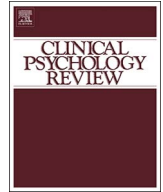




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Review

Selection and implementation of emotion regulation strategies in major depressive disorder: An integrative review



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HIGHLIGHTS

- There is a large literature on emotion regulation (ER) in major depression (MDD).
- MDD is linked to aberrant habitual use of ER strategies based on self-reports.
- People with MDD can often effectively implement ER strategies under instruction.
- More laboratory and naturalistic emotion regulation research is needed.

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ABSTRACT

Emotion regulation (ER), broadly defined, has been implicated in mental health, including major depressive disorder (MDD). We review empirical studies examining selection and implementation of ER strategies in adults with current or past MDD. We focus on eight strategies (rumination, distraction, cognitive reappraisal, suppression, acceptance, savoring, positive rumination, dampening), organizing the review by research design: (1) self-reported habitual use (i.e., trait) of ER strategies, (2) spontaneous use of ER strategies in laboratory settings, (3) experimentally instructed ER strategies, and (4) use of ER strategies in naturalistic settings. Reviewed findings suggest that MDD is associated with unskillful selection of ER strategies—indexed by self-reported habitual use of ER strategies—but not impaired abilities to implement them; in fact, those with current MDD and MDD in remission show intact abilities to implement many ER strategies when instructed to do so. Additionally, the vast majority of research examines trait ER, while there is a dearth of laboratory and naturalistic studies using MDD samples. There are also discrepant findings on habitual use of ER strategies assessed by self-reports and spontaneous use of ER strategies in the lab. We discuss implications of reviewed findings and five areas for future research in emotion dysregulation in MDD.

1. Introduction

Major depressive disorder (MDD) is one of the most prevalent, disabling, and burdensome mental disorders (Eaton et al., 2012; Kessler & Bromet, 2013). The 12-month prevalence for experiencing a major depressive episode (MDE) for adults in the United States (US) is approximately 6.7% (National Institute of Mental Health, 2015). MDD is associated with impairments in various domains of functioning, including low education completion rate, unemployment, poor marital quality, and early mortality in part due to elevated risk for physical disorders and suicide (Kessler & Bromet, 2013). The economic burden associated with MDD in the US is estimated to be \$210.5 billion in 2010, representing a 21.5% increase from 2005 (Greenberg, Fournier, Sisitsky, Pike, & Kessler, 2015).

MDD is a mood disorder, and the two cardinal symptoms involve aberrations in affect (American Psychiatric Association, 2013): elevated negative affect and diminished positive affect. Additionally, compared to healthy controls, people with MDD are characterized by greater instability of negative affect (Houben, Van Den Noortgate, & Kuppens, 2015) and blunted reactivity to positive and negative laboratory stimuli (Bylsma, Morris, & Rottenberg, 2008). Considering these affective aberrations associated with MDD, some recent theoretical approaches aim to understand MDD from the perspective of emotion dysregulation (Campbell-Sills & Barlow, 2007; Gross & Muñoz, 1995; Kring & Werner, 2004). In fact, researchers speculate that those who are unable to successfully down-regulate negative affect are vulnerable to MDD (e.g., Gotlib & Joormann, 2010; Gross & Muñoz, 1995). Hence, difficulties with emotion regulation are likely risk and maintaining factors for MDD.

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Emotion regulation (ER) refers to a set of processes that influence how people experience and express emotions (Gross & Thompson, 2007). Emotion regulatory processes can alter various aspects of emotion, including frequency, intensity, duration, and stability of positive and negative emotions. Two factors that determine the success of ER are (a) skillful selection of ER strategies and (b) effective implementation of selected strategies to achieve ER goals (Gross & Jazaieri, 2014). As such, unsuccessful ER in those with MDD could be due to inappropriate choice of ER strategies based on the situational demands and/or lack of abilities to effectively implement the selected strategies.

In the current paper, we review peer-reviewed research examining eight ER strategies in adults with MDD. We focus on rumination, distraction, cognitive reappraisal, and suppression because they have been strategies examined most frequently in the MDD literature. Further, the habitual use of these strategies has been significantly associated with more (for rumination and suppression) or less (for cognitive reappraisal) depressive symptomatology (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Additionally, considering the effectiveness of mindfulness-based treatment for MDD, of which acceptance is a central component (Piet & Hougaard, 2011), we review research on the ER strategy of acceptance. Lastly, given recent interest in regulation of positive emotions (i.e., positive ER; Carl, Soskin, Kerns, & Barlow, 2013), we review the literature on three main positive ER strategies—savoring, positive rumination, and dampening.

For each ER strategy, we organize the review based on four types of study designs. First, we describe literature examining global self-report measures (i.e., *trait* ER). Self-report measures reflect individuals' habitual use of, or dispositional tendency to adopt, an ER strategy.

Second, we review laboratory studies that measure spontaneous use of each strategy (i.e., *spontaneous* ER). These types of studies usually involve a mood induction task aimed to induce certain emotions (e.g., sadness) in participants. During or following the mood induction, participants are typically instructed to freely regulate their emotions. Then they are asked to report the extent to which they have used different ER strategies during the regulation phase by completing a self-report measure assessing distinct ER strategies.

Third, we review laboratory studies focused on the effects of *experimentally instructed* ER strategies on mood. In these studies, participants report their mood states before and after an experimentally instructed ER task that focuses on a particular ER strategy. Researchers assess mood changes to indicate the effects of the strategy on mood. When the ER task is preceded by or conducted during a mood induction, we note it. For strategies that are intended to improve mood (i.e., increase positive affect and/or decrease negative affect), this mood change can be viewed as an index of how effectively one uses the strategy. For this reason, these studies provide information about participants' abilities to implement different ER strategies when instructed to do so. For example, people with MDD may experience difficulties with ER due to inappropriate selection of ER strategies but can implement these strategies as successfully as healthy controls when instructed.

Finally, we review studies that examined ER strategies in everyday settings (*naturalistic* ER) using the experience sampling method (ESM; Csikszentmihalyi & Larson, 1987). ESM can increase ecological validity and reduce the recall biases inherent to retrospective self-report measures and daily diary studies (Stone et al., 1998). To date, there are only two studies that met our criteria to be included in the review (see details below), and both involved rumination. Consequently, only the Rumination section includes a review of naturalistic ER.

There are two recent review papers examining multiple ER strategies in relation to depression, broadly defined (i.e., Aldao et al., 2010; Joormann & Stanton, 2016), and we do not duplicate their efforts. The breadth of Aldao et al. (2010) focused on a broader range of psychopathology, which included depressive symptomatology. In contrast, we

focus our review on the ER of people with diagnosed MDD. Like Aldao et al., we review research examining self-reported ER strategies, but we also review three additional types of study designs, including two that are laboratory-based and one that is naturalistic. Of note, the current review does not include neuroimaging research (see Joormann & Stanton, 2016 and Rive et al., 2013, for reviews of neural correlates of ER in depressive psychopathology). Although Joormann and Stanton (2016) included studies using various designs, they did not include naturalistic studies or always explicitly note the study designs. In fact, no reviews to date have systematically differentiated and compared these methodologies of measuring ER in MDD. By doing so, we aim to clarify whether results provide similar conclusions across methodologies.

The current review only includes studies that had at least one MDD group (current or remitted) and one nondepressed control group, which allowed for between-group comparisons. All group differences we describe in this review—unless otherwise noted—always refer to differences between groups that were statistically significant in the original studies. We focus our review on studies that assessed psychiatric disorders using well-validated diagnostic interviews (e.g., SCID-IV; First, Spitzer, Gibbon, & Williams, 1996). We exclude research assessing psychiatric disorders using self-report measures and applying clinical cutoffs because doing so can lead to a greater number of false positives and false negatives of MDD than do diagnostic interviews (see Bredemeier et al., 2010, for a discussion). To provide a thorough background of each ER strategy, however, we briefly describe their associations with depressive symptoms when we introduce each strategy. Finally, we use specific terms throughout the paper to describe the MDD and control group samples; these are detailed in Table 1.

2. Rumination

Rumination has received the most attention compared to other ER strategies; it refers to repetitively focusing on the nature and the consequences of one's feelings (Gross & Thompson, 2007). Rumination was first proposed in Nolen-Hoeksema's (1987, 1991) response styles theory as a dispositional tendency (i.e., *trait*) to “repetitively [focus] on the fact that one is depressed; on one's symptoms of depression; and on the causes, meaning, and consequences of depressive symptoms” (Nolen-Hoeksema, 1991, p. 569). Since then, a large body of research has found that trait rumination is associated with higher levels of depressive symptoms (for reviews, see Aldao et al., 2010 and Nolen-Hoeksema

Table 1
Definitions of various types of participant groups.

Participant types	Operational definitions
MDD participants	People with
Current MDD	MDD who are experiencing a current MDE.
RMD	MDD whose MDE is in remission.
Control groups	People who
Healthy controls	have no current or past history of mental health disorders.
Never-depressed controls	have no current or past MDEs but it is unclear whether they have or have had other psychiatric disorders.
Currently nondepressed controls	are not in a current MDE but whose past history of MDD is either:
	<ul style="list-style-type: none"> • heterogeneous (i.e., with and without past MDD); or • unknown (i.e., past history of MDD was not assessed).

Note. MDD = major depressive disorder; MDE = major depressive episode; RMD = remitted depression.

et al., 2008). Laboratory studies with college samples have shown that inducing rumination often leads to an increase in both naturally occurring (Nolen-Hoeksema & Morrow, 1993) and experimentally induced depressed moods (Morrow & Nolen-Hoeksema, 1990).

Notably, researchers have raised concerns that the association between trait rumination and depressive symptoms is driven by the overlapping content of commonly used self-report measures of rumination and depressive symptomatology (e.g., Treynor, Gonzalez, & Nolen-Hoeksema, 2003). A factor analysis by Treynor et al. (2003) revealed two distinct components of rumination that are not confounded with depressive symptoms: brooding and reflection. *Brooding* involves passively thinking about one's depression and unachieved standards, and *reflection* refers to engaging in contemplation and problem solving (Treynor et al., 2003). Therefore, we also review the literature on brooding and reflection.

2.1. Trait rumination in MDD

Existing evidence on trait rumination among current MDD, RMD, and never-depressed or healthy individuals has been fairly robust. Participants with current MDD consistently report higher trait rumination than do RMD as well as never-depressed and healthy participants. RMD individuals report higher trait rumination than never-depressed and healthy controls (e.g., D'Avanzato, Joormann, Siemer, & Gotlib, 2013).

Findings on trait brooding and reflection and MDD support the distinction between these two components of rumination. Specifically, results of the brooding research mirror those of rumination: Brooding is elevated among current MDD samples compared to RMD samples and healthy controls (e.g., Joormann, Dkane, & Gotlib, 2006). RMD samples report higher levels of brooding than do healthy controls (e.g., Joormann et al., 2006). Results regarding reflection are inconclusive, with some evidence suggesting an association between current or past MDD and greater trait reflection (e.g., Joormann & Gotlib, 2010). Trait rumination, including brooding and reflection, findings are summarized in Table 2.

2.2. Spontaneous rumination in MDD

No studies to date have examined spontaneous rumination in MDD in the lab.

2.3. Rumination induction in MDD

Some have theorized that people ruminate because they believe it can help them better understand themselves and improve their moods (e.g., Watkins & Baracaia, 2001). Studies examining the mood effects of experimentally instructed rumination, however, have found that rumination often leads to worsened mood, particularly among those with MDD. Two studies had those with MDD and a control group complete a negative mood manipulation followed by a rumination induction. There were similar increases in self-reported (1) despondent mood following rumination between current MDD and currently nondepressed participants (Watkins & Brown, 2002) and (2) sadness between current MDD and healthy participants (LeMoult, Yoon, & Joormann, 2016). These findings suggest that experimentally instructed rumination is equally maladaptive for people independent of MDD status in the context of dysphoric mood.

Among the studies that did not use mood manipulations prior to rumination inductions, three found that rumination led to worsened mood in those with current MDD but not in never-depressed controls (Donaldson & Lam, 2004; Lavender & Watkins, 2004; Rimes & Watkins, 2005). Similarly, rumination caused greater mood deterioration in the current MDD than the healthy control group in the context of their natural moods (Whitmer, Frank, & Gotlib, 2012). In contrast, in a

sample of elderly adults, those with current MDD exhibited deteriorated mood to a similar extent as did never-depressed controls (Smoski, Labar, & Steffens, 2014). Taken together, instructed rumination consistently exerts an adverse impact on mood in people with current MDD, while never-depressed and healthy individuals are more likely to experience mood deterioration following a rumination task when they are in dysphoric (vs. nondysphoric) moods.

2.4. Naturalistic rumination in MDD

Two MDD studies have examined rumination in naturalistic settings using ESM. Both studies included a healthy control group and current MDD samples with and without comorbid generalized anxiety disorder (GAD). In both studies, participants were randomly prompted to report, along with other measures, momentary rumination eight times a day over a one-week sampling period. In a female-only adult sample, Kircanski, Thompson, Sorenson, Sherdell, and Gotlib (2015) found that, compared to the healthy control group, the two MDD groups (i.e., MDD only and MDD with comorbid GAD) were, on average, more likely to ruminate over the sampling week; further, the two MDD groups did not differ in their mean levels of rumination. Ruscio et al.'s (2015) found that mean levels of rumination in response to daily stressful events were significantly lower in the healthy control group than in the MDD and MDD with comorbid GAD groups, which did not significantly differ in levels of rumination. Ruscio et al. also examined how momentary rumination after a stressful life event uniquely predicted affect at subsequent signals. They found that people who ruminated more experienced greater increases in negative affect at the subsequent signal; this association was stronger for the two MDD groups than for the healthy control group. This suggests that those with current MDD are more adversely impacted by momentary rumination than are healthy controls regarding short-term affective outcomes, which aligns with laboratory findings.

2.5. Interim discussion of rumination

People with current MDD report higher trait rumination than do those with RMD, and those with RMD report higher trait rumination than do never-depressed and healthy controls. ESM studies provide further support that people with current MDD ruminate more than do healthy controls. Regarding components of rumination, trait brooding, like trait rumination, is elevated in those with RMD and highest in those with current MDD; the associations between trait reflection and MDD are less consistent. In fact, some researchers suggest that reflection has some adaptive features (Nolen-Hoeksema et al., 2008; Treynor et al., 2003). For example, higher trait reflection predicted a greater likelihood of recovery from an MDE six months later in a community sample of adults with current MDD (Arditte & Joormann, 2011).

Elevated trait rumination in people with current or remitted MDD relative to never-depressed and healthy controls suggests that high trait rumination—at least brooding—may be a risk factor for MDD. Longitudinal studies have shown that high trait rumination—indexed by scores on composite rumination measures—predicts the onset of MDEs in adolescents (Abela & Hankin, 2011) and community adults (Nolen-Hoeksema, 2000). Studies examining the brooding component found that trait brooding prospectively predicted the onset of MDEs in children (Gibb, Grassia, Stone, Uhrlass, & McGeary, 2012) and adolescents (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Thus, interventions targeting trait rumination, particularly trait brooding, may be efficacious in preventing MDEs.

Elevated trait rumination in people with current MDD compared to those with RMD suggests that high trait rumination may also be a maintaining factor for MDD. One possible mechanism by which trait rumination maintains MDD is the bidirectional associations between

depressed mood and ruminative thinking. Specifically, people who already have a dispositional tendency to dwell on their sad moods are even more likely to ruminate in a current MDE; this is especially deleterious for these high ruminators in a current MDE because, as the laboratory and ESM studies have shown, people are more vulnerable to the negative mood consequences of rumination if they feel depressed. As a result, these high ruminators have difficulty recovering from prolonged depressed mood. One way to stop this cycle is to effortfully reduce trait rumination, replacing it with a more constructive thinking style. Watkins and colleagues examined the efficacy of “rumination-focused cognitive-behavioral therapy” (CBT)—a CBT treatment with a

focus on training patients to shift from unhelpful rumination to a more effective thinking style—in treating those with subclinical residual depressive symptoms (Watkins et al., 2007, 2011). Preliminary evidence has shown that rumination-focused CBT significantly reduces trait rumination to normal levels and leads to better treatment outcomes compared to standard CBT; reduced trait rumination mediates these treatment effects (Watkins et al., 2007, 2011). This is a promising first step, and future studies should further investigate the efficacy of interventions targeting trait rumination in ameliorating depressive symptomatology and ultimately leading to recovery from MDD. Moreover, given the evidence that trait rumination does not consistently

Table 2
Summary of self-reported habitual use of eight emotion regulation strategies (trait ER).

Trait ER strategy	Authors	Group comparisons in trait ER strategies	Summary of findings		
Rumination (15 studies)	D'Avanzato et al. (2013)	RRS: cMDD > RMD > HC	Rumination—consistent results (13 studies): cMDD > RMD > NDC/HC Brooding—relatively consistent results (6 studies): cMDD > RMD > NDC/HC Reflection—mixed results (5 studies): cMDD = RMD; cMDD > or = HC; RMD > or = HC		
	Donaldson and Lam (2004)	RRS: cMDD > NDC			
	Ehring et al. (2008)	CERQ rumination: RMD > NDC			
	Johnson et al. (2008)	RRS brooding: history of MDD = no history of MDD RRS reflection: history of MDD > no history of MDD			
	Joormann and Gotlib (2008)	RRS: cMDD > HC RRS brooding: cMDD > HC RRS reflection: cMDD = HC			
	Joormann and Gotlib (2010)	RRS: cMDD > RMD > HC RRS brooding: cMDD > RMD > HC RRS reflection: cMDD = RMD > HC			
	Joormann et al. (2006)	RRS score: cMDD > RMD > HC RRS brooding: cMDD > RMD > HC RRS reflection: cMDD = RMD > HC			
	Kircanski et al. (2015)	RRS brooding: cMDD > HC			
	Lau et al. (2007)	RRS: cMDD > HC			
	Rimes and Watkins (2005)	RRS: cMDD > NDC			
	Riso et al. (2003)	RRS: cMDD > HC			
	Watkins and Baracaia (2002)	RRS: cMDD > RMD > NDC			
	Watkins and Brown (2002)	RRS: cMDD > CNDC			
	Watkins and Moulds (2009)	RRS: cMDD > RMD > HC RRS brooding: cMDD = RMD > HC RRS reflection: cMDD = RMD > HC			
	Werner-Seidler and Moulds (2012)	RRS: cMDD = RMD			
	Distraction (3 studies)	Donaldson and Lam (2004)		DRS: cMDD = NDC	Limited and mixed results: cMDD = or < NDC; RMD = HC
		Lau et al. (2007)		DRS: cMDD < NDC	
Watkins and Moulds (2009)		TCQ distraction: cMDD = RMD = HC			
Cognitive reappraisal (7 studies)	D'Avanzato et al. (2013)	ERQ reappraisal: cMDD < RMD = HC	Relatively consistent results: cMDD < RMD = NDC/HC		
	Ehring et al. (2008)	CERQ positive reappraisal: RMD = NDC			
	Ehring et al. (2010)	ERQ reappraisal: RMD = NDC			
	Fladung, Baron, Gunst, and Kiefer (2010)	ERQ reappraisal: cMDD < HC			
	Joormann and Gotlib (2010)	ERQ reappraisal: cMDD < RMD = HC			
	Kuyken and Brewin (1994)	WCQ positive reappraisal: cMDD < CNDC			
Suppression (5 studies)	Watkins and Moulds (2009)	TCQ reappraisal: cMDD = RMD = HC			
	Beblo et al. (2012)	EAQ suppression of NA ^a : cMDD > HC EAQ suppression of PA ^a : cMDD > HC ERQ expressive suppression ^b : cMDD > HC	Expressive suppression—somewhat mixed results (4 studies): cMDD > or = HC; RMD = NDC/HC; Suppression of subjective feelings—limited evidence (1 study): cMDD > HC Thought Suppression—limited evidence (1 study): RMD > NDC		
	D'Avanzato et al. (2013)	ERQ expressive suppression: cMDD > HC, cMDD = RMD, RMD = HC			
	Ehring et al. (2010)	ERQ expressive suppression: RMD = NDC			
	Joormann and Gotlib (2010)	ERQ expressive suppression: cMDD = RMD = HC			
	Watkins and Moulds (2009)	WBSI ^c : cMDD > RMD > HC WBSI intrusion ^c : cMDD > RMD > HC WBSI suppression ^c : cMDD = RMD > HC			
Acceptance (5 studies)	Beblo et al. (2012)	EAQ acceptance of NA ^d : cMDD < HC EAQ acceptance of PA ^d : cMDD < HC DERS nonacceptance ^d : cMDD > HC		Acceptance of emotion—consistent results (4 studies): cMDD < HC; RMD < NDC Acceptance of situation—limited evidence (2 studies): cMDD = NDC; RMD = NDC	
	Brockmeyer et al. (2012)	DERS nonacceptance: cMDD > HC			
	Ehring et al. (2008)	CERQ acceptance ^e : RMD = NDC DERS nonacceptance: RMD > NDC			
	Ehring et al. (2010)	DERS nonacceptance: RMD > NDC			
	Sigmon et al. (2007)	DERS nonacceptance: RMD > NDC COPE acceptance ^f : cMDD = NDC			

(continued on next page)

Table 2 (continued)

Trait ER strategy	Authors	Group comparisons in trait ER strategies	Summary of findings
Savoring Positive rumination (3 studies)	None		No evidence
	Johnson et al. (2008)	RPA emotion-focused ^f : with lifetime MDD = no lifetime MDD	Relatively consistent results: cMDD = RMD = NDC
Dampening (3 studies)	Werner-Seidler et al. (2013, Study 2)	RPA self-focused ^g : with lifetime MDD = no lifetime MDD	
	Werner-Seidler et al. (2013, Study 3)	RPA emotion-focus: RMD = NDC	
	Johnson et al. (2008)	RPA self-focus: RMD = NDC	
	Werner-Seidler et al. (2013, Study 2)	RPA emotion-focused: cMDD = RMD/NDC	
	Werner-Seidler et al. (2013, Study 2)	RPA self-focused: cMDD = RMD = NDC	
	Werner-Seidler et al. (2013, Study 3)	RPA dampening: with lifetime MDD = no lifetime MDD	Limited and mixed results: cMDD and RMD report either similar or higher dampening than NDC
		RPA dampening: RMD > NDC (became marginally significant after controlling for depressive symptoms)	
		RPA dampening: cMDD > NDC; cMDD = RMD; RMD = NDC	

Note. Findings for each ER strategy are presented in an alphabetical order based on the author names. > denotes that the group on the left side reported significantly ($p < 0.05$) higher scores than did the group on the right side, < denotes that the group on the left side reported significantly ($p < 0.05$) lower scores than did the group on the right side; = denotes that the two groups did not differ significantly from each other ($p > 0.05$). CERQ = Cognitive Emotion Regulation Questionnaire; cMDD = people with current major depressive disorder; CNDC = currently nondepressed controls (no current MDD); COPE = the COPE questionnaire; DERS = Difficulties in Emotion Regulation Scale; DRS = Distracting Responses Scale; EAQ = Emotion Acceptance Questionnaire; ERQ = Emotion Regulation Questionnaire; HC = healthy controls (no history of psychiatric disorders); NA = negative affect; NDC = never-depressed controls (no history of MDD); PA = positive affect; RMD = people with remitted major depression (past history of MDD but no current MDD); RPA = Responses to Positive Affect Questionnaire; RRS = Ruminative Responses Scale of the Response Styles Questionnaire; TCQ = Thought Control Questionnaire; WBSI = White Bear Suppression Inventory; WCQ = Ways of Coping Questionnaire.

^a Suppression of subjective feelings.

^b Expressive suppression.

^c Thought suppression.

^d Acceptance of emotion.

^e Acceptance of situation.

^f Emotion-focused positive rumination.

^g Self-focused positive rumination.

predict duration of MDEs (Nolen-Hoeksema et al., 2008) and that trait brooding does not predict recovery from MDEs (Arditte & Joormann, 2011), future investigations should identify the precise mechanisms of how trait rumination maintains MDEs—if it does at all—and how rumination-focused CBT alleviates depressive psychopathology.

3. Distraction

Distraction involves shifting one's attention away from the emotion-evocating aspect of the situation to other aspects of the situation or a completely different situation (Gross & Thompson, 2007). Like rumination, distraction was initially examined as a style by which individuals respond to their depressed mood and symptoms (Nolen-Hoeksema, 1991). In fact, Nolen-Hoeksema (1991) defined distracting responses as “purposeful turning one's attention away from one's symptoms of depression and its possible causes and consequences to pleasant or neutral activities” (p. 570). That is, engaging in pleasant or neutral distracting activities (e.g., going for a run) can temporarily ameliorate depressed mood, break the ruminative cycle, and promote problem solving, although chronic use of distraction can lead to maladaptive avoidance (see Nolen-Hoeksema et al., 2008, for a review). Existing studies show mixed findings on the association between trait distraction and depressive symptoms, suggesting a positive association, a negative association, and no association, possibly due to differences in populations and validity of self-report measures (see Nolen-Hoeksema et al., 2008, for a discussion).

3.1. Trait distraction in MDD

Three studies examined trait distraction in current MDD samples relative to controls, and the results are mixed. Those with current and past MDD report either lower (Lau, Christensen, Hawley, Gemar, & Segal, 2007) or similar (Donaldson & Lam, 2004; Watkins & Moulds, 2009) levels of trait distraction compared to never-depressed and healthy controls. Trait distraction findings are summarized in Table 2.

3.2. Spontaneous distraction in MDD

Regarding spontaneous use of distraction in the lab, Smoski et al. (2014) found that, compared to never-depressed controls, elderly participants with current MDD reported similar levels of spontaneous distraction after a negative mood induction. Likewise, individuals with current mood and/or anxiety disorders (a third of the sample had MDD) reported similar levels of spontaneous distraction after a negative mood induction compared to controls with no lifetime anxiety or mood disorders (Campbell-Sills, Barlow, Brown, & Hofmann, 2006a).

3.3. Distraction induction in MDD

Among studies that examined mood effects of experimentally instructed distraction, the three studies that did not use mood manipulations had mixed results. Two studies demonstrated that instructed distraction only improved moods in individuals with current MDD but not never-depressed or healthy controls (Lavender & Watkins, 2004; Whitmer et al., 2012). In contrast, there was no significant impact of instructed distraction on mood in either the current MDD or never-depressed group (Donaldson & Lam, 2004).

Four studies used negative mood induction prior to distraction tasks and showed mixed results. Current MDD and never-depressed participants reported similar levels of mood improvement before and after using distraction (LeMoult et al., 2016). Similarly, Joormann, Siemer, and Gotlib (2007) found mood improvement in current MDD, RMD, and healthy control samples following a distraction task, although the relative magnitude of mood changes across groups was not reported. In contrast, there were no significant mood effects of distraction among current MDD or currently nondepressed participants (Watkins & Brown, 2002). Lastly, distraction benefited those with current MDD more than never-depressed controls in terms of improving mood, although, interestingly, these two groups reported comparable levels of self-perceived success in implementing the distraction task (Smoski et al., 2014).

3.4. Interim discussion of distraction

Due to limited and mixed evidence, how trait and spontaneous distraction vary by MDD status remains unclear, in agreement with the mixed findings of trait distraction and depressive symptoms. More research is needed to replicate existing findings and to examine distraction in naturalistic settings. Evidence on mood effects of experimentally instructed distraction in MDD is also mixed, so we cannot draw firm conclusions. There is no systematic pattern of results that vary as a function of the presence or nature of mood induction or the distraction task procedure. The only pattern is that people with current MDD show mood improvement following distraction tasks to an either similar or greater degree, but never to a lesser degree, compared to various control groups, suggesting that those with current MDD may benefit more from distraction. This is somewhat consistent with evidence suggesting that distraction induction uplifts depressed mood among dysphoric (but not nondysphoric; classified based on depressive symptoms) participants (Nolen-Hoeksema et al., 2008). Even if this is supported, it remains unclear why people with current MDD receive greater benefits from distraction. Additional research should clarify these mixed findings by directly comparing different research designs in the same study while rigorously controlling confounding variables related to sample characteristics and study methodologies.

4. Cognitive reappraisal

Cognitive reappraisal involves reinterpreting the meaning or self-relevance of an emotion-eliciting situation to modify its potential emotional significance before emotion is fully developed (Gross & Thompson, 2007; John & Gross, 2004). For example, one may view a bad test result as a reflection of an area of growth (reinterpret meaning) or perceive a sad movie ending as unrelated to one's life (reappraise self-relevance). Laboratory studies have shown that instructed cognitive reappraisal is effective in down-regulating subjective experience and expressions of negative affect without increasing its physiological responses (e.g., Gross, 1998a). Moreover, individuals with higher trait cognitive reappraisal tend to experience and express more positive emotions and less negative emotions (Gross & John, 2003) and report less depressive symptoms than do those with lower trait cognitive reappraisal (Aldao et al., 2010).

4.1. Trait cognitive reappraisal in MDD

Initially studied in the context of coping, females with current MDD report using cognitive reappraisal to cope with stressful life events to a lesser extent compared to currently nondepressed controls (Kuyken & Brewin, 1994). Evidence on trait cognitive reappraisal has been relatively consistent. Specifically, those with current MDD report lower trait reappraisal compared to RMD and healthy control samples. Unlike with trait rumination, those with RMD and never-depressed and healthy controls do not differ significantly from each other in trait cognitive reappraisal (e.g., D'Avanzato et al., 2013). For a summary of the trait cognitive reappraisal findings, see Table 2.

4.2. Spontaneous cognitive reappraisal in MDD

Regarding spontaneous use of cognitive reappraisal, compared to never-depressed controls, those with current MDD (Smoski et al., 2014) and RMD (Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010) have been shown to use similar levels of cognitive reappraisal following negative mood inductions. Similarly, Campbell-Sills et al. (2006a) found similar levels of spontaneous cognitive reappraisal between people with current anxiety and/or mood disorders (a third of the sample had MDD) and controls with no lifetime anxiety or mood disorders.

4.3. Cognitive reappraisal induction in MDD

In terms of using experimentally instructed cognitive reappraisal to regulate emotion, people show comparable abilities regardless of their MDD status. Individuals with current depressive disorders (i.e., MDD and dysthymia) used instructed cognitive reappraisal to regulate happy and sad emotions as successfully as currently nondepressed controls (Millgram, Joormann, Huppert, & Tamir, 2015, Study 3). Further, the two groups reported similar levels of difficulty and effort in regulating emotional responses to sad stimuli, indicating an unimpaired self-perceived ability to implement cognitive reappraisal among those with depressive disorders. Likewise, Smoski et al. (2014) did not find a group difference among elderly adults with current MDD versus never-depressed controls in the extent to which cognitive reappraisal repaired their moods or in their self-perceived success in using the strategy. Moreover, Ellis, Vanderlind, and Beevers (2013) found that cognitive reappraisal did not differentially influence induced anger responses in current MDD versus healthy participants; these two groups perceived their abilities to implement cognitive reappraisal as “moderately well” and reported comparable effectiveness of cognitive reappraisal in reducing anger. Finally, RMD individuals have also been shown to use cognitive reappraisal as effectively as never-depressed controls (Ehring et al., 2010; Smoski et al., 2015).

4.4. Interim discussion of cognitive reappraisal

In summary, people with current MDD report lower trait cognitive reappraisal than RMD and various control groups, and RMD and control groups do not significantly differ from one another. Given that trait cognitive reappraisal differentiates those with remitted versus current MDD, low trait cognitive reappraisal might be a maintaining, but not a risk, factor for MDD. In contrast to this idea, however, researchers found that trait cognitive reappraisal did not predict recovery from MDEs (Arditte & Joormann, 2011) or improvements in depressive symptoms (Chambers et al., 2015) in current MDD samples. Alternatively, low trait cognitive reappraisal may be an episode-specific phenomenon that merely arises as a consequence of MDEs. Future longitudinal studies should examine changes in trait cognitive reappraisal by following the same group of participants with MDD over time, going in and out of MDEs.

Interestingly, laboratory findings on cognitive reappraisal do not mirror those of self-reports: People show similar degrees of spontaneous cognitive reappraisal in the lab independent of MDD status. It may be that people with current MDD use cognitive reappraisal less in certain circumstances—which leads to their lower trait cognitive reappraisal—that are not captured in the lab. Laboratory stimuli may be less emotionally intense and self-relevant than real-life events, and those with current MDD are less likely to reappraise real-life events. Alternatively, those with current MDD might feel less motivated to use cognitive reappraisal in their daily lives despite their awareness of its benefits and prefer alternative strategies that they are more familiar with or are less cognitively taxing.

To test these hypotheses, future researchers could examine motives for using or not using cognitive reappraisal in both laboratory and naturalistic settings. Additionally, laboratory studies show that people with current MDD or RMD can implement instructed cognitive reappraisal as effectively as control groups. Given this intact ability to use cognitive reappraisal among those with MDD, it is important to identify factors that contribute to their low habitual use of cognitive reappraisal, which can serve as potential targets for intervention. Moreover, future studies could also examine whether training people with current MDD to increase habitual use of cognitive reappraisal can lead to more favorable treatment outcomes.

5. Suppression

Suppression refers to effortful attempts to inhibit physiological, behavioral, and/or experiential aspects of emotional responses (Gross & Thompson, 2007). Like trait rumination, trait suppression is positively associated with depressive symptoms (Aldao et al., 2010). Researchers have studied various forms of suppression by focusing on different aspects of emotion that are suppressed. *Expressive suppression*, a continuing effort to inhibit explicit behavioral expressions in response to an emotional-eliciting event, is one of the most commonly studied forms of suppression (e.g., John & Gross, 2004). Individuals who habitually suppress emotion expressions self-reportedly experience more negative emotion and less positive emotion (Gross & John, 2003). Additionally, experimentally instructed expressive suppression tasks, despite decreasing expressive behavior, result in intact subjective experience of negative affect (Gross, 1998), diminished subjective experience of positive affect (Gross & Levenson, 1997), and increased sympathetic activation (Gross, 1998; Gross & Levenson, 1997). Another form of suppression, *thought suppression*, refers to a continuing effort to suppress thought processes that have led to the elicited emotions. Trait thought suppression has been linked to increases in unwanted thoughts, rumination, and depressive symptoms (Wenzlaff & Luxton, 2003; Wenzlaff & Wegner, 2000). Based on empirical investigations of suppression, Webb, Miles, and Sheeran (2012) classified the target of suppression into four categories: (1) emotion expression (i.e., expressive suppression), (2) subjective experience of emotion, (3) thoughts of the emotion-eliciting event, and (4) a combination of the first two, emotion expression and subjective experience. We review studies examining these four types of suppression.

5.1. Trait suppression in MDD

Evidence on trait expressive suppression is mixed. Two studies show that current MDD samples report greater trait expressive suppression than do healthy control samples (Beblo et al., 2012; D'Avanzato et al., 2013). In contrast, Joormann and Gotlib (2010) did not find differences in trait expressive suppression among current MDD, RMD, and healthy control participants. Similarly, trait expressive suppression among RMD individuals did not differ from never-depressed (Ehring et al., 2010) or healthy controls (Joormann & Gotlib, 2010).

Researchers have also examined suppression of subjective feelings as well as thought processes of emotion. Those with current MDD report habitually suppressing positive and negative emotion to a greater extent than do healthy controls (Beblo et al., 2012). Moreover, current MDD and RMD participants report greater trait thought suppression than do healthy controls (Watkins & Moulds, 2009). Findings of different types of trait suppression are summarized in Table 2.

5.2. Spontaneous suppression in MDD

No studies have examined any form of spontaneous suppression among those with current MDD relative to a control group. Those with RMD report higher levels of spontaneous expressive suppression in response to a sadness-eliciting film clip than do never-depressed controls (Ehring et al., 2010). Relatedly, Campbell-Sills et al. (2006a) found that, relative to controls with no lifetime anxiety or mood disorders, people with current anxiety and/or mood disorders (a third of the sample had MDD) showed heightened spontaneous suppression of film-induced negative emotions. They also found that spontaneous suppression negatively influenced participants' moods to a similar degree regardless of their current diagnoses.

5.3. Suppression induction in MDD

Although no studies have examined mood effects of experimentally instructed suppression as a function of current MDD, one study

investigated mood effects of instructed expressive suppression as a function of RMD. Participants who were asked to conceal emotion expression while watching a sad film clip reported higher subsequent negative affect than did those who were asked to reappraise the film clip; the association between expressive suppression and greater negative affect did not differ between the RMD and the healthy control group (Ehring et al., 2010). This suggests that, regardless of MDD history, expressive suppression is equally dysfunctional in down-regulating sadness compared to cognitive reappraisal.

5.4. Interim discussion of suppression

Although mixed, evidence on trait suppression suggests that people with current MDD or RMD habitually suppress emotions to an either greater or similar extent compared to never-depressed and healthy controls. Additionally, the deleterious mood effects of experimentally instructed expressive suppression relative to cognitive reappraisal are similar for RMD and healthy participants. Taken together, MDD might be associated with more frequent selection of suppression, but not necessarily more adverse consequences of using it.

One possible explanation for the negative consequences of suppression is the rebound effect of suppression—effortfully suppressing negative thoughts can paradoxically increase unwanted thoughts, which can further lead to rumination (Wenzlaff & Luxton, 2003; Wenzlaff & Wegner, 2000). Suppression may also reduce social sharing of emotion and opportunities to receive social support and form close relationships (e.g., Gross & John, 2003). Thus, we speculate that people with MDD experience these negative consequences of suppression more frequently because they (sometimes) report higher habitual use of suppression. However, considering the mixed results on trait suppression and a dearth of laboratory and naturalistic studies on suppression in MDD, more research is needed to examine suppression using different methodologies across various MDD groups to draw more confident conclusions. Longitudinal studies will offer insights on how the use of suppression predicts onset and course of MDD, as well as whether training people with current MDD to substitute suppression with a more helpful ER strategy (e.g., acceptance, social sharing) can lead to amelioration of depressive symptomatology.

6. Acceptance

Acceptance can be conceptualized in two ways—acceptance of emotion and acceptance of situation. Acceptance of emotion involves letting one's emotions unfold without intervention and embracing their existence without judgment or avoidance. Acceptance of situation refers to accepting and resigning to one's past experiences (e.g., a stressful event) and current situations (Garnefski, Kraaij, & Spinhoven, 2001; Hayes et al., 1999). Acceptance is a crucial component of mindfulness-based therapies (Hayes, Strosahl, & Wilson, 1999). Mindfulness-based treatments for depressive psychopathology have had positive outcomes (Piet & Hougaard, 2011). Given this, surprisingly, Aldao et al. (2010) did not find a significant association between trait acceptance and depressive symptoms in their meta-analysis. Here, we review acceptance as a function of MDD status.

6.1. Trait acceptance in MDD

In terms of trait acceptance of *emotion*, those with current MDD and RMD report lower levels of acceptance of emotion compared to never-depressed and healthy controls (e.g., Beblo et al., 2012). Regarding trait acceptance of *situation*, those with current MDD or RMD did not differ from never-depressed controls (e.g., Ehring, Fischer, Schnulle, Bosterling, & Tuschen-Caffier, 2008). All findings of trait acceptance are summarized in Table 2.

6.2. Spontaneous acceptance in MDD

No studies have examined spontaneous acceptance of emotion or situation in MDD. Campbell-Sills et al. (2006a) examined spontaneous acceptance of emotion induced by an anxiety-provoking film in participants with current anxiety and/or mood disorders (a third of the sample had MDD) and controls with no lifetime anxiety or mood disorders. Although both groups judged their emotions as quite acceptable, the clinical group reported significantly lower levels of acceptance of their negative emotions compared to the nonclinical controls.

6.3. Acceptance induction in MDD

Two studies have examined the effectiveness of experimentally instructed acceptance in MDD. Ellis et al. (2013) instructed current MDD and healthy participants to accept their emotions and measured their anger responses before and after a frustration task. Both groups experienced comparable changes of anger response and rated their abilities to accept their emotions as “moderately well.” Those with current MDD, however, reported lower perceived effectiveness of acceptance in reducing anger than did healthy controls. Moreover, Smoski et al. (2015) found that instructing participants to accept their thoughts and feelings when viewing sad images—rather than simply viewing them—benefited RMD and never-depressed individuals similarly in terms of their subjective negative affect.

6.4. Interim discussion of acceptance

Evidence on trait acceptance shows that people with current MDD and RMD report lower acceptance of emotion, but not acceptance of situation, compared to those without a history of MDD. In particular, Ehring et al. (2008) assessed both forms of acceptance and raised a similar conclusion after obtaining inconsistent results, proposing that lacking “acceptance of negative internal events” but not “external ones” is associated with depression vulnerability (p. 1582). The differential results for acceptance of emotion and situation also parallel the two possible roles of acceptance described by Wilson (1996)—“an active process of self-affirmation” and “a passive form of resignation to an unhappy fate,” respectively (p. 425). By this account, it is reasonable to speculate that accepting internal emotional states reflects nonjudgmental verification of oneself, while accepting the reality of life stress with a passive attitude might be a sign of hopelessness, low self-esteem, and passivity. Future research should directly compare these two forms of acceptance and distinguish their associated outcomes.

Regarding experimentally instructed acceptance, the two existing studies suggest that people with a current or past history of MDD have a similar ability to accept emotion as do never-depressed and healthy controls. Interestingly, participants—regardless of their MDD status—who employed acceptance reported *greater* post-acceptance anger compared to those who used cognitive reappraisal or received no instruction (Ellis et al., 2013). This may seem counterintuitive considering the positive outcomes frequently linked to acceptance (e.g., Shallcross, Troy, Boland, & Mauss, 2010) and its central role in mindfulness-based treatments. However, as discussed by Ellis et al. (2013), the beneficial effects of acceptance might not appear immediately after its implementation (e.g., Campbell-Sills, Barlow, Brown, & Hofmann, 2006b; Liverant, Brown, Barlow, & Roemer, 2008), and its effectiveness might result from repeated practice rather than simple laboratory instruction. Future researchers should replicate these findings in the context of other emotions, as well as investigate the short- and long-term benefits of using acceptance on one's emotional experience and well-being.

7. Positive ER: savoring, positive rumination, and dampening

The ER literature has predominantly focused on regulation of

negative emotion—the mood-*repair* effects of ER; there is a dearth of research on regulation of positive emotion. Given that diminished positive affect is a cardinal symptom of MDD, positive emotion regulation is particularly relevant to MDD. Recently, researchers have started to examine positive ER and identified several strategies that people employ to either upregulate (e.g., savoring, positive rumination) or downregulate positive emotions (e.g., dampening; see Carl et al., 2013, for a review). *Savoring* refers to intensifying and prolonging positive emotions by reflecting on past, present, or future pleasurable events (Bryant, 1989, 2003), and is one of the most frequently studied positive ER strategies. Another positive ER strategy is *positive rumination*, which involves *repetitively* thinking about “positive self-qualities, positive affective experience, and one's favorable life circumstances” (Feldman, Joormann, & Johnson, 2008, p. 509). In contrast to savoring and positive rumination, *dampening* entails using negative thoughts to decrease the intensity and duration of positive emotions (Feldman et al., 2008). Although it seems counterintuitive that people want to minimize positive emotions, those with low self-esteem may not feel they deserve positive affect and therefore dampen it (Feldman et al., 2008). Although trait savoring and positive rumination are associated with lower depressive symptoms, trait dampening is associated with higher depressive symptoms (Bryant, 2003; Eisner, Johnson, & Carver, 2009; Nelis et al., 2016).

7.1. Trait savoring, positive rumination, and dampening in MDD

No studies have examined trait savoring in MDD. We identified three studies that examined trait positive rumination and dampening as a function of MDD status. Regarding trait positive rumination, preliminary evidence suggests people's dispositional tendency to ruminate on pleasant things is comparable independent of their current or past history of MDD (Johnson, McKenzie, & McMurrich, 2008; Werner-Seidler, Banks, Dunn, & Moulds, 2013, Studies 2, 3). Findings of trait positive rumination are summarized in Table 2.

Results on trait dampening are less consistent. Johnson et al. (2008) found that trait dampening did not vary as a function of MDD status when comparing never-depressed controls and people with MDD, which included those with current or remitted MDD. In contrast, Werner-Seidler et al. (2013, Study 3) found that people with current MDD habitually dampen positive emotions more than do never-depressed controls. Werner-Seidler et al. (2013, Study 2) showed that those with RMD reported significantly higher trait dampening than never-depressed controls; however, this association became non-significant after accounting for current depressive symptoms, indicating that elevated dampening in RMD individuals may be driven by depressive symptoms. For a summary of findings of trait dampening, see Table 2.

7.2. Spontaneous savoring, positive rumination, and dampening in MDD

No studies to date have examined spontaneous use of positive ER strategies in MDD.

7.3. Savoring, positive rumination, and dampening induction in MDD

No studies to date have examined mood effects of positive ER strategies in MDD.¹

¹ Two studies examined the effectiveness of positive memory recall in repairing experimentally induced negative affect in MDD samples (Joormann et al., 2007; Werner-Seidler & Moulds, 2012). Although positive memory recall is similar to savoring (reminiscing pleasant memories), we did not include these two studies because, in line with Feldman et al.'s (2008) argument, positive ER strategies, including savoring, are responses to *positive* emotions and therefore differ from those involving using positive thoughts and memories to improve negative emotions.

7.4. Interim discussion of savoring, positive rumination, and dampening

Preliminary evidence suggests that trait dampening, but not trait positive rumination, may be associated with MDD. More specifically, those with current MDD or residual depressive symptoms from remitted MDD are more likely to dampen positive emotions than never-depressed controls. Prospective research is needed to examine whether trait dampening plays a role in difficulties experiencing intense and/or lasting positive affect and thus in maintaining MDD. Moreover, because trait dampening is more relevant to current depressive psychopathology, interventions targeting positive ER may be particularly beneficial to those with current MDD or RMD individuals with residual symptoms (Werner-Seidler et al., 2013).

8. General summary

This review is the first that systematically examines studies on the use—both selection and implementation—of ER strategies as a function of MDD status and research methodology. We focused on eight strategies: rumination, distraction, cognitive reappraisal, suppression, acceptance, savoring, positive rumination, and dampening. For each ER strategy, we reviewed self-reports of habitual use of the strategy (i.e., trait ER), laboratory studies assessing spontaneous use of the strategy (i.e., spontaneous ER) or mood effects of implementing instructions of the strategy (i.e., effectiveness of ER), and ESM studies examining the strategy in naturalistic settings (i.e., naturalistic ER).

We summarize the trait ER findings in Table 2. In terms of trait ER, relatively consistent results are found for four strategies—rumination (particularly brooding), cognitive reappraisal, acceptance, and positive rumination. People with current MDD report higher trait rumination compared to those with RMD as well as never-depressed and healthy controls; people with RMD report higher trait rumination than never-depressed and healthy controls. Additionally, people with current MDD report lower trait cognitive reappraisal than those with RMD and never-depressed and healthy controls; unlike with rumination, the RMD and these control groups do not differ from each other. Regarding trait acceptance, people with current MDD or RMD report lower acceptance of emotion, but not acceptance of situation, compared to never-depressed and healthy controls. Lastly, current MDD, RMD, and never-depressed groups do not differ in trait positive rumination. Trait measures of the other strategies or components of strategies either show mixed results (reflection, distraction, expressive suppression, and dampening) or lack sufficient evidence to draw a conclusion (suppression of subjective feelings, thought suppression, and savoring). Taken together, people with MDD show different patterns in their habitual use of at least three ER strategies compared to never-depressed and healthy controls. For some strategies, aberrant habitual use is observed both during and outside MDEs (higher rumination and brooding and lower acceptance of emotion), while for others, aberrant patterns are only observed in current MDD, but not RMD, samples (lower cognitive reappraisal), meaning that they are likely episode-specific phenomena. More research is needed to examine the habitual use of other ER strategies in MDD and clarify equivocal findings.

Compared to trait ER, there is less evidence on spontaneous ER in MDD. Initial findings suggest that how people with MDD or RMD spontaneously select a strategy in laboratory settings does not always match their habitual use of the strategy. Although people with current MDD consistently report lower trait cognitive reappraisal than do never-depressed and healthy controls, two laboratory studies suggest that current MDD and never-depressed participants show similar levels of spontaneous cognitive reappraisal. Additionally, in contrast to results for trait expressive suppression, one laboratory study indicates that people with RMD report higher (not similar) spontaneous expressive suppression than do never-depressed controls. Although limited evidence prevents us from making more comparisons, existing findings suggest that trait and spontaneous ER do not frequently generate the

same results. This may be because trait and spontaneous measures entail different ER settings (naturalistic vs. laboratory), interested duration of using a strategy (chronic vs. momentary), and levels of recall biases (high vs. low). Furthermore, given the scant evidence on the use of ER strategies in naturalistic settings, we have little knowledge of whether findings of trait and spontaneous ER match those obtained from naturalistic settings. Thus, future researchers should be aware of these potential methodological influences and directly compare these methodologies within the same groups of participants.

Regarding the effectiveness of experimentally instructed ER, mood changes pre- to post-ER as a function of MDD status vary by strategy. Instructed rumination impacts mood more negatively for those with current MDD than for never-depressed and healthy controls. More specifically, rumination tasks always worsen mood in people with current MDD, while never-depressed and healthy controls are more likely to experience mood deterioration following a rumination task when negative mood is induced beforehand. This suggests that people with current MDD not only ruminate more frequently but also experience more negative affective consequences following rumination due to their already dysphoric moods. In contrast, cognitive reappraisal improves mood independent of MDD status. In other words, relative to never-depressed and healthy controls, people with current MDD or RMD show unimpaired abilities to use instructed cognitive reappraisal to down-regulate negative affect when instructed to do so. Moreover, those with current MDD show either similar or more mood improvement—if mood improves at all—compared to never-depressed and healthy controls following instructed distraction, indicating an intact ability to use instructed distraction in those with current MDD. It is noteworthy that all mood induction procedures described in this review involve inducing negative emotions, which reflects a lack of attention to positive emotion regulation in MDD.

In conclusion, these findings suggest that emotion dysregulation in MDD is mainly associated with unskillful selection (i.e., self-reported habitual use) of ER strategies, rather than impaired ability to implement them effectively. This has important clinical implications. For example, psychoeducation of skillful selection of ER strategies may prove to be a promising clinical intervention for MDD. Additionally, given the success of current MDD and RMD samples in following laboratory ER instructions, they may benefit from clear guidance on effective implementation of helpful ER strategies.

9. Current limitations and future directions of ER in MDD

The field has made much progress in understanding ER and MDD. In particular, research attention has been given to self-reported habitual use of ER strategies and the effectiveness of implementing experimentally instructed ER strategies. Below, we highlight five burgeoning areas of research that are critical to further elucidating the role of emotion dysregulation in MDD.

9.1. Expanding the current scope of strategies

It is important for research to further examine ER strategies that intervene early in the emotion-generative process. Gross's (2015) process model categorizes ER strategies into five families based on when ER exerts an influence: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. To date, as demonstrated in the review, researchers have heavily focused on strategies that regulate later in the emotion-generative process—attentional deployment (e.g., distraction), cognitive change (e.g., cognitive reappraisal), and response modulation (e.g., suppression). Although less studied, situation selection and situation modification could also be linked to MDD.

Situation selection involves active attempts to increase or decrease one's chance of being in a situation where emotional experiences are expected to occur (Gross & Thompson, 2007). As discussed by

Campbell-Sills and Barlow (2007), depressed people tend to avoid social situations and activities (i.e., social withdrawal) as a way to down-regulate anticipated negative affect due to the fear of poor social performance and subsequent worsened mood and self-esteem. Persistent social withdrawal can be deleterious because it precludes their opportunities to experience positive emotions from engaging in social activities and receiving social support. In addition, people with MDD may show unhealthy use of situation modification, attempts to modify the emotion-laden physical environment to change its emotional impact (Gross & Thompson, 2007). If a depressed person attends a social occasion, he or she may avoid initiating conversation and potential negative social experiences. Despite their relevance to MDD, situation selection and situation modification in MDD have received little research attention. Future investigators should examine how people with MDD select and modify situations to regulate emotion.

9.2. Shifting from putative adaptiveness to flexibility

Most research has characterized ER strategies as either putatively adaptive or maladaptive based on their associated social, emotional, and mental health outcomes without considering the context in which they occur (e.g., Aldao et al., 2010; John & Gross, 2004). More recently, researchers have begun to recognize this limitation. Research is increasingly examining ER strategies in relation to these contextual factors and focusing on the flexibility of using different strategies based on situational demands (e.g., Aldao, 2013; Aldao, Sheppes, & Gross, 2015; Bonanno & Burton, 2013). This shift of research attention is particularly meaningful for MDD samples because depressive psychopathology has long been linked to inflexibility in domains including cognitive response styles (e.g., rumination, attribution), emotional reactivity, and physiological responses to emotional stimuli (see Kashdan & Rottenberg, 2010, for a discussion). It is possible that individuals with MDD do not lack the ability to implement individual strategies when given explicit instruction but are unable to shift spontaneously from one to another. It would be theoretically and practically beneficial to investigate the rigid patterns of the use of ER strategies in MDD and target this inflexibility in clinical interventions.

9.3. Understanding emotion regulation motives

Examining which ER strategies those with MDD use and how well they implement them does not clarify *why* they regulate emotion the way they do. To date, little is known about the motives of ER in MDD samples. People regulate emotion according to various motives, including hedonic motives (i.e., maximizing pleasure and reducing pain) and instrumental motives (i.e., desired outcomes other than altering phenomenology of emotion; Tamir, 2016).

One instrumental motive that is particularly relevant to MDD is self-verification—people's preferences to experience emotions that are consistent with their emotional states (Tamir, 2016). Women with current depressive disorders (i.e., MDD and dysthymia) are more likely than their currently nondepressed peers to choose to engage with sad (versus happy or neutral) stimuli and to up-regulate their emotional responses to sad stimuli (Millgram et al., 2015). In terms of hedonic motives, however, recent evidence suggests that, compared to healthy controls, people with RMD value hedonic pleasure more (Ford, Shallcross, Mauss, Floerke, & Gruber, 2014). Similarly, in an ESM study, people with MDD and/or GAD reported that they should feel much more positive affect and much less negative affect than did healthy controls (Thompson, Kircanski, & Gotlib, 2016). Importantly, group differences largely held after accounting for mean negative and positive affect, suggesting that the group differences were not being driven by differences in baseline negative and positive affect (Thompson et al., 2016). Given these findings, more research is needed to elucidate the motives of ER use in MDD samples. Doing so may help explain why MDD individuals use strategies that can maintain their depressed mood

(e.g., rumination, dampening). Understanding these ER motives in MDD can also guide clinicians to intervene dysfunctional ER motives before the actual regulatory processes take place.

9.4. Incorporating interpersonal factors

Researchers should also examine the role of interpersonal factors in ER in MDD. The literature has predominantly focused on how people regulate emotion alone (i.e., intrapersonal ER) without considering the social context. Recently, researchers have begun to formulate new frameworks to guide research advances in the area of interpersonal ER (e.g., Hofmann, 2014; Zaki & Williams, 2013), which can be crucial to people with MDD. For instance, social withdrawal associated with MDD decreases the likelihood of experiencing positive emotions through social interactions; thus, the presence of a close friend is a particularly important source of positive emotion for those with MDD. Moreover, because people with MDD are easily stuck in ruminative thinking, social activities can serve as a helpful distraction. Engaging in healthy conversations with others allows them to express their emotions and gain insights that facilitate cognitive reappraisal or problem solving. Future research should test the newly developed frameworks for interpersonal ER and examine how interpersonal factors are adaptive or maladaptive in MDD.

9.5. Understanding the mechanisms

Perhaps most importantly, although researchers have made much progress in understanding the phenomenology of emotion dysregulation in MDD, little is known about the causal role of emotion dysregulation in the etiology of MDD. There is a dearth of longitudinal studies, and the existing ones have focused almost exclusively on rumination (e.g., Arditte & Joormann, 2011; Gibb et al., 2012; Nolen-Hoeksema, 2000). It will be important for future investigations to document changes in the use of various ER strategies by following the same group of participants throughout their course of MDD. Additionally, the phenomenology of emotion dysregulation in MDD has led some researchers to develop and examine new treatment approaches that incorporate ER components into the traditional CBT for MDD, and preliminary evidence has demonstrated promising outcomes (Berking, Ebert, Cuijpers, & Hofmann, 2013; Watkins et al., 2007, 2011). Therefore, a better understanding of the etiological role of ER strategies in MDD can facilitate the development and improvement of treatments that target problematic ER processes in MDD.

10. Conclusion

MDD is characterized by elevated negative affect and diminished positive affect, and these emotional aberrations may be attributed in part to emotion dysregulation. Researchers over the past few decades have made significant progress in understanding ER and MDD, including the ability to appropriately select and effectively implement ER strategies. Given these research advances, we review empirical studies on eight ER strategies and four types of research designs. Findings suggest that emotion dysfunction in MDD is primarily associated with aberrant habitual use of ER strategies, rather than impaired ability to implement strategies when instructed to do so. This suggests that training people with MDD to select appropriate ER strategies and providing them with clear guidance on effective implementation of helpful strategies may be beneficial. Additionally, researchers have primarily focused on self-reported trait ER, and there is much less evidence on spontaneous ER and mood effects of ER strategies observed in the lab as well as little evidence on naturalistic ER. Given the retrospective biases inherent in global self-reports, researchers should increase the use of other research designs, especially those with high ecological validity, such as ESM. Moreover, researchers have mostly examined the regulation of negative emotions in MDD, and more attention is needed for

investigating positive emotion regulation in MDD. Finally, given the discrepancies between self-report and laboratory findings, future research should directly compare different methodologies to clarify these inconsistent results.

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Contributors

Daphne Y. Liu conducted literature searches and provided summaries of relevant research studies. Daphne Y. Liu and Renee J. Thompson collectively wrote this manuscript and both have approved the final manuscript.

Conflict of interest

Both authors declare that they have no conflicts of interest.

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