Emotion regulation in action: Use, selection, and success of emotion regulation in adolescents' daily lives

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Abstract

Successful emotion regulation (ER) is a central aspect of psychosocial functioning and mental health and is thought to improve and be refined in adolescence. Past research on ER has mainly focused on one-time measurements of habitual ER. Linking regulatory strategies to emotions in daily lives is key to understanding adolescents' emotional lives. Using an Experience Sampling Method with 78 adolescents ($M_{age} = 13.91$, $SD_{age} = .95$, 66% girls), we investigated the use, selection, and success in down-regulating negative emotions of eight ER strategies across 44 assessments. Acceptance was the strategy employed most often followed by problem-solving, rumination, distraction, avoidance, reappraisal, social support, and suppression. Interestingly, negativity of the event influenced the use of ER strategies: With low intensity negative emotions, acceptance was more likely to be used, and with high intensity negative emotions, suppression, problem-solving, distraction, avoidance, social support, and rumination were more likely to be used. With regard to success, multilevel models revealed that problem-solving, reappraisal, and acceptance were more successful in down-regulating negative emotions than rumination. Further, among girls, no relations between the momentary use of ER strategies and depressive symptoms was found. Among boys, a negative relation between acceptance and depressive symptoms emerged. Results from this study suggest that there is a reciprocal relationship between the intensity of negative emotions and ER strategies and that gender differences may exist. Taken together, this study showed which ER strategies are used by a healthy adolescent sample, and these results are discussed with regard to their theoretical and practical importance.

Keywords

adolescence, emotion regulation, experience sampling method, negative affectivity

Successfully regulating emotions is central and important for psychosocial functioning and is related to mental health benefits (Gross & Thompson, 2007). Further, emotion regulation (ER) is considered a transdiagnostic process (Kring & Sloan, 2010), predictive of various psychopathological diagnoses among adults (Aldao, Nolen-Hoeksema, & Schweizer, 2010). ER in adolescence is less well examined even though symptoms of anxiety and depression rise at this age (Kessler, Berglund, Demler, Jin, & Walters, 2005). Importantly, adolescents do not experience emotions that were not present in childhood (Rosenblum & Lewis, 2003); however, many challenges (e.g., changes in relationships, emergence of psychological disorders) in adolescence are emotion-related or have to do with ER deficits (Allen & Sheeber, 2009). This suggests that the emotional challenges (e.g., increased conflicts with parents, finding a supportive peer group) adolescents experience have to do with how they regulate their emotions (Steinberg, 2008). Despite important progress in research on ER with research in the laboratory and habitual ER (Aldao et al., 2010; Gross, 2015b; Webb, Miles, & Sheeran, 2012), the use, selection, and success of ER strategies in the *daily lives* of adolescents remain largely unknown (see Silk, Steinberg, & Morris, 2003; Tan et al., 2012 for exceptions). Linking regulatory strategies to emotions in daily lives is one critical way to understand adolescents' emotional and regulatory lives. The objectives of the current study were to examine which ER strategies adolescents use, how ER strategies are selected, how successfully strategies reduce negative emotions, and to what

extent ER strategies in daily life relate to well-being (i.e., depressive symptoms).

Emotion regulation in adolescence

ER is the ability to modify the experience and expression of emotions (Gross & Thompson, 2007). Emotions can be regulated in many ways, ranging from thinking about the problem on one's own to problem-solving with friends or distracting oneself from the emotion altogether. In the current study, we focused on eight ER strategies (avoidance, rumination, suppression, problem-solving, reappraisal, acceptance, social support, and distraction) which all show relations with psychopathology (Aldao et al., 2010; Tan et al., 2012; Webb et al., 2012). Definitions, advantages, disadvantages,

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Table 1. Definitions, advantages, disadvantages, and correlations with well-being and problems of all eight emotion-regulation strategies in the present study.

Emotion-regulation strategy	Definition	Advantage	Disadvantage	Associations with well-being and problems
Rumination	Repeatedly thinking about a negative event or emotion (Abela & Hankin, 2011)	Gives people the feeling of problem-solving (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008)	Focus on negativity Does not help in overcoming the source of negative emotions	More negative emotions (Moberly & Watkins, 2008), depressive symptoms (Garnefski & Kraaij, 2006), and maladaptive outcomes in a review (Aldao et al., 2010) Less positive emotions (Nezlek & Kuppens, 2008)
Avoidance	Leaving or staying away from a situation or person that elicits negative emotions (Ayers & Sandler, 1999)	Creates distance to feelings (e.g., avoiding a person to first calm down)	Does not help in overcoming the source of negative emotions Fosters social distance	Less negative emotions (Tan et al., 2012) More negative outcomes, especially substance-use (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996)
Suppression	Hiding an emotion so that others do not know the emotion is being felt (Gross & Thompson, 2007)	Helps to comfort others (e.g., suppressing grief to prevent others from worrying)	Does not help in overcoming the source of negative emotions Fosters inauthenticity and social distance	Less positive emotions and more psychopathology (Gross & John, 2003)
Problem-solving	Attempts to consciously alter a situation to resolve distress (Aldao et al., 2010)	Solution for problem may be found	Some problems cannot be solved (e.g., loss of a loved one)	Less depressive symptoms (Bell & D'Zurilla, 2009)
Reappraisal	Reframing a situation's meaning in a way that it changes the person's judgment of the situation (Gross, 2007)	Can help to feel better in many daily situations (e.g., having to wait in line at the supermarket)	Does not improve situation but personal interpretation of situation (e.g., being abused by one's partner) Does not help in overcoming the source of negative emotions	More positive emotions and less negative emotions (Gross & John, 2003) Beneficial effects on affect, self-esteem, and adjustment (Blalock, Kashdan, & Farmer, 2016)
Acceptance	Recognizing and embracing negative emotions to stop wanting to change the negative emotions one feels (Hofmann & Asmundson, 2008)	Can help to feel better in many daily situations and in response to minor events (e.g., the parcel one expected did not arrive)	Does not improve the situation Does not help in overcoming the source of negative emotions (e.g., being abused by one's partner)	Less fear in laboratory task (Eifert & Heffner, 2003)
Social support	Sharing one's emotions and asking others for advice (Finfgeld-Connett, 2005)	Being with others is associated with well-being (Coan, 2008) Problem-solving may occur	Rehashing problems and consequences (i.e., co-rumination, Rose, 2002)	Co-rumination is associated with internalizing disorders (Hankin, Stone, & Wright, 2010)
Distraction	Shifting one's attention away from the negative stimulus and towards something unrelated (Gross, 1998)	Can help to focus on other tasks (e.g., studying for an exam)	Never dealing with a problem	More emotional problems (Webb et al., 2012)

and relations with well-being and problems associated with these ER strategies are presented in Table 1.

For a long time, most research has focused on ER in adults or infants and young children (Eisenberg, Champion, & Ma, 2004). During the past decade however, the importance of adolescence as a critical period for the development of ER has been recognized more and more which is also reflected by the increasing amount of studies investigating the relation between ER and psychopathology in adolescence (e.g., Riediger & Klipker, 2014; Schäfer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017). Adolescence is a relevant developmental period for the development of ER because adolescents experience more daily life hassles, more negative emotions, and fewer positive emotions than when they were children (Larson & Ham, 1993) as well as greater fluctuations of emotions (Maciejewski, van Lier, Branje, Meeus, & Koot, 2015; Silk et al., 2003). Additionally, adolescents have to learn to regulate these emotions more independently than when they were children (Steinberg, 2008). At the same time, their cognitive abilities develop, which may enable them to better identify and regulate their emotions (Steinberg, 2005). Importantly, studies of adolescents have

either investigated changes in trait-like ER strategies across development (Gullone, Hughes, King, & Tonge, 2010; Zimmermann & Iwanski, 2014) or have related specific ER strategies to symptoms of psychopathology (e.g., Garber, 2006). Although those studies provide important information, they do not offer insight into momentary ER strategies that are characterized by an immediate reaction to emotional elicitors. Moreover, those studies do not capture adolescents' repertoire of ER strategies, the relative frequency of each ER strategy in daily life, or the situational factors that influence ER strategy "selection". In order to more fully understand adolescents' emotional lives, investigating emotions and regulation in, or close to, the moment that they occur is important.

Momentary emotion regulation in everyday life

Even though the need to investigate ER in natural settings has been identified and requested by several researchers (e.g., Aldao, 2013; Gross, 2015a), to our knowledge only five studies have examined ER repertoires in daily lives. Three studies were carried out on adults (Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Brockman, Ciarrochi, Parker, & Kashdan, 2017; Heiy & Cheavens, 2014), and the other two on adolescents (Silk et al., 2003; Tan et al., 2012).

In the first study among adolescents (Silk et al., 2003), each time a wristwatch beeped during a weeklong sampling period (48 sampling moments), participants filled out a pen-and-paper questionnaire asking about their momentary emotions, their most negative event, and how they had regulated their emotions with one of 13 ER strategies. Only high intensity negative events were selected to investigate the impact of ER strategies, and ER strategies were grouped into four broader categories (primary control, secondary control, disengagement, and involuntary engagement). ER strategies falling in the categories of involuntary engagement (e.g., rumination) and disengagement (e.g., avoidance) were less successful in down-regulating anger and sadness. However, in contrast to expectations, primary (e.g., problem-solving) and secondary control (e.g., reappraisal, acceptance) strategies were not successful in down-regulating negative emotions either. Furthermore, in line with the idea that ER is beneficial for mental health (Gross & Thompson, 2007), adolescents who were less successful in regulating their emotions reported more internalizing and externalizing symptoms compared to those who were more successful regulators.

In the second study, Tan et al. (2012) called adolescents four times a day (14 sampling moments) on answer-only mobile phones provided by the researchers to assess adolescents' emotions and ER strategies, and they compared ER strategy use and effectiveness of anxious and typically-developing adolescents. In both groups, acceptance, avoidance, and reappraisal were the most frequently used strategies. Moreover, avoidance, problem-solving, and reappraisal were successful in down-regulating anger, sadness, or upset (non-specific generalized distress) in both groups. Further, among healthy adolescents, acceptance was associated with lower distress in response to high intensity events.

These studies provide first insights into adolescents' daily regulatory efforts; yet three questions remain. First, the relative frequency with which ER strategies were implemented differed in each study. Hence, it is not clear which ER strategies are used most often. Second, the selection of ER strategies is not clear. The common assumption is that ER affects emotional intensity (Gross & Thompson, 2007). According to the contextual framework of ER

(Aldao, 2013; Bonanno & Burton, 2013), emotional intensity also affects ER strategy selection (Dixon-Gordon, Aldao, & De Los Reyes, 2015; Sheppes et al., 2014; Zimmermann & Iwanski, 2014). Previous studies examining ER in adolescents' daily lives have not focused on this question but have selected high-intensity moments instead (Silk et al., 2003; Tan et al., 2012). However, most daily emotional experiences are not very intense (Scherer, Wranik, Sangsue, Tran, & Scherer, 2004), and examining the full range of emotional intensity can contribute to the understanding of the selection process. In laboratory studies, adults were more likely to implement reappraisal in low negativity conditions whereas they implemented distraction in high negativity conditions (Sheppes & Levin, 2013; Sheppes, Scheibe, Suri, & Gross, 2011). Whether this difference also appears in adolescents has not yet been examined. Third, there may be important differences in the impact of ER for short-term versus long-term regulatory successes. In the long-term view, ER strategies are often seen as either adaptive or maladaptive because of their relations with psychopathology (Aldao et al., 2010). However, it is likely that some of the ER strategies that are evaluated as maladaptive in the long-term serve important regulatory functions in the short-term in regulating both low and high negative intensity emotions (Werner & Gross, 2010). This may be especially true for adolescents who are presumably still developing and refining their ER skills (Steinberg, 2008; Zimmermann & Iwanski, 2014). Adolescents may therefore be particularly sensitive to the relative success and failure of each of the strategies as they implement them in a trial and error way, learning for themselves which strategy may work best under specific circumstances. The studies by Silk, Steinberg, and Morris (2003) and Tan and colleagues (2012) could not answer these questions because these studies focused on high intensity events only, grouped ER strategies into broader categories, and did not investigate ER selection.

The present study

The current study aimed to address the aforementioned questions by investigating the frequency, selection, and regulatory success of a wide range of ER strategies (acceptance, rumination, reappraisal, problem-solving, distraction, suppression, social support, and avoidance) in a general population adolescent sample. Further, we investigated how these daily-life strategies related to depressive symptoms. Because gender differences in depressive symptoms (Hankin, Mermelstein, & Roesch, 2007) and ER strategies exist (Nolen-Hoeksema & Aldao, 2011), gender differences were also explored in the current study. In line with previous studies (Brans et al., 2013; Heiy & Cheavens, 2014; Silk et al., 2003; Tan et al., 2012), we used an Experience Sampling Method (ESM; Hektner, Schmidt, & Csikszentmihalyi, 2007) to answer four primary research questions.

What ER strategies do adolescents use in their daily lives?

We examined eight strategies several times a day to investigate ER repertoires and the impact of each strategy. Because this study was exploratory in nature, we only had hypotheses for acceptance: We hypothesized that adolescents would most often report using acceptance based on findings from previous studies (Brans et al., 2013; Heiy & Cheavens, 2014; Tan et al., 2012) and based on the knowledge that emotions in daily life are of rather low intensity (Scherer

et al., 2004) which makes them easier to accept. We had no hypotheses for the other ER strategies, because of inconsistent evidence in prior research and the fact that only very few studies focused on momentary ER.

How does the intensity of negative events contribute to the selection of ER strategies?

We hypothesized that negative event intensity would influence the number and type of strategies adolescents employ (Sheppes et al., 2014). Specifically, we expected that in line with adult laboratory research (Sheppes & Levin, 2013; Sheppes et al., 2011), distraction would be implemented in response to high negativity events whereas reappraisal would be implemented in response to low intensity negative events. Further, consistent with a study in which more coping strategies were utilized in response to intense distress (Zimmer-Gembeck, Skinner, Morris, & Thomas, 2013), we expected adolescents to invoke a greater range of ER strategies with more intense negative emotions.

How successful are ER strategies in reducing negative emotions?

We hypothesized that rumination would be least successful in down-regulating negative emotions in comparison to all other strategies because of the consistent relation with negative outcomes (see Table 1). For all other ER strategies, we expected positive effects because we examined regulatory success in the short-term, and even putatively maladaptive ER strategies may be beneficial by momentarily and strategically reducing negative affect (Werner & Gross, 2010; e.g., avoiding a person in order to first calm down, suppressing grief to prevent someone else from worrying or distracting to focus on other important tasks). Only when these ER strategies are invoked excessively or in inappropriate contexts (Aldao, 2013), may they show their maladaptive consequences. Notably, the success with which ER strategies are implemented in daily lives has rarely been examined in adolescents (or adults).

How are ER strategies in daily lives related to depressive symptoms?

ER is an important process in the development of mood disorders (Allen & Sheeber, 2009; Gross & Thompson, 2007) and it is likely that everyday use of ER strategies also relates to depressive symptoms in general. However, this hypothesis has never been examined in adolescents. We hypothesized that frequently using rumination and suppression would be associated with more depressive symptoms and frequently using acceptance, reappraisal, and problem-solving would be associated with fewer depressive symptoms.

Method

Participants

Three secondary schools in the Netherlands agreed to participate in the current study. All schools were situated in low-income areas which means that at least 30% of all pupils attending these schools were from households that were below the average income in their postal code area. The Dutch school system streams adolescents into tracks based on their academic achievement. The current study

included only pupils from the middle or high educational school track. Schools allowed us to approach 195 participants, and 105 adolescents agreed to participate in the full research program. Of these adolescents, 98 (93.3%) agreed to participate in the current study. In total, 87 adolescents (88.8%) participated in the ESM because 11 (11.2%) were either sick at the time of the study or withdrew their willingness to participate. Most of the participants ($n = 79$, 90.8%) were born in the Netherlands, three were born in Turkey, one was born in Suriname, and four were born in countries not specified. The majority of the sample (87.3%) lived in two-parent homes.

Only adolescents who completed at least one third of all daily assessments were included in the analyses to ensure reliability (Delespaul, 1995). Adolescents included ($N = 79$, $M_{age} = 13.91$, $SD_{age} = .95$ years old, age range 12–17, 66% girls) and excluded ($N = 8$, $M_{age} = 14.31$, $SD_{age} = 1.03$ years old, age range 12–15, 63% girls) did not differ significantly from each other on age $t(83) = .72$, $p = .48$ or gender $\chi^2(1) = .04$, $p = 1.00$. Adolescents participated voluntarily and received a voucher of €20 (approximately US$27) for their participation. The Ethical Committee of the Faculty of Social Sciences approved all procedures (ECG2012-2606-042). Analyses that included between-person variables (i.e., depressive symptoms) were only filled out by a subset of participants ($N = 66$). Adolescents who completed both ESM and the baseline questionnaire did not differ from those who completed only ESM on age $t(76) = .97$, $p = .33$. They were, however, more likely to be girls $\chi^2(1) = 5.18$, $p = .05$.

Procedure

Participants were a subset from a longitudinal randomized controlled trial (RCT) that investigated the effectiveness of the Dutch depression prevention program "Op Volle Kracht" (adapted from the Penn Resiliency Program; Gillham et al., 2007). In the RCT, half of the adolescents received a CBT-based depression prevention program and the other half followed the regular school curriculum. Both groups filled out questionnaires at school on four time points (for a full description of the procedure, see Kindt, van Zundert, & Engels, 2012). The program was not effective in reducing depressive symptoms over 1 year as investigated with questionnaires (Kindt, Kleinjan, Janssens, & Scholte, 2014) and was completed before the start of the ESM data collection. No differences emerged between the prevention and the control condition on any of the key variables at the baseline measurement of the current study.[1] Nevertheless, we included condition (prevention/control) as a covariate in our analyses.[2]

For the current study, participants received an information letter that included passive consent from the parents. Data collection consisted of a baseline questionnaire that participants filled out on a computer at home and ESM during two weekends. The second weekend occurred 6 weeks after the first weekend to reduce participant burden.

At school, participants received smartphones with an application that buzzed at random times within 90-minute intervals. In pairs, adolescents received instructions on how to use the smartphones and explanations of questionnaire items. At each buzz, adolescents were supposed to stop their current activity and complete the questionnaire. During instructions, participants indicated times that they would not be able to answer (e.g., sports training). Buzzes occurred on Friday four times between 4:30 pm until 10:30 pm; on

Saturday and Sunday nine times between 9:00 am and 10:30 pm. Responding took approximately 6 minutes. Participants were reminded a maximum of two times within 6 minutes if they missed a signal.

ESM measures

Current negative affect. Current negative affect was assessed with nine items: jealous, anxious, ashamed, irritated, worried, angry, guilty, sad, and lonely. These items were selected from the Positive and Negative Affect Scale (Watson, Clark, & Tellegen, 1988). Adolescents indicated to what extent they felt each emotion just prior to the assessment on a 7-point scale that ranged from (1) *not at all* to (7) *very much*. A current negative affect score was derived by computing the mean across all negative affect items for each individual at each assessment.

Negative events. At each assessment, adolescents were asked to briefly describe the most negative event they experienced since the previous assessment. Also, they indicated how long ago the event occurred ranging from (1) *just before the assessment* to (6) *more than one hour ago*. This variable was used to control for the time that has passed since the event.

Peak negative affect during negative events. Peak negative affect was assessed with the same nine cues as current negative affect. Adolescents indicated the extent to which they felt each described emotion during the negative event on a 7-point scale that ranged from (1) *not at all* to (7) *very much*. A peak negative affect score was derived by computing the mean of all peak negative affect items for each individual at each assessment.

Momentary emotion regulation. Adolescents chose which of the eight emotion-regulation strategies (avoidance, distraction, problem-solving, social support, reappraisal, rumination, acceptance, and suppression) they had used to down-regulate their event-related negative affect and could select multiple strategies simultaneously. Momentary ER strategies were eight dichotomized variables indicating whether an emotion-regulation strategy had been used at each assessment. Examples of items were: "I tried to see the situation in a different light" (reappraisal), "I avoided the situation where the event occurred" (avoidance), and "I accepted that it happened" (acceptance). If none of the strategies fit, they could type their own strategy (8% of assessments). These descriptions were not included because they were not systematic enough.

Baseline measure

Depressive symptoms. Depressive symptoms were assessed with the Children's Depressive Inventory (CDI; Kovacs, 1985). The CDI is a self-report questionnaire of 27 items. Adolescents chose one of three statements that describes their feelings best (e.g., I am sad once in a while, I am sad many times, I am sad all the time). The item about suicidal thoughts was excluded due to ethical concerns resulting in 26 items total. Sum scores were computed for each participant and a higher score indicated more depressive symptoms. There were no missing variables so sum scores could be used instead of mean scores. Reliability of the questionnaire was good as demonstrated by a Cronbach's $\alpha = .77$.

Results

Momentary measurements consisted of 2,490 assessments. Because we were interested in how adolescents regulated affect during negative experiences, we selected only assessments when adolescents reported a negative event and chose from one of the provided ER strategies ($N = 1,843$, 74%). Because repeated momentary assessments (level 1) were nested within participants (level 2), multi-level regression models were estimated in the software Mplus (Muthén & Muthén, 1998–2010).

On average, adolescents filled out 33 of 44 assessments (75%). Adolescents' current negative affect was of relatively low intensity and their peak negative affect was significantly higher than their current negative affect $t(78) = 7.86$, $p < .001$, Cohen's $d = .36$ (Table 2). No differences emerged between boys and girls regarding current negative affect $t(77) = .44$, $p = .66$, peak negative affect $t(77) = .93$, $p = .36$ or depressive symptoms $t(65) = .89$, $p = .38$ (for means, see Table 3). On average, the negative event occurred 32.89 minutes ($SD = 12.96$ minutes) before the assessment.

To examine which ER strategies were employed most often by adolescents, we conducted a frequency analysis. Across all assessments, acceptance was used most often, followed by problem-solving, rumination, distraction, social support, avoidance, suppression, and reappraisal (Table 2). This order differed slightly for boys and girls: Girls used ER strategies in the order described above and boys used suppression more often than avoidance. Additionally, girls used all ER strategies but acceptance more often than boys. Because of these differences, and differences in the relative use of ER strategies (Table 3), we included gender as a covariate in subsequent analyses. Relative use of ER strategies was calculated by aggregating how often each strategy was used and dividing this number by the total number of measurements of each individual.

At each assessment, adolescents used 1.2 strategies on average. In 86.5% of the assessments adolescents used a single strategy, in 8.8% of the assessments they used 2 strategies, in 2.5% of the assessments they used 3 strategies, in 1.7% they used 4 strategies, and in 0.5% of all assessments they used more than 5 strategies. In total, 81 possible combinations were identified, which made it impossible to detect a pattern.

To answer our second research question regarding how peak negative intensity contributed to the selection of ER strategies, we performed a logistic regression analysis in MPlus with categorical dependent variables (eight dichotomized ER strategies) and a continuous independent variable (peak negative affect) including the covariates condition and gender. This analysis reveals the probability with which each of the ER strategies was selected based on peak negative affect. Results showed that with every 1-unit change (increase) in peak negative affect, the probability of using acceptance decreased by $B = -.74$ ($SE = .09$). In contrast, the probability for problem-solving ($B = .35$, $SE = .09$), rumination ($B = 1.14$, $SE = .13$), distraction ($B = .55$, $SE = .12$), social support ($B = .62$, $SE = .17$), avoidance ($B = .43$, $SE = .12$), and suppression ($B = .72$, $SE = .13$) significantly increased by the number presented in parentheses. All ps were $< .001$. For reappraisal, no relation with peak negative affect was found ($B = -.06$, $SE = .23$). Importantly, condition and gender did not influence the probability of the use of any of the ER strategies; for condition all ps were $> .05$, for gender ps were $< .05$ for some ER strategies, but significance of results did not change in comparison to not including gender.[3] Further, we also examined whether adolescents' higher

Table 2. Descriptive statistics and correlation matrix of all study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Intensity of current negative emotion	–											
2. Intensity of peak negative emotion	.85**	–										
3. Depressive symptoms	.39**	.06	–									
4. Range of strategies	.46**	.55**	.24	–								
Emotion-regulation strategy												
5. Acceptance	−.19	−.24*	−.17	−.13	–							
6. Problem-solving	.05	.26*	.05	.46**	−.27*	–						
7. Rumination	.52**	.59**	.25*	.71**	−.04	.30**	–					
8. Distraction	.37**	.41**	.23	.66**	−.12	.33**	.39**	–				
9. Social support	.27*	.37**	.25*	.71**	−.06	.37**	.58**	.54**	–			
10. Avoidance	.32**	.45**	.18	.76**	−.10	.38**	.61**	.61**	.62**	–		
11. Suppression	.39**	.52**	.20	.70**	−.03	.31**	.48**	.60**	.48**	.56**	–	
12. Reappraisal	−.06	.06	.03	.14	.01	.13	.17	.12	.26*	.11	.11	–
M (SD)	1.69 (.92)	2.03 (.95)	8.66 (5.11)	1.21 (.37)								
% of use					73.7	14.9	8.7	8.1	4.8	4.5	4.1	2.4
% of use (girls)					68.9	19.0	10.5	10.0	6.1	5.8	5.0	2.9
% of use (boys)					85.6	4.7	4.5	3.6	1.7	1.3	1.7	1.3

Note. N = 67 for depressive symptoms, N = 79 for all other variables. Strategy use is presented in proportions ranging from 0 to 100%. Variable anchors: Intensity of current negative emotions (1) not at all to (7) very much; intensity of peak negative emotions (1) not at all to (7) very much. Variable ranges: Intensity of current negative emotions (1–7); intensity of peak negative emotions (1–7); depressive symptoms (0–2, 26 items); range of strategies (1–8).
*p < .05; **p < .01.

Table 3. Means of current and peak negative intensity, depressive symptoms, relative use of emotion regulation strategies, and correlations between relative use of emotion regulation strategies and depressive symptoms, split for gender.

	Girls (N = 47)		Boys (N = 20)		Cohen's d
	M (SD)		M (SD)		
Intensity of current negative emotion	1.75 (.78)		1.67 (.57)		.12
Intensity of peak negative emotion	2.10 (.73)		1.96 (.50)		.22
Depressive symptoms	9.02 (5.01)		7.80 (5.38)		.24
Emotion-regulation strategies	Depressive symptoms		Depressive symptoms		Cohen's d for differences between emotion-regulation strategies
Acceptance	51.59 (.23)$_a$	.06	52.75 (.32)$_a$	−.55*	.42
Problem-solving	15.62 (.15)$_a$	−.06	3.20 (.08)$_{b***}$	.31	1.03
Rumination	8.10 (.10)$_a$	.25	2.7 (.04)$_{b**}$	.20	.71
Distraction	8.18 (.10)$_a$	.28	3.36 (.09)$_a$	.02	.51
Social support	5.19 (.06)$_a$	.24	1.7 (.03)$_{b**}$	.24	.74
Avoidance	4.55 (.06)$_a$	.20	1.26 (.02)$_{b**}$	−.02	.74
Suppression	4.16 (.04)$_a$	.26	1.10 (.02)$_{b**}$	−.19	.97
Reappraisal	2.32 (.03)$_a$	−.09	0.85 (.03)$_a$	.29	.49

Note. Strategy use is presented in proportions ranging from 0 to 100%. Means are compared horizontally. Subscript "a" refers to the girls' value. The "b" subscript for boys indicates a significant difference between girls and boys. Variable anchors: Intensity of current negative emotions (1) not at all to (7) very much; intensity of peak negative emotions (1) not at all to (7) very much. Variable ranges: Intensity of current negative emotions (1–7); intensity of peak negative emotions (1–7); depressive symptoms (0–2, 26 items).
*p < .05; **p < .01; ***p < .001.

peak negative affect was associated with using more ER strategies. To do that we recoded the summed ER strategies into a dummy variable (0 was one strategy, 1 was more than one strategy) and performed an independent samples *t* test with peak negative affect as dependent variable. Indeed, adolescents' peak negative affect was higher when they used more than one strategy ($M = 2.38$, $SD = .78$) than when they used only one strategy ($M = 1.98$, $SD = .55$), $t(287.65)^4 = 7.97$, Cohen's $d = .61$.

To examine our third research question on how successful adolescents' chosen ER strategies were in down-regulating their peak negative affect, we estimated the relation between ER strategies and current negative affect while controlling for peak negative affect, time elapsed since the event, condition, and gender using a multilevel regression model. Rumination was used as the reference category (see equation below). This allowed us to investigate how the use of a strategy relates to changes from peak affect to current affect in relation to rumination. To control for between-person differences in negative affect, all continuous level-1 predictors were group-mean centered (i.e., around each participants' mean score; Nezlek, 2012).

Table 4. Model results predicting current negative emotions from ER strategies in comparison to rumination, controlling for peak negative affect, time elapsed, and condition.

	Current negative affect				95% confidence interval	
	Intercept	SE	b	SE	Lower	Upper
Rumination	1.77	.12			1.53	2.01
Avoidance			.04	.09	−0.14	0.22
Distraction			−.06	.07	−0.20	0.07
Problem-solving			−.12*	.05	−0.22	−0.02
Acceptance			−.13**	.04	−0.21	−0.05
Suppression			.05	.10	−0.15	0.25
Reappraisal			−.17†	.09	−0.35	0.01
Social support			.02	.07	−0.12	0.16
Peak negative affect			.41**	.04	0.33	0.49
Time elapsed			−.02	.01	−0.04	0.00
Condition			.03	.16	−0.28	0.3436
Gender			.08	.14	−0.19	0.3544

Note. *p < .05; **p < .01; †p = .05.

Equation : Level 1 (assessment level). Current affect$_{ij}$ = β_{0j}
$+ \beta_{1j}$(reappraisal) $+ \beta_{2j}$(distraction) $+ \beta_{3j}$(problem − solving)
$+ \beta_{4j}$(social support) $+ \beta_{5j}$(avoidance) $+ \beta_{6j}$(acceptance)
$+ \beta_{7j}$(suppression) $+ \beta_{8j}$(peak affect) $+ \beta_{9j}$(time elapsed) $+ r_{ij}$

Level 2 (person level). $\beta_{0j} = \gamma_{00} + \gamma_{01}$(condition)
$+ \gamma_{02}$(gender)$_{+\mu_{0j}}$, $\beta_{1j} = \gamma_{10} + \mu_{1j}$, $\beta_{2j} = \gamma_{20} + \mu_{2j}$, $\beta_{3j} = \gamma_{30} + \mu_{3j}$, $\beta_{4j} = \gamma_{40} + \mu_{4j}$, $\beta_{5j} = \gamma_{50} + \mu_{5j}$, $\beta_{6j} = \gamma_{60} + \mu_{6j}$, $\beta_{7j} = \gamma_{70} + \mu_{7j}$, $\beta_{8j} = \gamma_{80} + \mu_{8j}$, $\beta_{9j} = \gamma_{90} + \mu_{9j}$ 5

As shown in Table 4, when adolescents, who had peak negative affect equal to their mean (i.e., 0 because of the group-mean centering), ruminated about the negative event their current negative affect was 1.77 (intercept) on a 7-point scale. When they accepted (1.77 − .13 = 1.64), problem-solved (1.77 − .12 = 1.65) or reappraised (1.77 − .17 = 1.60) the negative event, current negative affect was significantly lower than when they used rumination. This means that, compared to rumination, acceptance, problem-solving, and reappraisal were successful in down-regulating peak negative emotions. In contrast, when they avoided (1.77 + .04 = 1.81), distracted (1.77 − .06 = 1.71), suppressed (1. 77 + .05 = 1.82) or used social support 1.77 + .02 = 1.79), their current negative affect did not differ from when they used rumination.

Our fourth research question examining relations between momentary ER strategies and depressive symptoms was investigated by computing correlations between the relative frequency of each strategy and depressive symptoms. As shown in Table 2, out of all the ER strategies, only rumination and social support showed small significant positive associations with depressive symptoms across the whole sample. However, these relations differed for boys and girls. For girls, no significant relations between depressive symptoms and relative frequency of ER strategies were found. For boys, a negative significant relation between depressive symptoms and acceptance emerged (see Table 3).

Discussion

ER is a central topic of interest in research on the development and maintenance of psychopathology but knowledge about momentary ER among adolescents is still relatively sparse. To fill this gap, we examined adolescents' regulatory efforts (ER frequency, selection, and success) with an ESM paradigm. On average, adolescents' current negative emotions were lower than their peak negative emotions indicating successful regulation. Further, we found that adolescents predominantly used acceptance to regulate their emotions; however, negativity of the event influenced the selection of ER strategies. When negativity was higher, adolescents implemented more strategies, and they were more likely to use problem-solving, distraction, rumination, avoidance, suppression, and social support. In contrast, acceptance was more likely to be used in response to less intense negative events. Surprisingly, no relation between negativity of event and reappraisal was found. With regard to emotion-regulation success, we found that only acceptance, problem-solving, and reappraisal were more successful in regulating peak negative emotions (i.e., adolescents had lower current negative emotions) than rumination. Further, as expected, rumination was positively related to depressive symptoms. Unexpectedly, social support was positively related to depressive symptoms as well. These results are discussed in light of ER development and future research prospects.

Emotion-regulation frequency

Adolescents used the ER strategies in the following descending order of frequency: acceptance, problem-solving, rumination, distraction, social support, avoidance, suppression, and reappraisal, with acceptance being used in nearly 75% of all instances. In comparison with other studies, adolescents in our sample used acceptance to the same extent but all other ER strategies to a lesser extent. In line with our findings, all studies showed that acceptance and distraction were used relatively often whereas reappraisal was used relatively little (Brans et al., 2013; Heiy & Cheavens, 2014; Silk et al., 2003; Tan et al., 2012). Differences in the relative frequency may have to do with different populations (adults vs. adolescents) as adults may have a larger repertoire of ER strategies from which to choose. Further, all other studies only analyzed situations involving highly intense negative emotions. In contrast, we investigated ER in response to all events (slightly negative to intensely negative) and the frequent use of acceptance might have to do with the ease with which it can be applied in response to minor events, which were most prevalent. Our results extend previous work about momentary ER by focusing on minor negative events experienced on a regular basis throughout a day by adolescents.

Emotion-regulation selection: Predicting ER from peak negative affect

Most research on ER has assumed that ER strategies impact negative affect, and the reverse relation has been studied far less (but see Sheppes et al., 2014). Our results showed that negativity of an event contributed to the selection of ER strategies. First, when negativity of the event was more intense, participants invoked multiple strategies. This suggests that one strategy may not be sufficient to down-regulate highly intense negative emotions, and adolescents try multiple strategies hoping that one will eventually be successful

(Gross & Thompson, 2007). On the one hand, these findings suggest that adolescents' ER skills are still developing and underline adolescents' immaturity and lack of experience with regard to selecting ER strategies (Steinberg, 2005). On the other hand, it may be beneficial to use more than one ER strategy at a time because they might work at different time scales of the emotion-regulation process (Gross, 2015b). Hence, it may be good to first distract from the event to cool down and to problem-solve later. Thus, using distraction or problem-solving alone may not result in successful regulation, but the two in combination might be optimal. Further, some events may require several ER strategies because they are complex, they last for a long period of time, or their impact is intensely felt.

Emotion-regulation success: Predicting current affect from peak affect

Problem-solving, acceptance, and reappraisal are often seen as adaptive strategies (Aldao et al., 2010) and, as hypothesized, were more successful in down-regulating negative affect than rumination. Avoidance, distraction, suppression, and social support were not more successful in down-regulating negative affect than rumination. Avoidance and suppression, just like rumination, are often seen as maladaptive strategies (Aldao et al., 2010); however, we had expected them to be successful in regulating emotions in the short-term because under certain circumstances it may be beneficial to avoid or suppress one's emotions. One reason we did not find this may be because none of these strategies helped to overcome the elicitor of the negative affect, possibly the strongest predictor of successful ER (see Table 1). Our findings are consistent with literature on habitual ER strategies that identified negative relations of these putatively maladaptive strategies with internalizing disorders (Aldao et al., 2010; Schäfer et al., 2017). Internalizing disorders are related to deficits in ER (Allen & Sheeber, 2009), and ER is often assumed to underlie mental health problems, but the direction of effects is not clear yet. Recent research showed some evidence that insufficient ER strategies precede depressive symptoms: habitual use of suppression preceded depressive symptoms in two adolescent samples (DeFrance, Lennarz, Kindt, & Hollenstein, 2016; Larsen et al., 2013). Knowledge about the short-term influence of ER strategies may contribute to resolving this important question by showing the (mal)adaptive effects of specific ER strategies in the short-term. Future research may focus on designing studies in which participants are presented with specific situations in which, for instance, avoidance or suppression may be the most appropriate first strategy to use. This could be done in the laboratory to ensure controllability of negative events and may later also be applied to more ecologically valid methods such as ESM.

One particularly unexpected and interesting finding was that social support did not do better than rumination in down-regulating negative emotions. Perhaps it is important to better understand the nature of the support that adolescents were receiving. It may be that the social support came in the form of co-rumination. Co-rumination is defined as rehashing problems with friends by dwelling on the negative emotions (Abela & Hankin, 2011) which has been associated with the onset of depression (Stone, Hankin, Gibb, & Abela, 2011) and increases in depressive symptoms but also high friendship quality in female adolescents (Rose, Carlson, & Waller, 2007). Indeed, co-rumination may be a particular form of social support (i.e., adolescents feel they are being listened to and understood), but at the same time, this type of support may also be emotionally harmful. If indeed adolescents co-ruminated and focused on their negative affect, it is not surprising that current affect did not improve. Future research should examine in more depth what adolescents do when they receive social support to disentangle co-rumination from other forms of positive social support such as co-problem solving (Waller, Silk, Stone, & Dahl, 2014). Contrary to previous research (Webb et al., 2012), distraction was not more successful in down-regulating than rumination. Possibly, the distracting cues adolescents used were not strong enough.

ER strategies and well-being

Relations between ER strategies and depressive symptoms have been well-documented in questionnaire studies (Aldao et al., 2010) and ESM studies (e.g., Silk et al., 2003). In the current study, we did not replicate those results and found different patterns for boys and girls. In girls, none of the momentary ER strategies showed relations with depressive symptoms. In boys, in line with our hypothesis acceptance and depressive symptoms were negatively related. Previous studies have not investigated relations between ER strategies and depressive symptoms for boys and girls separately, which may explain the different results. Nevertheless, it is puzzling that we only found an expected relation in boys. With regard to the finding in boys, one has to keep in mind that our boys sample was rather small and results need to be interpreted cautiously. Taken together, results from this study seem to suggest that, in contrast to habitual ER strategies (Aldao et al., 2010; Schäfer et al., 2017), ER strategies used in response to minor negative events in daily life may not be predictive of depressive symptoms. It may be that it is not the amount of use of a specific ER strategy that is related to depressive symptoms but rather the effectiveness and appropriateness of the strategy (Haines et al., 2016; Silk et al., 2003). We have, however, not investigated this research question in the current study. Another possibility is that there was too little variance in depressive symptoms in this normative sample to find these relations. Future research should delve further into the predictive value of ER strategies used in daily life in healthy and distressed samples and compare daily use with the predictive value of habitual ER strategies to elucidate the role of daily ER strategies and well-being further, separately for boys and girls.

Limitations

This study's sample was relatively small with predominantly well-educated and healthy adolescents, and the study was conducted during weekends only. Future research should include larger, more diverse samples (e.g., samples with elevated mood disorders) to confirm and possibly extend the results reported in this study. As for the timing of the assessments, we chose weekends because they are a time in which adolescents can choose relatively freely what they want to do, with whom they meet, and where they are. But because of that freedom and choice, adolescents may have experienced relatively low negative affect, avoiding experiences or contexts that may trigger more negative events. To ensure generalizability, future studies should aim for a larger sample size or a sample with clearly distinguished subgroups (e.g., depressed vs. healthy adolescents) and should try to assess emotions and ER strategies during school time as well.

Second, even though we extended past research by examining eight ER strategies simultaneously, our list was not exhaustive. We aimed that adolescents respond to a very short ESM questionnaire and that made it impossible to include more ER strategies or to assess nuances of ER strategy use. However, future studies should aim at including more ER strategies, for example also those that facilitate the up-regulation of positive emotions (Carl, Soskin, Kerns, & Barlow, 2013). Third, we only focused on explicit ER strategies and relied on adolescents' self-report. Even though self-report provides important information about emotions, ideally, this approach should be complemented with behavioral observations in natural environments (e.g., self-talk, conversations with others). This could be done with an electronically activated recorder that unobtrusively records random sequences throughout a day and enables researchers to code the content of these sequences afterwards to receive objective information (Mehl, Pennebaker, Crow, Dabbs, & Price, 2001; Mehl & Robbins, 2012). Fourth, we combined nine negative emotions together into one negative emotions measure which gives a good indication of how successful ER strategies are in down-regulating broad negative emotions. However, it misses out on specifying the effects ER strategies can have on particular emotions. Future research could broaden our knowledge by investigating the regulation of discrete negative emotions as some emotions may be regulated differently than others (e.g., upset is regulated differently than anger; Tan et al., 2012).

Conclusion

It has been suggested that empirical work is lagging behind theoretical work on the structure and function of ER and that ESM studies are needed to fill these gaps (Aldao, 2013; Gross, 2015a). Our study adds to the scarce literature of momentary ER in an adolescent sample and helps to disentangle the emotional lives of adolescents. Consistent with other studies, it provides further support for the detrimental nature of rumination, even in the short-term and offers interesting future directions for the role of social support. Additionally, it emphasizes the importance of often neglected factors such as intensity of negative emotions in influencing the selection of ER strategies, and offers the promise of incorporating multiple ER strategies to examine how they work in tandem or one after the other in the most optimal ways.

Notes

1. Current negative affect $t(75) = .22, p = .82$, peak negative affect $t(75) = .16, p = .87$, reappraisal $t(75) = 1.62, p = .11$, Avoidance $t(75) = 1.19, p = .24$, problem-solving, $t(75) = 1.02, p = .31$, rumination $t(75) = .67, p = .51$, suppression $t(75) = 1.19, p = .24$, acceptance $t(75) = .54, p = .59$, social support, $t(75) = .07, p = .94$, distraction $t(75) = .87, p = .39$, range of strategies $t(75) = .41, p = .68$, depressive symptoms, $t(t(63) = .81, p = .42$.
2. Results were the same when including condition as a covariate compared to when not including it.
3. Between-level results for condition: Acceptance ($B = .18, SE = .54$), problem-solving ($B = -.87, SE = .60$), rumination ($B = .45, SE = .41$), distraction ($B = -.56, SE = .42$), social support ($B = -.27, SE = .48$), avoidance ($B = .35, SE = .38$), suppression ($B = .33, SE = .30$), and reappraisal ($B = .69, SE = .82$). Between-level results for gender: Acceptance ($B = -1.11, SE = .46, p = .02$), problem-solving ($B = 2.54, SE = .52, p < .001$),

rumination ($B = 1.21, SE = .52, p = .02$), distraction ($B = 1.99, SE = 1.17, p = .09$), social support ($B = 1.35, SE = .48, p = .005$), avoidance ($B = 1.58, SE = .44, p > .001$), suppression ($B = 1.16, SE = .47, p = .01$), and reappraisal ($B = .90, SE = .64, p = .12$).
4. Levene's Test for Equality of Variances revealed no equality of variances, $F = 23.69, p < .001$. Therefore, corrected dfs are reported.
5. $_j$ indicates a person and $_i$ indicates an assessment within a person. r is an error term on level 1.

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References

Abela, J. R. Z., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology*, 120, 259–271. doi:10.1037/A0022796

Aldao, A. (2013). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science*, 8, 155–172. doi:10.1177/1745691612459518

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30, 217–237. doi:10.1016/j.cpr.2009.11.004

Allen, N. B., & Sheeber, L. B. (2009). *Adolescent emotional development and the emergence of depressive disorders*. Cambridge, UK: Cambridge University Press.

Ayers, T. S., & Sandler, I. N. (1999). *Manual for the children's coping strategies checklist & the how I coped under pressure scale*. Tempe: Arizona State University.

Bell, A. C., & D'Zurilla, T. J. (2009). Problem-solving therapy for depression: A meta-analysis. *Clinical Psychological Review*, 29, 348–353. doi:10.1016/j.cpr.2009.02.003

Blalock, D. V., Kashdan, T. B., & Farmer, A. S. (2016). Trait and daily emotion regulation in social anxiety disorder. *Cognitive Therapy and Research*, 40, 416–425. doi:10.1007/s10608-015-9739-8

Bonanno, G. A., & Burton, C. L. (2013). Regulatory flexibility: An individual differences perspective on coping and emotion regulation. *Perspectives on Psychological Science*, 8, 591–612. doi:10.1177/1745691613504116

Brans, K., Koval, P., Verduyn, P., Lim, Y. L., & Kuppens, P. (2013). The regulation of negative and positive affect in daily life. *Emotion*, 13, 926–939. doi:10.1037/A0032400

Brockman, R., Ciarrochi, J., Parker, P., & Kashdan, T. (2017). Emotion regulation strategies in daily life: Mindfulness, cognitive reappraisal and emotion suppression. *Cognitive Behaviour Therapy*, 46, 91–113. doi:10.1080/16506073.2016.1218926

Carl, J. R., Soskin, D. P., Kerns, C., & Barlow, D. H. (2013). Positive emotion regulation in emotional disorders: A theoretical review. *Clinical Psychology Review*, 33, 343–360. doi:10.1016/j.cpr.2013.01.003

Coan, J. A. (2008). Towards a neuroscience of attachment. In J. Cassidy & P. R. Shaver (Eds.), *The handbook of attachment: Theory,*

research, and clinical implications (pp. 241–265). New York, NY: The Guilford Press.

DeFrance, K., Lennarz, H. K., Kindt, K. C. M., & Hollenstein, T. (2016). *Emotion regulation: Antecedent or outcome of depressive symptomology?* Manuscript submitted for publication.

Delespaul, P. A. E. G. (1995). *Assessing schizophrenia in daily life: The experience sampling method*. Maastricht, The Netherlands: University of Maastricht.

Dixon-Gordon, K. L., Aldao, A., & De Los Reyes, A. (2015). Emotion regulation in context: Examining the spontaneous use of strategies across emotional intensity and type of emotion. *Personality and Individual Differences*, *86*, 271–276. doi:10.1016/j.paid.2015.06.011

Eifert, G. H., & Heffner, M. (2003). The effects of acceptance versus control contexts on avoidance of panic-related symptoms. *Journal of Behavior Therapy and Experimental Psychiatry*, *34*, 293–312. doi:10.1016/j.jbtep.2003.11.001

Eisenberg, N., Champion, C., & Ma, Y. (2004). Emotion-related regulation: An emerging construct. *Merrill-Palmer Quarterly*, *50*, 236–259.

Finfgeld-Connett, D. (2005). Clarification of social support. *Journal of Nursing Scholarship*, *37*, 4–9. doi:10.1111/j.1547-5069.2005.00004.x

Garber, J. (2006). Depression in children and adolescents: Linking risk research and prevention. *American Journal of Preventive Medicine*, *31*, 104–125. doi:10.1016/j.amepre.2006.07.007

Garnefski, N., & Kraaij, V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality and Individual Differences*, *40*, 1659–1669. doi:10.1016/j.paid.2005.12.009

Gillham, J. E., Reivich, K. J., Freres, D. R., Chaplin, T. M., Shatte, A. J., Samuels, B., . . . Seligman, M. E. (2007). School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency Program. *Journal of Consulting and Clinical Psychology*, *75*, 9–19. doi:10.1037/0022-006x.75.1.9

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*, 224–237. doi:10.1037//0022-3514.74.1.224

Gross, J. J. (Ed.). (2007). *Handbook of emotion regulation*. New York, NY: Guilford Press.

Gross, J. J. (2015a). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*, 1–26. doi:10.1080/1047840X.2014.940781

Gross, J. J. (2015b). The extended process model of emotion regulation: Elaborations, applications, and future directions. *Psychological Inquiry*, *26*, 130–137. doi:10.1080/1047840X.2015.989751

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*, 348–362. doi:10.1037/0022-3514.85.2.348

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–24). New York, NY: Guilford Press.

Gullone, E., Hughes, E. K., King, N. J., & Tonge, B. (2010). The normative development of emotion regulation strategy use in children and adolescents: A 2-year follow-up study. *Journal of Child Psychology and Psychiatry*, *51*, 567–574. doi:10.1111/j.1469-7610.2009.02183.x

Haines, S. J., Gleeson, J., Kuppens, P., Hollenstein, T., Ciarrochi, J., Labuschagne, I., . . . Koval, P. (2016). The wisdom to know the

difference: Strategy-situation fit in emotion regulation in daily life is associated with well-being. *Psychological Science*, *27*, 1651–1659. doi:10.1177/0956797616669086

Hankin, B. L., Mermelstein, R., & Roesch, L. (2007). Sex differences in adolescent depression: Stress exposure and reactivity models. *Child Development*, *78*, 279–295. doi:10.1111/j.1467-8624.2007.00997.x

Hankin, B. L., Stone, L., & Wright, P. A. (2010). Corumination, interpersonal stress generation, and internalizing symptoms: Accumulating effects and transactional influences in a multiwave study of adolescents. *Development and Psychopathology*, *22*, 217–235. doi:10.1017/S0954579409990368

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, *64*, 1152–1168.

Heiy, J. E., & Cheavens, J. S. (2014). Back to basics: A naturalistic assessment of the experience and regulation of emotion. *Emotion*, *14*, 878–891. doi:10.1037/a0037231

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Thousand Oaks, CA: SAGE.

Hofmann, S. G., & Asmundson, G. J. G. (2008). Acceptance and mindfulness-based therapy: New wave or old hat? *Clinical Psychology Review*, *28*, 1–16. doi:10.1016/j.cpr.2007.09.003

Kessler, R. C., Berglund, P., Demler, O., Jin, R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*, 593–602. doi:10.1001/archpsyc.62.6.593

Kindt, K. C. M., Kleinjan, M., Janssens, J. M. A. M., & Scholte, R. H. J. (2014). Evaluation of a school-based depression prevention program among adolescents from low-income areas: A randomized controlled effectiveness trial. *International Journal of Environmental Research and Public Health*, *11*, 5273–5293. doi:10.3390/ijerph110505273

Kindt, K. C. M., van Zundert, R., & Engels, R. C. M. E. (2012). Evaluation of a Dutch school-based depression prevention program for youths in highrisk neighborhoods: Study protocol of a two-armed randomized controlled trial. *BMC Public Health*, *12*, 212. doi:10.1186/1471-2458-12-212

Kovacs, M. (1985). The children's depression inventory (CDI). *Psychopharmacology Bulletin*, *21*, 995–998.

Kring, A. M., & Sloan, D. M. (2010). *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment*. New York, NY: Guilford Press.

Larsen, J. K., Vermulst, A. A., Geenen, R., van Middendorp, H., English, T., Gross, J. J., . . . Engels, R. C. M. E. (2013). Emotion regulation in adolescence: A prospective study of expressive suppression and depressive symptoms. *The Journal of Early Adolescence*, *33*, 184–200. doi:10.1177/0272431611432712

Larson, R., & Ham, M. (1993). Stress and "storm and stress" in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*, *29*, 130–140. doi:10.1037//0012-1649.29.1.130

Maciejewski, D. F., van Lier, P. A. C., Branje, S. J. T., Meeus, W. H. J., & Koot, H. M. (2015). A 5-year longitudinal study on mood variability across adolescence using daily diaries. *Child Development*, *86*, 1908–1921. doi:10.1111/cdev.12420

Mehl, M. R., Pennebaker, J. W., Crow, D. M., Dabbs, J., & Price, J. H. (2001). The Electronically Activated Recorder (EAR): A device for sampling naturalistic daily activities and conversations. *Behavior*

Research Methods Instruments & Computers, 33, 517–523. doi:10.3758/bf03195410

Mehl, M. R., & Robbins, M. L. (2012). Naturalistic observation sampling: The electronically activated recorder (EAR). In M. R. Mehl & T. S. Conner (Eds.), Handbook of research methods for studying daily life (pp. 176–209). New York, NY: Guilford Press.

Moberly, N. J., & Watkins, E. R. (2008). Ruminative self-focus, negative life events, and negative affect. Behaviour Research and Therapy, 46, 1034–1039. doi:10.1016/j.brat.2008.06.004

Muthén, L. K., & Muthén, B. O. (1998–2010). Mplus user's guide (6th ed.). Los Angeles, CA: Muthén & Muthén.

Nezlek, J. B. (2012). Multilevel modeling analyses of diary-style data. In M. S. Mehl & T. S. Conner (Eds.), Handbook of research methods for studying daily life (pp. 357–383). New York, NY: The Guilford Press.

Nezlek, J. B., & Kuppens, P. (2008). Regulating positive and negative emotions in daily life. Journal of Personality, 76, 561–579. doi:10.1111/j.1467-6494.2008.00496.x

Nolen-Hoeksema, S., & Aldao, A. (2011). Gender and age differences in emotion regulation strategies and their relationship to depressive symptoms. Personality and Individual Differences, 51, 704–708. doi:10.1016/j.paid.2011.06.012

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. Perspectives on Psychological Science, 3, 400–424. doi:10.1111/j.1745-6924.2008.00088.x

Riediger, M., & Klipker, K. (2014). Emotion regulation in adolescence. In J. J. Gross (Ed.), Handbook of emotion regulation (pp. 187–202). New York, NY: The Guilford Press.

Rose, A. J. (2002). Co-rumination in the friendships of girls and boys. Child Development, 73, 1830–1843. doi:10.1111/1467-8624.00509

Rose, A. J., Carlson, W., & Waller, E. M. (2007). Prospective associations of co-rumination with friendship and emotional adjustment: Considering the socioemotional trade-offs of co-rumination. Developmental Psychology, 43, 1019–1031. doi:10.1037/0012-1649.43.4.1019

Rosenblum, G. D., & Lewis, M. (2003). Emotional development in adolescence. In G. R. Adams & M. D. Berzonsky (Eds.), Handbook of adolescence. Oxford, UK: Blackwell Publishing Ltd.

Schäfer, J. O., Naumann, E., Holmes, E. A., Tuschen-Caffier, B., & Samson, A. C. (2017). Emotion regulation strategies in depressive and anxiety symptoms in youth: A meta-analytic review. Journal of Youth and Adolescence, 46, 261–276. doi:10.1007/s10964-016-0585-0

Scherer, K. R., Wranik, T., Sangsue, J., Tran, V., & Scherer, U. (2004). Emotions in everyday life: Probability of occurrence, risk factors, appraisal and reaction patterns. Social Science Information, 43, 499–570. doi:10.1177/0539018404047701

Sheppes, G., & Levin, Z. (2013). Emotion regulation choice: Selecting between cognitive regulation strategies to control emotion. Frontiers in Human Neuroscience, 7, 179. doi:10.3389/fnhum.2013.00179

Sheppes, G., Scheibe, S., Suri, G., & Gross, J. J. (2011). Emotion-regulation choice. Psychological Science, 22, 1391–1396. doi:10.1177/0956797611418350

Sheppes, G., Scheibe, S., Suri, G., Radu, P., Blechert, J., & Gross, J. J. (2014). Emotion regulation choice: A conceptual framework and supporting evidence. Journal of Experimental Psychology: General, 143, 163–181. doi:10.1037/a0030831

Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. Child Development, 74, 1869–1880. doi:10.1046/j.1467-8624.2003.00643.x

Steinberg, L. (2005). Cognitive and affective development in adolescence. Trends in Cognitive Sciences, 9, 69–74. doi:10.1016/j.tics.2004.12.005

Steinberg, L. (2008). A social neuroscience perspective on adolescent risk-taking. Developmental Review, 28, 78–106. doi:10.1016/J.Dr.2007.08.002

Stone, L. B., Hankin, B. L., Gibb, B. E., & Abela, J. R. Z. (2011). Co-rumination predicts the onset of depressive disorders during adolescence. Journal of Abnormal Psychology, 120, 752–757. doi:10.1037/a0023384

Tan, P. Z., Forbes, E. E., Dahl, R. E., Ryan, N. D., Siegle, G. J., Ladouceur, C. D., & Silk, J. S. (2012). Emotional reactivity and regulation in anxious and nonanxious youth: A cell-phone ecological momentary assessment study. Journal of Child Psychology and Psychiatry, 53, 197–206. doi:10.1111/j.1469-7610.2011.02469.x

Waller, J. M., Silk, J. S., Stone, L. B., & Dahl, R. E. (2014). Co-rumination and co–problem solving in the daily lives of adolescents with major depressive disorder. Journal of the American Academy of Child and Adolescent Psychiatry, 53, 869–878. doi:10.1016/j.jaac.2014.05.004

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology, 54, 1063–1070. doi:10.1037/0022-3514.54.6.1063

Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: A meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. Psychological Bulletin, 138, 775–808. doi:10.1037/A0027600

Werner, K., & Gross, J. J. (2010). Emotion regulation and psychopathology. A conceptual framework. In A. M. Kring & D. M. Sloan (Eds.), Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment (pp. 13–37). New York, NY: The Guilford Press.

Zimmer-Gembeck, M. J., Skinner, E. A., Morris, H., & Thomas, R. (2013). Anticipated coping with interpersonal stressors: Links with the emotional reactions of sadness, anger, and fear. The Journal of Early Adolescence, 33, 684–709. doi:10.1177/0272431612466175

Zimmermann, P., & Iwanski, A. (2014). Emotion regulation from early adolescence to emerging adulthood and middle adulthood: Age differences, gender differences, and emotion-specific developmental variations. International Journal of Behavioral Development, 38, 182–194. doi:10.1177/0165025413515405