



## Review

## Emotion regulation in social anxiety and depression: a systematic review of expressive suppression and cognitive reappraisal

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## HIGHLIGHTS

- Social anxiety is characterized by an overreliance on expressive suppression.
- Social anxiety is also connected to ineffective use of cognitive reappraisal.
- Evidence is mixed regarding the role of expressive suppression in depression.
- Depression is strongly associated with an underutilization of cognitive reappraisal.
- Emotion regulation may play a role in co-occurring social anxiety and depression.

## ARTICLE INFO

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## ABSTRACT

Social anxiety disorder (SAD) and major depressive disorder (MDD) are highly comorbid, and together they result in greater functional impairment and a poorer prognosis than either condition alone. Theoretical models implicate impairments in emotion regulation in the development and maintenance of internalizing disorders, yet there has been no systematic comparison of emotion regulation in social anxiety and depression. The current review presents an in-depth examination of the literature on two widely-studied emotion regulation strategies, expressive suppression (ES) and cognitive reappraisal (CR), in SAD and MDD. Our review indicated that SAD is broadly characterized by an overreliance on ES, which is associated with negative social and emotional consequences. SAD is also characterized by ineffective utilization of CR, which inhibits the potential positive emotional benefits of this adaptive emotion regulation strategy. In contrast, MDD is broadly characterized by an underutilization of CR, which may be particularly detrimental in stressful or uncontrollable situations. For both SAD and MDD, treatment intervention appears to address deficits in CR but not ES. After reviewing the literature, we propose multiple pathways by which impairments in ES and CR may increase risk for the co-occurrence of SAD and MDD. Clinical implications and future research directions are also discussed.

## 1. Introduction

Social anxiety disorder (SAD) is the fourth most common mental disorder, with an estimated lifetime prevalence of 12.1% (Kessler et al., 2005). SAD rarely occurs in isolation, exhibiting particularly high rates of comorbidity with major depressive disorder (MDD; Ruscio et al., 2008). Individuals with SAD are 3.5–4.5 times more likely to develop MDD than those without SAD (Beesdo et al., 2007; Ruscio et al., 2008; Stein et al., 2001), and large-scale studies indicate that the onset of SAD precedes the development of MDD in up to 70% of comorbid cases (Fava et al., 2000; Kessler, Stang, Wittchen, Stein, & Walters, 1999). Furthermore, co-occurring SAD and MDD results in greater functional

impairment, poorer prognosis (Kessler et al., 1999; Stein et al., 2001), greater risk for alcohol and substance dependence (Nelson et al., 2000), and higher rates of suicidality (Mineka, Watson, & Clark, 1998) than when SAD occurs alone. Thus, it is of substantial importance to understand the factors that contribute to the co-occurrence of SAD and MDD.

## 1.1. Emotion &amp; emotion regulation

Multiple theoretical models assert that impairments in emotion processing and emotion regulation underlie the co-occurrence of anxiety and depression (e.g., Clark & Watson, 1991; Hofmann, Sawyer,

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Fang, & Asnaani, 2012; Kashdan & Farmer, 2014). Clark and Watson's (1991) tripartite model originally proposed that “dysfunctionally high negative affect” (p. 331) represented a shared affective component of anxiety and depression that could account, in part, for their overlap. Brown, Chorpita, and Barlow (1998) extended the tripartite model to better incorporate the heterogeneity of the anxiety disorders, finding that in addition to high negative affect, both depression and social anxiety (but not other anxiety disorders) were characterized by low positive affect. Subsequent research has consistently identified an association between social anxiety and diminished experiences of positive emotion,<sup>1</sup> even after controlling for the influence of depression (Gilboa-Schechtman, Shachar, & Sahar, 2014; Hughes et al., 2006; Kashdan, 2007; Watson & Naragon-Gainey, 2010).

SAD and MDD also exhibit similar deficits in processing and responding to emotions. Both individuals with high social anxiety and those with high levels of depression endorse difficulty identifying, understanding, and tolerating their emotions, which may further contribute to their maladaptive patterns of emotional experience (Hofmann et al., 2012; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). These overlapping patterns of high negative affect and low positive affect, coupled with difficulties identifying and tolerating emotions, point to impairments in emotion regulation as potential common underlying mechanisms in the co-occurrence of SAD and MDD.

Theoretical models implicate emotion regulation in the development and maintenance of mood and anxiety disorders (e.g., Heimberg, Brozovich, & Rapee, 2014; Hofmann et al., 2012). Emotion regulation encompasses a multi-faceted, heterogeneous, and complex set of processes by which an individual influences his or her own emotional experience and emotional expression. By far the most prominent theoretical model of emotion regulation in the psychological literature is Gross' (1998) process model of emotion regulation. According to the process model, emotion generation occurs through a temporal sequence of steps, beginning with a psychologically-relevant *situation*. The individual focuses on the situation (*attention*) and then interprets the situation (*appraisal*) according to personally-relevant goals and biases. In reaction to the appraisal, an emotional *response* is generated by the individual, which subsequently modifies the situation and restarts the emotion-generating process from the beginning. This situation-attention-appraisal-response sequence represents the process through which emotion is generated and within which emotion regulation occurs.

The process model outlines five “families” of emotion regulation strategies that occur at various points throughout the emotion generation sequence: situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross, 1998; Gross, 2014). *Situation selection* reflects an effort to regulate emotions by choosing to enter or avoid potential emotion-generating situations. Once an individual chooses to enter a situation, four additional strategies can be utilized. *Situation modification* reflects an effort to regulate emotion by purposefully changing the external environment to alter its emotional influence. *Attentional deployment* reflects an effort to regulate emotions by carefully directing attention (e.g., concentrating or distracting) within an emotion-generating situation. *Cognitive change* reflects an effort to regulate emotion by changing one's subjective appraisal of the emotion, the emotion-generating situation, or feelings of self-efficacy in the situation. Finally, *response modulation* reflects an effort to regulate emotion by influencing one's physiological response or behavioral actions in an emotion-generating situation. Importantly, these emotion regulation strategies are not inherently adaptive or maladaptive, but their utility depends on the contexts in and effectiveness with which they are employed (Gross, 2014).

Gross' process model of emotion regulation provides a useful

theoretical framework within which to examine the role of emotion dysregulation in psychopathology. Impairments in emotion regulation have been suggested as key components of internalizing disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Campbell-Sills, Ellard, & Barlow, 2014; Cisler, Olatunji, Feldner, & Forsyth, 2010; Gross & Jazaieri, 2014; Hofmann et al., 2012; Joormann & Siemer, 2014) and causal mechanisms in both SAD (Goldin et al., 2014a; Wirtz, Hofmann, Riper, & Berking, 2014) and MDD (Berking, Wirtz, Svaldi, & Hofmann, 2014). Thus, emotion dysregulation may be a salient risk factor for the co-occurrence of SAD and MDD.

Gross and Jazaieri (2014) have called for psychology to move beyond generalities about problematic emotional processing and make “more specific statements about the precise nature of these problematic emotional responses” (p. 389). However, there has been no systematic comparison of emotion regulation in social anxiety and depression. In the present review, we focus on two widely studied emotion regulation strategies: expressive suppression (ES) and cognitive reappraisal (CR). Using Gross' process model as a theoretical backdrop, we aim to provide depth and specificity to our knowledge of emotion regulation disturbances as potential mechanisms of comorbidity through a systematic review of ES and CR in SAD and MDD.

### 1.2. Expressive suppression

ES refers to the suppression of outward emotional expression, such as “putting a smile on” when anxious or keeping a “poker face” when pleased (Gross, 2014). ES falls within the *response modulation* category of the process model of emotion regulation. It is considered to be a *response-focused strategy*, because it is typically used to regulate emotion after the emotion has already been generated (i.e., late in the emotion-generative process; Gross, 2014). ES is intended to regulate the outward, or behavioral, emotional response but may do little to regulate the internal emotional response. Paradoxically, using ES to manage negative emotions, such as sadness or anxiety, has been shown to heighten the felt intensity of negative emotion, whereas using ES to manage positive emotions, such as happiness, has been shown to dampen the experience of positive emotion (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Gross, 2014; Gross & John, 2003; Kalokerinos, Greenaway, & Denson, 2014). ES is also associated with feelings of inauthenticity, perhaps because hiding outward emotion creates incongruence between an individual's internal emotional state and outward emotional expression (Gross & John, 2003). Furthermore, ES has long-term negative effects on life satisfaction, self-esteem, and wellbeing (Brewer, Zahniser, & Conley, 2016; Gross & John, 2003; Haga, Kraft, & Corby, 2009; Hu et al., 2014; Moore, Zoellner, & Mollenholt, 2008).

Using ES to regulate emotions also has social consequences. More frequent ES is associated with less sharing of both negative and positive emotions and greater discomfort with close relationships (Gross & John, 2003). Individuals who used ES more frequently reported receiving less social and emotional support from their peers, and their peers reported feeling less close to them (Gross & John, 2003). Similarly, unfamiliar conversation partners of people using ES reported feeling less rapport with their partner, less liking for their partner, and less desire for a future interaction compared to the conversation partners of people not using ES (Butler et al., 2003). The cognitive consequences of ES have also been shown to impact information processing in social interactions, such that more frequent ES is associated with poorer memory for social information (Richards & Gross, 2000) and greater distraction during conversations (Butler et al., 2003). Given that ES is associated with negative consequences in emotional experience, social functioning, and overall wellbeing, it is generally thought to be a maladaptive emotion regulation strategy.

<sup>1</sup> Note that some distinctions may exist among the facets of positive emotion in social anxiety and mood disorders (Naragon-Gainey, Watson, & Markon, 2009; Watson & Naragon-Gainey, 2010).

### 1.3. Cognitive reappraisal

CR reflects an effort to change the subjective evaluation of an emotion-generating situation to modify its emotional impact (Gross, 2014; Gross & John, 2003). For instance, an individual who is nervous about a job interview may tell himself that the interview is “a chance for me to learn more about the company,” thereby alleviating some of his anxiety (Gross, 2014). In Gross's process model of emotion regulation, CR falls within the *cognitive change* family and is considered an antecedent-focused strategy, because the strategy is typically used early in the emotion-generation process, before the emotional response has become fully activated (Gross & John, 2003). Research suggests that the effects of CR are independent from the effects of ES. When measured using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) in undergraduate samples, the two constructs were not significantly correlated, and the effects of ES and CR on other constructs (e.g., depression, impulse control) were additive rather than interactive (Gross & John, 2003; Kashdan & Steger, 2006).

Unlike ES, using CR to regulate emotions yields affective benefits, corresponding with more internally felt and outwardly expressed positive emotion as well as less internally felt and outwardly expressed negative emotion, as measured by both self- and peer-reports (Andreotti et al., 2013; Gross & John, 2003; Kalokerinos et al., 2014; Nowlan, Wuthrich, & Rapee, 2016). The emotional benefits of CR coincide with quality-of-life benefits, as more frequent CR is specifically associated with higher levels of life satisfaction, self-esteem, optimism, and environmental mastery (Brewer et al., 2016; Gross & John, 2003; Haga et al., 2009; Hu et al., 2014; Moore et al., 2008). Thus, individuals who use more frequent CR may feel more confident in their ability to regulate their emotions and subsequently more in control of their lives.

Like ES, CR also has social implications. Peers of individuals who used CR more frequently reported closer connection and greater liking for them than did peers of those who used CR less frequently (Gross & John, 2003). Additionally, although CR is related to expressing more positive but less negative emotion, those who reported using more frequent CR endorsed more frequent *sharing* of both positive and negative emotions (Gross & John, 2003). It may be that openly discussing negative emotions without expressing those emotions engenders closeness and likability in interpersonal relationships. Because of its associated positive outcomes in emotional experience, social relationships, and life satisfaction, CR is generally considered to be an adaptive emotion regulation strategy (Brewer et al., 2016; D'Avanzato, Joermann, Siemer, & Gotlib, 2013).

## 2. Methods

Given that both ES and CR have the potential to impact social and emotional functioning and are widely studied in the literature, the present review focused specifically on these two strategies. Relevant studies for this systematic review were identified using PsycINFO and PubMed, as well as a backwards literature search that consisted of scanning references cited in identified articles to evaluate if these references might be relevant to our search criteria. Our search terms included various combinations of ‘cognitive reappraisal’, ‘positive reappraisal’, ‘expressive suppression’, ‘emotion suppression’, ‘emotional suppression’, ‘social anxiety’, ‘social phobia’, and ‘depression’. Eligible articles were limited to empirical studies published (or in press and available online) in peer-reviewed journals through December 2017. Our original search yielded 360 unique articles. We excluded articles that did not pertain to the study of ES or CR in social anxiety or depression ( $n = 174$ ).<sup>2</sup> We also excluded studies of children and

<sup>2</sup> Our literature search focused on the constructs of ES and CR as defined by Gross' process model of emotion regulation. Articles that examined the internal suppression of emotional experience, or other non-expression suppression-

adolescents ( $n = 51$ ), studies that focused exclusively on the neural correlates of emotion regulation ( $n = 18$ ),<sup>3</sup> studies published in a language other than English ( $n = 11$ ), and case studies ( $n = 2$ ). Our final publication list included 104 articles (see Fig. 1 and Tables 1-3).

## 3. Results

### 3.1. Expressive suppression

#### 3.1.1. Expressive suppression in SAD

Research overwhelmingly demonstrates that individuals with SAD report using ES more frequently than individuals without SAD (Blalock et al., 2016; D'Avanzato et al., 2013; Farmer & Kashdan, 2012; Kashdan & Breen, 2008; Spokas et al., 2009; Werner et al., 2011). Cross-sectional studies yielded moderate to large effect sizes, such that individuals with high social anxiety reported more frequent ES on a trait, state, and daily basis than did those with low social anxiety ( $d$ 's = 0.49–1.09<sup>4</sup>; Aldao & Dixon-Gordon, 2014; De France & Hollenstein, 2017; Kashdan & Steger, 2006; Kivity & Huppert, 2016; Kneeland et al., 2016; McLean et al., 2007; O'Toole et al., 2014; O'Toole et al., 2017; Park et al., 2011; Schroder et al., 2015; Spokas et al., 2009). The relationship was also demonstrated in an undergraduate sample using a longitudinal design, with higher baseline ES predicting higher social anxiety three months later ( $d = 0.56$ ; Kashdan & Breen, 2008). These results were replicated in clinical samples; individuals with SAD reported more frequent ES on a trait and daily level than did controls without an anxiety disorder ( $d$ 's = 0.77–1.16; Blalock et al., 2016; Jazaieri et al., 2017). Thus, more frequent ES appears to be characteristic of both clinical and non-clinical social anxiety, with effect sizes consistently moderate to large.

Behavioral examinations of emotion regulation provide additional support for this conclusion. Werner et al. (2011) developed the Emotion Regulation Interview (ERI), based on Gross' process model of emotion regulation, to investigate the ways in which individuals with SAD use emotion regulation techniques to manage their anxiety. Participants were interviewed about their emotion regulation strategies during a laboratory speech task and two recent anxiety-evoking social situations. Compared to controls, participants with SAD reported using more frequent ES to regulate their anxiety, both during the speech task ( $d = 0.51$ ) and in recent social situations ( $d = 0.59$ ).

Daily diary and experience-sampling methodologies have revealed important day-to-day connections between social anxiety and ES, with a particular focus on positive emotion and positive experiences. Using experience sampling, Kashdan and Steger (2006) found that undergraduates with high social anxiety reported fewer positive events on the days when their social anxiety and ES were both high. A daily diary study by O'Toole et al. (2014) yielded similar findings, with greater daily ES more strongly predicting diminished positive affect for undergraduates high in social anxiety than for those low in social anxiety ( $d = 0.20$ ). The effects of ES on positive emotional experiences in social anxiety may be especially relevant when considering overlap with depression.

Most research on ES has been conducted using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), which assesses ES of emotions broadly (i.e., collapsing across positive and negative emotions). However, the literature indicates that the *type* of emotional

(footnote continued)

related constructs, were not included in our review.

<sup>3</sup> Published studies with both neuroimaging data and behavioral data were included, although only the behavioral data are discussed in the present review.

<sup>4</sup> Although we did not conduct a formal meta-analysis, we have provided effect sizes throughout the Results section and in Tables 1-3 where possible. To facilitate comparability among studies, correlation coefficients ( $r$ ), eta-squared ( $\eta^2$ ), and odds ratios (ORs) were converted to Cohen's  $d$ , with  $d = 0.20$  be interpreted as a “small” effect size,  $d = 0.50$  as “moderate,” and  $d = 0.80$  as “large” (J. Cohen, 1988).

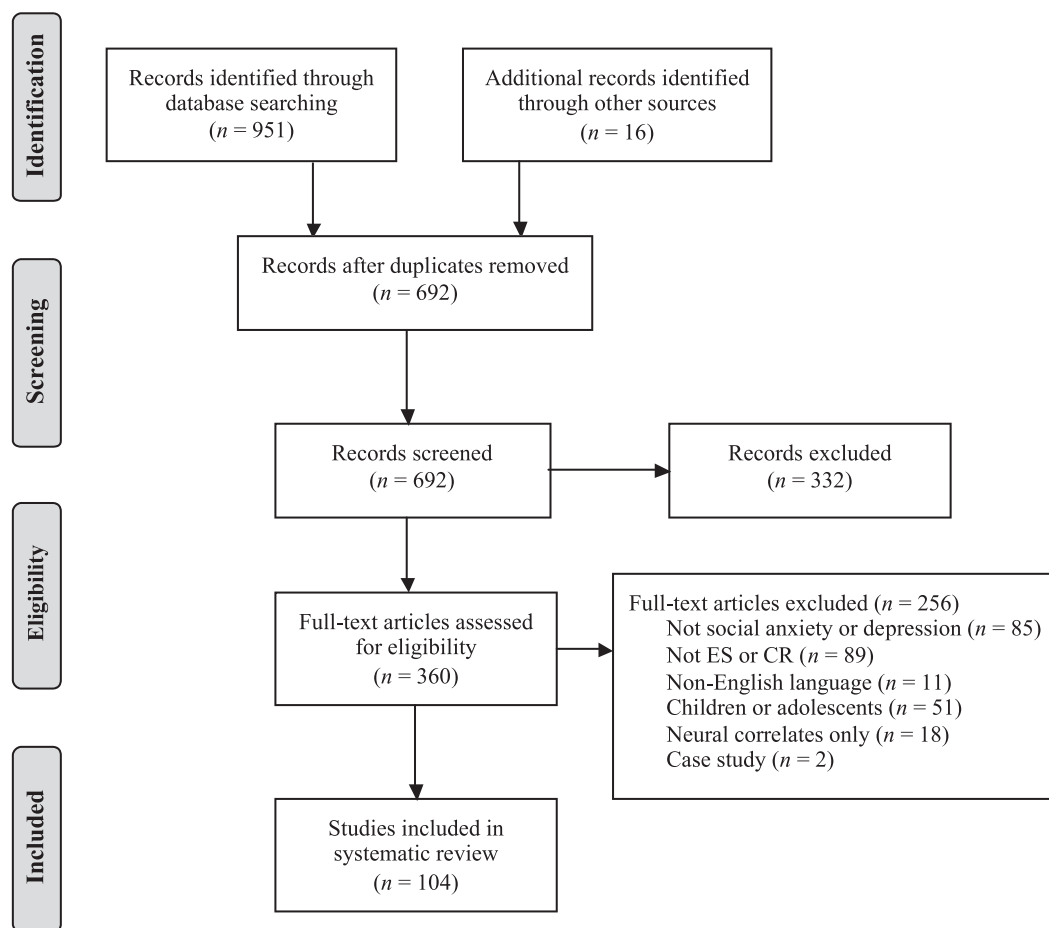


Fig. 1. PRISMA diagram of articles selected for review.

Note: CR = cognitive reappraisal; ES = expressive suppression.

expression that is suppressed may matter for individuals with SAD. For example, among undergraduates, higher social anxiety was associated with more frequent suppression of anger expression in response to social rejection ( $d = 0.52$ ; Breen & Kashdan, 2011). This finding aligns with related research demonstrating that individuals with SAD made greater efforts to conceal and control their anger relative to controls (Erwin, Heimberg, Schneier, & Liebowitz, 2003), and attempts to suppress anger were associated with higher levels of social anxiety and depressive symptoms among individuals with SAD and non-clinical samples (Erwin et al., 2003; Trew & Alden, 2009). Thus, suppression of anger expression may play a relevant role in the experience of depression for individuals with social anxiety.

Suppressing positive emotions may also be detrimental for individuals high in social anxiety. Using a two-week daily diary methodology, Farmer and Kashdan (2012) found that for undergraduates high in social anxiety, more frequent ES for positive emotions (but not negative emotions) resulted in lower positive affect and fewer positive social experiences the following day. ES for positive emotions had no effect on next-day positive affect for undergraduates low in social anxiety. Blalock et al. (2016) partially replicated these results, finding that individuals with SAD exhibited more frequent ES for positive emotions than individuals without SAD ( $d = 0.77$ ). More frequent ES for positive emotions was also related to lower daily positive affect, but these effects were not specific to individuals with SAD. Thus, ES for positive emotion may not only occur more frequently but may also yield more negative consequences for individuals with high social anxiety, contributing to lower positive affect and fewer positive social events on a day-to-day basis.

Taken together, the literature demonstrates that social anxiety is

associated with more frequent ES, across multiple contexts and at various levels of symptom severity. Research on dysfunctional beliefs about emotional experience and expression in SAD may help to explain this overreliance on ES. Individuals with high social anxiety endorse beliefs that emotional control is important and expressing emotion conveys weakness, and as such, ES may be employed in an effort to avoid social rejection (Spokas et al., 2009). Additionally, social anxiety is characterized by less acceptance and more experiential avoidance of negative emotions (Kashdan, Ferrisizidis, Farmer, Adams, & McKnight, 2013b; Kivity & Huppert, 2016), suggesting that individuals with SAD may believe negative emotions to be inappropriate or intolerable and thus try to hide these emotions in an attempt to avoid the emotional experience altogether. High social anxiety is also associated with beliefs that emotional responses cannot be changed or controlled (De Castella et al., 2014; Kneeland et al., 2016). Thus, when individuals with high social anxiety experience undesirable emotions, believing that they cannot control their internal emotional response, they may use ES in an attempt to conceal any outward displays of emotion. Indeed, Spokas et al. (2009) found that dysfunctional beliefs about emotion accounted for significant unique variance<sup>5</sup> in the relationship between social

<sup>5</sup> Methodological concerns exist when conducting mediation analyses with cross-sectional data. Preacher and Hayes (2008) have suggested that mediation analyses, when applied to cross-sectional data, estimate the unique effect of the variable of interest with regard to the relation between other, distinct variables. However, others (e.g., Maxwell & Cole, 2007) question the utility of this approach. Because we believe that studies that report “mediation” results using cross-sectional data do provide useful, although limited, information, we have chosen to describe their findings using the more conservative language of



**Table 1**  
Social anxiety articles selected for review.

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Aldao, Jazaieri, Goldin, and Gross (2014)	71	Adults with SAD	Intervention-related changes	Individual CBT	Maladaptive (including ES); Adaptive (including CR)	Single items for weekly ES and CR frequency	Maladaptive strategies (including ES) declined weekly and adaptive strategies (including CR) increased weekly over the course of CBT. Weekly use of maladaptive strategies predicted weekly social anxiety symptoms, whereas weekly use of adaptive strategies did not.
Bialock, Kashdan, and Farmer (2016)	79	Community adults (40 with SAD; 39 controls)	Daily diary	n/a	ES frequency; CR frequency	ERQ-F	Participants with SAD reported greater trait ES ( $d = 1.15$ ) and less trait CR ( $d = 1.47$ ) than controls. SAD also predicted greater daily ES for positive ( $d = 1.16$ ) and negative ( $d = 1.00$ ) emotions and less daily CR for positive emotions ( $d = 0.52$ ).
Bleichert et al. (2015)	71	Undergraduate students (38 LSAs; 33 HSAs)	Intervention-related changes	Brief CR training	CR ability	Reduction in negative emotion	HSAs demonstrated higher negative valence ratings of negative social statements than LSAs ( $d = 0.59$ ). Following a CR training and extinction phase, HSAs exhibited equivalent CR ability relative to LSAs.
Breen and Kashdan (2011)	170	Undergraduate students	Cross-sectional	n/a	ES frequency	Single item assessing ES of anger (ES-Anger)	Social anxiety was associated with ES-Anger ( $d = 0.52$ ) in response to hypothetical social rejection vignettes.
Brozovich et al. (2015)	75	Adults with SAD	Intervention-related changes	Individual CBT	CR frequency	ERQ-F (CR subscale)	CR frequency increased over the course of CBT ( $d = 1.92$ ), but weekly CR did not predict weekly social anxiety symptoms.
Cristea, Matt, Tătar, and David (2013)	103	Undergraduate students	Intervention-related changes	Brief CR training	CR ability	Pre/post reduction in negative emotion	For participants with HSA, CR training was more effective in regulating negative emotions than was a brief training in reflective pondering.
Cristea et al. (2014)	99	Adults with HSA	Intervention-related changes	Brief CR training	CR ability	Pre/post physiological changes	Participants with higher social anxiety derived fewer physiological benefits from CR than from acceptance, whereas participants with lower social anxiety derived equivalent benefits from both strategies.
Farmer and Kashdan (2012)	89	Undergraduate students	Daily diary	n/a	ES frequency; CR frequency	Single ES and CR items adapted from the ERQ	For participants higher in social anxiety, higher ES for positive emotions predicted less next-day positive emotion and positive social events. Participants higher in social anxiety did not benefit from greater use of daily CR.
Goldin, Manber, Hakimi, Canli, and Gross (2009a)	32	Community adults (15 with SAD; 17 controls)	Intervention-related changes	Brief CR training	CR ability	Pre/post reduction in negative emotion	Participants with SAD reported greater negative emotion than controls in reaction to social threat images ( $d = 1.00$ ), but when prompted to use CR, the two groups showed equivalent reduction in negative emotion to social threat images.
Goldin, Manber-Ball, Werner, Heimberg, and Gross (2009b)	54	Community adults (27 with SAD; 27 controls)	Intervention-related changes	Brief CR training	CR ability	Pre/post reduction in negative emotion	Participants were instructed to either “react” or use CR for negative self-beliefs. All received a brief training in CR to regulate emotions related to negative self-beliefs. Although individuals with SAD exhibited greater negative emotion than controls in both conditions, the two groups exhibited equivalent decreases in negative emotion when using CR versus just reacting (SAD: $d = 2.45$ ; Control: $d = 2.85$ ).
Goldin et al. (2012)	75	Adults with SAD (38 CBT; 37 WL)	Intervention-related changes	Individual CBT	CR self-efficacy	ERQ-SE (CR Subscale)	CBT yielded greater increases in CR than did WL ( $d = 1.03$ ). Pre-to-post increases in CR accounted for significant unique variance in the relationship between group (CBT or WL) and pre-to-post reductions in social anxiety.
Gilboa-Schechtman et al., 2014	75	Adults with SAD (38 CBT; 37 WL)	Intervention-related changes	Individual CBT	ES frequency; ES self-efficacy; CR frequency; CR self-efficacy	Single items assessing weekly ES/CR frequency and self-efficacy	CBT yielded greater increases in CR frequency ( $d = 0.63$ ) and self-efficacy ( $d = 0.84$ ), but no differences in ES frequency ( $d = 0.29$ ) or self-efficacy ( $d = 0.20$ ), compared to WL. During CBT, only weekly increases in CR self-efficacy predicted next-week decreases in social anxiety, and change in CR self-efficacy over treatment predicted post-CBT social anxiety.
Goldin, Lee, et al. (2014a)	59	Adults with SAD (31 CBT; 28 WL)	Intervention-related changes	Brief CR training	CR ability	Pre/post reduction in negative emotion	When reappraising social criticism, the CBT group showed significant pre-to-post-treatment improvements in CR ability ( $d = 1.92$ ), but the WL group did not ( $d = 0.56$ ).

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Table 1 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Goldin et al. (2016)	108	Adults with SAD (36 CBT; 36 MBSR; 36 WL)	Intervention-related changes	Group CBT; Group MBSR	CR frequency CR self-efficacy	ERQ-F (CR subscale); ERQ-SE (CR subscale)	Both CBT and MBSR yielded greater increases in CR frequency ( $d = 0.59$ and $0.71$ , respectively) and CR self-efficacy ( $d = 1.05$ and $0.58$ , respectively) relative to WL. Changes in CR frequency mediated the relationship between treatment condition (CBT v. WL, MBSR v. WL) and change in social anxiety. Changes in CR self-efficacy mediated the relationship between CBT v. WL (but not MBSR v. WL) and change in social anxiety.
Goldin, Morrison, Jazaieri, Heimberg, and Gross (2017)	108	Adults with SAD (36 CBT; 36 MBSR; 36 WL)	Intervention-related changes	Group CBT; Group MBSR	CR frequency CR self-efficacy	ERQ-F (CR subscale); ERQ-SE (CR subscale)	CBT produced greater increases in CR self-efficacy than did MBSR (90% increase vs. 56% increase). During CBT, increases in weekly CR frequency and CR self-efficacy predicted next-week decreases in social anxiety.
Helbig-Lang, Rusch, Rief, and Lincoln (2015)	139	Community adults (67 with SAD; 72 controls)	Intervention-related changes	Brief CR instruction	CR ability	Pre/post reduction in anxiety	SAD participants reported lower perceived success in using CR as instructed relative to controls ( $d = 0.51$ ), but SAD and control participants did not differ in actual anxiety reduction when using CR.
Jamieson, Nock, and Mendes (2013)	69	Community adults (34 with SAD; 35 controls)	Intervention-related changes	Brief CR instruction	CR ability	Pre/post physiological functioning	SAD participants who received CR instruction perceived greater coping resources ( $d = 0.58$ ) and produced a more adaptive profile of physiological reactivity ( $d = 0.55-0.76$ ) compared to SAD participants with no CR instruction.
Jazaieri, Goldin, and Gross (2017)	242	Study 1: Community adults (128 with SAD; 42 controls) Study 2: Adults with SAD (40 CBT; 32 WL)	Study 1: Cross-sectional Study 2: Intervention-related changes	Study 1: n/a Study 2: Individual CBT	ES frequency CR frequency	ERQ-F	Study 1: SAD participants reported lower CR ( $d = 0.77$ ) and higher ES ( $d = 0.77$ ) than did controls. ES negatively predicted life satisfaction for those with SAD ( $d = -0.54$ ) but not controls ( $d = -0.39$ ). Study 2: The CBT group, but not the WL group, experienced increases in CR (CBT: $d = 2.17$ ; WL: $d = 0.35$ ) and decreases in ES from pre- to post-treatment (CBT: $d = 0.87$ ; WL: $d = 0.29$ ). Decreases in ES, but not increases in CR, predicted improvements in satisfaction with life.
Kashdan and Breen (2008)	145	Undergraduate students	Longitudinal	n/a	ES frequency	ERQ-F (ES subscale)	Baseline ES positively predicted social anxiety three months later ( $d = 0.56$ ). ES moderated the relationship between social anxiety and positive emotion, such that less ES predicted greater positive emotion at low levels of social anxiety, but ES was unrelated to positive emotion at high levels of social anxiety.
Kashdan and Steger (2006)	97	Undergraduate students	Daily diary	n/a	CR frequency ES frequency	Trait: ERQ-F Daily: 8 selected ERQ-F items	Trait social anxiety predicted greater daily ES ( $d = 0.65$ ). Using daily variables, greater daily social anxiety interacted with greater daily ES to predict lower daily positive affect and fewer daily positive social events.
Kivivity and Huppert (2016)	124	Undergraduate students (43 HSA with CR training; 40 HSA no CR training; 41 LSA no CR training)	Daily diary	Brief CR training	ES frequency ES self-efficacy CR frequency CR self-efficacy	Trait: ERQ-F; ERQ-SE; Behavioral measure of CR Daily: 4 selected ERQ-F and ERQ-SE items	At baseline, HSAs reported lower CR self-efficacy ( $d = 0.82-0.85$ ), higher ES frequency ( $d = 0.82-1.09$ ), and higher ES self-efficacy ( $d = 0.44-0.65$ ) than did LSAs. Following the CR intervention, HSAs reported greater daily CR frequency ( $d = 0.42-0.47$ ) and CR self-efficacy ( $d = 0.62-0.93$ ), as well as lower social anxiety ( $d = 0.88-0.96$ ) when regulating their daily emotions, than did LSAs and HSAs that did not receive the intervention. Compared to LSAs, HSAs overall reported greater perceived effort and lower perceived success in their daily use of CR (effort: $d = 0.46-0.65$ ; success: $d = 0.34-0.54$ ) and ES (effort: $d = 0.33-0.63$ ; success: $d = 0.53-0.61$ ).

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Table 1 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Kneeland, Nolen-Hoeksema, Dovidio, and Gruber (2016)	89	Community adults and undergraduate students (41 in “emotion is malleable” condition; 48 in “emotion is fixed” condition)	Intervention-related changes	n/a	CR frequency ES frequency	State-based ERQ-F	Trait social anxiety was associated with ES ( $d = 0.61$ ) but not CR during a speech task ( $d = -0.32$ ). Higher social anxiety was also associated with lower belief in emotion malleability ( $d = -0.49$ ). During the speech task, participants in the “malleable” condition used more CR ( $d = 0.51$ ), but did not differ in ES, when compared to participants in the “fixed” condition.
Kocovski, Fleming, Hawley, Huta, and Antony (2013)	137	Adults with SAD (53 CBT; 53 MAT; 31 WL)	Intervention-related changes	Group CBT; Group MAT	CR frequency	ERQ-F (CR subscale)	CR increased from pre- to post-treatment in CBT ( $d = 0.21$ ) and MAT ( $d = 0.17$ ), but not in WL ( $d = 0.12$ ). CBT yielded larger increases in CR relative to WL ( $d = 0.73$ ) but not relative to MAT ( $d = 0.06$ ).
Mathewson et al. (2013)	23	Adults with SAD	Intervention-related changes	Group CBT	CR frequency ES frequency	ERQ-F	CR increased over the course of treatment, and increases in CR predicted positive treatment response ( $d = -0.49$ ). ES did not change across visits and did not predict treatment response.
Moscovitch et al. (2012)	25	Adults with SAD	Intervention-related changes	Group CBT	CR frequency ES frequency	ERQ-F	CR increased over the course of treatment ( $d = 0.94$ ), but ES did not change ( $d = 0.29$ ). Early increases in CR (i.e., from pre- to mid-treatment) differentiated responders from non-responders ( $d = 1.06$ ).
Moscovitch, Chiupka, and Gavric (2013)	66	Undergraduate students (33 HSAs; 33 LSAs)	Cross-sectional	n/a	CR frequency CR self-efficacy	Self-reported use of CR in response to negative imagery	Fewer HSAs (53.1%) reported using CR to cope with negative images compared to LSAs (90.3%) during a laboratory speech task.
O'Connor, Staiger, Kambouropoulos, and Smillie (2014)	402	Community adults	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	Social anxiety was associated with both ES ( $d = 0.72$ ) and CR ( $d = -0.68$ ). ES and CR both accounted for unique variance in the relationship between reward sensitivity and social anxiety.
O'Toole, Jensen, and Fentz (2014)	114	Undergraduate students (62 HSAs; 52 LSAs)	Daily diary	n/a	CR frequency ES frequency	Trait: ERQ-F Daily: 8 selected ERQ-F items	HSAs reported higher daily ES ( $d = 0.75$ ) and lower daily CR ( $d = 0.37$ ) than did LSAs. Trait social anxiety interacted with daily ES and daily CR ( $d = 0.20$ ) to predict same-day positive affect. Specifically, higher ES was more strongly associated with lower positive affect for HSAs than for LSAs ( $d = 0.20$ ). Higher CR was more strongly associated with higher positive affect for LSAs than for HSAs ( $d = 0.20$ ).
O'Toole, Zachariae, and Meennin (2017)	114	Undergraduate students (62 HSAs; 52 LSAs)	Daily diary	n/a	CR frequency ES frequency	Trait: ERQ-F Daily: 8 selected ERQ-F items	HSAs reported higher daily ES than LSAs ( $d = 0.96$ ), but the two groups did not differ in daily CR ( $d = 0.03$ ). Social anxiety did not moderate the relationship between emotion intensity and ER strategy.
Spokas, Luterek, and Heimberg (2009)	95	Undergraduate students (33 HSAs; 31 MSAs; 31 LSAs)	Cross-sectional	n/a	ES frequency	EQO (Emotion inhibition subscale)	There was a significant effect of group on ES ( $d = 0.65-0.73$ ), such that ES increased linearly as level of social anxiety increased. Beliefs about emotional expression (i.e., that controlling expression is important; that expression is a sign of weakness) accounted for significant unique variance in the relationship between social anxiety and ES.
Werner, Goldin, Ball, Heimberg, and Gross (2011)	81	Community adults (48 with SAD; 33 controls)	Cross-sectional	n/a	ES frequency ES self-efficacy CR frequency CR self-efficacy	Emotion Regulation Interview; ERQ-F; ERQ-SE	SAD participants endorsed higher ES frequency ( $d = 0.51-0.59$ ), lower ES self-efficacy ( $d = 0.46-0.74$ ), and lower CR self-efficacy ( $d = 0.74-1.19$ ) than did controls. The groups did not differ on CR frequency.

Note. CBT = cognitive behavioral therapy; CR = cognitive reappraisal; ER = emotion regulation; ERQ-F = Emotion Regulation Questionnaire, Self-Efficacy Items; ES = expressive suppression; HSA = high social anxiety; LSA = low social anxiety; MAT = mindfulness and acceptance-based therapy; MBSR = mindfulness-based stress reduction; SAD = social anxiety disorder; WL = waitlist.

<sup>a</sup> Effect sizes in bold are significant at the  $p < .05$  level. Where possible, correlation values and other effect sizes have been transformed to Cohen's  $d$ . Effect sizes were not included in the Relevant Findings column if sufficient information was not provided in the publication text.

**Table 2**  
Depression articles selected for review.

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Aker et al. (2014)	201	Community adult women (109 previously-depressed; 64 never-depressed)	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	Previously-depressed women reported more frequent ES ( $d = 0.39$ ) and less frequent CR ( $d = -0.37$ ) compared to never-depressed women. ES ( $d = 0.05$ ), but not CR ( $d = -0.01$ ), predicted past history of depressive episodes.
Amstadter and Vernon (2008)	65	Trauma-exposed undergraduate students (31 with PTSD; 34 without PTSD)	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	Within a trauma-exposed population, neither ES ( $d = 0.28$ ) nor CR ( $d = -0.43$ ) was associated with depressive symptoms.
Andreotti et al. (2013)	124	Undergraduate students	Cross-sectional	n/a	CR frequency	ERQ-F (CR subscale)	CR was correlated with depressive symptoms ( $d = -0.61$ ), negative affect ( $d = -0.61$ ), and positive affect ( $d = 0.68$ ).
Arditte and Joormann (2011)	40	Community adults with MDD	Longitudinal	n/a	ES frequency; CR frequency	ERQ-F	Neither ES ( $d = -0.02$ ) nor CR ( $d = -0.49$ ) was associated with depressive symptoms at baseline, nor did they predict recovery status (i.e., current depression versus remitted depression) after six months (ES: $d = -0.20$ ; CR: $d = 0.19$ ).
Arens et al. (2013)	120	German women, i.e., individualistic culture (30 depressed; 30 controls)	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	Non-depressed Turkish women reported higher CR than depressed Turkish women ( $d = 0.65$ ), but the two groups did not differ on ES. (Group differences were not reported for the German sample.) Depressed participants from both cultures used ES more frequently than CR.
Beblo et al. (2012)	80	Turkish women, i.e., collectivistic culture (30 depressed; 30 controls)	Cross-sectional	n/a	ES frequency	ERQ-F (ES subscale)	Inpatients with MDD reported higher ES than did controls ( $d = 1.00$ ).
Boden and Thompson (2015)	919	Adults (39 inpatients with MDD; 41 controls) MTurk adults	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	Depression was associated with ES but not CR. Poorer emotional awareness (i.e., lower voluntary attention to emotions, lower source clarity) predicted higher ES, which in turn predicted higher depression.
Brewer et al. (2016)	1568	Undergraduate students	Longitudinal	n/a	ES frequency; CR frequency	ERQ-F	Baseline CR predicted lower psychosocial distress (i.e., depression, anxiety, stress) nine months later (Time 2; $d = 0.13$ ). ES predicted lower life satisfaction ( $d = 0.11$ ) but was unrelated to psychological distress ( $d = 0.08$ ) at Time 2.
Brummer et al. (2014)	543	Community adults (317 younger adults; 175 middle-aged adults; 85 older adults)	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	The relationship between ES and depression varied by age: ES was associated with depression in younger adults ( $d = 0.77$ ) and middle-aged adults ( $d = 0.49$ ), but not in older adults ( $d = 0.00$ ). The CR and depression relationship was not reported.
Cohen (2013)	241	Adults with cancer	Cross-sectional	n/a	ES frequency	CECS	ES was negatively associated with depression among in-treatment cancer patients.
Cheng et al. (2017)	96	Adult caregivers; (32 in CR intervention, 64 in psychoeducation)	Intervention-related changes	CR-specific intervention	CR ability	Pre/post reduction in depression	Caregivers who received the CR intervention reported lower depression than those who received a standard psychoeducation ( $d = 0.50$ ) or simplified psychoeducation intervention ( $d = 0.46$ ).
Decker et al. (2016)	72	Adults with cocaine-dependence	Cross-sectional	n/a	ES frequency; CR frequency	ERQ-F	CR was associated with depressive symptoms ( $d = -0.61$ ) and was lower among participants with comorbid MDD compared to those without MDD ( $d = 0.94$ ). ES was not related to depressive symptoms ( $d = 0.08$ ) or MDD diagnosis.
del Palacio-Gonzalez and Bernsen (n.d.)	220	Undergraduate students	Cross-sectional and prospective	n/a	ES frequency; CR frequency	ERQ-F	For memories of events that were highly central to identity, higher ES predicted higher concurrent depression, even after controlling for memory valence and other emotion regulation strategies. ES did not predict depression seven weeks later ( $\beta = -0.04$ ).

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Table 2 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
del Palacio-Gonzalez et al. (2017)	43	Undergraduate students (20 HDSS; 23 LDSS)	Daily memory diary	n/a	ES frequency CR frequency	Trait: ERQ-F Daily: single item from ERQ-F	HDSS reported higher trait ES ( $d = 0.71$ ) and lower trait CR ( $d = -0.98$ ) than did LDSS. When regulating negative emotions related to daily autobiographical memories, HDSS reported higher ES ( $d = 1.44$ ) than LDSS but did not differ in CR ( $d = 0.59$ ). BAS moderated the relationship between CR and depression, such that higher CR was associated with lower depression among those with low BAS but was not associated with depression among those with high BAS. ES was not associated with either BAS or depression. CR accounted for significant unique variance in the relationship between mindfulness and depression, such that mindfulness positively predicted CR, which negatively predicted depression.
Dennis (2007)	67	Undergraduate students	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	Following a negative mood induction, CR instructions yielded moderate reductions in depressed mood ( $d = 0.44$ ). CR instructions appeared more effective at reducing depression for participants with low baseline depression than for those with high baseline depression. Following a negative mood induction, CR instructions were more effective at reducing depressive symptoms when preceded by “waiting” instructions ( $d = 0.84$ ). CR was equally effective when preceded by emotional acceptance instructions or by “waiting” instructions ( $d = 0.29$ ).
Desrosiers et al. (2013)	187	Treatment-seeking adults	Cross-sectional	n/a	CR frequency	ERQ-F (CR subscale)	In a subsample of 118 participants, ES predicted a significant percentage (6%) of the variance in depressive symptom scores.
Diedrich et al. (2014)	48	Adults with MDD	Intervention-related changes	Brief CR instruction	CR ability	Pre/post reduction in depression	Cluster analyses yielded four patterns of emotion regulation: high regulators (moderate CR/high ES); high CR/low ES; moderate CR/low ES; and low regulators (low CR/moderate ES). There was a significant effect of group on depressive symptoms ( $d = 1.30$ ): the low regulator group had the highest depression score, and the high CR/low ES group had the lowest depression score.
Diedrich et al. (2016)	54	Adults with MDD	Intervention-related changes	Brief CR instruction	CR ability	Pre/post reduction in depression	Recovered-depressed participants did not differ from non-depressed participants on trait ES ( $d = 0.15$ ) or CR ( $d = 0.18$ ). When watching a sadness-inducing film, recovered-depressed participants reported using more state ES ( $d = 0.50$ ) but not state CR ( $d = 0.29$ ) than did non-depressed participants.
Durá et al. (2010)	175	Women with breast cancer	Cross-sectional	n/a	ES frequency	CECS	CR was negatively correlated with depression ( $d = -0.56$ ) and interpretation bias ( $d = -0.52$ ). CR also accounted for significant unique variance in the relationship between interpretation bias and brooding, which in turn predicted depression.
Eftekhari et al. (2009)	301	Undergraduate women	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	ES was associated with depressive symptoms in both Study 1 ( $d = 0.70$ ) and Study 2 ( $d = 0.63$ ).
Ehring et al. (2010)	73	Undergraduate students (30 recovered-depressed; 43 non-depressed)	Intervention-related changes	Brief ES instruction; Brief CR instruction	ES frequency CR frequency	Trait: ERQ-F State: Two ES items; two CR items	Women with MDD endorsed lower CR than did controls ( $d = 0.60$ ). After receiving negative feedback on a difficult task, MDD participants with low CR made more errors on a subsequent task. MDD participants with high CR did not differ from controls on subsequent errors.
Everaert et al. (2017)	119	Undergraduate students	Cross-sectional	n/a	CR frequency	CBERQ (Positive reappraisal subscale)	CR did not differ from controls on subsequent errors.
Fergus and Bardeen (2016)	904	Study 1: 465 online adults Study 2: 439 online adults	Cross-sectional	n/a	ES frequency	ERQ-F (ES subscale)	
Fladung et al. (2010)	66	Adult women (33 inpatients with MDD; 33 controls)	Cross-sectional	n/a	CR frequency	ERQ-F (CR subscale)	

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Table 2 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Forkmann, Scherer, Böcker, et al. (2014a)	232	Inpatient adults	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	Inpatients with suicidal ideation reported higher ES ( $d = 0.62$ ) and lower CR ( $d = 0.32$ ) than did inpatients without suicidal ideation, regardless of whether or not a patient is in a current depressive episode.
Forkmann, Scherer, Pawelzik, et al. (2014b)	44	Inpatient adults with a depressive disorder	Intervention-related changes	Individual CBT	ES frequency CR frequency	ERQ-F	CR increased from pre- to post-treatment ( $d = 0.70$ ), and pre-to-post change in depression was associated with post-treatment CR ( $d = 0.63$ ). ES did not change from pre- to post-treatment ( $d < 0.06$ ). Pre-treatment depression was associated with both pre- and post-treatment ES ( $d = 0.72$ and $d = 0.85$ , respectively). Trait depression was associated with trait ES burden ( $d = 0.87$ ), but not daily ES burden ( $d = -0.12$ ). Trait ES burden was also associated with processing speed, even after accounting for depression.
Franchow and Suchy (2015)	62	Undergraduate students	Cross-sectional	n/a	ES "burden"	15 items examining trait and state ES effort	CR was negatively associated with depressive symptoms and did not differ by gender.
Garnefski et al. (2004)	630	Adults	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR was correlated with depressive symptoms in the community sample ( $d = -0.28$ ), elderly sample ( $d = -0.58$ ), and psychiatric outpatient sample ( $d = -0.30$ ). (The authors also examined two adolescent samples, not detailed here.)
Garnefski and Kraaij (2006)	1001	Adults (611 community adults; 89 elderly adults; 301 psychiatric outpatient adults)	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR during a stressful life event (e.g., bereavement, divorce) was negatively associated with current depressive symptoms even after controlling for event type, perceived preventability, and other cognitive ER strategies.
Garnefski and Kraaij (2009)	139	Community adults	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	Among the 210 participants who completed a measure of depression, depressed mood was negatively associated with CR and positively associated with ES.
Gross and John (2003)	595	Study 5: Undergraduate students	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	Depressed mood was negatively associated with CR ( $d = -0.32$ ) and positively associated with ES ( $d = 0.54$ ).
Haga et al. (2009)	489	Undergraduate students (211 American adults, 193 Norwegian adults, 85 Australian adults)	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	Participants with MDD endorsed less frequent CR than did controls, and within the MDD sample, CR was negatively associated with depressive symptoms ( $d = -1.04$ ).
Hori et al. (2014)	207	Adults (74 with MDD; 133 control subjects)	Cross-sectional	n/a	CR frequency	WCCL (Positive reappraisal subscale)	Women with high ES reported greater depression/dejection at first oncology visit, after diagnosis, and after discharge than did women with low ES.
Iwamitsu et al. (2005)	14	Women with breast cancer	Cross-sectional	n/a	ES frequency	CECS	CR negatively correlated with depression ( $d = 0.63-0.70$ ), and accounted for significant unique variance in the relationship between mindfulness and depression.
Jermann et al. (2009)	240	Undergraduate students and community adults	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	Current MDD participants endorsed less CR than remitted MDD participants ( $d = 1.15$ ) and controls ( $d = 1.26$ ). The groups did not differ in ES. Across the full sample, CR was associated with lower depression ( $d = 1.19$ ) and greater ability to inhibit the effects of negative priming ( $d = 0.52$ ), and ES was associated with higher depression ( $d = 0.43$ ) and poorer ability to inhibit the effects of negative priming ( $d = 0.49$ ).
Joormann and Gotlib (2010)	101	Community adults (22 current MDD; 47 remitted MDD; 32 control subjects)	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	(continued on next page)

Table 2 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Khalaila and Cohen (2016)	110	Adult spousal caregivers	Cross-sectional	n/a	ES frequency	CECS	ES was associated with depressive symptoms ( $d = 0.68$ ) among caregivers. ES interacted with perceived caregiver burden to predict depression, indicating that the relationship between burden and depressive symptoms was stronger when ES was higher.
Kraaij and Garnefski (2006)	248	Dutch victims of war	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR was associated with depressive symptoms 20 years after the war ( $d = -0.58$ ), even after controlling for trauma-related symptoms and other cognitive coping strategies.
Kraaij et al. (2002)	99	Community older adults (65+ years)	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR was negatively associated with depression ( $d = 0.56$ ), and the relationship remained significant even after controlling for other cognitive ER strategies.
Kuyken and Brewin (1994)	64	Adult women (32 with MDD; 32 controls)	Cross-sectional	n/a	CR frequency	WCO (Positive reappraisal subscale)	When coping with stressful interpersonal events, women with MDD used less CR than did controls ( $d = 0.63$ ).
Li et al. (2015)	609	Adult women (247 with breast cancer; 362 controls)	Cross-sectional	n/a	ES frequency	CECS	ES was positively associated with depressive symptoms across both groups ( $d = 1.15-1.76$ ). Even after controlling for group membership and anxiety symptoms, ES accounted for 8.5% of the variance in depressive symptoms.
Martin and Dahlen (2005)	362	Undergraduate students	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR was negatively associated with depression ( $d = 0.45$ ), and the relationship remained significant even after controlling for other cognitive ER strategies.
Mennin et al. (2015)	21	Adults with GAD	Intervention-related changes	Individual ERT	CR frequency	ERQ-F (CR subscale)	ERT for GAD yielded increases in CR frequency ( $d = 0.52-0.72$ ) and reductions in the severity of comorbid MDD ( $d = 1.04-1.32$ ) at posttreatment, 3-month follow-up, and 9-month follow-up.
Mennin et al. (2018)	53	Adults with GAD	Intervention-related changes	Individual ERT	CR frequency	ERQ-F (CR subscale)	ERT for GAD produced greater increases in CR ( $d = 0.54$ ) and decreases in depressive symptoms ( $d = 0.93$ ) than did the comparison treatment (Modified Attentional Control). CR mediated the effect of treatment on depressive symptoms.
Millgram et al. (2015)	61	Study 3: Undergraduate students (31 HDSS; 30 LDSs)	Intervention-related changes	Brief CR training	CR ability	Pre/post sadness in the desired direction (i.e., greater or lesser)	HDSS did not differ from LDSs in using CR to regulate their emotions in the desired direction ( $d = 0.29$ ). HDSS chose to use CR to increase their emotional reaction to sad images more than LDSs ( $d = 0.70$ ), which was associated with higher felt sadness for HDSS ( $d = 0.98$ ).
Moore et al. (2008)	359	Adult women (262 undergraduates; 62 trauma-exposed community members)	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	CR was negatively associated with depression in the undergraduate ( $d = 0.56$ ) but not the trauma-exposed sample ( $d = 0.37$ ). ES was positively associated with depression in both samples (undergraduate: $d = 0.43$ ; trauma-exposed: $d = 1.15$ ).
Mutz et al. (2017)	364	Adults recruited online	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	CR was negatively correlated with depressive symptoms ( $d = 0.39$ ), and ES was positively correlated with depressive symptoms ( $d = 0.39$ ). ES accounted for significant unique variance in the relationship between mental toughness and depressive symptoms.
Nowlan et al. (2015)	81	Community adults over age 60 with type 2 diabetes (28 receiving "positive reappraisal intervention; 27 receiving "cognitive restructuring" intervention; 26 receiving "supportive counseling" intervention)	Intervention-related changes	Positive reappraisal, cognitive restructuring, or supportive counseling intervention	CR ability	Pre/post reduction in depression	None of the interventions led to changes in depressive symptoms over the one-week study period.

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Table 2 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Peh et al. (2017)	144	Adult cancer patients	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	Depression was correlated with ES ( $d = 0.37$ ) and CR ( $d = -0.47$ ). However, when hope was included in the model, neither ES nor CR exhibited a direct effect on depression.
Richmond et al. (2017)	1106	Undergraduate students	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	Depression was correlated with ES ( $d = 0.58$ ) and CR ( $d = -0.61$ ). CR, but not ES, accounted for significant unique variance in the relationship between depression and non-suicidal self-injury.
Rodin et al. (2017)	59	Combat veterans	Cross-sectional	n/a	ES ability	Behavioral task	No differences in ES were observed in veterans with versus without MDD.
Romero-Moreno et al. (2011)	130	Caregivers of relatives with dementia	Intervention-related changes	Benefit finding intervention	CR frequency	TMMS-24 (Mood repair subscale)	Increases in CR over time predicted decreases in caregivers' depression over time, regardless of treatment condition (i.e., active versus waitlist).
Rudolph et al. (2007)	100	Undergraduate students	Cross-sectional	n/a	CR frequency	CERQ (Positive reappraisal subscale)	CR was negatively correlated with depressive symptoms ( $d = 0.87$ ), but the relationship was no longer significant after controlling for other ER strategies.
Schlatter & Cameron, 2010	40	Women with breast cancer	Prospective with repeated measures (daily diary)	n/a	ES frequency	CECS	ES-Anger was positively associated with depression over the 84-day study period ( $b = 0.08$ ), but ES-Anxiety, ES-Depression, and overall ES were not associated with depression.
Simsek et al. (2017)	31	Community adult women (16 at high risk for depression; 15 at low risk for depression)	Intervention-related changes	Brief CR instruction	CR ability	Pre/post reductions in negative emotion	No group differences in CR ability emerged when participants were instructed to reappraise negative images during a computer task ( $d = 0.23$ ).
Smoski et al. (2013)	37	Community adults (18 with remitted MDD; 19 controls)	Intervention-related changes	Brief CR training	CR ability	Pre/post reductions in negative emotion	There were no group differences in CR ability when instructed to reappraise sad images during a computer task ( $d = 0.33$ ).
Soto et al. (2011)	171	Undergraduate students (71 European American; 100 Chinese)	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	Culture interacted with ES to predict depression, such that ES correlated positively with depression in American participants ( $d = 0.72$ ) but was uncorrelated with depression in Chinese participants. The interaction between culture and CR did not predict depression.
Su, Lee, and Oishi (2013)	323	Undergraduate students (172 European American; 151 Chinese)	Cross-sectional	n/a	ES frequency	Six items on suppressing positive emotion in social contexts	Culture interacted with ES to predict depression, such that ES of positive socially-disengaging emotions (e.g., pride) was associated with depression for American participants ( $d = 0.37$ ) but not for Chinese participants ( $d = -0.20$ ). Independent (versus interdependent) self-construal accounted for the effect of cultural membership.
Tran and Rimes (2017)	641	Undergraduate students	Cross-sectional	n/a	ES frequency	ASQ (Concealing Subscale)	ES was associated with depression ( $d = 0.56$ ), and ES accounted for significant unique variance in the relationship between unhealthy perfectionism and depression.
Troy et al. (2010)	65	Community adult women	Intervention-related changes	Behavioral task with brief CR instructions	CR ability	Pre/post reductions in sadness	The relationship between CR ability and depression was moderated by overall stress ( $d = 0.59$ ). At low levels of stress, CR was not associated with depression. At high levels of stress, participants with high CR exhibited less depression than those with low CR.
Troy et al. (2013)	173	Community adult women with recent life stressor	Intervention-related changes	Brief CR instructions	CR ability	Pre/post reductions in sadness	There was a three-way interaction between CR ability, stress severity, and stress controllability. In situations with high stress severity, higher CR predicted lower depression when the situation was perceived as less controllable, but higher CR predicted more depression when the situation was perceived as more controllable.

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Table 2 (continued)

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Troy et al. (2017)	429	Study 1: 301 MTurk adults Study 2: 68 community adult women	Cross-sectional	n/a	CR self-efficacy	ERQ-SE (CR subscale)	Across three studies, socioeconomic status moderated the relationship between CR and depression. For those lower in SES, CR was negatively associated with depression. For those higher in socioeconomic status, CR was not associated with depression.
Wang et al. (2014)	509	Study 3: 60 community adult women with recent life stressor Women with breast cancer	Prospective	n/a	CR frequency	CERQ (Positive reappraisal subscale)	Baseline CR was negatively associated with depressive symptoms one month later, even after controlling for baseline depression.
Wisco and Nolen-Hoeksema (2010)	83	Undergraduate students	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	CR was negatively associated with depressive symptoms ( $d = 1.01$ ), whereas ES was not associated with depression ( $d < 0.04$ ).
Yuan et al. (2014)	64	Undergraduate students (20 with "acceptance" instructions; 23 with "suppression" instructions; 20 with no regulation instructions)	Intervention-related changes	Brief ES instructions	ES ability	Pre/post reductions in depression	Participants who received instructions to use ES during a frustrating task exhibited greater reductions in depression relative to those who received no instructions ( $d = 0.73$ ).
Zhang et al. (2017)	67	Community adults (36 with MDD; 31 controls)	Cross-sectional	Brief ES instruction; brief CR instruction	ES ability CR ability	Single-item assessing emotional intensity	Participants with MDD did not differ from controls in their emotional intensity after being prompted to use ES ( $d = 0.00$ ) or after being prompted to use CR ( $d = 0.04$ ) to manage negative emotions.
Zhou et al. (2016)	429	Undergraduate students	Cross-sectional	n/a	ES frequency	ERQ-F in five social contexts (family, close friends, classmates, teachers, strangers)	ES of happiness was positively associated with depression, and this relationship was stronger in social contexts involving close relationships (i.e., family, friends, classmates; $d = 0.61-0.75$ ) compared to less close relationships (i.e., teachers, strangers; $d = 0.22-0.56$ ). ES of sadness was also positively associated with depression but did not vary based on social context.

Note. ASQ = Affective Styles Questionnaire (Hofmann & Kashdan, 2010); CBT = cognitive behavioral therapy; CECS = Courtauld Emotional Control Scale (Watson & Greer, 1983); CERQ = Cognitive Emotion Regulation Questionnaire (Garnefski, Kraaij, & Spinhoven, 2001); CR = cognitive reappraisal; ER = emotion regulation; ERQ-F = Emotion Regulation Questionnaire, Frequency Items; ERQ-SE = Emotion Regulation Questionnaire, Self-Efficacy Items; ES = expressive suppression; HDS = high depressive symptoms; MDD = major depressive disorder; LDS = low depressive symptoms; MTTurk = Amazon Mechanical Turk; SAD = social anxiety disorder; TMMS-24 = Trait Meta-Mood Scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995); WCCL = Ways of Coping Checklist (Folkman & Lazarus, 1985); WCQ = Ways of Coping Questionnaire (Folkman & Lazarus, 1988).

<sup>a</sup> Effect sizes in bold are significant at the  $p < .05$  level. Where possible, correlation values and other effect sizes have been transformed to Cohen's  $d$ . Effect sizes were not included in the Relevant Findings column if sufficient information was not provided in the publication text.



**Table 3**  
Articles selected for review that included both social anxiety and depression.

Study	N	Sample Characteristics	Study Design	Intervention	ER Strategies	ER Measures	Relevant Findings & Effect Sizes <sup>a</sup>
Aldao and Dixon-Gordon (2014)	218	Undergraduate students	Cross-sectional	n/a	ES frequency; CR frequency	Single items assessing trait ES and CR	ES ( $d = 0.65$ ), but not CR ( $d = -0.14$ ), was associated with depressive symptoms. Similarly, ES ( $d = 0.90$ ), but not CR ( $d = 0.35$ ), was associated with social anxiety symptoms.
D'Avanzato et al. (2013)	551	Community adults (189 with current MDD; 48 with remitted MDD; 58 with SAD; 256 controls)	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F	Participants with MDD or SAD endorsed higher ES ( $d = 0.50$ ) and lower CR ( $d = 0.76$ ) than controls. Participants with SAD endorsed higher ES than those with MDD ( $d = 0.45$ ), and participants with MDD endorsed lower CR than those with SAD ( $d = 0.31$ ).
De France and Hollenstein (2017)	1582	Undergraduate students	Cross-sectional	n/a	ES frequency CR frequency	ERQ-F; RESS	A subsample of 117 participants were selected for endorsing specific ER profiles on the RESS. On the ERQ-F, CR was associated with depression ( $d = -1.07$ ) and social anxiety ( $d = -0.58$ ). ES was not associated with depression ( $d = 0.30$ ) but was associated with social anxiety ( $d = 0.77$ ). On the RESS, CR was not associated with either depression ( $d = -0.32$ ) or social anxiety ( $d = -0.22$ ). ES was associated with both depression ( $d = 0.45$ ) and social anxiety ( $d = 0.87$ ).
Haines et al. (2016)	74	Community adults	Ecological momentary assessment	n/a	CR frequency	Two items assessing CR frequency	CR was not directly associated with depression or social anxiety. Depression interacted with controllability to predict CR, such that participants with high depression used CR in more controllable situations, and those with low depression used CR in less controllable situations. Controllability did not interact with social anxiety to predict CR.
McLean, Miller, and Hope (2007)	160	Undergraduate women	Cross-sectional	n/a	ES frequency	ERQ-F (ES subscale)	ES was correlated with social anxiety ( $d = 0.56$ ) and depressive symptoms ( $d = 0.35$ ). ES accounted for unique variance in the relationship between social anxiety and symptoms of disordered eating, but the relationship was no longer significant after controlling for depression. Social anxiety remained associated with ES even after controlling for depression.
Park et al. (2011)	784	Undergraduate students	Cross-sectional	n/a	ES frequency	ERQ-F (ES subscale)	ES correlated with social anxiety ( $d = 0.49$ ) and depressive symptoms ( $d = 0.56$ ). ES accounted for significant unique variance in the relationship between independent self-construal and social anxiety, as well as the relationship between interdependent self-construal and social anxiety.
Schroder, Dawood, Yalch, Donnellan, and Moser (2015)	598	Undergraduate students (Study 1: 388 Study 2: 210)	Cross-sectional	n/a	CR frequency ES frequency	ERQ-F	Across both studies, depressive symptoms were associated with CR ( $d = -0.70$ ) but not ES ( $d = 0.16$ ). In Study 2, social anxiety symptoms were associated with both CR ( $d = -0.43$ ) and ES ( $d = 0.80$ ). Beliefs that emotions could not be changed were associated with lower CR in both studies.

Note. CBT = cognitive behavioral therapy; CR = cognitive reappraisal; ER = emotion regulation; ERQ-F = Emotion Regulation Questionnaire; Frequency Items; ES = expressive suppression; MDD = major depressive disorder; RESS = Regulation of Emotion Systems Survey (De France & Hollenstein, 2017); SAD = social anxiety disorder.

<sup>a</sup> Effect sizes in bold are significant at the  $p < .05$  level. Where possible, correlation values and other effect sizes have been transformed to Cohen's  $d$ . Effect sizes were not included in the Relevant Findings column if sufficient information was not provided in the publication text.

anxiety and ES, suggesting that individuals with SAD rely on ES in an effort to keep their emotions in control and avoid negative evaluation from others.

**3.1.1.1. Expressive suppression in treatment for SAD.** Although ES differentiates between individuals with and without SAD, ES shows minimal change in response to treatment. Over a 12-week course of group cognitive behavioral therapy (CBT) for SAD, reported ES did not change ( $d = -0.29$ ; [Moscovitch et al., 2012](#)), and treatment responders did not differ significantly from non-responders in their use of ES at pre-, mid-, or post-treatment ([Mathewson et al., 2013](#)). Similar findings emerged in weekly examinations of emotion regulation during individual CBT for SAD. ES decreased over the 16-week treatment ( $d = -0.87$ ), but despite the large effect size, this decrease did not differ from that in the waitlist condition ([Goldin, Lee, et al., 2014a](#); [Jazaieri et al., 2017](#)). Moreover, decreases in ES were related to large decreases in social anxiety from pre-to-post treatment ( $d = 1.28$ ), but ES did not predict decreases in social anxiety on a weekly basis ([Goldin, Lee, et al., 2014a](#)).

Interestingly, when ES was examined in combination with other “maladaptive” emotion regulation strategies (i.e., situational avoidance, situation modification, and attentional deployment) in the same study sample, the use of maladaptive strategies as a whole more strongly predicted social anxiety than did the use of adaptive strategies (such as CR), both during and after treatment ([Aldao et al., 2014](#)). It may be that reduction in ES alone is not enough to influence affect or symptomatology for individuals with clinical levels of social anxiety. In line with this possibility, [Kashdan and Breen \(2008\)](#) observed that reductions in ES were related to increases in positive emotion over a three-month study period, but only for undergraduates with low social anxiety. Undergraduates with high social anxiety exhibited consistently low levels of positive emotion over the three-month study period regardless of their level of ES. Similarly, post-treatment ES was negatively associated with life satisfaction following CBT, suggesting that even after successful treatment, ES frequency continues to negatively affect individuals with SAD ([Jazaieri et al., 2017](#)).

### 3.1.2. Expressive suppression in depression

Compared to the research on ES in social anxiety, the literature on ES in depression presents relatively mixed findings. The majority of cross-sectional studies of non-clinical samples have found more frequent ES to be associated with greater depression, with small to moderate effect sizes in both undergraduate ( $d$ 's = 0.35–0.71; [Aldao & Dixon-Gordon, 2014](#); [Boden & Thompson, 2015](#); [del Palacio-Gonzalez, Berntsen, & Watson, 2017](#); [Gross & John, 2003](#); [Haga et al., 2009](#); [McLean et al., 2007](#); [Moore et al., 2008](#); [Richmond, Hasking, & Meaney, 2017](#); [Tran & Rimes, 2017](#)) and community adult samples ( $d$ 's = 0.39–0.70; [Fergus & Bardeen, 2016](#); [Mutz, Clough, & Papageorgiou, 2017](#)). However, other research with undergraduate samples did not find a relationship between ES and depression ( $d$ 's = 0.04–0.28; [Amstadter & Vernon, 2008](#); [Schroder et al., 2015](#); [Wisco & Nolen-Hoeksema, 2010](#)). To further complicate the picture, [De France and Hollenstein \(2017\)](#) found that ES was associated with depression when measured with the Regulation of Emotion Systems Survey (RESS;  $d = 0.45$ ) but not when measured with the ERQ ( $d = 0.30$ ). The latter findings highlight the tenuous nature of cross-sectional studies and the potential pitfalls of overreliance on a single tool (e.g., the ERQ) for measurement of complex emotion regulation constructs.

Findings from clinical and remitted samples are similarly mixed. [Joormann and Gotlib \(2010\)](#) found that ES was associated with depressive symptoms dimensionally ( $d = 0.43$ ), but no group differences

in ES were found when comparing individuals with current MDD, individuals with remitted MDD, and healthy controls. [Aker, Harmer, and Landrø \(2014\)](#) found that women with remitted MDD endorsed more frequent ES than did women with no history of MDD ( $d = 0.39$ ), but ES frequency no longer predicted depression status after accounting for CR and rumination. Research conducted with inpatient samples, on the other hand, produced conflicting results. [Beblo et al. \(2012\)](#) found that inpatients with MDD reported higher ES than did healthy controls, with a large effect size ( $d = 1.00$ ). [Forkmann et al., 2014a, Forkmann et al., 2014b](#)) similarly found that ES (but not CR) was a strong predictor of the severity of depression among inpatients with depressive disorders and significantly predicted suicidal ideation among a heterogeneous group of inpatients ( $d = 0.62$ ), regardless of whether or not they were in an active depressive episode.

Of course, cross-sectional and self-report research is limited in its scope, and many of the studies described above report only zero-order correlations between ES and depressive symptoms. Unfortunately, studies using behavioral measures and longitudinal designs do little to clarify the conflicting picture presented above, yielding predominantly small effects and null findings. [Ehring, Tuschen-Caffier, Schnülle, Fischer, and Gross \(2010\)](#) found no difference in ES when comparing undergraduates with remitted depression and controls ( $d = 0.15$ ), although those with remitted depression spontaneously used more ES during a sad film clip than controls ( $d = 0.50$ ). [Rodin et al. \(2017\)](#) found that combat veterans with and without MDD did not differ in ES ability during a behavioral task. Although longitudinal research on ES in depression is largely lacking, [Arditte and Joormann \(2011\)](#) found similarly null effects. ES was uncorrelated with depression in a community sample with MDD ( $d = -0.02$ ), and ES failed to predict recovery from depression six months later ( $d = -0.20$ ).

Research examining moderators help to shed some light on these mixed findings regarding the relationship between ES and depression. One possible explanation is that ES may only be relevant to depressive symptomatology in certain contexts, such as situations with high personal relevance. For example, ES was associated with higher depression when undergraduates thought back to events that were highly central to their identity but not when they thought back to events that were less central to their identity ([del Palacio-Gonzalez & Berntsen, n.d.](#)). A large effect was also found when examining ES for regulating negative emotions related to daily self-relevant memories, with undergraduates high in depression endorsing greater ES than those low in depression ( $d = 1.44$ ; [del Palacio-Gonzalez et al., 2017](#)). Relatedly, ES for positive emotions (i.e., happiness) was more strongly associated with depression when used in social contexts with close others, such that stronger effects emerged when ES was used during interactions with family, friends, and classmates ( $d = 0.61$ – $0.75$ ) compared to teachers and strangers ( $d = 0.22$ – $0.56$ ; [Zhou, Shang, & Wang, 2016](#)).

Using ES to manage negative emotions surrounding health-related stressors or caretaking responsibilities may also impact the experience of depression. Some studies have examined the role of ES among cancer patients, primarily using the Courtauld Emotional Control Scale (CECS; [Watson & Greer, 1983](#)). This literature robustly reports an association between ES and depression, with moderate to large effect sizes ( $d$ 's = 0.37–1.76; [M. Cohen, 2013](#); [Durá et al., 2010](#); [Iwamitsu et al., 2005](#); [Li et al., 2015](#); [Peh et al., 2017](#)). ES also predicted depression longitudinally in cancer patients, up to 84 days after diagnosis ([Schlatter & Cameron, 2010](#)). Similar findings emerged in a sample of spousal caregivers of elder adults, for whom ES was positively associated with depressive symptoms ( $d = 0.68$ ) and interacted with caregiver burden, such that the relationship between burden and depression was stronger when ES was higher ([Khalaila & Cohen, 2016](#)). Thus, using ES in highly emotional and personally-relevant contexts may be especially detrimental for the experience of depression.

Age may also be a relevant contextual factor. [Brunner, Stopa, and Bucks \(2014\)](#) found that older adults used ES more frequently than young and middle-aged adults but experienced less psychological

(footnote continued)

“unique variance accounted for” to clarify that we do not endorse true mediational interpretations of the results of these studies.

distress from its use. ES was associated with greater depression among young adults (18–29 years;  $d = 0.77$ ) and middle-aged adults (30–64 years;  $d = 0.49$ ), but not among older adults (65–91 years;  $d = 0.00$ ). These age-related results may help explain the mixed findings above, in which ES is associated with depression more often among undergraduate samples (e.g., Aldao & Dixon-Gordon, 2014; Boden & Thompson, 2015; del Palacio-Gonzalez et al., 2017; Gross & John, 2003; Haga et al., 2009; Moore et al., 2008; Richmond et al., 2017) but less so among community-based samples, which tend to have a wider age range (Aker et al., 2014; Arditte & Joormann, 2011; Joormann & Gotlib, 2010; Rodin et al., 2017).

A second possibility is that cognitive processing deficits influence the relationship between ES and depression. For example, a cross-sectional study of undergraduates found that those who worked harder to suppress their outward emotions (i.e., greater ES “burden”) endorsed higher depressive symptoms, and higher ES burden related to poorer processing speed, over and above the effects of depression (Franchow & Suchy, 2015). Using ES to regulate emotion exacts a cognitive toll, and these detrimental cognitive consequences – rather than the emotional consequences of ES – could contribute to elevated levels of depression. Alternatively, individuals who have a hard time managing their emotions using cognitive strategies (e.g., CR) may be more reliant on ES (Joormann & D’Avanzato, 2010). Joormann and Gotlib (2010) found that depressed individuals had greater difficulty inhibiting negative information than did non-depressed individuals, and this poorer cognitive inhibition was in turn related to more frequent use of ES across the entire sample. Thus, ES and cognitive deficits may facilitate a “vicious cycle” of depression: Individuals with depression experience cognitive processing deficits, making cognitive emotion regulation strategies (like CR) more difficult. When depressed individuals are unable to regulate their emotions through cognitive strategies, they may instead attempt to suppress their outward emotional expression. However, using ES could then result in more cognitive difficulties, thereby perpetuating the cycle and worsening depression. Indeed, research has demonstrated that a combination of low CR and moderate ES is associated with particularly high levels of depression (Eftekhari, Zoellner, & Vigil, 2009). Given that these studies have been conducted in cross-sectional samples, longitudinal research will be necessary to determine whether cognitive processes do indeed play a role in the relationship between ES and depression.

**3.1.2.1. Expressive suppression in treatment for depression.** Only one study has examined ES in relation to treatment for depression. In unstandardized weekly individual CBT for depressed inpatients, more frequent ES was associated with higher depression at pre- and post-treatment ( $d = 0.72$  and  $d = 0.85$ , respectively; Forkmann, Scherer, Pawelzik, et al., 2014b). However, over the course of treatment, ES remained stable from pre- to post-treatment ( $d < 0.06$ ), whereas depression decreased significantly ( $d = 1.06$ ). These findings parallel treatment research in SAD; ES appears to be related to depression but may not be directly addressed through CBT and exhibits little association with symptom change.

### 3.1.3. Conclusions on expressive suppression

Individuals with SAD possess dysfunctional beliefs about emotional expression, believing that negative emotions are intolerable, emotional experience cannot be changed, and emotional expression could lead to social rejection. In line with these beliefs about emotion, individuals with SAD use more frequent ES for negative and positive emotions than do individuals without SAD, with effect sizes in the medium to large range. Unfortunately, ES is not only ineffective at regulating emotions but also yields social and emotional consequences for individuals with SAD. Suppressing the expression of positive emotion is especially damaging, being connected with fewer positive social events and fewer positive emotions. Thus, overreliance on ES not only maintains social anxiety over time but may also contribute to low positive affect

experienced by individuals with SAD, thereby providing a potential pathway from social anxiety to the development and maintenance of depression.

The direct relationship between ES and depression is less clear. Based on correlational research with non-clinical populations, a small to moderate positive relationship between ES and depressive symptomatology appears to exist. Individuals with depression are more avoidant and less aware of their emotions, which may contribute to a heightened tendency to use ES. However, elevated ES did not characterize individuals with remitted MDD or individuals with MDD in non-treatment-seeking samples. Only among inpatients with severe mental illness did ES emerge as an influential predictor with a large effect, both for depression and for suicidality. Thus, overreliance on ES may not be as broadly characteristic of MDD as it is of SAD.

Alternatively, ES may predict depression only in certain contexts, such as those with high personal relevance like coping with a life-threatening illness or recounting identity-defining events. ES may also influence depression through related cognitive processing deficits. Individuals with depression may be more reliant on ES to regulate emotions because their cognitive resources are already taxed (e.g., from processes such as rumination). Additionally, the cognitive deficits associated with depression may make it difficult for depressed individuals to utilize more complex emotion regulation techniques (such as CR), facilitating a reliance on ES instead. These two processes may have an additive effect among individuals with severe depression, making ES especially detrimental for severely depressed or hospitalized patients.

Additional longitudinal and treatment studies examining ES are needed, both in SAD and MDD samples. Continued exploration of the link between ES for positive emotion and low positive affect in SAD will be especially important for understanding the co-occurrence of MDD and SAD. More research is also needed on the emotional consequences and treatment implications of ES in a depressed population. Preliminary findings with depressed inpatients yielded post-treatment patterns of ES similar to those in SAD, but research utilizing a standardized treatment protocol, an outpatient population, and an appropriate control group will be necessary before drawing further conclusions.

## 3.2. Cognitive reappraisal

### 3.2.1. Cognitive reappraisal in SAD

Unlike ES, research suggests that individuals with high social anxiety use CR just as frequently as individuals with low social anxiety. Trait and state CR frequency was unrelated to social anxiety symptoms among undergraduates and community samples (Aldao & Dixon-Gordon, 2014; Kashdan & Steger, 2006; Kneeland et al., 2016), and in the one study that reported a significant relationship, the effect size was small ( $d = -0.39$ ; Schroder et al., 2015). Moreover, trait and daily CR frequency did not distinguish undergraduates with high versus low social anxiety ( $d$ 's = 0.03–0.20; Farmer & Kashdan, 2012; Kivity & Huppert, 2016; O’Toole et al., 2014; O’Toole et al., 2017), and in the ERI, a speech-based behavioral task, individuals with or without SAD did not differ in CR frequency (Werner et al., 2011).

Nonetheless, CR frequency may still play a role in social anxiety. When examining behavioral inhibition and behavioral approach systems (BIS/BAS) in a non-clinical community sample, O’Connor et al. (2014) found that CR frequency accounted for significant unique variance in the relationship between BAS and social anxiety, such that lower behavioral approach predicted less frequent CR, which in turn predicted higher social anxiety. CR frequency also accounted for significant unique variance in the relationship between BIS and social anxiety, with higher behavioral inhibition predicting less frequent CR, which then predicted higher social anxiety. Heightened sensitivity to threat and blunted sensitivity to reward may act as risk factors for less frequent CR, thereby contributing to the development and maintenance of social anxiety.

CR frequency may also be important for regulating emotions that

emerge from negative *imagery* (rather than thoughts) for individuals with SAD. [Moscovitch et al. \(2013\)](#) asked undergraduates to report on their negative mental imagery during a laboratory speech task and describe how they dealt with that imagery. Only about 50% of undergraduates high in social anxiety reported using CR to cope with the negative images (i.e., by “mentally altering the content or perceptual features of the image,” [Moscovitch et al., 2013](#), p. 428), whereas 90% of undergraduates low in social anxiety reported doing so. Given that negative self-imagery has been tied to higher levels of social anxiety and serves to maintain social anxiety over time ([Heimberg et al., 2014](#)), choosing not to use CR to regulate emotion-eliciting images may heighten risk for developing SAD and perpetuate maladaptive patterns of emotion.

With the above exceptions, the literature broadly indicates that individuals with high and low social anxiety use CR with equal frequency. Emotion dysregulation in SAD may instead reflect difficulties using CR *effectively*. Individuals with high social anxiety did not differ in self-reported ease of implementing CR, but they did rate themselves as less successful in using CR for emotion regulation relative to individuals with low social anxiety ( $d$ s = 0.34–1.19; [Helbig-Lang et al., 2015](#); [Kivity & Huppert, 2016](#); [Werner et al., 2011](#)). This perceived lower self-efficacy is supported by evidence of actual ineffectiveness among those with high social anxiety. In their daily diary study, [Farmer and Kashdan \(2012\)](#) found that CR was an effective strategy for managing negative emotions for individuals low in social anxiety, leading to fewer next-day negative social events. However, those high in social anxiety appeared unable to use CR effectively, with CR having no relation to next-day emotion or social events. Moreover, individuals high in social anxiety exhibited smaller increases in positive affect when using CR relative to those low in social anxiety ( $d = 0.20$ ; [O'Toole et al., 2014](#)). Thus, social anxiety is characterized by ineffective rather than infrequent CR, and individuals with high social anxiety do not obtain the same benefits from using CR as do their low social anxiety peers.

Individuals with SAD may be able to utilize CR more effectively if they receive instructions or training. Many studies have found positive effects of CR for individuals with high social anxiety after only a single training session. For instance, [Goldin, Manber, et al. \(2009a\)](#) recruited community members to complete a computerized task that asked participants to either “just watch” or “reframe” pictures of facial expressions that conveyed negative social reactions (e.g., a mixture of anger and contempt) and report their subsequent feelings of negative emotion. Prior to completing the task, participants received a brief training in CR, in which they were instructed how to reappraise their thoughts about the picture. Compared to individuals without SAD, individuals with SAD reported higher levels of negative emotion following the negative social stimuli in both conditions, to a large effect ( $d = 1.00$ ; [Goldin, Manber, et al., 2009a](#)), but the reduction in negative emotion following CR (in the “reframe” condition) was equivalent in both groups. These results were replicated in studies using negative self-beliefs as stimuli (e.g., “No one likes me”; [Goldin, Manber-Ball, et al., 2009b](#)), facial stimuli paired with negative social comments (e.g., “You disgust me!”; [Blechert et al., 2015](#)), and guided imagery of negative social-evaluative situations to induce a negative mood ([Cristea et al., 2013](#)).

Although the training in these studies was brief (usually between 5 and 20 min), receiving CR instruction may have improved emotion regulation ability in part by facilitating feelings of self-efficacy and control for individuals with SAD. After learning to reappraise their physiological stress response as beneficial, treatment-seeking community members high in social anxiety not only demonstrated a more adaptive profile of physiological reactivity ( $d$ s = 0.55–0.76) but also endorsed having more resources to cope with the social stress task relative to high social anxiety participants who did not receive the CR instructions ( $d = 0.58$ ; [Jamieson et al., 2013](#)). Along similar lines, [Kivity and Huppert \(2016\)](#) provided a single session of CR training to undergraduates high in social anxiety who then completed a daily diary

for one week. Compared to socially anxious undergraduates who did not receive the CR training, those that received the training reported using CR with more frequency ( $d = 0.42$ ) and more self-efficacy ( $d = 0.62$ ), and they endorsed a significant decrease in social anxiety after one week ( $d = 0.88$ ). Moreover, the change in social anxiety in the trained group was partially explained by changes in beliefs about social anxiety. High social anxiety undergraduates who received the training and subsequently implemented more frequent CR in stressful situations experienced an increase in the belief that their social anxiety was malleable, which then predicted decreased social anxiety over time ([Kivity & Huppert, 2016](#)). Being able to use CR effectively – or *believing* that one can do so – may be more important for individuals with SAD than simply using CR more frequently.

**3.2.1.1. Cognitive reappraisal in treatment for SAD.** Based on the evidence above, emotion dysregulation in social anxiety may stem in part from ineffective CR, and individuals with high social anxiety appear to benefit from instruction in CR. However, some research suggests that a brief training in CR is insufficient for individuals with more severe levels of SAD ([Cristea et al., 2014](#)). Evidence-based treatment protocols, such as CBT or mindfulness and acceptance-based approaches, may provide more substantive training in CR, with longer-lasting effects.

Treatment outcome research provides evidence that CR frequency increases in response to treatment and that change in CR is an important predictor of improvement in social anxiety. During group CBT for SAD, treatment responders reported more frequent use of CR at mid- and post-treatment than did non-responders ( $d = 1.34$  and  $0.88$  respectively; [Mathewson et al., 2013](#); [Moscovitch et al., 2012](#)). Moreover, increases in CR frequency between pre- and mid-treatment assessments predicted responder status at post-treatment ( $d = 1.06$ ), and these early changes in CR were related to greater decreases in social anxiety over the course of treatment ( $d = 0.87$ ; [Moscovitch et al., 2012](#)). These changes in CR frequency may not be exclusive to CBT. [Goldin et al. \(2016\)](#) found that CR frequency mediated SAD symptom improvement for both group CBT and mindfulness-based stress reduction (MBSR). Thus, increased CR frequency appears to be a positive predictor of treatment success across multiple treatment modalities.

Not all research has demonstrated positive treatment effects on CR frequency in SAD. For instance, post-treatment CR frequency did not differ between completers of group CBT and a waitlist control group, although the effect size was moderate ( $d = 0.73$ ; [Kocovski et al., 2013](#)). Research on individual CBT for SAD found that those receiving CBT exhibited greater increases in CR frequency relative to those on the waitlist ( $d = 0.63$ ), but change in CR frequency did not predict change in social anxiety on a weekly basis or across the full course of treatment ([Brozovich et al., 2015](#); [Goldin, Lee, et al., 2014a](#)), nor did change in CR frequency predict post-treatment life satisfaction ([Jazaieri et al., 2017](#)).

Given the relationship between SAD and CR self-efficacy, positive treatment effects on CR frequency may actually reflect treatment-related improvements in perceived (or actual) CR *ability*. Whereas CR frequency did not predict treatment response, increases in perceived CR self-efficacy often did. CR self-efficacy positively predicted improvements in social anxiety over the course of treatment, and only increases in CR self-efficacy predicted post-treatment social anxiety scores ([Goldin et al., 2017](#); [Goldin, Lee, et al., 2014a](#)). Moreover, increases in CR self-efficacy fully accounted for the effect of CBT on social anxiety ([Goldin et al., 2012](#)). Unlike CR frequency, improvements in CR self-efficacy may be a mechanism of change specific to CBT for SAD. Although CR frequency mediated symptom change for both CBT and MBSR, CBT yielded greater increases in CR self-efficacy relative to MBSR ( $d = 1.05$  and  $0.58$ , respectively), and CR self-efficacy mediated treatment outcome only for the CBT group ([Goldin et al., 2016](#); [Goldin et al., 2017](#)).

Importantly, CBT appears to improve actual (not just perceived) CR ability. On a computerized social evaluation task, individuals who



completed a 16-week individual CBT protocol for SAD were better able to reappraise negative social evaluations than were waitlist controls ( $d = 1.92$  and  $d = 0.56$ , respectively; Goldin et al., 2014b). Even though the task provided a brief CR training for all participants, the CBT group exhibited significantly less negative emotion than the waitlist group when using CR to down-regulate an affective response to social criticism. Thus, CBT for SAD yielded real improvements in CR ability for managing anxiety triggered by negative judgments from others. Taken together, empirically-supported treatments for SAD, particularly CBT, yield positive changes in CR frequency, CR self-efficacy, and actual CR ability.

### 3.2.2. Cognitive reappraisal in depression

Research largely indicates that CR frequency is negatively related to depression. Among undergraduate, community, and clinical samples, less frequent CR predicted greater self-reported depression, with effect sizes predominantly in the moderate to large range ( $d$ 's = 0.28–1.19; Andreotti et al., 2013; Decker, Morie, Hunkele, Babuscio, & Carroll, 2016; Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013; Eftekhari et al., 2009; Everaert et al., 2017; Garnefski, Teerds, Kraaij, Legerstee, & van den Kommer, 2004; Garnefski & Kraaij, 2006; Gross & John, 2003; Haga et al., 2009; Hori et al., 2014; Jermann et al., 2009; Joormann & Gotlib, 2010; Kraaij, Pruyboom, & Garnefski, 2002; Martin & Dahlen, 2005; Mutz et al., 2017; Richmond et al., 2017; Rudolph, Flett, & Hewitt, 2007; Schroder et al., 2015; Wisco & Nolen-Hoeksema, 2010).<sup>6</sup> A meta-analysis provided additional support for this relationship, demonstrating that across 114 empirical studies, lower levels of CR were associated with higher levels of depression with a small-to-moderate effect size ( $d = 0.35$ ; Aldao et al., 2010).

CR frequency may differ among individuals with current versus remitted depression. Individuals with current MDD reported less frequent CR than individuals with remitted depression and controls, with moderate to large effect sizes ( $d$ 's = 0.63–1.26; D'Avanzato et al., 2013; Decker et al., 2016; Hori et al., 2014; Joormann & Gotlib, 2010; Kuyken & Brewin, 1994). Similarly, undergraduates with remitted depression did not differ from controls on trait or state measures of CR frequency ( $d = 0.18$ – $0.29$ ; Ehrling et al., 2010). However, Aker et al. (2014) found that individuals with remitted depression reported less frequent CR relative to those who had never experienced depression ( $d = 0.37$ ), with CR significantly predicting remitted depression status, even when controlling for levels of rumination. Thus, low CR frequency appears to be especially characteristic of individuals in an active episode.

Additional research has examined moderators of the relationship between CR and depression. In a non-clinical sample, the relationship between CR frequency and depression was moderated by reward sensitivity (i.e., BAS; Dennis, 2007), such that less frequent CR was associated with higher depression among those with low BAS but not those with high BAS. As noted above, low BAS has also been shown to predict less frequent CR and, subsequently, higher social anxiety (O'Connor et al., 2014). Thus, the co-occurrence of low reward sensitivity with infrequent CR may be an especially damaging combination for the manifestation of internalizing symptoms, such as depression and social anxiety. Further research is needed to replicate and support these associations among BAS, CR frequency, and internalizing symptoms.

The relationship between CR and depression may also be influenced by stress. When reflecting on past stressful life events (e.g., bereavement, divorce, war-related experiences), individuals who reported using less frequent CR during the event endorsed higher current depression, even after controlling for event type, perceived preventability, and other cognitive emotion regulation strategies ( $d = 0.58$ ; Garnefski

& Kraaij, 2009; Kraaij & Garnefski, 2006). Additionally, individuals with MDD who endorsed less frequent CR were more likely to make errors in challenging tasks, especially following negative feedback, relative to controls (Fladung, Baron, Gunst, & Kiefer, 2010). On the other hand, individuals with MDD who reported more frequent CR did not differ from controls on likelihood or actual number of errors, suggesting that habitual use of CR may serve a protective function in the face of negative emotions, such as frustration and feelings of failure (Fladung et al., 2010).

CR self-efficacy may also be important in the face of stress. When instructed to reappraise a sad film clip to “decrease its emotional impact” (Troy, Wilhelm, Shallcross, & Mauss, 2010, p. 786), women with high levels of life stress who were able to utilize CR more efficaciously reported lower levels of depression relative to those who were less efficacious in using CR. CR self-efficacy was not associated with depression for women with low levels of life stress. Controllability of life stressors also interacted with CR ability. Under conditions of high stress, more effective CR was linked to lower levels of depression, but only when the stressors were uncontrollable (Troy, Shallcross, & Mauss, 2013). The same pattern emerged when examining socioeconomic status (SES) as a marker of stress and controllability; greater CR self-efficacy predicted lower levels of depression for low SES women (i.e., those experiencing more stress and less control over their environment) but was unrelated to depression among high SES women (Troy, Ford, McRae, Zorolia, & Mauss, 2017). Thus, high CR self-efficacy may be protective for people with high levels of stress, particularly when they have little control over their stressors.

Outside of stressful contexts, CR self-efficacy does not show a direct relationship with depression (Troy et al., 2010). Instead, research suggests that individuals with depression are effective at using CR when reminded to do so. When prompted to reappraise a sad image “to reduce its negative tone” (Smoski, Keng, Schiller, Minkel, & Dichter, 2013, p. 172), individuals with remitted depression were as effective as never-depressed individuals in reducing their negative affect ( $d = 0.33$ ). Similarly, when instructed to use CR to regulate positive and negative affect, depressed undergraduates were as effective as non-depressed undergraduates ( $d = 0.29$ ; Millgram, Joormann, Huppert, & Tamir, 2015), young women at high risk for depression (i.e., genetic predisposition) were as effective as low-risk women ( $d = 0.23$ ; Simsek et al., 2017), and individuals with MDD were as effective as healthy controls ( $d = 0.04$ ; Zhang, Fan, Sun, Qiu, & Song, 2017). After a sad mood induction, instructions to use CR produced a greater reduction in depressed mood relative to a control condition for individuals with MDD ( $d = 0.44$ ; Diedrich, Grant, Hofmann, Hiller, & Berking, 2014). However, as with SAD, CR instruction was more helpful for participants with lower levels of depression than for those with higher levels of depression, suggesting that a simple reminder to use CR may have limited effectiveness in regulating negative affect for individuals with more severe depression (Diedrich et al., 2014).

Even when individuals with depression are able to effectively use CR, they may choose to implement the strategy in a way that will maintain or even increase their sadness. Individuals high in depression tended to use CR more frequently in controllable situations but less frequently in uncontrollable situations, a pattern also tied to lower levels of wellbeing (Haines et al., 2016). Similarly, when given a choice, depressed undergraduates were more likely to use CR to *increase* their negative affect in response to a sad picture than were their non-depressed peers ( $d = 0.70$ ; Millgram et al., 2015). Individuals with depression do not necessarily *want* to increase sad mood, but their emotion regulatory efforts are more likely to result in dysregulated affect. A recent systematic review of emotion regulation in MDD came to a similar conclusion, that “emotion dysregulation in MDD is mainly associated with unskillful selection... of ER strategies, rather than impaired ability to implement them effectively” (Liu & Thompson, 2017).

As with ES, cognitive processing deficits may play a role in the relationship between CR and depression. Individuals with depression

<sup>6</sup> Note that there were two exceptions in cross-sectional undergraduate studies in which trait CR frequency exhibited a non-significant relationship with depression ( $d = -0.18$ , Kashdan & Steger, 2006;  $d = -0.14$ , Aldao & Dixon-Gordon, 2014).



exhibited poorer cognitive inhibition compared to non-depressed individuals, and reduced ability to inhibit negative stimuli was related to less frequent CR among both depressed and non-depressed participants ( $d = 0.52$ ; Joormann & Gotlib, 2010). Greater interpretation bias was also associated with lower CR ( $d = -0.56$ ), which in conjunction with brooding, predicted higher depression (Everaert et al., 2017). Thus, cognitive deficits associated with depression (e.g., attentional biases, interpretation biases, cognitive control deficits) may make utilizing complex emotion regulation strategies like CR more difficult (Joormann & D'Avanzato, 2010), and as a result, individuals with depression (or at risk for depression) may be less likely to reinterpret emotion-related cognitions in an adaptive way, further strengthening their cognitive biases and potentially facilitating a depressive episode.

**3.2.2.1. Cognitive reappraisal in treatment for MDD.** Given the large body of literature linking infrequent CR to depression, surprisingly little research has directly investigated changes in CR over the course of treatment for depression. Our literature review yielded only one study that directly examined CR during CBT for depression. Forkmann, Scherer, Pawelzik, et al. (2014b) investigated changes in emotion regulation over the course of unstandardized weekly individual CBT for inpatients with MDD. CR frequency was not related to pre-treatment levels of depression ( $d = 0.20$ ) but was associated with symptom change, such that inpatients reporting more frequent post-treatment CR experienced greater decreases in depression during treatment ( $d = 0.63$ ). Thus, increases in CR frequency appear to have positive effects on depression over time, but research using standardized outpatient CBT for depression is needed to fully understand the interaction of CBT and CR in depression.

Research on non-CBT modalities has also demonstrated positive outcomes of increasing CR frequency during treatment for depression. In an examination of depression in dementia caregivers over a one-year period, increases in CR frequency corresponded with reductions in depression regardless of treatment type (i.e., psychoeducation versus control intervention; Romero-Moreno, Márquez-González, Mausbach, & Losada, 2011). Similarly, in an MDD sample, Arditte and Joormann (2011) examined whether CR frequency could predict recovery from a depressive episode over a six-month period. Although small sample size may have precluded a statistically significant effect, CR exhibited a (non-significant) moderate effect in the expected direction ( $d = 0.49$ ), with greater CR frequency predicting recovery from depression six months later, regardless of treatment status. A brief, targeted CR intervention has also been examined, with positive results. When administered to dementia caregivers, twelve hours of positive reappraisal training yielded greater reductions in depressive symptoms than did psychoeducation-based interventions ( $d$ 's = 0.46–0.50; Cheng et al., 2017).

CR frequency may also play a relevant role in mindfulness-based treatments for depression. In a cross-sectional study with French undergraduates, CR frequency accounted for significant unique variance in the relationship between mindfulness and depression, with greater mindfulness predicting more frequent CR, which in turn predicted less depression (Jermann et al., 2009). Relatedly, a brief self-compassion intervention was shown to enhance the effect of CR for individuals with MDD relative to a “waiting” (non-intervention) condition ( $d = 0.84$ ; Diedrich, Hofmann, Cuijpers, & Berking, 2016). It may be that individuals who are more mindful or self-compassionate have an easier time reframing negative emotion-generating experiences, experiencing less depression as a result. These studies are limited by their focus on trait-level processes and single-session interventions (rather than a full mindfulness-based treatment protocol), but their conclusions suggest that mindfulness-based treatment approaches, as well as acceptance and self-compassion skills training, may be useful interventions for depressed individuals because of their positive effects on CR.

### 3.2.3. Conclusions on cognitive reappraisal

Research on the relationship between SAD and CR frequency consistently yielded small, non-significant effects, suggesting that individuals with high social anxiety use CR just as frequently as individuals with low social anxiety. However, individuals with SAD may not be using CR in an effective way, because they do not reap the same social and emotional advantages as their non-anxious counterparts. Instruction and practice may help improve CR ability, with even single-session training producing moderate improvements in regulating negative affect, such that individuals with SAD were able to use CR just as effectively as individuals without SAD. Alternatively, the utility of CR may be undermined more so by self-efficacy beliefs rather than actual ability. Individuals with SAD report low confidence in their ability to use CR to manage their anxiety and other negative emotions, which may subsequently reduce the effectiveness of their emotion regulation attempts. Brief trainings in CR, then, serve as small confidence boosters for individuals with SAD, increasing belief in their ability to cope with uncomfortable and distressing emotions by using CR. A full course of treatment amplifies these outcomes and yields large effect sizes. Change in CR self-efficacy is an important mechanism of treatment change, with early improvements in reported CR success resulting in enhanced outcomes for SAD. A key aim for future research will be disentangling the effects of perceived CR ability versus actual CR ability on the development and maintenance of SAD.

Whereas SAD is characterized by ineffective CR, depression is more clearly defined by infrequent CR. Less frequent CR relates to greater depression among undergraduate, community, and clinical samples, and individuals with current MDD report less frequent CR than their remitted depressed and non-depressed peers, with the majority of effect sizes in the moderate to large range. CR frequency may be especially influential during times of high stress or in uncontrollable situations; if the situation itself cannot be changed, being able to change one's thoughts about the situation could protect against feelings of helplessness, reduce negative affect, and ultimately minimize risk for depression. Relatedly, infrequent CR may act as an underlying mechanism for the development of depression in the face of stressful life events. The combination of low reward sensitivity (i.e., BAS) and infrequent CR may be an especially potent influence on the development of internalizing symptoms, providing a potential pathway from social anxiety to the development of secondary depression. Finally, given the consistent relationship between CR frequency and depression, it is surprising that such little research has investigated the effects of CBT for depression on CR. Available research suggests that unstandardized interventions produce moderate improvements in CR frequency, but randomized controlled trials using empirically-supported treatments for depression are lacking. Directly examining CR in treatment, in addition to other, related cognitive processes (e.g., rumination, decentering), will enhance our understanding of whether CR frequency predicts treatment response and whether treatment improves CR frequency and/or ability, thereby allowing providers to refine intervention targets, improve treatment protocols, and enhance outcomes.

### 3.3. Emotion regulation as a pathway from SAD to MDD

The studies reviewed above reveal that SAD and MDD are both characterized by problems in emotion regulation strategy choice and implementation. It is possible that these overlapping patterns of impairment in emotion regulation act as a pathway for the development of MDD among individuals with SAD, an important consideration as the onset of SAD precedes that of MDD in the large majority of comorbid cases (Fava et al., 2000; Kessler et al., 1999). However, research has yet to examine this possibility directly. Only one study has conducted a side-by-side comparison of ES and CR patterns in SAD and MDD, finding that individuals with SAD exhibited more frequent ES than did individuals with MDD, and individuals with MDD exhibited less frequent CR than did individuals with SAD (D'Avanzato et al., 2013).

Nonetheless, the present literature review has identified multiple ways in which ES and/or CR could confer risk for the development of comorbid MDD among individuals with SAD.

Heightened ES frequency, particularly for positive emotions, may act as a pathway from social anxiety to depression. Social anxiety is broadly characterized by diminished experiences of positive emotion (Gilboa-Schechtman et al., 2014; Kashdan, 2007), and ES for positive emotions contributes specifically to lower positive affect and fewer positive events for individuals with SAD (Blalock et al., 2016; Farmer & Kashdan, 2012). Low positive affect is also part of the affective profile of MDD, and an overreliance on ES may reduce the experience of positive affect, thereby contributing to symptoms of anhedonia<sup>7</sup> and increasing risk for depression. Along a somewhat less direct route, ES may contribute to depression risk through its association with negative social consequences, including less social support and poorer quality friendships (Gross & John, 2003). Insecure attachment has been proposed as a potential vulnerability for both social anxiety and depression (Eng, Heimberg, Hart, Schneier, & Liebowitz, 2001), and the interpersonal consequences of ES in SAD may increase risk for depression. When individuals with SAD use ES, they feel disingenuous for hiding their emotions and, simultaneously, are perceived by others as being insincere. Thus, they are less likely to make new social connections and may even create distance in their existing relationships. Indeed, providing inadequate positive emotional responses (i.e., suppressing outward positive emotion expression) to a partner's shared good news predicted declines in relationship quality and more frequent relationship termination for socially anxious individuals (Kashdan et al., 2013a). Moreover, interpersonal factors have long been recognized as contributors to the development and maintenance of depression (see Hames, Hagan, & Joiner, 2013, for review). As such, reductions in social support, coupled with the affective consequences of ES, may increase risk for depression among individuals with SAD.

Preliminary evidence for this pathway is provided by research on the dissociation, or disconnect, between positive emotional experience and behavior (Mauss et al., 2011). Researchers measured the extent to which positive emotion was experienced internally relative to the extent to which positive emotion was expressed outwardly; a larger disconnect represented more felt emotion but less emotional expression (i.e., more ES). Among undergraduates, greater dissociation for positive emotion was related to lower levels of social connectedness six months later, which in turn was related to higher levels of depression after one year. We might expect a similar pattern to emerge in SAD. Individuals with SAD employ frequent ES in an effort to regulate their positive emotions, experiencing fewer daily positive social events as a result (Farmer & Kashdan, 2012). The short-term social consequences of ES may lead to long-term reductions in social support and connectedness, and subsequently, the development of MDD.

CR provides another potential pathway between social anxiety and depression. Individuals with SAD endorse the belief that they are ineffective at using CR to regulate their emotions. Given the association between MDD and low CR frequency, individuals with SAD who also use CR less frequently may be more vulnerable to developing MDD. Research indicates that low CR frequency is predictive of depressive symptoms among individuals with SAD (D'Avanzato et al., 2013). Thus, using CR less frequently may contribute to higher levels of depression among individuals with SAD, thereby increasing the likelihood of developing comorbid MDD.

<sup>7</sup> Although distinct constructs, positive affect exhibits a strong, negative relationship with anhedonia across clinical and non-clinical samples ( $d = -1.19$ ; Watson & Naragon-Gainey, 2010). Both constructs are also independently related to social anxiety and depression, but it should be noted that positive affect and anhedonia exhibit stronger relationships with MDD ( $d = -0.89$  and  $1.25$ , respectively) than with SAD ( $d = -0.31$  and  $0.63$ , respectively; Watson & Naragon-Gainey, 2010).

Why might some individuals with SAD use CR more or less frequently than others? It may simply be that believing CR cannot be used effectively encourages less frequent use. Indeed, undergraduates who more strongly endorsed the belief that their emotions and anxiety could not be changed also reported less frequent CR (Schroder et al., 2015). Individuals with high social anxiety also endorse the belief that emotional responses cannot be changed or controlled (De Castella et al., 2014; Kneeland et al., 2016), and as a result, they may be less likely to engage in CR as an emotion regulation technique.

The connection between cognitive impairments and emotion regulation may help to expand this pathway further. SAD is associated with a number of cognitive processing biases, such as attentional bias towards threat and negative interpretation bias, that are thought to play a causal role in the development and maintenance of the disorder (Heimberg et al., 2014; Morrison & Heimberg, 2013). Through these cognitive biases, individuals with SAD are hypervigilant to negative social stimuli in their surroundings and may also avoid positive social stimuli. As discussed above, difficulties inhibiting negative stimuli were related to less frequent CR and more frequent ES, which in turn were related to greater depression (Joormann & Gotlib, 2010). Thus, the cognitive processing biases associated with SAD may make individuals with SAD more attuned to negative social and emotional information and less likely to reinterpret emotion-related cognitions in an adaptive way. The resulting decreases in CR frequency may then act as a risk factor for the subsequent development of depression (Joormann & D'Avanzato, 2010).

On a larger scale, the attentional and memory biases associated with SAD may contribute to broader cognitive deficits and thus play into the “vicious cycle” of depression described above. Because individuals with SAD devote many cognitive resources to monitoring their environment for threat and managing their own social impression, they may experience difficulty regulating their emotions using more complex strategies, such as CR. Thus, individuals with SAD who exhibit stronger cognitive biases may also be less likely to use CR, making them more vulnerable to depression. Simultaneously, these individuals may opt for an emotion regulation strategy that requires fewer cognitive resources, such as ES. Unfortunately, using ES more frequently will likely maintain social anxiety and contribute to further cognitive processing difficulties, thereby perpetuating the “vicious cycle.”

Lastly, the co-occurrence of low reward sensitivity and infrequent CR may be a detrimental combination for the development of depression in social anxiety. Low BAS sensitivity is theorized to play a role in the development and maintenance of SAD and has been shown to predict increases in depression over time (Kimbrel, 2008; Kimbrel, Mitchell, & Nelson-Gray, 2010; Naragon-Gainey, Gallagher, & Brown, 2013). Given that low BAS is also associated with CR frequency in both social anxiety and depression (Dennis, 2007; O'Connor et al., 2014), individuals with SAD who also exhibit low BAS may use CR less frequently and thus be more vulnerable to developing depression.

#### 4. Discussion

Our examination of ES and CR revealed both shared and specific vulnerabilities for SAD and MDD. SAD is characterized by an overreliance on ES for positive and negative emotions, which has affective and interpersonal consequences for individuals with high social anxiety. Trait depression is also associated with heightened ES, but the direct relationship between ES and MDD is less clear. Instead, ES may interact with cognitive vulnerabilities to contribute to elevated risk for MDD. CR represents difficulties in emotion regulation self-efficacy in SAD. Individuals with SAD endorse the belief that they cannot use CR effectively to regulate their emotions, and some evidence suggests that this perceived deficit corresponds with actual CR ability. MDD is consistently characterized by infrequent CR.

#### 4.1. Future directions

Future research should carefully consider other components of emotion regulation, such as context and flexibility (Haines et al., 2016; Hofmann et al., 2012; Joormann & Siemer, 2014; Kashdan & Steger, 2006). The context of an emotion-generating situation, in addition to when and how emotion regulation strategies are employed, may influence the affective consequences of a given strategy. The work of Troy et al. (2010, 2013, 2017), for instance, highlighted the influences of situational context, in which stress level and perceived controllability impacted the relationship between CR and depression. Additionally, differences in the use and utility of ES have emerged when comparing (traditionally Western) individualistic culture with (traditionally Eastern) collectivist culture. More frequent ES is associated with negative mental health consequences (e.g., higher depression, higher anxiety, and lower positive affect) among participants from independent cultures but is associated with mental health benefits (e.g., lower negative affect, less loneliness, better emotional recovery) among those from interdependent cultures (Arens, Balkir, & Barnow, 2013; Hu et al., 2014; Soto, Perez, Kim, Lee, & Minnick, 2011; Su et al., 2013; Yuan, Liu, Ding, & Yang, 2014). The study of ES as an underlying mechanism of internalizing symptoms, such as anxiety and depression, must be informed by cultural context.

Emotion regulation research has also highlighted the importance of flexibility in strategy use (Aldao, Sheppes, & Gross, 2015; Bonanno & Burton, 2013; Gross & Jazaieri, 2014; Haines et al., 2016; Hofmann et al., 2012). Although our review primarily focused on emotion regulation at a trait level, the effectiveness of emotion regulation at a state level may depend on the ability to flexibly select and use different strategies based on situational demands and personal goals. Non-clinical research has demonstrated the benefits of flexible emotion regulation strategy use. Being able to more flexibly apply ES (e.g., generating more or less suppression) in a given situation prospectively predicted better adjustment to college two years later (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). Similarly, the ability to use adaptive emotion regulation strategies, like CR, with greater cross-situation variability was linked to lower levels of psychopathology (Aldao & Nolen-Hoeksema, 2012). Clinical research has also begun to examine emotion regulation flexibility in social anxiety and depression specifically, with a focus on experiential avoidance. Individuals high in social anxiety and individuals high in depression have been shown to exhibit inflexible use of experiential avoidance when regulating negative emotions, especially when those emotions are at their most intense levels (O'Toole et al., 2017; Shahar & Herr, 2011). These findings suggest that emotion regulation flexibility enables better psychological adjustment to the emotion-generating environment, but individuals with high levels of internalizing symptoms experience difficulty flexibly modifying their emotion regulation strategies (Aldao et al., 2015; Bonanno & Burton, 2013). Future research should incorporate emotion regulation flexibility, particularly for ES and CR, in addition to frequency and effectiveness of strategy use.

#### 4.2. Clinical implications

Our literature review provides a number of potential targets for treatment interventions aimed at SAD, MDD, and their co-occurrence. For SAD, increasing CR appears to be an important mechanism of change related to symptom improvement in empirically-supported treatments (e.g., CBT, MBSR). Although the mechanism by which CR changes during treatment needs further clarification, it is possible that direct and repeated cognitive restructuring practice in CBT not only increases the frequency of CR but also enhances confidence in using CR for emotion regulation purposes. Additionally, perceived self-efficacy of CR in managing anxious emotions predicted weekly changes in social anxiety during treatment (Goldin, Manber, et al., 2009a). Broadening the application of cognitive restructuring to other emotions, such as

down-regulating sadness or up-regulating enjoyment, may encourage clients to utilize CR for emotions other than anxiety, thereby generalizing the skills learned in therapy to be applied in other areas of their life.

ES, on the other hand, should be targeted directly in therapy. Given their broad emotional deficits, individuals with SAD may benefit from psychoeducation on the social utility of expressing emotion as well as practice identifying and reacting to felt emotions. In-session exposures could be used to practice expressing emotions in social situations, which would help challenge the belief that expressing emotion conveys weakness and leads to social rejection. Therapists may specifically want to emphasize the importance of expressing positive emotion, which could increase positive affect and facilitate more positive interactions over time.

The lack of research on ES and CR in treatment for MDD makes specific recommendations difficult; systematic research in this area is greatly needed. Given the effectiveness of CBT for MDD, it is not much of a stretch to imagine that cognitive restructuring enhances CR and encourages increased frequency of its use. However, depressed individuals exhibit a propensity to use CR to up-regulate their negative mood (Millgram et al., 2015). Therapists should make a point to encourage clients to utilize CR for emotions other than sadness, which may increase adaptive use of the strategy and encourage up-regulation of positive emotions. Like individuals with SAD, individuals with MDD would also benefit from emotion-focused psychoeducation, with an additional treatment aim being to enhance identification and understanding of their own emotional response.

For both SAD and MDD, directly targeting emotion regulation in treatment may be an important intervention. Preliminary research suggests that adding emotion regulation components to a traditional CBT protocol is a feasible next step. In an effort to improve the effectiveness of CBT for generalized anxiety disorder (GAD), Mennin and colleagues developed Emotion Regulation Therapy (ERT; Mennin & Fresco, 2014). ERT incorporates psychoeducation, teaching, and practice implementing adaptive emotion regulation strategies along with more traditional CBT components, such as exposures. In both open and controlled trials for individuals with primary GAD and comorbid MDD, ERT yielded moderate to large decreases in anxiety and depressive symptoms, with increases in CR frequency mediating reductions in depressive symptoms (Mennin, Fresco, O'Toole, & Heimberg, 2018; Mennin, Fresco, Ritter, & Heimberg, 2015). ERT has not yet been studied in SAD, but the present review suggests that individuals with SAD would benefit from the addition of emotion regulation components in treatment. Given the positive effects of ERT for GAD with comorbid depression, ERT may also be useful for prevention and treatment of comorbid depression in SAD.

#### 4.3. Limitations

Our literature review is the first to systematically compare and contrast the research on ES and CR in social anxiety and depression, but the limitations of our review must also be carefully considered. First, our review focused primarily on the constructs of ES and CR as defined by Gross's process model of emotion regulation. Consequently, the large majority of reviewed papers used the ERQ (Gross & John, 2003), which has the potential to restrict the study of ES and CR to the specifics of a single measure. Overreliance on the ERQ may miss important nuances of ES and CR as emotion regulation strategies, as the original (and most widely used) version of the ERQ focuses only on regulation frequency, rather than perceived or actual ability, and collapses across the regulation of positive and negative affect. Recent research has also called into question the validity of the ES and CR factors on the ERQ. De France and Hollenstein (2017) found that ES and CR related differently to social anxiety and depression when measured by the ERQ versus the RESS. Moreover, examinations of the ERQ in non-undergraduate community samples were unable to replicate the two-factor structure using



the original 10-item questionnaire (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014; Wiltink et al., 2011). Continuing to broaden methodologies for measuring ES and CR will be important for enhancing our understanding of these constructs and their impact on internalizing disorders.

Second, methodological concerns exist with studies that rely on self-report measures and cross-sectional designs. Self-report measures are particularly vulnerable to response bias, assessing emotion regulation only when participants are aware of, can remember, and can verbalize its use. Cross-sectional designs are especially problematic when examining theoretical models involving mediation. Although some researchers have argued that using mediation-related analytic techniques with cross-sectional data is sometimes merited for the purposes of hypothesis generation (Hayes, 2013), mediation approaches using data collected at a single time point can generate substantially biased estimates of longitudinal parameters (Maxwell & Cole, 2007). In our literature review specifically, nearly all studies that reported “mediation” results were conducted using cross-sectional data. Findings from these studies should be interpreted with caution. Future research would do well to consider collecting data using neuropsychological and physiological measures, at longitudinal time points, or through true experimental designs in which ES or CR are directly manipulated.

Methodological concerns also exist among studies that use behavioral measures or brief interventions to measure emotion regulation ability. Studies that included behavioral measures of CR, for instance, typically asked or instructed participants to reframe thoughts about negatively-valenced stimuli (e.g., videos, images, facial expressions, etc.) in order to modify the emotional impact of such stimuli. Although the CR instructions are in line with CR as defined by the process model of emotion regulation, the operational definition of the outcome varied widely. Depending on the study, improvement in CR ability was defined as change in negative emotion (Blechert et al., 2015; Cristea et al., 2013; Goldin, Manber, et al., 2009a; Goldin, Manber-Ball, et al., 2009b; Goldin, Ziv, et al., 2014b; Simsek et al., 2017; Smoski et al., 2013), change in anxiety (Helbig-Lang et al., 2015), change in psychophysiology (Cristea et al., 2014; Jamieson et al., 2013), change in sadness (Millgram et al., 2015; Troy et al., 2010, 2013), or change in depression (Cheng et al., 2017; Diedrich et al., 2014, 2016; Nowlan, Wuthrich, Rapee, Kinsella, & Barker, 2015). The impact of CR may not be equivalent across these various outcomes, which could complicate interpretations and limit generalizability of the findings.

Fourth, our literature review was complicated by the exact issue that we set out to address: the co-occurrence of social anxiety and depression. Although certain studies set out to examine emotion regulation in social anxiety, or in depression, it is unlikely that the researchers were able to truly examine these conditions in isolation. Individuals diagnosed with SAD may also have had MDD, and visa versa. Even in non-clinical and undergraduate samples, the overlap of social anxiety and depression can be problematic, and the solution sought may vary depending on the symptom set under investigation (i.e., either social anxiety or depression). The large majority of emotion regulation research on social anxiety statistically controls for depressive symptoms, whereas the majority of emotion regulation research on depression neither measures nor controls for social anxiety. Because of this discrepancy, comparisons between the two bodies of literature should be carefully considered, particularly given our overarching goal of illuminating pathways from social anxiety to depression.

Lastly, the investigation into ES and CR in social anxiety and depression would be strengthened by a meta-analytic review of the literature. Our overarching goal in the present review was to take an account of the state of the current literature on ES and CR in social anxiety and depression and integrate the body of research into suggestions for potential pathways between social anxiety and depression. A primarily qualitative literature review was best suited to address this aim, but a meta-analytic review would be useful in providing important quantitative information about pooled effect sizes and identifying

larger patterns across studies.

#### 4.4. Conclusions

SAD and MDD are characterized by difficulties identifying, accepting, understanding, and tolerating emotions. These deficits in emotional processing contribute to problems with responding to and regulating emotion, thereby cultivating a pervasive and detrimental affective pattern marked by high negative emotion and low positive emotion. The emotion regulation strategies that individuals with SAD and MDD choose to use, the confidence in their ability to use them, and the effectiveness with which they are employed have significant implications for the development and maintenance of these disorders. Our review highlighted ES and CR as independent contributors to social anxiety and depression and proposed possible pathways through which these emotion regulation strategies may confer vulnerability for comorbid SAD and MDD. From this review, we believe that a specific program of research can be developed to investigate these pathways directly. This line of research has the potential to facilitate the development of targeted interventions for SAD, thereby reducing the likelihood of developing comorbid MDD and ultimately reducing the societal burden of both disorders.

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#### Contributors

Authors M.T.D. and R.G.H. collaborated on the design and aims of the current review. Author.

M.T.D. conducted literature searches and wrote the first draft of the manuscript. Both authors.

contributed to and have approved the final manuscript.

#### Conflict of interest

The authors declare that they have no conflicts of interest.

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