



Assessing emotion regulation repertoires: The Regulation of Emotion Systems Survey



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ABSTRACT

Research has shown a link between emotion regulation (ER) repertoire, the range of ER strategies an individual employs and the degree to which they rely on them, and well-being. However, this advancement is hindered by the lack of a single measurement tool capable of assessing multiple ER strategies on a common scale. The current paper reports on two studies utilizing the Regulation of Emotion Systems Survey (RESS), a new self-report measure allowing for variable- and person-centered analyses of six common ER strategies (Distraction, Rumination, Reappraisal, Suppression, Engagement, Arousal Control). Study 1 ($n = 1582$) included scale development, validation, and Latent Profile Analysis (LPA). Results showed the RESS is a valid, reliable, and effective measure. Three profiles were identified (Average, Suppression Propensity, Engagement Propensity). The Average group reported greater psychosocial functioning than the Suppression group. Study 2 ($n = 100$) LPA indicated 4 profiles (Average, Suppression Propensity, Engagement Propensity, Multi-strategy) and assessed the effects of emotionality. The Average group reported lower emotional awareness than the Engagement and Multi-Strategy groups. Profiles did not differ on frequency or intensity of emotions. Findings demonstrated the utility of the RESS and confirm the importance of ER repertoires to better understand connections between ER and well-being.

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Emotions define our human experience, provide important signals about the world, and shape how we feel, think, and act (Bradley & Lang, 2000). However, in order to achieve long-term goals and operate in line with social norms, individuals must learn to regulate their emotional experiences in adaptive ways (Dahl, 2004). Consequently, emotion regulation (ER), or the modification of processes involved in the generation or manifestation of emotion (Campos, Frankel, & Camras, 2004), is an essential component of psychological well-being and successful social functioning (Macklem, 2008). However, while the need to regulate emotions is commonplace, how regulation is achieved varies greatly across individuals with subsequent variations in psychosocial functioning.

In order to assess how ER is related to psychosocial functioning and psychopathology, research has focused primarily on identifying one-to-one relationships between elements of psychosocial functioning and the extent to which an individual uses one specific ER strategy (Dixon-Gordon, Aldao, & De Los Reyes, 2014). For example, Gross and John (2003) found that high levels of suppression use were related to higher levels of depression, while reappraisal use was significantly associated with lower levels of depression. However, the function, and thereby the effectiveness, of ER strategies varies across context (e.g., Troy, Ford, McRae, Zorolia, & Mauss, 2017). When receiving an

unwanted gift, suppressing disappointment for the sake of maintaining social relations is often beneficial (Butler & Gross, 2004). Moreover, reappraisal becomes harmful when positively re-evaluating negative situations prevents individuals from taking action to modify the triggering event (Christensen & Aldao, 2015), and may actually only be adaptive when used in uncontrollable contexts (Troy, Shallcross, & Mauss, 2013). Therefore, the use of a single ER strategy may not be inherently “good” or “bad” on its own. The implications of a specific ER strategy may, instead, be dependent on the extent to which an individual uses a strategy at the exclusion of other possible strategies.

Consequently, attempts to examine the relation between ER and psychosocial functioning have shifted away from these one-to-one associations in exchange for an examination of ER repertoires: the range of ER strategies an individual employs, and the proportional degree to which they rely on them. This focus allows for a richer picture of an individual's regulatory patterns and captures individual differences in strategy use and psychosocial outcomes. Recent research assessing ER repertoires has shown that reliance on a small subset of ER behaviors is likely to increase the chances of experiencing difficulties with emotion regulation (Aldao, Sheppes, & Gross, 2015; Bonanno, Papa, Lalande, Westphal, & Coifman, 2004) while an ER repertoire comprised of a large range of strategies is associated with less depression, anxiety, social anxiety (e.g., Loughheed & Hollenstein, 2012), and greater well-being even when controlling for previous well-being and cognitive abilities (Bonanno et al., 2004). Therefore, reliance on a small subset of ER

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behaviors is associated with poor psychosocial outcomes, whereas the tendency to implement a wide range of ER strategies is associated with successful regulation and greater psychosocial functioning.

Approaching ER from an ER repertoire perspective, rather than a one-to-one approach, provides the potential for a broad impact both within basic emotion science and peripheral disciplines (e.g., clinical, health, sport, social, developmental, and industrial/organizational psychology) that often rely on self-report of ER. However, there are three main limitations to self-reported ER measurement that need to be resolved in order to realize this impact. First, assessing multiple ER strategies currently requires multiple ER strategy questionnaires, which is cumbersome due to the number of different surveys and items involved. Consequently, two additional problems emerge. There is a lack of concordance across response scales. Among the most reliable and often used measures, assessments of specific strategies have different response scales capturing agreement with statements (ERQ, Gross & John, 2003), truth of statements (CBAS, Ottenbreit & Dobson, 2004), or estimations of the frequency of a given behavior (RRS, Nolen-Hoeksema & Morrow, 1991). Because the types of responses participants are choosing from vary so widely, it is unwise to simply amalgamate various scales. Also, there is great variation in the focus of the questions across scales. Some scales provide specific contexts within which regulatory strategies may occur, such as location (e.g., CBAS, Ottenbreit & Dobson, 2004), or the specific emotion being regulated (e.g., RRS, Nolen-Hoeksema & Morrow, 1991). Therefore, it is impossible to know if responses can be generalized beyond those locations and emotions.

Finally, while some ER questionnaires specify the valence of the emotion being regulated (e.g., RRS, Nolen-Hoeksema & Morrow, 1991; ERQ, Gross & John, 2003), others do not (e.g., CBAS, Ottenbreit & Dobson, 2004; EES; Kring, Smith, & Neale, 1994), therefore possibly confusing strategies used to manage positive and negative emotion. Evidence suggests that regulation of negative and positive emotions may operate differently to impact well-being, and therefore should be examined separately (e.g., Beaver, 2008; Forbes & Dahl, 2005).

To overcome these challenges, we developed a new measure aimed at assessing an individual's ER repertoire, the Regulation of Emotion Systems Survey (RESS). The RESS overcomes each of the limitations listed above. First, the RESS integrates several common ER strategies into one measure to allow for succinct measurement of multiple ER strategies. Second, as all strategies are assessed on a single measurement scale, the RESS allows for direct comparison of the level upon which individuals rely on each strategy. Third, the RESS includes a focus only on the regulation of negative emotion, at least with this initial version. We have chosen to focus on negative emotions as regulation of negative emotion has shown the most robust and consistent associations with psychosocial functioning (e.g., Macklem, 2008). For example, experiencing negative emotions such as anger, sadness, and fear have shown relations to externalizing problems in children, while experiencing positive emotions showed no such relation (Kim, Walden, Harris, Karrass, & Catron, 2007). Moreover, while positive emotions were associated only with symptoms and diagnoses of depression, negative emotions were broadly associated with both symptoms and diagnoses of depression and anxiety disorders, and are hypothesized to partially account for the high levels of comorbidity between anxiety and depression (Beaver, 2008; Watson, Clark, & Carey, 1988). The RESS uses the questionnaire prompt "At the time I experience a negative emotion, I usually respond to it right away by..." to alleviate any confusion over the valence to which the participant responds.

When deciding which strategies to include in the RESS, several inclusion criteria were identified. First, clear evidence must exist to demonstrate a strategy's impact on an emotional experience. Second, strategies must have a clear impact on one of three emotion components: cognition, behavior, or physiological arousal. These three emotion components are included in theoretical models of basic emotions (Rosenberg & Ekman, 1997), dimensional models (Barrett, 2006;

Russell, 2003), the process model of ER (Gross, 2015), functionalist models (Campos, Mumme, Kermoian, & Campos, 1994), and both latent and emergent accounts of emotion (Coan, 2010), and can therefore be conceptualized as core emotion components. Any strategy that did not have a direct impact on one of these three emotion domains was excluded. Third, strategies must be distinct from each other to avoid repetition. Any strategy that could be conceptualized as a subclass of another, or as a combination of strategies already included, was excluded (e.g., brooding as a subset of rumination). Fourth, only those strategies that are available to conscious awareness were included since this was a self-report measure. Finally, only those strategies that can be employed in the moment, while an emotion is being experienced, were included. This last criterion allowed the exclusion of mood regulation or coping efforts such as exercise and substance use that have a downstream impact on negative emotions and can be better conceived as mood-altering behaviors.

Using these criteria we identified six primary ER strategies. First, we included three ER strategies with well-documented impacts on the cognitive component of emotion: Distraction, or the withdraw of attention away from an emotional situation (Sheppes & Meiran, 2008), Rumination, or a preservative focus on an emotional experience and its causes and consequences (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), and Reappraisal, altering an emotional experience by changing how you think about it (McRae, Ciesielski, & Gross, 2012). Second, we included two common ER strategies that directly impact the behavioral component of emotion: Expressive Suppression (Suppression), active attempts to eliminate the outward, behavioral manifestation of an emotional experience (Gross, 2007), and Expressive Engagement (Engagement). Rather than simply being the opposite of Suppression, Engagement involves actively engaging with an emotion by amplifying expressive dynamics in order to moderate the emotional experience (Kennedy-Moore & Watson, 2001). Finally, we also included Arousal Control due to its direct impacts on an emotional experience by increasing control of the autonomic arousal component of emotion. Relatively less attention has been paid to the ability of Arousal Control to function as an ER strategy; however, there is an adequate literature to confirm the effectiveness of Arousal Control on an emotional experience, particularly in research examining treatment of anxiety, panic attack disorders, and anger (Deffenbacher, Demm, & Brandon, 1986; Deffenbacher & Stark, 1992; Hazaleus & Deffenbacher, 1986; Ley, 1999).

The RESS, therefore, includes measures of Distraction, Rumination, Reappraisal, Suppression, Engagement, and Arousal Control. Each of these strategies has clear evidence in support of its direct impact on an emotional experience and particularly on one of the three core components of emotion. Moreover, they are also each distinct, with the potential for deployment at the conscious command of the individual using it, and in the moment of an emotional experience. See Fig. 1 for an organizational display of each of the ER strategies included in the RESS and their corresponding emotion components.

1. The current research

The current research consisted of two independent studies. The objectives of the first study were to 1) develop a self-report measure (RESS) to assess an individual's propensity to utilize six ER strategies when experiencing a negative emotion; 2) assess the validity of the RESS; 3) identify various ER repertoires through the use of a person-centered analysis (Lougheed & Hollenstein, 2012; Zalewski, Lengua, Wilson, Trancik, & Bazinet, 2011), and 4) determine the relation between various ER repertoires and indicators of psychosocial functioning, such as anxiety, depression, and relationship quality. The objectives of the second study were to 1) confirm the factor structure of the RESS; 2) identify ER repertoires in a second, independent sample; and 3) assess the impact of potential moderators, emotional awareness and emotionality, on repertoire membership.

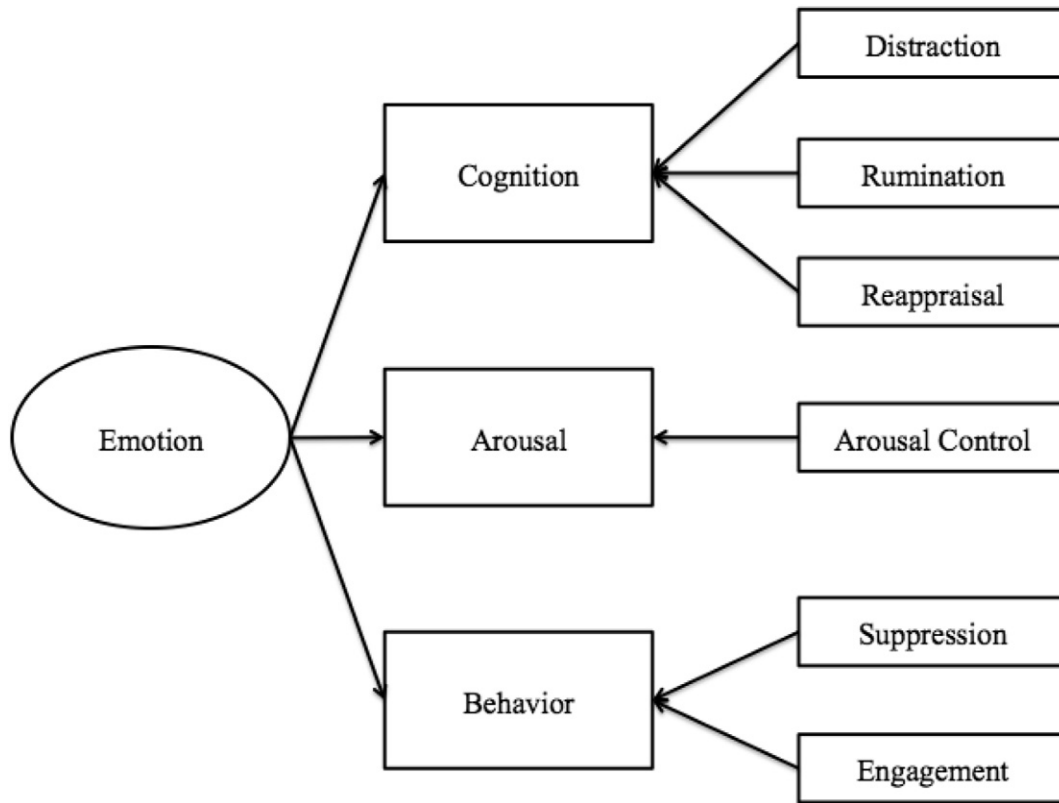


Fig. 1. Strategies included in the RESS and their impact on emotion components.

2. Study 1

2.1. Methods

2.1.1. Participants

Participants included 1606 students enrolled in a first year Psychology class. Participants were asked to complete a package of questionnaires, including the RESS, as part of their class requirements. Twenty-four cases where participants completed <75% of the questions were removed from the dataset, resulting in a sample size of 1582. Participants were between the ages of 16 and 33 years old ($M = 18.2$, $SD = 1.2$). The majority of participants was female (75.5%) and identified as Caucasian (77.8% Caucasian, 14.4% East Asian, 5.1% South Asian, and 7.8% Other).

2.1.2. Procedure

In Phase 1 of Study 1, participants completed the RESS during the first week of classes via an online survey site. A Latent Profile Analysis (LPA) was run on the RESS data using Mplus (Muthén & Muthén, 1998–2010). LPA is a person-centered approach that uses within-individual patterns of responding across variables to derive distinct profiles (Lanza & Cooper, 2016), and determines each individual's probability of being a member of each derived profile (Zalewski et al., 2011). As an individual's probability of belonging to one derived profile diminishes, so, too, does the certainty with which one can conclude that they are a member of that group. Therefore, as we were interested in assessing the relationship between membership in each profile and outcome measures, only those belonging to the top 10th percentile of each profile were recruited to participate in the second phase of Study 1.

An email was sent out to students who qualified, and they were invited to attend an hour-long session at a computer lab on campus to complete additional surveys on a computer (Phase 2). Students were compensated with a 1% credit towards their class grade. A total of 117 individuals participated in Phase 2 (Mean Age: 18.3, SD : 1.3; 79% Female).

2.1.3. Measures

2.1.3.1. Regulation of Emotion Systems Survey (RESS). The RESS is a self-report questionnaire designed to assess an individual's propensity to use six strategies of emotion regulation to down-regulate their experiences of negative emotions. Eight items were created to identify a response indicative of each of six ER strategies (Distraction, Rumination, Reappraisal, Suppression, Engagement, and Arousal Control), resulting in a total of 48 items. These items were created by first reviewing the available literature of each strategy to develop a strong conceptual definition of each strategy. Next, we identified items used in previously developed scales that clearly reflected each strategy to develop an understanding of how these strategies are being assessed currently. Items for the RESS were then created using a combination of the theoretical underpinnings of each strategy and language common to assessments of each strategy. Finally, we then customized each item to reflect the goals of the RESS: immediate application of ER strategies to down-regulate a negative emotion.

Participants rated each item using a five-point Likert scale ranging from one (Never) to five (Always). All participants completed the RESS once during the first week of classes (Phase 1), and the subset of participants that participated in Phase 2 completed it again during a laboratory session. The internal reliability of each subscale was high; subscales had Cronbach's alpha levels ranging from 0.88 through 0.94 (Table 1).

2.1.3.2. Distraction. Cognitive Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). The CBAS is a 31-item self-report measure with four subscales assessing cognitive social, cognitive non-social, behavioral social, and behavioral non-social avoidance. In order to assess the cognitive mechanism of distraction, the two cognitive subscales were pooled. Participants responded on a five-point Likert scale ranging from one (not true at all for me) to five (extremely true for me). The

Table 1

RESS subscale reliability scores for Study 1 (phases 1 and 2) and Study 2, correlation between phase 1 and 2 of Study 1 RESS scores, and correlation values between RESS subscales and corresponding measures.

RESS subscale	Cronbach's alpha Study 1 phase 1	Cronbach's alpha Study 1 phase 2	Cronbach's alpha Study 2	Correlation between phase 1 and phase 2 RESS completion	Corresponding measure	Pearson correlation
Distraction	0.92	0.90	0.91	0.51**	CBAS – pooled cognitive subscales	0.07
Rumination	0.90	0.94	0.89	0.73**	RRS	0.47**
Reappraisal	0.95	0.95	0.94	0.68**	ERQ – reappraisal	0.34**
Suppression	0.98	0.96	0.94	0.86**	ERQ – suppression	0.76**
Engagement	0.96	0.96	0.91	0.83**	EES	0.81**
Arousal control	0.91	0.91	0.84	0.68**		

Note: CBAS: Cognitive Behavioral Avoidance Scale; RRS: Ruminative Response Scale; ERQ: Emotion Regulation Questionnaire; EES: Emotional Expressivity Scale; Note that there is no corresponding measure of Arousal Control.

** $p < 0.01$.

pooled cognitive CBAS subscale demonstrated high internal reliability, Cronbach's $\alpha = 0.91$.

2.1.3.3. Rumination. Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991). The RRS is a 22-item self-report measure assessing a participant's propensity to use rumination in response to depressed mood. Items were rated using a Likert scale from one (almost never) to four (almost always). RRS total scores demonstrated high internal reliability in this sample (Cronbach's $\alpha = 0.93$).

2.1.3.4. Reappraisal and suppression. Emotional Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ is a 10-item self-report questionnaire that measures an individual's propensity to use reappraisal and expressive suppression to regulate emotions. Participants responded using a seven-point Likert scale ranging from one (strongly disagree) to seven (strongly agree). In this sample, internal reliability was high for both the reappraisal subscale ($\alpha = 0.88$) as well as the suppression subscale ($\alpha = 0.86$).

2.1.3.5. Expression. Emotional Expressivity Scale (EES; Kring et al., 1994). The EES is a 17-item self-report tool, which assesses the proclivity to openly express experienced emotions. Items are rated on a four-point Likert scale from one (never true) to four (always true). The EES demonstrated high internal reliability (Cronbach's $\alpha = 0.92$).

2.1.3.6. Anxiety. Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item self-report inventory designed to measure the severity of anxiety symptoms. Respondents indicated on a four-point scale (0 = not at all; 3 = severely) the severity of anxiety symptoms (e.g., heart pounding, unable to relax, nervousness). In the current sample, Anxiety was calculated as the mean across all items, and demonstrated strong internal reliability (Cronbach's $\alpha = 0.92$).

2.1.3.7. Depression. Beck Depression Inventory, second edition (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report questionnaire assessing the extent to which someone has experienced depressive symptoms in the past two weeks. Participants are asked to choose one of four statements that best reflect the extent to which they have experienced various symptoms of depression in the last two weeks (e.g., 0 = I do not feel sad; 1 = I feel sad much of the time; 2 = I am sad all of the time; and 3 = I am so sad or unhappy that I can't stand it). One item regarding suicidal thoughts was excluded at the request of the institutional ethics review board. In the current study, Depressive Symptoms was calculated as the mean across items and demonstrated high internal consistency, Cronbach's $\alpha = 0.93$.

2.1.3.8. Social anxiety. Self-Report Liebowitz Social Anxiety Scale (LSAS-SR; Dos Santos, Loureiro, Crippa, & Osorio, 2013). The LSAS-SR consists of 24 items rated on a four-point Likert scale (0 = None to 3 = Severe) and assesses the extent to which an individual experiences social anxiety symptoms. In the current sample, Social Anxiety Symptoms was

calculated as the mean of all items, and demonstrated high internal consistency, Cronbach's $\alpha = 0.96$.

2.1.3.9. Relationship quality. Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987). The IPPA is a 53-item self-report measure assessing specific elements of an individual's relationships to index the strength of relationships with parents and peers. Items are scored on a five-point Likert Scale from one (almost never or never true) to five (almost always or always true). In the current sample, Family Relationship Quality was calculated as the mean across family items, and Peer Relationship Quality was calculated as the mean across peer items. Both subscales demonstrated high internal consistency, Cronbach's $\alpha = 0.94$.

2.2. Study 1 results

2.2.1. Phase 1

2.2.1.1. RESS factor analysis. All items were assessed for missing values and normality of distributions. In total, there were 63 missing data points, which were distributed throughout individuals and items. These missing data points accounted for <1% of the total RESS dataset, and therefore imputation was not necessary (Fidell & Tabachnick, 2003).

A principal axis factor analysis was conducted on all 48 RESS items, using an oblimin rotation. Individual items were restricted to factor loadings of 0.40 and higher. Two items did not load onto any factor, therefore the analysis was re-run without them. The analysis produced a six-factor solution. Each item loaded onto only one of the six factors, and each factor was indicative of a distinct ER strategy, therefore each factor was labeled by the ER strategy it measured (Distraction, Rumination, Reappraisal, Suppression, Engagement, and Arousal Control; See Table 2). Six subscale variables were created based on the mean of the items within each factor. Women and men showed no significant differences in their scores on most RESS subscales, however, women scored significantly higher than men on Rumination (see Table 3). RESS subscale reliabilities ranged from Cronbach's alpha values of 0.88 to 0.95 (Table 1).

2.2.1.2. Latent profile analysis. In order to identify the ER repertoires within this sample, a series of latent profile analyses (LPA) using the Mplus software package (Muthén & Muthén, 1998–2010) were conducted on the Phase 1 RESS data. Six subscale means were entered into the analysis (Distraction, Rumination, Reappraisal, Suppression, Engagement, and Arousal Control). A two-class model was run first and evaluated for goodness of fit. This was followed by an analysis of all models up to nine classes, after which the analysis was stopped because all indicators of fit ceased to improve.

Several statistics were examined in order to determine the fit of each of the models. The Bayesian information criterion (BIC; Schwarz, 1978), adjusted Bayesian information criterion (adjusted BIC; Sclove, 1987),

Table 2
Study 1 RESS Factor structure, eigenvalues, item descriptions, and item loadings.

Factor label	Eigen-value	Item description	Loading		
Reappraisal	9.68	Looking at different angles	0.87		
		Identifying different angles	0.87		
		Looking from different perspective	0.83		
		Thinking of other ways to interpret	0.82		
		Thinking of alternate ways to see situation	0.80		
		Trying to see different perspective	0.78		
		Trying to think of more positive light	0.65		
		Trying to see more positive light	0.63		
		Questioning emotions	0.60		
		Analyzing emotion	0.60		
Engagement	6.77	Expressing feelings	0.82		
		Showing I was upset	0.81		
		Showing what I was feeling	0.80		
		Showing feelings	0.79		
		Vocalizing feelings	0.73		
		Letting emotions show	0.72		
		Telling others how I felt	0.62		
		Using facial expressions	0.46		
		Rumination	4.63	Thinking again and again	0.87
				Thinking about event again and again	0.85
Going over event again and again	0.81				
Continually thinking about event	0.79				
Trying to decide what went wrong	0.69				
Thinking about what was bothering me	0.68				
Distraction	2.55	Distract self	0.89		
		Keep busy	0.83		
		Doing something else	0.82		
		Working on something	0.61		
		Think about other topics	0.61		
		Think about other things	0.57		
		Engage in activity	0.45		
Arousal control	1.59	Slow heart rate and breathing	0.94		
		Focusing on heart rate and breathing	0.90		
		Deep breaths	0.66		
		Decreasing tension	0.54		
Suppression	1.32	Hiding feelings	0.84		
		Hide what I was feeling	0.83		
		Concealing feeling	0.83		
		Pretend I wasn't upset	0.83		
		Effort to hide my feelings	0.81		
		Pretending not upset	0.78		
		Making sure no one could tell	0.71		
Acting like not upset	0.48				

and Akaike information criterion (AIC; Akaike, 1973) are indicators of model fit provided by MPlus, with lowest values indicating the best fit (Nylund, Asparouhov, & Muthén, 2007). Entropy is another model fit indicator that identifies how well a model classifies individuals into the derived profiles, with values closest to 1 indicating the best fit (Celeux & Soromenho, 1996). Finally, the Vuong–Lo–Mendell–Rubin (VLMR) likelihood ratio test and the Lo–Mendell–Rubin (adjusted LMR) likelihood ratio test are both significance tests that indicate whether the model provides a significantly better fit to the data when compared to the model with one fewer groups (Nylund et al., 2007). See Table 4 for fit statistics of the models tested.

Evaluation of the fit statistics of the models run indicated that a three-group model was the best fit to the data. Although the AIC, BIC, and adjusted BIC values continued to improve as the number of groups increased, entropy values declined following the three-group model. Furthermore, the VLMR and adjusted LMR ratio tests indicated that the three-group model was a significantly better fit than the two-group model and no further models proved to be a significantly better fit than the one before it.

The results of the three-group model are displayed in Fig. 2a and b. Fig. 2a is shown first because we used deviations from the sample mean to obtain relative classifications for labeling purposes. Fig. 2b displays the groups in the raw scale to aid in interpretation of each group's ER repertoire. Fig. 2a displays the mean of the z-scores of each variable

entered into the LPA analysis (e.g., Distraction, Rumination) separated by group membership, and therefore allows for identification of differences between the groups in this sample. The groups were labeled according to these group differences: (1) *Average ER*: all scores were within 0.5 SD of the sample mean; (2) *Suppression Propensity*: high (>0.5 SD above the sample mean) on Suppression, low (>0.5 SD below the sample mean) on Engagement, and within 0.5 SD of the sample mean on the remaining variables; (3) *Engagement Propensity*: high (>0.5 SD above the sample mean) on Engagement, low (>0.5 SD below the sample mean) on suppression, and within 0.5 SD of the sample on the remaining variables.

The ER repertoires of each group are displayed in Fig. 2b using the raw scale means within each group, which allow for identification of the relative frequency of the six strategies assessed. Fig. 2b confirms the group differences identified by Fig. 2a, but also shows that the groups have some similarities in strategy use. For example, the Suppression and Engagement groups display almost identical strategy use across four strategies but then differ on the absolute frequency of Suppression and Engagement. Furthermore, Rumination is consistently among the highest reported ER strategy for all three groups; therefore it did not distinguish group membership. The size and sex distributions in each group are presented in Table 5. Chi-square analysis indicated that groups did not differ by sex, $\chi^2(2) = 4.50, p = 0.10$.

2.2.2. Phase 2

Participants who were in the top 10th percentile of each profile (Profile 1: $n = 358$, Profile 2: $n = 434$; Profile 3: $n = 311$) were invited to attend a lab session approximately a month following the initial survey completion to complete the RESS for a second time as well as measures of convergent validity and psychosocial functioning. Approximately 10% of invited participants of each profile completed Phase 2, resulting in a total of 117 participants (Profile 1: $n = 36$, Profile 2: $n = 39$, Profile 3: $n = 41$).

To assess whether the RESS is a valid measure of the constructs it was designed to measure, and therefore an effective means of assessing each of the six ER strategies independently, correlations were run between each of the RESS subscales and their corresponding pre-existing measures. Results indicated that all RESS constructs were significantly correlated with their corresponding measures, with the exception of the RESS subscale Distraction and its corresponding measure, the cognitive subscale of the CBAS (See Table 1). Test-retest reliability was assessed by identifying the correlation between Phase 1 and Phase 2 administration of the RESS. Correlation values were moderate to strong for all RESS subscales (see Table 1).

To test the second hypothesis, that use of various ER repertoires would result in differences in psychosocial functioning, a series of ANCOVAs were conducted to assess if there were significant differences in Anxiety, Depression, Social Anxiety, Parent Relationship Quality, and Peer Relationship Quality between the LPA groups. As sex differences were found for several variables, sex was entered as a covariate. Furthermore, as several studies have found that individuals who rely on a wide range of ER strategies tend to display greater psychosocial functioning (Bonanno et al., 2004; Loughheed & Hollenstein, 2012), planned Simple contrasts were run following each ANCOVA to compare the Average group to the Engagement and Suppression Propensity groups independently. See Table 6 for a summary of results, and Table 7 for correlation values between all study variables.

There were significant main effects across groups of Anxiety, Depression, Social Anxiety, Family Relationship Quality, and Peer Relationship Quality. The contrasts showed that while there were no significant differences between the Average and Engagement Propensity groups, the Suppression Propensity group had significantly higher Anxiety, Depression, Social Anxiety, and Relationship Quality than the Average group.

Table 3

Average scale scores and mean differences between men and women for Study 1 and 2.

Scale	Score range	Study 1			Study 2		
		Total mean (SD)	Mean (SD)		Total mean (SD)	Mean (SD)	
			Men (n = 21)	Women (n = 86)		Men (n = 29)	Women (n = 65)
RESS distraction	1–5	3.09 (0.9)	3.19 (0.9)	3.07 (0.9)	2.62 (0.9)	2.70 (1.0)	2.60 (0.9)
RESS rumination	1–5	3.74 (0.9)	3.20 (1.0)	3.88(0.9)**	3.36 (0.9)	3.24 (0.9)	3.43 (0.9)
RESS reappraisal	1–5	2.80 (1.0)	2.91 (1.1)	2.79 (0.95)	2.41 (0.9)	2.55 (0.9)	2.37 (0.9)
RESS suppression	1–5	2.92 (1.2)	3.20 (1.2)	2.85 (1.2)	2.84 (1.0)	2.53 (0.8)	2.92 (1.0)
RESS engagement	1–5	2.68 (1.1)	2.47 (1.1)	2.77 (1.1)	2.33 (0.8)	2.19 (0.7)	2.30 (0.8)
RESS arousal control	1–5	2.38 (1.1)	2.38 (0.9)	2.37 (1.1)	2.02 (0.9)	1.79 (0.7)	2.09 (0.9)
Anxiety	0–3	0.64 (0.5)	0.45 (0.5)	0.69 (0.5)*	0.45 (0.4)	0.41 (0.3)	0.39 (0.5)
Depression	0–3	0.81 (0.06)	0.57 (0.5)	0.89 (0.6)**	0.58 (0.5)	0.49 (0.4)	0.58 (0.5)
Social anxiety	0–3	0.91 (0.6)	0.81 (0.6)	0.94 (0.6)	2.19 (1.0)	2.05 (0.9)	2.30 (1.0)
Family relationship quality	1–5	2.34 (0.8)	2.38 (0.8)	2.35 (0.8)	2.54 (0.8)	2.70 (0.9)	2.51 (0.7)
Peer relationship quality	1–5	2.12 (0.7)	2.47 (0.6)	2.06 (0.7)*	2.18 (0.7)	2.17 (0.5)	2.11 (0.7)
Cognitive avoidance	1–5	1.93 (0.7)	1.59 (0.7)	1.92 (0.7)			
EES engagement	1–6	3.48 (1.0)	2.93 (0.9)	3.62 (1.0)**			
ERQ reappraisal	1–7	4.63 (1.2)	4.93 (0.9)	4.51 (1.3)			
ERQ suppression	1–7	3.68 (1.6)	4.44 (1.5)	3.50 (1.6)*			
RRS rumination	1–4	2.32 (0.7)	2.25 (0.7)	2.35 (0.7)			
Awareness	1–5				3.79 (0.09)	3.74 (0.9)	3.82 (0.9)
Reactivity	1–5				2.54 (1.0)	2.37 (1.0)	2.54 (1.0)
Intensity	1–5				2.76 (1.1)	2.67 (1.1)	2.75 (1.1)

Note:

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

2.3. Study 1 discussion

In Study 1, we confirmed a six-factor structure of the RESS. The RESS subscales demonstrated good test-retest reliability and internal consistency. Moreover, the subscales of Rumination, Reappraisal, Engagement, and Suppression were each significantly correlated with their corresponding pre-existing scales. The subscale of Distraction, however, was not significantly correlated with the cognitive subscales of the CBAS. Although this measure was the closest fit to the construct of Distraction being measured in the RESS, it seems these two measures may assess different forms of cognitive distraction, likely due to differing focal events. The RESS's Distraction subscale focuses exclusively on deliberate attempts to distract attention away from a specific event and negative emotion being experienced in the moment, whereas the CBAS focuses on avoiding vague stimuli or situations and thoughts that, for the most part, have not yet taken place. For example, a sample RESS Distraction item is "At the time I experience a negative emotion, I usually respond to it right away by engaging in activities to distract myself", while a sample CBAS item is "I avoid making decisions about my future". The anticipatory versus reactionary difference of these two scales is evidenced by a strong relation between CBAS scores and anxiety symptoms, whereas no such relation was found between RESS Distraction scores and anxiety symptoms (Table 7). Therefore, while this scale was chosen as a corresponding measure due to its prevalence in assessing cognitive avoidance and a lack of an alternative, it seems

that the RESS and the CBAS may actually be capturing different aspects of cognitive distraction.

Study 1 also used LPA to identify the predominant ER repertoires within the sample, and to determine the relation between ER repertoires and psychosocial functioning. Although the Average group reported average use of all regulatory acts, the Suppression and Engagement Propensity groups used one behavior more often than most of the other possible ER strategies. Membership in the various groups had distinct implications for psychosocial functioning, such that the Suppression Propensity group reported significantly higher anxiety, depression, and social anxiety, but also relationship quality, than the Average group. This is in line with past research, which has found that while Suppression is positively associated with internalizing symptomatology, it also helps to maintain social networks and facilitate close relationships (Bonanno et al., 2004). As ER involves managing multiple, perhaps conflicting, goals (Campos, Walle, Dahl, & Main, 2011), it's possible that individuals with this ER repertoire prioritize a goal of affiliation over a goal of symptom reduction. The Engagement Propensity group, alternatively, did not differ significantly from the Average group on any measures of psychosocial functioning.

Of interest is that these groups, and therefore the differences between them, were not based on only one select strategy. Each group reported engaging in each of the six ER strategies at least sometimes, however, they did so to various degrees based on their ER repertoire. For example, the Suppression and Engagement groups had similarly elevated levels of Rumination, however, there were marked differences in how these high levels of Rumination impacted psychosocial functioning depending on the other strategies in the ER repertoire. When high Rumination was paired with high levels of Suppression, individuals demonstrated significantly higher internalizing symptoms, which is consistent with the literature on chronic rumination. However, when high Rumination was paired with high levels of Engagement, individuals were not significantly different than the average group on any variable. Therefore, it is the combined effect of levels of reliance on each strategy, the ER repertoire, that accounted for these differences in psychosocial functioning.

Table 4

Study 1 fit statistics for LPA models.

Number of profiles	AIC	BIC	Adjusted BIC	Entropy	VLMR p value	Adj. LMR p value
2	32,610.62	32,744.78	32,665.36	0.82	<0.001	<0.001
3	31,795.01	31,977.46	31,869.45	0.78	<0.001	<0.001
4	31,550.94	31,781.70	31,645.09	0.76	0.3329	0.3367
5	31,401.27	31,680.32	31,515.13	0.75	0.7287	0.7298
6	31,241.28	31,568.63	31,374.84	0.75	0.2456	0.2459
7	31,124.12	31,499.77	31,277.4	0.76	0.6159	0.6168
8	31,022.53	31,446.48	31,195.52	0.76	0.4587	0.4594
9	30,941.32	31,413.57	31,134.01	0.76	0.3584	0.3583

Note: AIC: Adjusted Bayesian information criterion; BIC: Bayesian information criterion; VLMR: Vuong–Lo–Mendell–Rubin; Adj. LMR: Adjusted Lo–Mendell–Rubin.

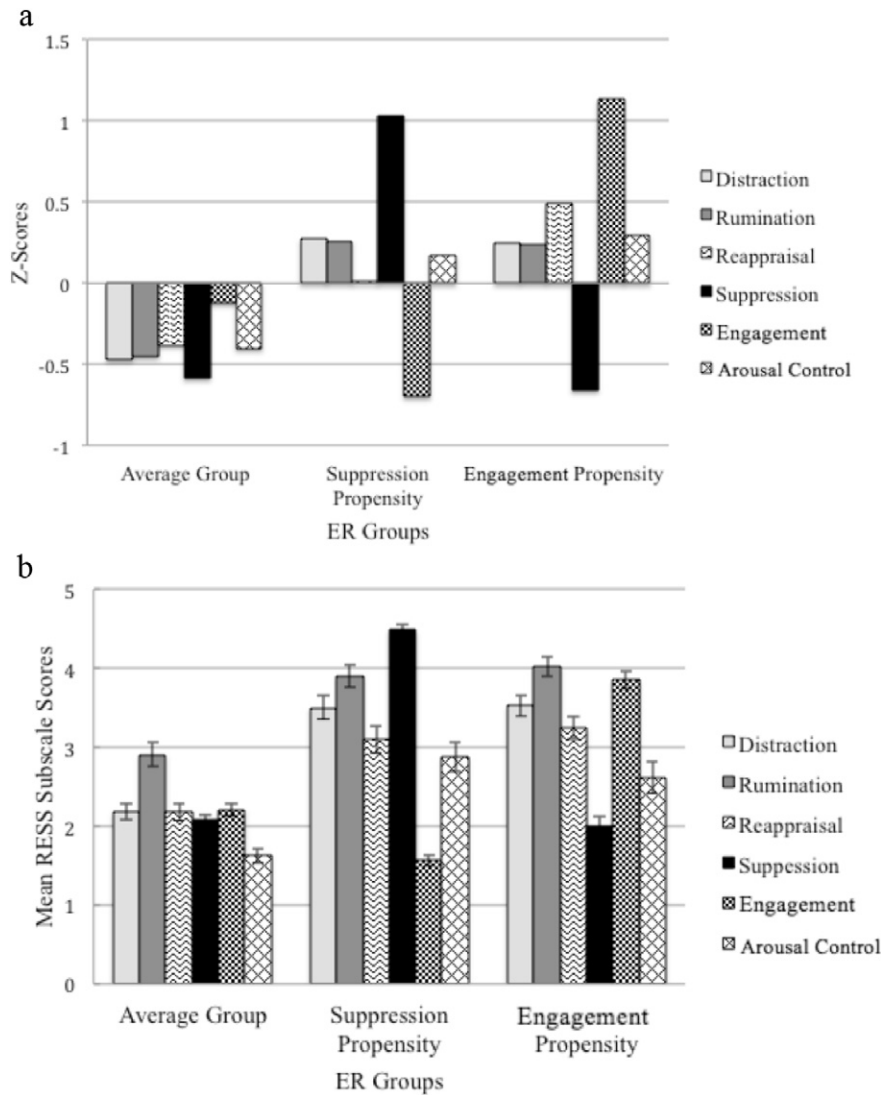


Fig. 2. a. Study 1 Phase 1: Three group model of RESS ER Strategies. Note. Scores of each act are represented as standard deviations from the overall sample mean. Arousal Control b. Study 1 Phase 1: ER repertoires based on the average score of each ER strategy within each group. Note. 1: Never, 2: Sometimes, 3: Half of the time, 4: Most of the time, 5: All of the time.

3. Study 2

It is possible that the differential patterns of ER strategy use found in Study 1 were due to fundamentally different experiences of emotions themselves. Although all individuals use ER to down-regulate their experience of negative emotion to some extent, it is possible that some individuals feel the need to do so more than others. Emotional reactivity, how often an individual has emotional responses (Nelson & Perry, 2015) and emotional intensity, how intensely an individual feels emotions (Dixon-Gordon, Aldao, & De Los Reyes, 2015), play a role in the experience of emotions. It is plausible that individuals who experience high emotional reactivity and intensity may require more deliberate and extensive attempts

to regulate their emotional experiences, thus influencing their repertoires. In Study 1, for example, the Average group showed slightly lower than average use of every ER strategy assessed. It is possible that this group of participants also experienced negative emotions less often and less intensely than participants in the other two groups.

Emotional awareness, or knowledge of our own emotional experiences (Boden & Thompson, 2015), is also an important component in emotional experiences and regulation. Individuals who are highly attuned to the components of their emotional experiences may be more likely to recognize the need for regulation, and as a result have more control over, and be more aware of, the regulatory strategies they employ (Barrett & Gross, 2001). Emotional awareness may also influence ER strategy use, as individuals with higher emotional awareness report higher levels of reappraisal, and lower levels of expressive suppression (Boden & Thompson, 2015).

Study 2 also aimed to replicate the factor structure of the RESS, identify the ER repertoires of a new and independent sample, and to assess the psychosocial differences among these groups. Moreover, to test the effects of emotion reactivity, intensity, and awareness, Study 2 examined the association of emotional reactivity, intensity, and awareness with ER repertoires.

Table 5 The sizes, mean age, and sex distributions of each LPA group in Study 1.

LPA Group	N		Mean age (SD)		Percentage female	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Average	568	37	18.62 (1.92)	18.68 (1.87)	70.8%	72.2%
Suppression	590	39	18.23 (1.11)	18.23 (1.11)	73.9%	76.3%
Engagement	424	41	17.91 (0.56)	17.93 (0.57)	85.0%	92.7%

Table 6
Study 1 mean values for each LPA group, and summary of ANOVA and contrast results controlling for sex.

Scale (possible mean score range)	1. Average group (n = 34)	2. Suppression group (n = 39)	3. Engagement group (n = 41)	F (η_p^2)	Simple contrast 1 vs. 2	Simple Contrast 1 vs. 3
Anxiety (0–3)	0.43	0.81	0.67	5.96** (0.10)	0.38**	0.17
Depression (0–3)	0.60	1.01	0.84	5.12** (0.08)	0.41**	0.16
Social anxiety (0–3)	0.76	1.19	0.77	7.41** (0.12)	0.42**	–0.02
Family relationship quality (1–5)	2.23	2.71	2.13	6.94** (0.11)	0.40**	–0.26
Peer relationship quality (1–5)	2.00	2.55	1.83	13.46** (0.20)	0.55**	–0.17

Note:
** $p < 0.01$.

3.1. Methods

3.1.1. Participants

Participants included 103 students recruited online via a University studies Facebook page. Only participants who completed over 75% of the items were included in the study. Three participants were removed as their scores were >3 standard deviations above the mean and as such were identified as outliers (Van Selst & Jolicoeur, 1994). Furthermore, to maximize comparability to Study 1, only those participants who fell within the top tenth percentile of each resulting LPA profile were included in the analyses, resulting in a total of 84 participants ($M = 21.8$ years old, $SD = 1.5$; 65% female).

3.1.2. Procedure

Participants signed up for the study by responding to an ad placed on a University studies Facebook page. They were provided with a

username and password and directed to a secure questionnaire site. Participants were compensated \$5.00 for completing the surveys, which took approximately 30 min to complete.

3.1.3. Measures

See Table 1 for Cronbach's Alpha values for Anxiety, Depression, Social Anxiety, Family Relationship Quality, and Peer Relationship Quality (see Study 1 for descriptions). Three new variables were included in Study 2: Emotion Awareness, Reactivity, and Intensity.

3.1.4. Awareness

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is a 36-item self-report measure assessing the extent to which an individual struggles with emotion regulation. This study used only the Awareness subscale, which is comprised of six items. Items are rated on a five-point Likert scale from one (Almost never) to five (Almost always). In the current sample the Awareness subscale demonstrated high internal consistency, Cronbach's $\alpha = 0.91$.

Table 7
Correlation values of all Study 1 Phase 2 variables.

	Age	Anxiety	Depression	Family relationship quality	Peer relationship quality	Social anxiety	Expression (EES)	Reappraisal (ERQ)
Age	1.00							
Anxiety	–0.07	1.00						
Depression	–0.12	0.75**	1.00					
Family relationship quality	0.05	0.31**	0.43**	1.00				
Peer relationship quality	–0.03	0.34**	0.44**	0.33**	1.00			
Social anxiety	–0.07	0.53**	0.60**	0.22*	0.43**	1.00		
Expression (EES)	–0.02	–0.13	–0.14	–0.30**	–0.57*	–0.35**	1.00	
Reappraisal (ERQ)	0.06	–0.41**	–0.47**	–0.24*	–0.23*	–0.28*	0.02	1.00
Suppression (ERQ)	0.01	0.13	0.15	0.30**	0.42**	0.36**	–0.81	–0.06
Cognitive avoidance (CBAS)	0.06	0.55**	0.67**	0.47**	0.48**	0.64**	–0.24*	–0.30**
Rumination (RRS)	0.04	0.69**	0.64**	0.25**	0.34**	0.45**	–0.12	–0.34**
RESS suppression	0.04	0.23*	0.22*	0.29**	0.42**	0.40**	–0.72**	–0.02
RESS rumination	–0.12	0.42**	0.33**	0.02	0.10	0.25**	0.24	–0.35**
RESS reappraisal	0.09	–0.11	–0.16	–0.14	–0.01	–0.11	–0.04	0.34**
RESS arousal control	–0.06	0.05	–0.11	–0.04	0.01	0.02	–0.08	0.27**
RESS distraction	–0.16	–0.06	–0.07	–0.11	–0.02	–0.01	–0.47	0.42**
RESS engagement	–0.14	–0.02	–0.09	–0.32**	–0.38**	–0.34**	0.81**	0.04
	Suppression (ERQ)	Cognitive Avoidance (CBAS)	Rumination (RRS)	RESS Suppression	RESS Rumination	RESS Reappraisal	RESS Arousal Control	RESS Distraction
Suppression (ERQ)	1.00							
Cognitive avoidance (CBAS)	0.32**	1.00						
Rumination (RRS)	0.15	0.50**	1.00					
RESS suppression	0.76**	0.35**	0.20*	1.00				
RESS rumination	–0.14	0.24*	0.47**	0.00	1.00			
RESS reappraisal	0.01	–0.08	0.07	0.13	–0.04	1.00		
RESS arousal control	0.05	0.05	0.09	0.12	–0.11	0.43**	1.00	
RESS distraction	0.11	0.07	–0.09	0.17	–0.16	0.23*	0.33**	1.00
RESS engagement	–0.75**	–0.23*	–0.003	–0.73**	0.28**	0.05	0.02	0.02

Note:
* $p < 0.05$.
** $p < 0.01$.

3.1.5. Reactivity and intensity

Perth Emotional Responsivity Scale (PERS; Becerra & Campitelli, 2013). The PERS is a 30-item self-report measure assessing the frequency (Reactivity), the intensity, and the duration of an individual's emotional experiences. Items are rated on a five-point Likert Scale from one (Never) to five (Always). In the current sample the PERS subscales demonstrated good internal consistency across all subscales, Cronbach's $\alpha = 0.85\text{--}0.90$. In the current study, only the Reactivity and Intensity subscales were used.

3.2. Study 2 results

All items were assessed for missing values and normality of distributions. Missing data points accounted for <1% of the total RESS dataset, and therefore imputation was not used. Women and men showed no significant differences on any study variables (see Table 3).

3.2.1. RESS factor structure confirmation

A confirmatory factor analysis was completed on the RESS items to confirm the factor structure outlined in Study 1. The data fit the six-factor model, and each item loaded onto its corresponding factor.

3.2.2. Latent profile analysis

To identify the prominent ER repertoires within the sample, a series of LPAs using the Mplus software package (Muthén & Muthén, 1998–2010) were conducted. See study 1 for a more thorough explanation of LPA. Evaluation of the fit statistics of the models run indicated that a four-group model was the best fit to the data (Table 8). Although the AIC and adjusted BIC values continued to improve as the number of groups increased, the four-group model retained the lowest BIC and highest entropy values. Furthermore, based on the Bootstrapped LMR ratio test, the four-group model was a significantly better fit than a three-group model. Moreover, based on the VLMR and adjusted LMR ratio tests, no further models proved to be a significantly better fit than the 4 group model. Therefore, the four-group model provided the best combination of fit statistics (low information criterion statistics, high entropy, and significant likelihood ratio tests).

The results of the four-group model are displayed in Fig. 3a and b. Fig. 3a is displayed first as we used deviations from the sample mean to obtain relative classifications for labeling purposes. Fig. 3b displays the raw scale to aid in interpretation of each group's repertoire. Fig. 3a displays the mean of the z-scores of each variable entered into the LPA analysis (e.g., Distraction, Rumination) separated by group membership, and therefore allows for the identification of differences between the groups in this sample. The groups were labeled according to the pattern of these group differences: (1) *Average*: all scores were within 1SD of the sample mean; (2) *Suppression Propensity*: high (>1 SD above the sample mean) on Suppression, low (>0.5 SD below the sample mean) on Engagement, and within 0.5 SD of the sample mean on remaining variables; (3) *Engagement Propensity*: high (>2SD above the sample mean) on Engagement, low (>1 SD below the sample mean) on Suppression, and within one SD of the sample mean on the remaining variables; (4) *Multi-Strategy*: high (>1 SD above the sample mean) on

Reappraisal, Distraction, and Arousal Control, and within one SD above the sample mean on remaining variables.

Fig. 3b shows the raw scale means within each group, which allow for the identification of the ER repertoires of each group. Fig. 3b confirms the group differences identified by Fig. 3a, but also shows that the groups have similarities in their strategy use. As in Study 1, the Suppression and Engagement groups display almost identical levels of most strategies but differ on the frequency of Suppression and Engagement use. Also similar to Study 1, Rumination levels are consistently high across the four groups. Chi-square analysis indicated that groups did not differ by sex, $\chi^2(3) = 0.54$ $p = 0.91$. See Table 9 for the size, mean age, and gender distribution of each group.

3.2.3. Relation between profile membership, outcome measures, awareness, and emotionality

A series of ANOVAs were conducted to assess how internalizing measures, Relationship Quality, Awareness, Reactivity, and Intensity differed between ER repertoires. As individuals with average strategy use tend to report better psychosocial functioning (Lougheed & Hollenstein, 2012), we compared the Average group to each of the other ER groups using planned Simple contrasts. See Table 10 for a summary of ANOVA and contrast results. Significant differences between groups were found only for Family Relationship Quality and Awareness. The Average group reported significantly higher Family Relationship Quality than the Engagement group, and significantly lower Emotional Awareness than the Engagement and Multi-Strategy groups.

3.3. Study 2 discussion

Study 2 had four main objectives. First, Study 2 sought to confirm the factor structure of the RESS. The factor structure was maintained, identifying six independent subscales that each accounted for a distinct ER strategy. The second objective of Study 2 was to identify the prominent ER repertoires of the current sample. Four distinct groups emerged: Average, Suppression Propensity, Engagement Propensity, and Multi-Strategy. Third, Study 2 aimed to identify the relation between ER profile membership and psychosocial functioning. The Average group had significantly higher Family Relationship Quality than the Engagement group. However, unlike Study 1, no significant differences were found in internalizing symptoms across the four groups. There are several possible explanations for this difference. First, the methodology for survey completion varied across studies. Participants in Study 1 completed surveys on a lab computer for course credit, whereas participants in Study 2 completed the survey package online, accessed remotely through an ad on a university studies Facebook page. The context through which participants accessed and participated in the two studies may have affected their responding. Second, the age range was considerably larger in Study 2. While Study 1 consisted almost exclusively of participants in their late teens, Study 2 included participants ranging between 20 and 25 years old. Therefore, the wider age range of participants in Study 2 may account for large within group variance of the association between group membership and psychosocial functioning. Finally, a smaller sample size may be accounting for a lack of significance, as the sizes of the Engagement and Multi-Strategy groups were quite small in Study 2.

Finally, the fourth objective of Study 2 was to identify if membership in the various ER profiles was associated with differences in certain qualities of emotional experiences, specifically emotional awareness, reactivity, and intensity. Based on the results of Study 2, ER group membership was not differentiated by reactivity or intensity of negative emotions. This indicates that members of each ER group were not experiencing their emotions differently, they were merely responding to them differently, suggesting that one's ER

Table 8
Study 2 fit statistics for LPA models.

Number of profiles	AIC	BIC	Adjusted BIC	Entropy	VMLR p value	Adj. LMR p value	Bootstrapped LMR
2	1520.94	1570.44	1510.43	0.79	0.14	0.15	<0.01
3	1497.78	1565.51	1483.40	0.82	0.37	0.38	<0.01
4	1468.07	1554.04	1449.82	0.89	0.07	0.07	<0.01
5	1457.95	1562.15	1435.82	0.88	0.71	0.71	0.03
6	1456.83	1579.27	1430.84	0.88	0.85	0.86	0.43

Note: AIC: Adjusted Bayesian information criterion; BIC: Bayesian information criterion; VLMR: Vuong–Lo–Mendell–Rubin; Adj. LMR: Adjusted Lo–Mendell–Rubin.

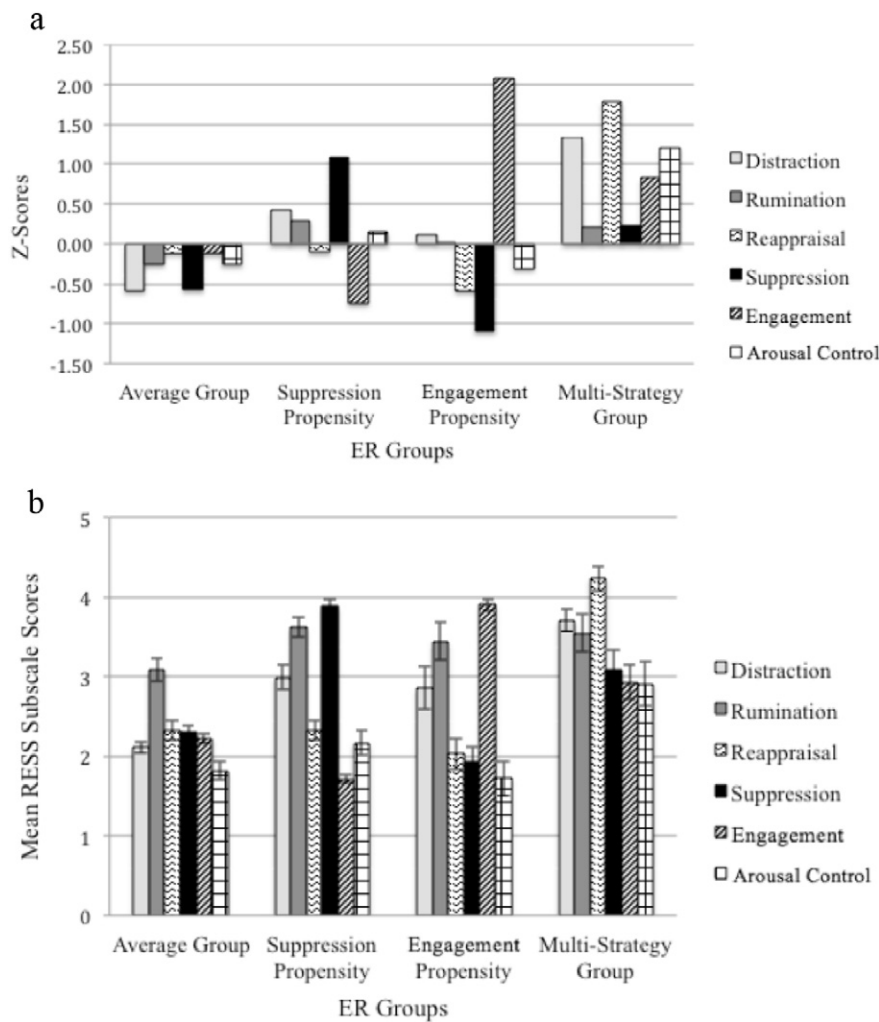


Fig. 3. a. Study 2: Four-group model of RESS ER strategies. Note. Scores of each strategy are represented as standard deviations from the overall sample mean. b. Study 2: ER repertoires based on the average score of each ER strategy within each group. Note. 1: Never, 2: Sometimes, 3: Half of the time, 4: Most of the time, 5: All of the time.

repertoire may not be predicated on a specific pattern of emotional experience.

Groups, however, did exhibit significant differences in emotional awareness. The Average group reported significantly less awareness than the Engagement and Multi-Strategy groups, thereby indicating that individuals who reported high levels of multiple strategies, or high use of Engagement, were more likely to demonstrate emotional awareness than those who reported average levels of a range of ER strategies. These findings are consistent with previous research that found that emotional awareness is significantly related to emotional engagement (Kerns, Comer, & Zeman, 2014), which was high in the Engagement Propensity group, and reappraisal (Boden & Thompson, 2015; Subic-Wrana et al., 2014), which was high in the Multi-Strategy group. However, high levels of emotional awareness could also lead to high levels of ER awareness. While it is possible that higher awareness of an emotional experience led to the use of more, or specific, ER strategies, it is also possible that higher

awareness led to higher levels of ER strategy use reporting. Furthermore, this suggests that future use of the RESS should include a measure of awareness to use as a covariate.

4. General discussion

Based on the results of two independent studies, the RESS was an effective measure of the six ER strategies it aimed to assess. The subscales of Rumination, Reappraisal, Engagement, and Suppression were each significantly correlated with their corresponding measure of convergent validity. Moreover, the RESS allows for a more efficient measure of the six ER strategies than combining existing measures as it provides a consistent response scale and focuses on the down-regulation of negative emotions.

While it can be used for variable-centered analysis, the structure of the RESS also allowed for a person-centered approach to ER. The RESS allowed for easy identification of individual ER repertoires, how ER repertoires cluster within a sample, and interpretation of both raw scale and standardized values. The LPA results of both studies allow us to draw two conclusions.

First, while the LPA results of the two studies were not identical, three repertoires were consistently found: an Average group, which included similar levels of all strategies, and Suppression and Engagement Propensity groups, which were almost identical aside from their levels of Suppression and Engagement. The consistency of the Suppression and Engagement Propensity groups has several possible explanations.

Table 9

The size, mean age, and sex distributions of each LPA group in Study 2.

LPA group	N	Mean age (SD)	Percentage female
Average	49	21.50 (1.50)	65.3%
Suppression	36	22.18 (1.54)	66.7%
Engagement	9	22.50 (2.20)	50.0%
Multi-strategy	8	21.83 (1.72)	55.6%

Table 10
Study 2 mean values for each LPA group, and summary of ANOVA and contrast results.

Scale (possible mean score range)	1. Average group	2. Suppression propensity	3. Engagement propensity	4. Multi-strategy	F (η^2_p)	Simple contrast 1 vs. 2	Simple contrast 1 vs. 3	Simple contrast 1 vs. 4
Depression (0–3)	0.57	0.63	0.57	0.43	0.31 (0.01)	0.06	−0.01	−0.14
Anxiety (0–3)	0.40	0.43	0.48	0.46	0.16 (0.01)	0.04	0.07	0.06
Social anxiety (1–5)	2.58	2.80	2.47	2.48	0.47 (0.02)	0.20	−0.11	−0.11
Family relationship quality (1–5)	2.61	2.82	2.07	2.35	2.90* (0.10)	0.22	−0.53*	−0.25
Peer relationship quality (1–5)	2.19	2.42	1.92	1.91	2.18 (0.07)	0.24	−0.27	−0.27
Awareness (1–5)	3.78	3.41	4.44	4.41	5.42** (0.17)	−0.37	0.67*	0.63*
Reactivity (1–5)	2.57	2.51	2.58	2.38	0.10 (0.01)	−0.06	0.01	−0.20
Intensity (1–5)	2.70	2.84	3.07	2.53	0.45 (0.02)	0.14	0.37	−0.17

Note:

* $p < 0.05$.

** $p < 0.01$.

First, both samples included late adolescents, and therefore their ER repertoires may be reflective of ER during this age. A cross-sectional study comparing ER repertoires of participants aged 11–50 found that Engagement, defined by talking about emotional triggers or emotional experiences, and Suppression were highest in late adolescence (Zimmermann & Iwanski, 2014). Therefore, it is possible that both samples have highlighted a developmental period in which high Engagement and Suppression are common. Second, while Suppression and Engagement are not mutually exclusive strategies, individuals in these two groups seem to use them somewhat inflexibly, causing the stark dichotomy seen in the current studies. It is plausible that these participants may not be able to flexibly integrate both of the behavioral ER strategies into their ER repertoires as easily as they can flexibly utilize the other four strategies. Future studies should focus on using the RESS in a dynamic fashion to assess the flexibility with which individuals deploy various strategies.

The second conclusion to be drawn from both studies is that while the LPA results were similar, Study 2 found a fourth ER repertoire, consisting of high levels of Distraction, Rumination, Reappraisal, and higher than average Arousal Control. This is consistent with previous research that has found that the use of “adaptive ER”, which includes strategies such as relaxation and reappraisal, increased significantly after 17 years of age (Zimmermann & Iwanski, 2014). Therefore, the older participants in Study 2 may have begun to develop more mature ER strategies in comparison to the younger participants in Study 1. A comparison with older adults in a future study would test this hypothesis.

The current research was not without limitations. First, the computer-based measurement used in both studies allows for the potential of skewed data, as users may tend to choose only mid-range or extreme response options (Duffy, Smith, Terhanian, & Bremer, 2005). Future studies should compare paper-and-pencil to computer administered RESS. Second, the exclusive use of self-report methodology allows for potentially inflated shared variance among measures. Finally, both samples used predominantly Caucasian, female participants in late adolescence, and all participants were students currently enrolled in university. Therefore, results may not be generalizable beyond a late adolescent, Caucasian, adolescent university student population.

Emotions, and their regulation, are idiosyncratic processes, best suited for analyses that allow for the capture of person-centered differences. The RESS demonstrated an ability to identify ER repertoires by effectively and efficiently assessing a range of ER strategies. The present results indicate the promise of the RESS as a valid measure of a range of

primary ER strategies, providing a means to compare how different populations regulate their emotions.

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