001	-.087 (.072) *p* = .225	.093 (.076) *p* = .219	-.032 (.054) *p* = .554
W2 DEP	-	-	-	-	-	.040 (.169) *p* = .813	.125 (.094) *p* = .185	.614 (.064) *p* < .001	-	-
W2 GAS	-	-	-		-	-.080 (.177) *p* = .651	-.158 (.100) *p* = .113	-	.731 (.106) *p* < .001	-
W2 SAS	-	-	-	-		-.046 (.086) *p* = .594	.050 (.055) *p* = .371	-	-	.736 (.055) *p* < .001
Model 2b	**W2 NED**	**W2 COV**	**W2 DEP**	**W2 GAS**	**W2 SAS**	**W3 NED**	**W3 COV**	**W3 DEP**	**W3 GAS**	**W3 SAS**
Predictors	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
W1 NED	.765 (.071)	.049 (.177)	-.019 (.119)	.099 (.123)	-.032 (.076)	-	-	-	-	-

	$p < .001$	$p = .784$	$p = .875$	$p = .422$	$p = .674$					
W1 COV	.144 (.126) $p = .253$	.157 (.174) $p = .367$	-.046 (.121) $p = .705$	-.069 (.129) $p = .596$	-.062 (.080) $p = .444$	-	-	-	-	-
W1 DEP	.004 (.166) $p = .979$	.053 (.263) $p = .841$	.716 (.087) $p < .001$	-	-	-	-	-	-	-
W1 GAS	.122 (.159) $p = .441$	-.167 (.254) $p = .512$	-	.494 (.112) $p < .001$	-	-	-	-	-	-
W1 SAS	.071 (.110) $p = .519$	-.164 (.215) $p = .447$	-	-	.881 (.038) $p < .001$	-	-	-	-	-
W2 NED	-	-	-	-	-	.573 (.103) $p < .001$	-.083 (.329) $p = .800$	-.240 (.156) $p = .123$	.013 (.150) $p = .933$	-.107 (.110) $p = .330$
W2 COV	-	-	-	-	-	-.220 (.148) $p = .137$	-.154 (.266) $p = .563$	-.289 (.168) $p = .086$	-.296 (.141) $p = .036$	-.136 (.116) $p = .240$
W2 DEP	-	-	-	-	-	.240 (.169) $p = .157$	.288 (.315) $p = .360$	.497 (.112) $p < .001$	-	-
W2 GAS	-	-	-	-	-	.003 (.187) $p = .985$	-.181 (.280) $p = .519$	-	.519 (.103) $p <.001$	-
W2 SAS	-	-	-	-	-	-.308 (.143) $p = .031$	.306 (.188) $p = .104$	-	-	.792 (.062) $p < .001$

Note. NED = Negative emotion differentiation; BSV = Between-strategy variability; COV = Covariation; DEP = Depressive symptoms; GAS = Generalized anxiety symptoms; SAS = Social anxiety symptoms. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.
*p<.05, **p<.01, ***p<.001.

Table 9. *Indirect effects for reverse mediation models (2a, 2b) with negative emotion differentiation as focal predictor.*

	Effect of IV on mediator (a)	**Effect of mediator on outcome (b)**	**Indirect effect (ab)**	**95% CI**	**Adjusted alpha value**
Mediator: Between-strategy variability					
Depressive symptoms	.157 (.134) *p* = .241	.324 (.090) *p* < .001	.051 (.046) *p* = .263	[-.038, .140]	.025
Generalized anxiety symptoms	-.018 (.128) *p* = .891	.324 (.090) *p* < .001	-.006 (.042) *p* = .891	[-.024, .140]	.025
Social anxiety symptoms	-.205 (.069) *p* = .003	.324 (.090) *p* < .001	-.067 (.029) *p* = .022	[-.123, -.010]	.025
Mediator: Covariation					
Depressive symptoms	.053 (.263) *p* = .841	-.220 (.148) *p* = .137	-.012 (.059) *p* = .845	[-.126, ,105]	.05
Generalized anxiety symptoms	-.167 (.254) *p* = .512	-.220 (.148) *p* = .137	.037 (.062) *p* = .555	[-.085, ,159]	.05
Social anxiety symptoms	-.164 (.215) *p* = .447	-.220 (.148) *p* = .137	.037 (.062) *p* = .481	[-.064, ,136]	.05

Note. *p<.05, **p<.01, ***p<.001.

5.4 Study 2 discussion

Through a three-wave longitudinal study, findings from cross-lagged panel modelling provided partial support for the reverse mediation account of the regulatory flexibility framework of distress: ER flexibility (indexed by between-strategy variability) mediated the pathway from social anxiety symptoms to subsequent negative emotion differentiation abilities. In contrast to our results from Study 1, however, ER flexibility (indexed by repertoire and covariation of contextual-variability and strategy-variability) did not mediate "forward" pathways from distress tolerance and negative emotion differentiation to subsequent social anxiety symptoms.

Regarding the forward mediation pathways of interest, ER flexibility (indexed by covariation) at Wave 2 was negatively associated with generalized anxiety symptoms at Wave 3 in Model 2b. In line with theories of emotion dysregulation in affective distress (Mennin et al., 2002; 2005), this provides some support that difficulties with flexible regulation, which hinder the effective down-regulation of emotional responses, may contribute to generalized anxiety symptoms (Aldao & Nolen-Hoeksema, 2012; Coifman & Summers, 2019; Kashdan & Rottenberg, 2010). Further, this extends latent profiling work that generalized anxiety symptoms are linked to weaker ER flexibility indexed by low endorsement of concealing, tolerating, and adjusting affective styles (Conroy et al., 2020) or reliance on rumination and expressive suppression strategies (Wang et al., 2023). However, across the examined cross-lagged panel models, we did not find consistent evidence that distress tolerance or negative emotion differentiation were associated with subsequent ER flexibility, or that ER flexibility was associated with distress symptoms. This may be attributed to a) poor reliability of indices of ER flexibility assessed, b) a lack of statistical power to detect longitudinal mediation effects, and/or c) differential effects of ER abilities on ER flexibility and ER flexibility on distress symptoms at the occasion- versus person-level, which are elaborated in the General Discussion.

While previous studies have emphasized the contributing role of ER deficits (i.e., difficulties with distress tolerance, emotion differentiation) and ER inflexibility to social anxiety symptoms (e.g., Kashdan & Farmer, 2014; Laposa et al., 2015; Goodman et al., 2021; O'Toole et al., 2014), our findings point to an alternative, reverse mediation account in which social anxiety symptoms shape less flexible regulation processes which could exert influence on negative emotion differentiation abilities (H2a)—a point we return to in the General Discussion. In a similar vein, although this mediation effect did not reach significance, our findings showed that greater generalized anxiety symptoms at Wave 1 were associated with weaker ER flexibility (indexed by covariation) at Wave 2 which, in turn, was associated with poorer distress tolerance at Wave 3. In line with emerging longitudinal work about reciprocity between generalized anxiety symptoms and emotion dysregulation (Masters et al., 2019), this supports existing theoretical accounts that psychological distress could motivate the rapid downregulation of negative emotions which could manifest as less flexible or context-appropriate ER processes (Milyavsky et al., 2018). For instance, generalized anxiety symptoms could motivate the rigid use of rumination or expressive suppression, even when these strategies are ineffective for a specific emotional context, to rapidly downregulate feelings of anxiety (Wang et al., 2023). In addition, in line with Veilleux's (2023) momentary model of distress tolerance, our findings demonstrate some evidence—though not replicated in Model 1a—that repeated patterns of regulatory inflexibility (i.e., weaker covariation between contextual and strategy variability), implicating difficulties with context-appropriate strategy use, could impair perceived abilities to tolerate distress.

6. General discussion

Across both time-lagged and longitudinal studies, we sought to examine a novel regulatory flexibility framework of distress in which ER flexibility mediates bidirectional associations between selected ER abilities (negative emotion differentiation and emotional distress tolerance) and distress symptoms. Time-lagged designs were employed to mitigate common method bias (Tehseen et al., 2017) and establish temporal precedence in our mediation framework. Furthermore, ER flexibility was comprehensively assessed via survey-based, task-based and experience sampling approaches, and operationalized according to dominant theories of ER flexibility (Aldao et al., 2015; Bonanno & Burton, 2013). In Study 1, we demonstrated preliminary evidence that ER flexibility, when assessed via self-report, mediated the respective pathways from distress tolerance and negative emotion differentiation to subsequent social anxiety symptoms. However, these findings were not replicated when ER flexibility was measured using a laboratory-based task (Study 1) or through experience sampling (Study 2). In addition, the proposed reverse mediation account was partially supported in Study 2, in which ER flexibility (indexed by mean between-strategy variability) explained the indirect effects of social anxiety symptoms on subsequent negative emotion differentiation abilities. Four noteworthy contributions of the present work are outlined and discussed in turn.

6.1 Theoretical contributions

First, we demonstrate preliminary evidence for the “forward” account of our regulatory flexibility framework of distress: in Study 1, self-reported ER flexibility mediated indirect effects of negative emotion differentiation and distress tolerance on subsequent social anxiety symptoms. While difficulties with negative emotion differentiation and distress tolerance have been identified as risk factors for social anxiety symptoms in clinical and community samples (e.g., Kashdan & Farmer, 2014; Keough et al., 2010; Laposa et al., 2015; Michel et al., 2016; Thompson et al., 2017), these findings advance insight into a relevant mediating mechanism that explains these associations. Given that difficulties with negative emotion differentiation were related to poorer self-reported ER flexibility, this supports the feelings-as-information theoretical account (Schwarz, 1990; Schwarz, 2011) and suggests that poorer differentiation of negative emotions is related to weaker regulatory flexibility owing to more limited contextual information required to evaluate stressors. In line with existing accounts of distress tolerance (see Keough et al., 2010; Leyro et al., 2010; Simons & Gaher, 2005), our findings also indicate that lower distress thresholds are associated with perceptions of less flexible strategy use, potentially due to difficulties with appraising contextual cues and/or with tailoring strategy use in response to contextual demands. Overall, the present work addresses an important gap in existing research by elucidating ER flexibility as a critical mediator which explains associations between two key ER difficulties and social anxiety symptoms.

Our second contribution involves identifying ER inflexibility as a specific risk factor (Study 1) for and consequence of (Study 2) social anxiety symptoms, as opposed to a transdiagnostic factor across distress symptoms including depressive or generalized anxiety symptoms (Nolen-Hoeksema & Watkins, 2011). Drawing on Relational Frame Theory (RFT; Hayes et al., 2006, 1996), social anxiety symptoms in particular are maintained and reinforced by tendencies to avoid or control distressing emotions (e.g., feelings of nervousness) and thoughts (e.g., fears of negative social evaluation) which ironically heighten their salience and functional importance (Wenzlaff & Wegner, 2000). Inflexible emotion regulation processes, which may include rigid avoidance-oriented regulatory responses, may thus specifically perpetuate the severity of social anxiety symptoms. Consistent with this, previous work has identified ER inflexibility, in particular the persistent use of avoidance-oriented strategies (e.g., thought suppression, experiential avoidance), as a risk factor for social anxiety symptoms in both nonclinical and clinical samples (Goodman et al., 2021; O'Toole et al., 2017; Tng et al., 2023). Further, considering that previous work has focused on the predictive effects of regulatory flexibility on social anxiety symptoms, social anxiety symptoms were also found to motivate less flexible emotion regulation (i.e., between-strategy variability) in Study 2, a point we elaborate on below.

Third, in partial support of our hypothesized reverse mediation account, social anxiety symptoms were prospectively associated with lower between-strategy variability which, in turn, was prospectively associated with poorer emotion differentiation abilities. While previous experience sampling studies have identified that lower between-strategy variability across occasions contributes to increased distress and negative affect (e.g., Battaglini et al., 2022; Blanke et al., 2020; Ma et al., 2024; Wang et al., 2021), our findings extend emerging longitudinal evidence of reciprocity between distress and emotion regulation (e.g., Dawel et al., 2021) and demonstrate that distress symptoms may influence the variability of regulatory strategy use in response to negative emotional events. In line with Milyavsky et al.'s (2018) theoretical account, the intense and persistent psychological distress associated with social anxiety symptoms, as well as tendencies to appraise negative emotions as unacceptable (e.g., Campbell-Sills et al., 2006; Turk et al., 2005), likely motivate the rapid downregulation of unpleasant emotions. Accordingly, this may foster less flexible ER processes, specifically the *less varied* strategy use within a given emotional event which indicate poorer abilities to prioritize certain strategies and inhibit certain strategies. For instance, social anxiety symptoms can motivate the haphazard use of multiple, albeit ineffective, strategies in an attempt to downregulate distressing emotions as rapidly as possible (Blanke et al., 2020; Daniel et al., 2023). This also accords with recent studies showing that college-aged adults with more severe social anxiety symptoms report employing a greater number of strategies to similar extents, rather than prioritizing specific strategies, in response to distressing situations over a 2-week ecological momentary assessment procedure (Daniel et al., 2023).

In addition, while existing work has emphasized the contributing role of emotion differentiation skills to emotion regulation choices (e.g., Barrett et al., 2001; Kalokerinos et al., 2019; Kashdan et al., 2015; Thompson et al., 2021), our findings suggest that negative emotion differentiation abilities may be malleable to emotion regulation flexibility processes: higher (lower) between-strategy variability at Wave 2 was related to increased (reduced) emotion differentiation abilities at Wave 3. Drawing on theoretical accounts of emotion differentiation, emotion knowledge, and emotion regulation (Barrett et al., 2001; Gross & Thompson, 2007; Vedernikova et al., 2021), it is plausible that less varied strategy use, which implicates attempts to rapidly downregulate distress, hinder opportunities for elaborative processing of emotional information and sustained attention to emotional states and sensations through engagement strategies such as cognitive reappraisal and mindfulness (Gross & Thompson, 2007). Building on prior studies (Mikkelsen et al., 2021; Van der Gucht et al., 2019; Vedernikova et al., 2021), ER inflexibility (e.g., less varied strategy use such as the use of multiple strategies evenly or endorsing few strategies weakly) may thus prevent individuals from accessing emotion knowledge (i.e., information about the characteristics of emotional events), thus reducing abilities to identify and label nuanced emotions. Given that longitudinal research on emotion regulation flexibility is still in its infancy, our findings critically elucidate ER inflexibility as a consequence of social anxiety symptoms, and suggest that emotion differentiation abilities may be malleable to ER flexibility processes.

Fourth, we did not find any evidence supporting the hypothesized “forward” mediation account when ER flexibility was assessed through the ER choice task (Study 1) or 5-day experience sampling protocol (Study 2). While limitations of the ER choice task are outlined above (see Study 1 Discussion), we offer three alternative explanations for the discrepant mediation results when ER flexibility was measured through experience sampling. First, it is possible that the indices of ER flexibility used, covariation and between-strategy variability, were not reliable indicators of the flexible employment of regulatory strategies according to contextual demands. While the mean between-strategy variability index assesses variability of strategy use within an occasion and the covariation index captures degree of covariation between ER variability and contextual variability across occasions (Aldao et al., 2015), these indices preclude inferences of situation-strategy fit or how effectively these strategies were implemented (Daniel et al., 2023). For instance, higher between-strategy variability values could be obtained through various patterns of strategy use including the prioritization of specific engagement strategies or the prioritization of specific disengagement strategies (see Blanke et al., 2020). In addition, given that participants reported on emotional events and their regulatory processes after a temporal lag (i.e., up to 6 hours), this may have introduced measurement errors in the ER flexibility indices due to trait- or state-level differences in emotional clarity while the event occurred (Ottenstein & Lischetzke, 2020) and/or retrospective recall biases due to characteristics of the event such as personal relevance (Robinson & Clore, 2002). Thus, determining whether between-strategy variability and covariation are reliable markers of ER flexibility is an important step toward evaluating these indices as potential intervention targets. Next, our longitudinal sample size (N range = 161–198) may have lacked statistical power. In line with Kline's (2015) guidelines of an $N:q$ ratio of between 10 to 20 participants per parameter, our cross-lagged panel models including three measurement waves required a larger sample size of above 200 to detect forward mediation effects of interest. Hence, future research should replicate our mediation framework with larger samples. A third potential explanation is that while the present investigation focused on between-person associations between ER abilities, regulatory flexibility, and distress symptoms across measurement waves, it is possible that these associations may be more pronounced at the within-person or occasion-level. Recent ecological momentary assessment (EMA) studies indicate that distress tolerance (Veilleux et al., 2018) and emotion differentiation abilities (Erbas et al., 2021; Springstein et al., 2023) fluctuate from moment to moment across occasions at the within-person level. In addition, Chen et al. (2024) found, across two cross-cultural EMA studies, that increased momentary context sensitivity and use of repertoire were associated with reduced momentary distress (i.e., depressed mood, anxious mood, perceived stress) in each emotional situation. In view of this, moment-level distress tolerance and emotion differentiation may shape the variability or context-appropriateness of regulatory responses within emotional events which, in turn, foster momentary distress symptoms (see Veilleux, 2023). Hence, although the present work conceptualizes ER abilities and regulatory flexibility as trait-like attributes (i.e., attributes a person "has"), this highlights the need to examine our mediation framework at the within-person level, accounting for the moment-to-moment dynamics of emotion regulation flexibility (i.e., processes that a person "does"; Cantor, 1990).

6.2 Limitations and future directions

Several limitations of the study should be noted. First, given that our experience sampling measure of ER flexibility assessed overall strategies employed in response to each emotional event, this precluded examinations of how individuals adjusted their strategy use within each situation in response to emotional feedback (e.g., Chen et al., 2024). Besides the evaluation of contextual demands and recruitment of diverse strategies, ER flexibility encompasses the capacity to monitor feedback about the efficacy of a regulatory strategy and maintain or modify one's regulatory approach accordingly (Bonanno and Burton, 2013). Hence, future experience sampling measures of regulatory flexibility should capture feedback responsiveness within events by asking about participants' initial ER strategy use, their efficacy, and any subsequent modifications in strategy use (e.g., Chen et al., 2024).

A second limitation is that although we focused on the intensity of various negative emotions as a key contextual factor when assessing ER flexibility, other relevant contextual features were not accounted for. These include perceived situational controllability (e.g., Haines et al., 2016; Wenzel et al., 2019) and social context (i.e., involvement of others in the situation), which have been found to shape the flexible use of regulatory strategies. In particular, given the specific association we found between ER flexibility and social anxiety, it is important that future research considers how the social context of emotional events may shape flexible strategy use (see Daros et al., 2019; English et al., 2017), as well as how the social context of emotional events may potentially moderate associations between ER flexibility and social anxiety symptoms. In addition, considering that our experience sampling measure of ER flexibility was limited to covert strategies which function intra-personally, future research on ER flexibility and distress symptoms should examine a wider range of regulatory strategies including ‘overt’, behavioral strategies such as seeking social support, behavioral activation, and substance use (Aldao & Dixon-Gordon, 2014; Heiy & Cheavens, 2014).

Third, we note that our use of cross-lagged panel modelling was limited in delineating between-persons and within-persons associations in the bidirectional mediation model across waves (see Hamaker et al., 2015; Mulder & Hamaker, 2020). That is, the autoregressive pathways in the CLPM may not have adequately accounted for trait-like or time-invariant individual differences in ER abilities, ER flexibility, or distress symptoms; consequently, the cross-lagged parameters were unable to separate within-person processes (i.e., changes across waves) from stable between-person differences. In future work, it is important that alternative models are used (e.g., random-intercept cross-lagged panel models) which account for trait-like stability in constructs using a random intercept, such that the lagged relationships in the mediation model are specific to within-person processes across time (Lucas, 2023).

Finally, our studies were conducted with samples of undergraduate students, characterized by a narrow range of subclinical symptom levels. Hence, further work is warranted to examine if these findings similarly hold true for individuals with higher levels of distress symptoms, such as those diagnosed with major depressive or social anxiety disorders. In particular, it is plausible that specific components of ER flexibility (e.g., context sensitivity, repertoire) differ for adults with a clinical diagnosis of generalized or social anxiety disorder, compared to healthy controls (e.g., Conroy et al., 2020; Goodman et al., 2021). In addition, future work should ascertain the generalizability of our findings to samples of more diverse ethnicities and other age groups such as older adults.

6.3 Conclusion

Considering the prevalence of co-occurring distress symptoms in young adults (Li et al., 2022; Luo et al., 2021), we investigated a novel regulatory flexibility framework in which ER flexibility mediates potentially reciprocal associations of negative emotion differentiation and emotional distress tolerance with various distress symptoms. Through time-lagged and longitudinal studies, preliminary empirical support for the framework was demonstrated: self-reported ER flexibility mediated the respective associations from distress tolerance and negative emotion differentiation with social anxiety symptoms. In addition, the reversed association of social anxiety symptoms with negative emotion differentiation abilities was mediated by between-strategy variability measured via experience sampling. By utilizing a multi-method approach to assessing ER flexibility, these findings underscore the need for future research to account for bidirectional influences when examining emotion regulation difficulties, regulatory flexibility, and psychological distress. In line with our theorised framework, future work should consider the role of enhancing capacity for emotion differentiation and distress tolerance in ER-flexibility-based interventions for social anxiety symptoms (e.g., Specker & Nickerson, 2023).

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Appendix

Table S1. *Bivariate correlations between focal predictors, mediators, outcome variables, and all covariates (Study 1).*

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. Distress tolerance	-												
2. Neg. emotion differentiation	.259**	-											
3. ER flexibility	.389**	.541**	-										
4. Depressive symptoms	-.444**	-.093	-.155*	-									
5. Generalized anxiety	-.425**	-.088	-.136	.862**	-								
6. Social anxiety symptoms	-.376**	-.390**	-.484**	.408**	.366**	-							
7. Strategy-switching	-.056	-.062	-.097	.053	.203*	.247**	-						
8. Strategy-maintenance	.147	.102	.096	-.034	-.166	-.176*	-.448**	-					
9. Age	.218**	.139	.241**	-.021	-.054	-.156*	-.109	.084	-				
10. Gender	-.331**	-.190*	-.229**	.118	.121	.254**	.149	-.051	-.527**	-			
11. Income	.055	-.097	-.186*	-.120	-.029	.021	-.018	.053	-.140	.036	-		
12. Subjective social class	-.213**	-.228**	-.172*	.233**	.109	.208**	.045	-.027	.121	.083	-.445**	-	
13. Extroversion	.139	.303**	.313**	-.133	-.040	-.588**	-.004	.007	-.099	-.051	.040	-.185*	-
14. Neuroticism	-.748**	-.299**	-.439**	.451**	.438**	.451**	.159	-.137	-.259**	.339**	.000	.184*	-.124

Note. Significant correlations are in bold. **p* < .05, ***p* <.01.

Table S2.
Bivariate correlations between focal predictors, mediators, outcome variables, and covariates at each measurement wave (Study 2).

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Wave 1												
1. Distress tolerance	-											
2. Negative emotion differentiation	.254**	-										
3. Between-strategy variability	.186*	.412***	-									
4. Covariation	.096	-.154	-.072	-								
5. Dep. symptoms	-.655***	-.239**	-.087	-.099	-							
6. GA symptoms	-.593***	-.166	-.001	-.147	.826***	-						
7. SA symptoms	-.497***	.001	-.069	-.140	.521***	.388***	-					
8. Age	-.034	-.054	.096	.075	.091	.091	.056	-				
9. Gender	-.179*	-.008	-.154	-.037	.063	.087	.091	-.388***	-			
10. Income	.207**	.079	.033	.006	-.173*	-.183*	-.162*	-.239***	.028	-		
11. Social class	.284***	-.034	.095	.075	-.397***	-.382***	-.260***	-.221***	-.038	.404***	-	
12. Extroversion	.218**	-.071	.001	-.086	-.255***	-.192**	-.609***	-.127	.008	.074	.147*	-
13. Neuroticism	-.595***	-.075	-.040	-.103	.498***	.498***	.426***	-.099	.218**	-.140*	-.234***	-.192**
Wave 2												
1. Distress tolerance	-											
2. Negative emotion differentiation	.072	-										
3. Between-strategy variability	.202*	.026	-									
4. Covariation	-.049	-.087	.088	-								
5. Dep. symptoms	-.605***	-.017	.021	-.023	-							

6. GA symptoms	-.602***	.034	-.028	-.024	.771***	-	
7. SA symptoms	-.484***	.100	-.119	.045	.418***	.405***	-
Wave 3							
1. Distress tolerance	-						
2. Negative emotion differentiation	.111	-					
3. Between-strategy variability	.217*	.308**	-				
4. Covariation	-.070	-.268	.069	-			
5. Dep. symptoms	-.731***	-.098	-.025	.235	-		
6. GA symptoms	-.640***	-.121	-.010	.222	.906***	-	
7. SA symptoms	-.594***	-.140	-.097	.100	.528***	.494***	-

Note. Significant correlations are in bold. Dep. Symptoms = Depressive symptoms; GA symptoms = Generalized anxiety symptoms; SA symptoms = Social anxiety symptoms.

*p < .05, **p <.01, ***p<.001.