Review

Understanding positive emotion deficits in depression: From emotion preferences to emotion regulation

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HIGHLIGHTS

- Depression is associated with difficulties with the regulation of positive emotion.
- Individuals with depression habitually attempt to down-regulate positive emotion.
- Individuals with depression infrequently attempt to up-regulate positive emotion.
- Preliminary evidence links depression to relative reductions in preferences for positive emotion.

ABSTRACT

Depression is characterized by increased levels of negative affect and decreased levels of positive affect. Prior research shows that individual differences in emotion regulation play an important role in understanding sustained negative affect within the disorder; yet, much less is known about the regulation of positive emotion in depression. The current paper utilizes emotion regulation models that synthesizes multiple emotion processes, including what people want to feel (emotion preferences) and the ways in which people typically respond to emotion (habitual use of emotion regulation strategies), to increase our understanding of positive emotion in depression. In doing so, we propose that depression is associated with relative reductions in the preference for positive emotion; these reductions may therefore increase the habitual use of emotion regulation strategies that serve to down-regulate positive emotion and decrease the use of strategies that serve to up-regulate positive emotion. Dysfunction in habitual emotion regulation strategy use may, in turn, contribute to the relatively low levels of positive emotion within the disorder. The paper also discusses important empirical gaps in the extant literature on emotion preferences and emotion regulation in depression and highlights novel treatment targets (e.g., emotion preferences) for interventions aimed at improving emotion dysfunction in depression.

1. Introduction

Depression is characterized by dysfunctions in emotion (Gross & Jazaieri, 2014; Joormann & Vanderlind, 2014). In fact, emotional dysfunction is so central to depression that it comprises the two hallmark symptoms of Major Depressive Disorder (MDD): sustained negative affect and loss of pleasure (American Psychiatric Association, 2013). Whereas most research focuses on negative affect in depression, research aimed at understanding positive emotion in depression is scarce. This empirical gap is particularly pressing as diminished levels of positive emotion distinguishes depression from other forms of psychopathology (Watson, Clark, & Carey, 1988), relates to a worse course

of depression (Vrieze et al., 2013), and predicts poor treatment response (Forbes et al., 2010; McMakin et al., 2012; Spijker, Bijl, De Graaf, & Nolen, 2001). Given the link between positive emotion and the course and treatment of MDD, it is crucial to investigate factors that contribute to the occurrence of positive emotion deficits in this disorder.

Most research on positive emotion in depression focuses on acute emotional reactions to positive stimuli (e.g., Forbes, Miller, Cohn, Fox, & Kovacs, 2005; Henriques & Davidson, 2000; Persad & Polivy, 1993; Rottenberg, Kasch, Gross, & Gotlib, 2002). Many studies document that individuals diagnosed with depression react less to positive stimuli compared to participants with no history of psychopathology (see

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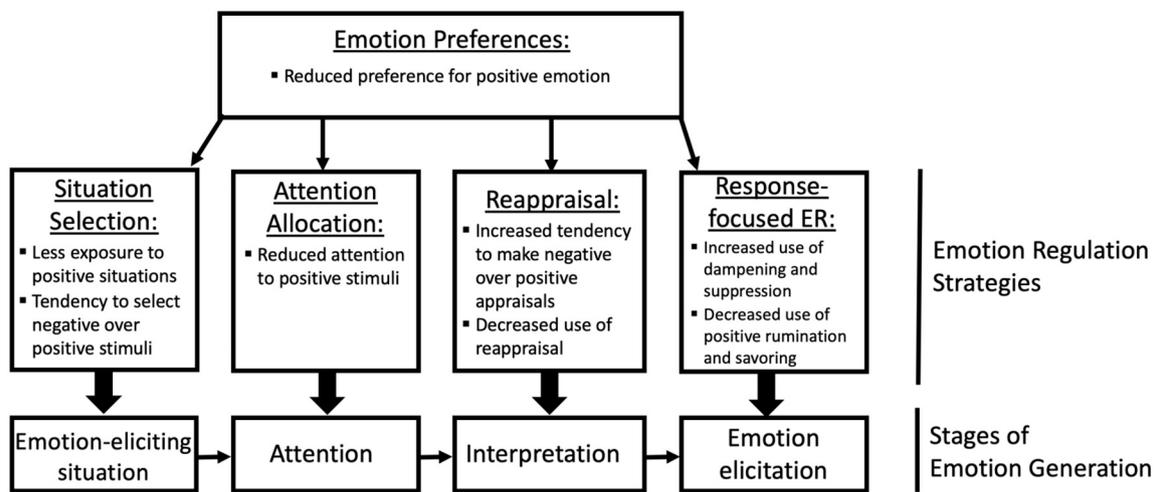*E-mail address:* michael.vanderlind@yale.edu (W.M. Vanderlind).

Fig. 1. A translation of the instrumental model of emotion regulation (ER) to the study of positive emotion in depression. Within this model, relative reductions in preference for positive emotion are thought to influence habitual use of positive ER strategies such that individuals with MDD are more likely to engage in strategies that serve to avoid or down-regulate positive emotion and less likely to use strategies that serve to up-regulate positive emotion. Habitual ER is thought to affect the experience of emotion across each stage of emotion generation. The figure synthesizes the extant research that supports each facet of the model.

Bylsma, Morris, & Rottenberg, 2008, for a meta-analysis). Findings showing depression-related reductions in emotional reactivity to positive stimuli span multiple levels of analysis, including self-reports of emotion (Sigmon & Nelson-Gray, 1992), behavioral expressions of emotion (Rottenberg et al., 2002; Sloan, Strauss, Quirk, & Sajatovic, 1997), psychophysiological responding to positive stimuli (Dichter, Tomarken, Shelton, & Sutton, 2004; Rottenberg, Gross, & Gotlib, 2005), and brain activation during exposure to positive material (see Admon & Pizzagalli, 2015, for a review). When examining emotion, however, researchers not only look at initial reactivity to positive stimuli but also at how individuals respond to and regulate emotion (Hare et al., 2008; Domes et al., 2010; Heller et al., 2009; Carthy, Horesh, Apter, Edge, & Gross, 2010; Silvers et al., 2012; Rottenberg, 2017).

Emotion regulation (ER) refers to processes that modify the frequency, intensity, and duration of emotional states (Gross, 2014; Gross, 2015). Although most research focuses on the regulation of negative affect, studies show that people also regulate positive emotion (Feldman, Joormann, & Johnson, 2008; Tugade & Fredrickson, 2007; Werner-Seidler, Banks, Dunn, & Moulds, 2013). Difficulties in ER are implicated in many forms of psychopathology (see Aldao, Nolen-Hoeksema, & Schweizer, 2010, for a meta-analysis). With regard to depression, an abundance of research shows that ER difficulties play a central role in understanding sustained negative affect in depression (Joormann & Stanton, 2016; Joormann & Vanderlind, 2014; Liu & Thompson, 2017). However, there is only a limited amount of research on the regulation of positive emotion in the disorder.

Most research on ER focuses on the strategies people use to regulate their emotions (Gross, 1998a; Gross, 2015). As seen in Gross's (1998a) process model of emotion regulation, ER strategies include cognitive and behavioral processes that modify emotional experiences. In a recent review, Liu and Thompson (2017) note that the most common type of ER difficulty in depression involves problems with the habitual use of ER strategies. The habitual use of ER strategies refers to the frequency with which a strategy is utilized over time (Gross, 2014). Dysfunction in habitual ER arises when individuals frequently engage in response styles that exacerbate emotional problems and infrequently use strategies that serve to ameliorate affective dysfunction (Joormann & Stanton, 2016; Liu & Thompson, 2017).

Recent expansions of the process model, however, focus on the question of why people have preference for certain ER strategies over others. Instrumental models of ER (Tamir, 2009a; Tamir, 2016), for example, highlight the concept of emotion preferences, defined as desired emotional states (Tamir, 2009a). When people regulate their

emotions, they do so to achieve a desired emotional end-state (e.g., Gross, 2015; Mauss & Tamir, 2014; Tamir, 2016). For instance, people might regulate their emotions when they want to increase their level of happiness. To attain their emotional preference, people use ER strategies which are likely to yield emotional states that are congruent with their emotion preferences (e.g., Millgram, Sheppes, Kalokerinos, Kuppens, & Tamir, 2019). There is empirical work supporting the notion of emotion preferences and its impact on habitual ER. Not only do studies show that there is variability in emotion preferences (e.g., Tamir, 2009b; Tamir & Ford, 2009), but they also document that individual differences in emotion preferences influence ER strategy use (e.g., Millgram, Joormann, Huppert, Lampert, & Tamir, 2019; Millgram, Joormann, Huppert, & Tamir, 2015). Among prior work, many researchers utilize instrumental models of ER to understand the nature of negative emotion in depression. To date, however, no review has applied a comprehensive ER model that synthesizes emotion preferences and habitual ER to understand the diminished levels of positive emotion that characterize depression.

The overarching aim of this review is to utilize well-established ER models to review the literature on positive ER in depression. More specifically, the first aim of the current paper is to use Gross's (1998a) process model of ER as a framework for reviewing difficulties in the habitual use of positive ER strategies in depression. The second aim of the current paper is to adopt instrumental models of ER (Tamir, 2016) that focus on emotion preferences. Then, we will synthesize these ER models to review the nature of emotion preferences in depression and the extent to which emotion preferences might influence the habitual use of positive ER strategies within the disorder. Better understanding of the nature of positive ER in depression and factors that contribute to habitual ER holds great promise for the refinement of treatments aimed at improving positive affect deficits in depression.

2. Habitual use of positive ER strategies in depression

Gross's process model (1998a) proposes that ER strategies can occur across a set of stages that are thought to underlie the generation of an emotional experience (see Fig. 1). Specifically, this model catalogs ER strategies across four stages of emotion generation. The first stage is the occurrence of an emotion-eliciting situation. Attention is then directed towards the situation (stage 2), and, subsequently, an interpretation regarding the meaning of the event is made (stage 3). This cascade of processes is thought to, in turn, generate a particular emotional response (stage 4).

The categories of ER strategies correspond to these four stages of emotion generation. At stage 1 (occurrence of emotion-eliciting situation), situation selection can be used to avoid or to enter into the situation. At the second stage (attention to emotional stimuli), attention can be allocated away from emotion-eliciting stimuli to decrease emotion or allocated towards emotion-eliciting stimuli to increase emotion. The third stage of emotion generation is interpretation. Many emotion-eliciting situations are ambiguous, and the way in which a situation is interpreted or appraised, whether automatic or deliberate, may alter emotional experiences. The regulatory strategy that occurs within stage 3 is reappraisal. Reappraisal is an ER strategy whereby people change their initial interpretation of a situation to modulate emotional responding (Gross & John, 2003). For instance, interpreting one's failure to say "hello" as a simple oversight rather than a deliberate act of avoidance is likely to elicit lower levels of negative emotion. Finally, ER strategies that occur at the fourth stage of emotion generation (emotion elicitation) are referred to as response-focused ER strategies, as they are thought to occur in response to the emotion that has been evoked (Gross, 1998a). There are a number of response-focused ER strategies, and these strategies modulate emotion in different ways (Aldao et al., 2010; Gross, 2014). For instance, some people suppress the behavioral expression of emotion whereas others elaborate on the causes and consequences of the emotion. Whereas most existing research focuses on the regulation of negative affect, this review will focus on ER strategies known to modulate positive emotion and on the habitual use of positive ER strategies in depression.

2.1. Situation selection

As noted by Liu and Thompson (2017), few studies have examined situation selection in depression, particularly as it pertains to positive stimuli. Some notable exceptions found that depression is related to less exposure to events that are likely to elicit positive emotion. Lewinsohn and Libet (1972), for example, reported that depressive symptoms were inversely associated with the frequency of engaging in self-reported pleasurable activities. In more recent work, MDD participants were more likely to choose exposure to sad over happy music compared to control participants, who were more likely to choose exposure to happy over sad music (Millgram et al., 2015). In a separate sample, however, the authors showed participants positive, negative, and neutral images, and participants were given the option to view each image for a second time or to view a blank computer screen before the start of the next trial. The authors found that individuals with MDD were more likely to choose to view sad images over a blank computer screen compared to healthy controls; however, both groups chose positive images and neutral images over a computer blank screen to a similar degree. Although more research is needed in this area, the few existing studies on situation selection suggest that depression is associated with reduced selection of positive situations, particularly when choosing between positive and negative stimuli.

2.2. Attention allocation

Many researchers have found that individuals with no history of psychopathology exhibit an attentional bias towards positive stimuli (Ellis, Beevers, & Wells, 2011; Gotlib, McLachlan, & Katz, 1988; Joormann & Gotlib, 2007; McCabe & Gotlib, 1995). That is, in these studies, healthy controls were more likely to selectively attend to positive stimuli over neutral and/or negative stimuli. In contrast, multiple studies have reported that individuals with elevated depressive symptoms lack a positive attentional bias. For example, Ellis et al. (2011) presented participants with a 2 × 2 assortment of emotional (positive, dysphoric, aversive) and neutral words and tracked their eye gaze over time. Whereas individuals with low levels of depressive symptoms spent more time attending to positive words than neutral, aversive, or dysphoric words, individuals with elevated depressive symptoms attended

to all word types equally. Similar findings also have been observed among individuals diagnosed with MDD (Gotlib et al., 1988; Joormann & Gotlib, 2007; McCabe & Gotlib, 1995) and in samples of individuals with remitted depression (Joormann & Gotlib, 2007). Additionally, some researchers reported that depressed participants avoid attending to positive stimuli. For instance, Shane and Peterson (2007) presented individuals with positive-neutral word pairs and found that individuals with elevated depressive symptoms were more likely to attend to neutral information over positive information; the opposite pattern was seen among individuals with low levels of depressive symptoms. Thus, in this study, participants with elevated depressive symptoms fail to exhibit a bias towards positive over neutral information and they selectively avoided attending to positive stimuli and attended to neutral information instead. Consistent with the Shane and Peterson (2007) study, avoidance of positive stimuli was observed in youth diagnosed with clinical depression (Hankin, Gibb, Abela, & Flory, 2010). Of note, other studies failed to demonstrate positive attention biases between diagnostic groups (e.g., Mogg, Bradley, & Williams, 1995; Mogg, Bradley, Williams, & Mathews, 1993; Mogg, Millar, & Bradley, 2000; Sanchez, Vazquez, Marker, LeMoult, & Joormann, 2013). However, some of these studies focused on the subliminal processing of emotional information. In general, findings in the extant literature were more consistent when researchers examined attention over longer periods of time (i.e., at least 1000 milliseconds).

Regardless of biases in attention (i.e., selectively attending to certain types of information over others), some researchers have found that diagnostic groups differ in regard to the amount of time spent attending to positive stimuli. When presented with a 2 × 2 array of emotional (sad, threat, positive) and neutral words, individuals diagnosed with MDD (Kellough, Beevers, Ellis, & Wells, 2008) and participants with elevated symptoms (Sears, Newman, Ference, & Thomas, 2011) spent less time looking at positive information than healthy controls and individuals with low levels of depressive symptoms, respectively. Duque and Vázquez (2015) reported comparable findings using paradigms comprised of positive-neutral image pairs. Taken together, these studies show that individuals with depression lack a positive attentional bias and attend to positive stimuli less than healthy controls. Thus, at the level of attention allocation, reduced selective attention to positive stimuli may contribute to low levels of positive emotion among individuals with depression compared to healthy controls.

2.3. Interpretation and reappraisal

Cognitive models of depression highlight the tendency to make more negative and less positive appraisals of emotion-eliciting events as a central feature of depression (Mathews & MacLeod, 2005; Teasdale, 1988). Supporting this notion, multiple studies found that individuals with depression display biases in their interpretations of ambiguous events. Researchers have previously assessed interpretation biases by recording appraisals during exposure to ambiguous events (e.g., scrambled sentences, homophones, fictional scenarios) that can either be interpreted as positive or negative. For example, Rude, Wenzlaff, Gibbs, Vane, and Whitney (2002) presented participants with scrambled sentences comprised of six words. The participants were asked to select five of the six words and arrange the words to create a logical sentence. The sentences could either be unscrambled to create positive or negative sentences, and the authors found that greater propensity to unscramble words to form negative over positive sentences was associated with increases in depressive symptoms (Rude et al., 2002) and with a subsequent diagnosis of MDD (Rude, Durham-Fowler, Baum, Rooney, & Maestas, 2010) at a follow-up assessment. Relatedly, researchers found that individuals with depression are more likely to interpret ambiguous stimuli as negative instead of positive (Cowden Hindash & Amir, 2012; Everaert, Bronstein, Cannon, & Joormann, 2018; Orchard, Pass, & Reynolds, 2016). A proclivity to make more

negative interpretations and less positive interpretations of ambiguous information also was observed among healthy youth at risk for depression via their mother's psychiatric history (Dearing & Gotlib, 2009). Further, researchers documented a link between the degree to which individuals make negative over positive interpretations and depression severity (Lee, Mathews, Shergill, & Yiend, 2016).

Recent research further characterized depression-related difficulties regarding interpretation. Specifically, Everaert et al. (2018) had participants complete an interpretation flexibility task to measure the degree to which people could update interpretations upon the receipt of new information. Participants were presented with sets of statements that depicted social scenarios. In the disconfirm condition, the first two statements would lure participants to generate either a positive or negative interpretation of the scenario, and the third statement would present information revealing a conclusion to the situation that was opposite in valence compared to the first two lure statements (e.g., a situation that originally seemed negative had a positive conclusion). As each of the three statements were presented, participants rated the plausibility of various interpretations, including an appraisal that was consistent with the original lure statements and one that was consistent with the final, disconfirming statement. The authors found that individuals with elevated depressive symptoms were less likely than participants with low levels of depressive symptoms to change from a negative to a positive interpretation when presented with positive evidence that disconfirmed negative lure statements. Individuals with elevated depressive symptoms did not differ from those with low levels of depression in their ability to change from positive to negative interpretations in light of disconfirming negative evidence.

Diagnostic group differences in interpretation also have been found to vary across methodologies. Many studies showed that interpretation biases are evident when participants select or generate interpretations. However, studies that measure interpretation biases using relatively more objective paradigms yielded more mixed results. For instance, Cowden Hindash and colleagues (2012) reported that, regardless of depressive symptoms, all participants in their study were faster to accept than reject a benign or positive interpretation of an ambiguous event. In contrast, individuals with no history of psychopathology exhibited positive interpretation biases within an event-related potential (ERP) study, which was not observed among individuals diagnosed with depression (Moser, Huppert, Foa, & Simons, 2012). These studies highlighted the importance of measuring constructs across multiple levels of analysis to comprehensively understand the stages at which ER strategies differ between clinical and healthy samples.

In addition to being less likely to make positive interpretations of emotionally ambiguous situations, individuals with depression have been found to be less likely to engage in positive reappraisal to override prepotent interpretations (e.g., D'Avanzato, Joormann, Siemer, & Gotlib, 2013). Gross (1998b) defined reappraisal as an ER strategy that entails modifying an interpretation of an event to modulate emotional responding. Most research on habitual reappraisal has assessed reappraisal using Gross and John's (2003) Emotion Regulation Questionnaire (ERQ). Items include, "When I want to feel more positive emotion, I change the way I'm thinking about the situation." and "When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about." Researchers found that individuals with MDD reported less frequent use of reappraisal than healthy controls (D'Avanzato et al., 2013) and that the habitual use of reappraisal was inversely associated with depressive symptoms in both clinical and nonclinical samples (Aldao et al., 2010; Garnefski & Kraaij, 2006; Joormann & Gotlib, 2010). No study has separated the reappraisal items to examine whether depression is linked to both less frequent use of reappraisal to change positive and negative emotion or, alternatively, whether the findings are driven by infrequent use of reappraisal in only one emotional context.

In sum, individuals with depression exhibit biased ER at the level of interpretation such that they are less likely to make positive appraisals

of emotionally-ambiguous events and are less likely to use reappraisal to override initial (presumably negative) interpretations. The tendency to make negative over positive interpretations and the infrequent use of reappraisal to override this tendency is thought to set the stage for elaborated processing of negative material. According to the process model (Gross, 1998a), elaboration on negative appraisals is, in turn, likely to yield negative emotion instead of positive emotion.

2.4. Emotion response

Response-focused ER entails strategies that aim to alter cognition, behavior, experience, and physiology after emotion is elicited. Although most research, to date, focuses on the use of strategies to modulate responses to negative emotion, there is evidence that individuals with and without depression also actively regulate the experience of positive emotion (Carl, Soskin, Kerns, & Barlow, 2013; Werner-Seidler et al., 2013). In general, findings reveal that individuals with depression are less likely to engage in strategies that maintain or enhance positive emotion (positive rumination, savoring) and are more likely to engage in strategies that serve to down-regulate positive emotion (dampening, suppression).

2.4.1. Dampening and expressive suppression

Dampening positive emotion has received the most attention within the depression literature. Feldman et al. (2008) defined dampening as attempts to down-regulate positive emotion after it has been elicited by changing cognition to be more negative. Most research assessed habitual dampening using a self-report measure known as the Responses to Positive Affect scale (Feldman et al., 2008). Example assessment items include "Think, 'I don't deserve this.'", "Think about things that have not gone well for you.", and "Remind yourself these feelings won't last." Many studies found that depression is associated with relatively greater tendencies to dampen positive emotion. Indeed, many researchers reported that greater use of dampening were associated with greater depressive symptoms (Eisner, Johnson, & Carver, 2009; Feldman et al., 2008; Nelis, Holmes, & Raes, 2015) and that dampening use was greater among individuals diagnosed with MDD compared to healthy controls (Werner-Seidler et al., 2013). Within a sample of individuals diagnosed with MDD, greater use of dampening also was linked specifically to greater symptoms of anhedonia (Werner-Seidler et al., 2013).

Importantly, researchers have found that the tendency to dampen positive emotion is not restricted to the context of a depressive episode. In fact, studies have shown that individuals diagnosed with remitted depression endorsed greater levels of dampening compared to individuals with no history of MDD and did not differ from individuals diagnosed with current MDD when controlling for current depressive symptoms (Nelis et al., 2015; Werner-Seidler et al., 2013). Results from these studies revealed that dampening positive emotion may not solely be a by-product of depression but, rather, represent a risk factor for the disorder. Further support for dampening as an ER risk factor for depression was seen in work by Raes, Smets, Nelis, and Schoofs (2012), who found that increases in dampening prospectively predicted increases in depressive symptoms as well as tendencies to ruminate on negative material. In sum, depression and anhedonia symptoms, in particular, have been associated with greater tendencies to dampen positive emotion, and habitual engagement in dampening were associated with risk for the disorder.

Similar to dampening, expressive suppression has been found to reduce the experience of emotion. Gross and Levenson (1993) defined suppression as inhibiting the behavioral expression of an emotional experience. Examples include attempts to hide a smile when feeling happy or to stop crying when feeling sad. Although few studies have focused on the suppression of positive emotion in depression, one notable exception reported that habitual use of suppression of both positive and negative affect was elevated among those with MDD (Beblo et al., 2012). Integrating this finding with the literature on dampening,

prior work has shown that individuals with depression appear to habitually engage in ER strategies aimed at reducing positive emotion once it has been elicited.

2.4.2. Positive rumination and savoring

In contrast to dampening and suppression, positive rumination has been identified as an ER strategy that increases positive emotion. Nolen-Hoeksema (1991) defined rumination as a thought process in which individuals cycle over the causes and consequences of an emotional state. An extensive program of research documented rumination as a defining feature of depression, with depressed individuals reporting greater tendencies to ruminate on negative material (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008, for a review). Importantly, however, rumination has been defined as a style of thought that is not limited to negative material. Thus, although most research has focused on rumination in the context of negative material, researchers have begun to examine patterns of positive rumination in depression. Habitual positive rumination has been assessed commonly using the Responses to Positive Affect Scale (Feldman et al., 2008). Example items include, "Think about how happy you feel.", "Think about how proud you are of yourself.", and "Think, 'I am living up to my potential.'" In contrast to dampening and suppression, few researchers revealed evidence of a direct link between depression and habitual positive rumination. One notable exception showed that habitual positive rumination mediated the link between trait positive affect and depressive symptoms. Specifically, low levels of positive affect were associated with relatively infrequent use of positive rumination that, in turn, was linked to greater depressive symptoms (Harding, Hudson, & Mezulis, 2014). Although not robustly associated with depressive symptoms, low positive rumination has been associated with symptoms of anhedonia. Specifically, Werner-Seidler et al. (2013) found that less habitual use of positive rumination was linked to greater levels of anhedonia across non-clinical and clinical samples (Werner-Seidler et al., 2013). Further, relatively low levels of habitual positive rumination prospectively predicted increases in anhedonia over time (Nelis et al., 2015).

Savoring also has been identified as a positive ER strategy that serves to increase positive emotion. Despite some similarities with positive rumination, Gruber, Eidelman, Johnson, Smith, and Harvey (2011) described at least three ways in which these two ER strategies differ from one another. They said that savoring is commonly used in response to low-arousal positive emotions whereas positive rumination is often initiated during high-arousal positive emotions. Second, the authors reported that the strategies differ in terms of focus, with savoring being associated with greater focus on external sensations and positive rumination being associated with greater focus on internal sensations. Finally, the authors asserted that savoring is more of a passive process and that positive rumination is more of an active thought process. Although distinct in their phenomenology, one study found that they relate to depression in similar ways. Indeed, Beblo et al. (2012) reported that individuals with MDD savor positive emotion less than individuals with no history of the disorder.

Synthesizing findings across all types of response-focused ER strategies, there is robust evidence that individuals with depression engage in strategies that serve to down-regulate positive emotion, and there is some evidence that they do not engage in strategies that serve to up-regulate positive emotion. An important limitation to this work, however, is the reliance on global, retrospective self-reports on how individuals typically respond to positive emotion. This measurement style is subject to a host of reporting biases, including demand effects and current mood-congruent reporting, among others. More work is needed to understand the relation between depression and the use of response-focused ER strategies in real time.

3. Summary

There is evidence that individuals with MDD exhibit dysfunctional

ER strategy use at each stage of the process model. A few studies show a relation between depression and exposure to positive situations. Regarding attention allocation, many studies find that individuals with depression lack a positive attentional bias and attend to positive stimuli less than healthy controls. Further, depressed participants are less likely to interpret situations as positive (and instead, more likely to interpret them as negative). Relatedly, they are less likely to update negative interpretations in light of disconfirming positive evidence, and they are less likely to use reappraisal to change their initial appraisals of situations to make them more positive. Finally, participants with depression report a greater tendency to engage in response-focused ER strategies that serve to down-regulate positive emotion. These patterns of habitual ER are, in turn, thought to decrease the likelihood of experiencing positive emotion and, instead, increase negative emotion. Despite increased evidence showing that depression is associated with dysfunctional strategy use, it remains unclear as to *why* individuals with depression habitually use certain strategies over others to regulate positive emotion. More specifically, a vital gap in the literature centers on the question – why do individuals with depression more frequently engage in strategies that serve to down-regulate positive emotion and less frequently use strategies that serve to up-regulate positive emotion relative to healthy controls?

Instrumental accounts of ER (Tamir, 2009a; Tamir, 2016) argue that people regulate their emotions to achieve desired emotional states, known as emotion preferences. Because emotion regulation strategies serve as means to attain desired emotional states, emotion preferences may represent an important factor for understanding habitual ER. Although humans typically strive to increase pleasure and decrease pain, research on emotion preferences shows that people do not always seek to increase positive emotion and, instead, exhibit variability in what they want to feel (Tamir, 2005; Tamir & Ford, 2009). These accounts address why individuals with MDD may seek to avoid or down-regulate positive emotion. Further, instrumental models are consistent with the expanded process model of ER (Gross, 2015; Sheppes, Suri, & Gross, 2015) that posits that individuals first assess the degree to which they value experiencing a certain emotion before employing a given strategy. According to instrumental models, reduced preference for positive emotion would lead to the use of strategies that limit the elicitation of positive emotion as well as strategies that serve to down-regulate positive affect when elicited. In the next section, the concept of emotion preferences will be discussed. Research on emotion preferences in depression will be reviewed to address the second primary question of the current paper – why do individuals with depression more commonly use strategies that yield low levels of positive emotion and less frequently use strategies that potentiate positive affect relative to people without a history of depression?

4. Emotion preferences and the link to habitual ER

The instrumental model of ER highlights that emotion preferences influence ER strategy use (Tamir, 2009a; Tamir, 2016). Emotion preferences refer to what people want to feel, and basic affective research shows that preferences vary at a state (Tamir & Ford, 2009; Tamir, Mitchell, & Gross, 2008) and trait (Elliot & Thrash, 2002; Tamir, 2009b) level. According to the instrumental model of ER, individuals are thought to use ER strategies that are congruent with their emotion preferences. An individual's emotion preferences are driven by two concepts: pleasure and utility. Simply, individuals prefer emotions that are either pro-hedonic (i.e., increase pleasure, decrease pain) or useful, meaning that they help an individual to attain a goal that is independent of hedonic principles. The instrumental model theorizes that one's goals influence the type of emotions (pleasurable or useful) that are preferred. For example, if an individual has the goal to perform well on an exam, then he or she may forgo immediate pleasure in order to study. Although studying may be less pleasurable than other activities (e.g., going to see a movie with friends), the individual elects to work

hard and possibly experience aversive states (e.g., stress) because doing so is expected to facilitate the attainment of a good grade. Notably, one's goals are not always rational. Rather, people may exhibit irrational beliefs, whether consciously or unconsciously, regarding the expected utility of certain emotional states (Tamir, Chiu, & Gross, 2007). Nevertheless, the instrumental model of ER (Tamir, 2009a; Tamir, 2016) posits that goals guide emotion preferences, which, in turn, results in emotion being regulated such that preferred emotional states are attained.

Two types of measures typically are used to assess emotional preferences. Consistent with research on preferences in other domains (e.g., Elliot & McGregor, 2001; Hart & Albarracín, 2009), one measure involves self-report, where participants directly rate their emotional preferences (e.g., "To what extent do you want to feel happy?"; Augustine, Hemenover, Larsen, & Shulman, 2010; Hackenbracht & Tamir, 2010; Porat, Halperin, & Tamir, 2016; Tamir & Ford, 2012; Tamir et al., 2016). A second measure involves behavioral indices of regulatory behavior. For instance, participants select stimuli (e.g., images, music) to be exposed to from multiple emotion-provoking stimuli, or choose whether to increase or decrease their reactions to such stimuli (e.g., Erber, Wegner, & Therriault, 1996; Millgram et al., 2015; Millgram, Joormann, et al., 2019; Wood, Heimpel, Manwell, & Whittington, 2009). There is accumulating evidence for the convergent and predictive validity of these measures in the laboratory and in daily life (e.g., Kalokerinos, Tamir, & Kuppens, 2017; Porat et al., 2016; Tamir, Ford, & Ryan, 2013; Wood et al., 2009).

Basic research on the instrumental model of ER demonstrates that emotion preferences are associated with preference-congruent ER strategy use. For example, individuals reporting greater preference for anger more frequently select anger-inducing stimuli, whereas participants with greater preferences for happiness select happy stimuli (Tamir & Ford, 2009). Moreover, individuals who report greater motivation to avoid threats engage in greater worry, a cognitive response that facilitates the avoidance of threats (Elliot & Thrash, 2002). More recently, emotion preferences were shown to causally shape the selection of emotion regulation strategies. Millgram, Joormann, et al. (2019) manipulated emotion preferences by instructing people's ER goals (e.g., increase/decrease positive emotion) and subsequently measured whether people chose to use rumination or distraction. The authors found that participants were more likely to engage in rumination when viewing positive images following instructions to increase positive emotion. Finally, Millgram et al. (2015) found that, among individuals with MDD, greater self-reported preference for negative emotion relates to tendencies to select negative stimuli in a situation selection task. Similarly, self-reported preferences for positive emotion among individuals with MDD related to the selection of positive stimuli (Millgram, Joormann, et al., 2019).

Taken together, there is emerging evidence supporting the notion that preferences are associated with goal-congruent strategy use, with several studies documenting this relation among individuals with clinical depression. Importantly, most empirical studies on the instrumental model of ER focus on preferences for and the regulation of negative emotion, especially when examining this model in depression. The next section will review the nature of emotion preferences in depression and discuss the link between emotion preferences and the habitual use of positive ER strategies.

4.1. Instrumental accounts of positive ER in MDD

Fig. 1 includes a depiction of the instrumental ER model for understanding positive emotion deficits in depression. Overall, emotion preferences are thought to influence ER at every stage of regulation (situation selection, attentional allocation/deployment, reappraisal, response-focused ER). Specifically, reduced preference for positive emotion is thought to increase engagement in strategies that serve to down-regulate positive emotion and to decrease engagement in

strategies that serve to up-regulate positive emotion. There is preliminary support for some tenants of this model; however, many remain underexplored.

The first step of the model focuses on emotion preferences in depression. Millgram et al. (2015) were the first to document an association between MDD and emotion preferences. The authors asked participants to self-report the extent to which they want to experience various emotional states and found that individuals with MDD reported greater preferences for sadness and a reduced preference for happiness compared to those with no history of psychopathology (Millgram et al., 2015). Further, in a separate study (Millgram et al., 2015, Study 2), the authors had participants complete a music selection task, wherein they were asked to choose between listening to sad, happy, and neutral music. Individuals with a diagnosis of MDD were more likely to choose sad music over happy music compared to non-depressed controls. These results have since been replicated. Yoon, Verona, Schlauch, Schneider, and Rottenberg (2019) reported that individuals with MDD are more likely to choose sad music relative to happy music, whereas individuals without a history of MDD were more likely to select happy music. Arens and Stangier (2019) also found that participants with MDD demonstrated a greater preference for sadness; more than half of the depressed participants chose sad music, whereas the opposite was observed among nondepressed controls.

Recent evidence shows that depression-related differences in preference for positive emotion are stable over time and prospectively predict changes in depressive symptoms. Millgram, Joormann, et al. (2019) tracked participants' emotion preferences and symptoms over three time points, which, in total, spanned approximately one year. They found that, although all participants were more likely to report preferences for positive emotion relative to negative emotion, individuals with current MDD or dysthymia self-reported relatively less preference for positive emotion compared to healthy controls at all three time points. Notably, among depressed participants, preference for positive emotion prospectively predicted changes in clinical symptoms over time; relatively less preference for positive emotion at baseline was associated with increases in symptom severity at time point three, which occurred within the context of a real-life stressor (i.e., final exam period). These results remained significant even when controlling for baseline depressive symptoms. Taken together, there is growing evidence that depression is linked to relative reductions in preference for positive emotion, and one study suggests that this relative reduction may represent an important risk factor for increases in symptoms during periods of stress.

Within the model, emotion preferences are connected to every stage of habitual ER, such that emotion preferences are thought to result in goal-congruent strategy utilization. Specifically, diminished preference for positive emotion is thought to result in: 1) reduced propensities to select positive stimuli over negative or neutral stimuli, 2) less allocation of attention towards positive stimuli over of other types of stimuli, 3) less proclivity to make positive over negative interpretations and less proclivity to change initial negative appraisals to positive appraisals, and 4) greater engagement in response-focused strategies that serve to down-regulate positive emotion (e.g., dampening) and less use of strategies that serve to up-regulate positive emotion (e.g., positive rumination). Engagement in preference-congruent ER strategies is, in turn, thought to yield low levels of positive emotion.

In their initial study on emotion preferences in depression, Millgram et al. (2015) found that the degree to which depressed participants report preferences for negative emotion predicts the frequency with which they choose to view a sad image over a blank computer screen. More recently, the authors of one study found that, among participants with depression, relative reductions in preference for positive emotion predicted ER strategy use (Millgram, Joormann, et al., 2019). Participants self-reported their preference for positive emotion and completed a behavioral ER task, during which they were given the choice to use cognitive reappraisal to either increase or decrease their emotional

experience. Not only were individuals with MDD less likely to choose to use cognitive reappraisal to upregulate positive emotion in response to positive images than healthy controls, but also the degree to which people were likely to use reappraisal to up-regulate positive emotion was negatively associated with self-reported preference for positive emotion. Thus, there is some evidence showing that depression is associated with relatively less preference for positive emotion and that such preferences are linked to relative reductions in the frequency with which up-regulatory positive ER strategies are employed.

The association between emotion preferences and depression does not suggest that individuals with depression *want* to be depressed. MDD is aversive and is often a debilitating disorder; for these reasons, individuals with a diagnosis of MDD often seek relief. The body of work examining emotion preferences and depression do not imply that people with the disorder choose to feel unhappy. Rather, in the studies reviewed here, nearly all participants, regardless of depression status, report greater preference for positive over negative emotional states. Diagnostic group differences reflect *relative* reductions in preference for positive emotion (i.e., depressed individuals report somewhat reduced preference for happiness *relative* to never depressed individuals). The relative reduction in positive emotion is likely reflective of conflicts in emotion preferences. In the general population, conflicting emotion preferences are not uncommon, with evidence that although people generally want to feel good, in certain contexts they also are motivated to experience negative emotions (e.g., Tamir et al., 2008; Tamir & Ford, 2012). Therefore, although depressed individuals clearly want to feel more happy than sad, they nonetheless want to feel somewhat less happy compared to never depressed individuals. The question really becomes, then: why is it that depression is associated with relative reductions in positive emotion preferences?

One possibility is that the experience of positive emotion in MDD creates a sharp contrast between current emotion and negative mood state. Hopeless thinking (Abramson, Metalsky, & Alloy, 1989), a common feature of depression, may lead an individual to think that such positive emotion will be short-lived. Thus, individuals diagnosed with MDD may want to experience less positive emotion to avoid emotion instability and to prevent an abrupt return to chronic negative affect at the conclusion of a positive emotional state. Avoidance of emotion instability has been studied among individuals with Generalized Anxiety Disorder (GAD). Indeed, Newman and Llera (2011) proposed the Contrast Avoidance model of GAD wherein those with the disorder engage in worry as a preventative effort to reduce the potential for stressful events to further increase negative affect.

Second, individuals with MDD may wish to experience less positive emotion because they fear losing control during positive emotion. In line with this, individuals with MDD have been shown to exhibit heightened fear of positive emotion (Werner-Seidler et al., 2013). Fear of positive emotion also has been associated with depressive symptoms within non-clinical samples (e.g., Vanderlind, Stanton, Weinbrecht, Velkoff, & Joormann, 2017). In this sense, fear of positive affect could be understood as an extension of Goldstein and Chambless' (1978) 'fear of fear' construct – a term that is often used interchangeably with anxiety sensitivity (Reiss, 1991). Fear of fear has been posited to play an important role in the etiology of Panic Disorder, in which individuals fear the experience of anxiety and the possibility that they will lose control during periods of intense anxiety (Goldstein & Chambless, 1978). Consequently, individuals diagnosed with Panic Disorder seek to avoid states characterized by high levels of anxiety and physiological activation. Individuals with MDD may similarly want to experience less positive emotion because they fear that they will lose control when in a positive mood state.

Finally, one motive for regulating emotion is to experience emotion that verifies one's identity. People with MDD may hold the view that chronic sadness or pessimistic thought is central to their sense of self. These individuals may, in turn, seek to experience emotion in line with this view. This explanation fits with Swann, Stein-Seroussi, and Giesler'

(1992) self-verification theory. Empirical support for self-verification theory comes from studies showing that individuals with low self-esteem are less inclined to repair negative mood states partly because they are more familiar with them (Wood et al., 2009) and that individuals are more likely to seek negative affective states to the extent they are more familiar with them (Ford & Tamir, 2014). Translating this model to MDD, those with MDD may consider chronic and/or frequent sadness to be part of their identity. These three ideas are proposed as potential explanations for possible conflict in emotion preferences among individuals with MDD and serve to explain why they might report relatively less preference for positive emotion. Future research is certainly needed to test these theories as they relate to emotion preferences.

5. Future directions

There are many important avenues for future research aimed at testing the application of an instrumental ER model to the study of positive emotion in MDD. First, it is critical for future research to continue to focus on replication, thereby increasing the evidence that depression is characterized by relative reductions in preference for positive emotion. In doing so, future work should also expand upon the assessment of emotion preferences. For example, recent work utilizes a modified version of the implicit associations task (IAT) that assesses implicit attitudes towards emotions (Harmon-Jones, Harmon-Jones, Amodio, & Gable, 2011; Markovitch, Netzer, & Tamir, 2017; Netzer, Igra, Anan, & Tamir, 2015). Integrating self-report with response-time measures of emotion preferences in MDD promises to replicate and extend prior work by showcasing the nature of disorder-related preferences across multiple task types and across varying levels of awareness. Further, behavioral tasks, such as the emotion-based IAT, reduce demand characteristics commonly associated with self-report measures, wherein individuals provide responses that are consistent with their perception of what researchers expect to observe.

Given the relative dearth of research investigating the relation between emotion preferences and positive ER in depression, it is critical for future work to test the specific associations between emotion preferences and the major categories of ER strategies: situation selection, attention allocation, reappraisal, and response-focused ER (e.g., dampening and positive rumination). Further, to examine whether emotion preferences represent an underlying mechanism of ER dysfunction in depression, researchers should manipulate emotion preferences and examine the effects on habitual use of positive ER strategies. One possibility for manipulating emotion preference is to use state factors that previously have been shown to evoke preference for positive emotions over negative emotions. For example, Tamir and Ford (2009) show that individuals report greater preference for positive emotion when expecting to enter a collaborative social interaction rather than a confrontational situation. Therefore, one way to examine the causal role of emotion preferences is to manipulate the social context in which one utilizes positive ER strategies and to assess for spontaneous ER strategy use. Greater engagement in ER strategies that serve to up-regulate positive emotion within socially collaborative conditions compared to confrontational conditions among individuals with depression would provide some support for the causal role of preferences informing engagement in ER strategies. An alternative option would be to examine the relation between emotion preferences and ER strategy use over time. Using an ecological momentary assessment (EMA) approach, for example, one could test whether emotion preferences predict subsequent changes in ER strategy use. Although it is difficult to infer causality without experimental manipulation, establishing a clear temporal relation would also provide greater evidence for preferences contributing to strategy selection.

It is also fundamental to establish that relative reductions in preference for positive emotion and dysfunction in the habitual use of positive ER strategies contribute to diminished levels of positive

emotion. Most research focuses on group differences in preference or strategy use. However, few studies show that these differences are associated with deficits in positive emotion. Thus, although presumed, it is important for future work to document that diagnostic group differences in emotion preferences and the habitual use of positive ER strategies predict relatively reduced levels of positive emotion that commonly characterize MDD. Future work using EMA paradigms again holds promise for discovering whether preferences and strategy use predict subsequent changes in positive emotion over time. A comprehensive examination of the extent to which the instrumental model of ER explains positive emotion deficits in depression would be to test whether individuals with depression exhibit reduced preference for positive emotion that, in turn, predicts greater utilization of ER strategies that serve to down-regulate positive emotion and less use of strategies that serve to up-regulate positive emotion, thereby yielding reductions in positive emotion over time. Finally, if future research uncovers support for emotion preferences as an underlying mechanism of habitual ER dysfunction in depression, a vital next step is to understand why such preferences emerge within the disorder.

In addition to studying depression-related emotion preferences across various levels of analysis and time course, work is needed to investigate the link between the above-mentioned theoretical perspectives and emotion preferences in depression. Testing the association between measures of contrast avoidance (Contrast Avoidance Questionnaire-General Emotion; Llera & Newman, 2017), fear of positive emotion (i.e., Affective Control Scale, Williams, Chambless, & Ahrens, 1997), and desire for self-verification (Desire for Self-Verification and Self-Enhancement Questionnaire; e.g., Wiesenfeld, Swann Jr, Brockner, & Bartel, 2007) and indicators of emotion preferences (e.g., self-reported preferences, emotion-based IAT) as they relate to depression will help to elucidate why depression is associated with relative reductions in preference for positive emotion. Better understanding of factors that may underlie these reductions will expand the instrumental model of ER and, in turn, identify factors that may explain the down-stream effects on ER strategy use.

Finally, future research is needed to integrate research on emotion preferences and other emotion processes (e.g., emotion valuation) that have been implicated in depression. The instrumental model of ER dissociates emotion preferences from the valuation of emotions. Emotion preferences refer to what people want to feel, whereas research on emotion valuation theory (e.g., Tsai, Knutson, & Fung, 2006), focuses on the affective states people value as ideal. Although they are clearly related, preferences and valuations are not synonymous (e.g., Kruglanski et al., 2002; Kruglanski et al., 2015). For instance, although most people would not regard anger as ideal, they might nonetheless want to feel angry in contexts where they believe anger would be useful to them (e.g., during confrontation; Tamir et al., 2008). Similarly, although happiness is considered ideal in many cultures (e.g., Tsai, 2007), there are situations in which people would not want to feel happy (e.g., funeral). Thus, emotion preferences refer to the specific emotional states people want to feel both within and across contexts, whereas affect valuation refers to the broad affective states people consider to be ideal. To the extent that what people want does not always correspond with their broader ideals (e.g., Carver & Scheier, 2000; Kruglanski et al., 2002), the emotions people want to feel may or may not correspond with their ideal broad affective states.

Research exploring the interplay between emotion preferences and emotion valuation in depression is needed. There is evidence that depression is related to the extreme valuation of happiness (e.g., Ford, Shallcross, Mauss, Floerke, & Gruber, 2014). For instance, people who were diagnosed with depression in the past reported valuating happiness to the extreme more than never depressed individuals (Ford et al., 2014). Additionally, leading people to extremely value happiness resulted in them feeling less happy in response to happiness-inducing stimuli (Mauss, Tamir, Anderson, & Savino, 2011). If depression is associated with the extreme valuation of happiness, how this might be

reconciled with reductions in preferences for positive emotion observed in depression? One possibility is that although depressed individuals highly value happiness, they to not believe they are able to attain it, and therefore want it to a lesser extent. The degree to which people want and pursue certain end-states depends both on the desirability of those end-states and their perceived attainability (e.g., Kruglanski et al., 2015). If depressed individuals perceive positive emotion as less attainable they might be less motivated to feel positively, even if they believe positive emotion to be highly valuable. Consistent with this possibility, the link between the extreme valuation of happiness and depressive symptoms was found to be moderated by expectancies regarding the ability to improve negative mood (Fergus & Bardeen, 2016). The extreme valuation of happiness was associated with depressive symptoms only when participants had low expectancies regarding their ability to alter their negative emotions (Fergus & Bardeen, 2016). Another possibility is that the valuation of happiness is multifaceted. Whereas some aspects of valuating happiness positively relate to depressive symptoms, others may not. Indeed, research on the association between valuation of happiness and well-being is mixed, with some studies showing that positive evaluations of happiness are related to lower well-being (Ford et al., 2014; Mauss et al., 2011), whereas other studies showing that positive evaluations of happiness are related to higher well-being (e.g., Catalino, Algoe, & Fredrickson, 2014; Peterson, Park, & Seligman, 2005). To address these inconsistencies, one study examined the factorial structure of the Valuing Happiness Scale and found that only one factor out of three was negatively related to well-being (Luhmann, Necka, Schönbrodt, & Hawkley, 2016). This factor might capture the extent of worrying about being unhappy (e.g., "If I don't feel happy, maybe there is something wrong with me"; Luhmann et al., 2016). It is therefore possible that the association between depressive symptoms and valuating happiness is related to depressed individuals' concerns regarding the possible implications of being unhappy rather than the valuation of happiness per se. Testing these and other possibilities is an important task for future research.

In summary, application of the instrumental model of ER to the understanding of positive emotion in depression involves proposing that relative reductions in preference for positive emotion contributes to greater engagement in ER strategies that serve to down-regulate positive emotion and less frequent engagement in ER strategies that serve to up-regulate positive emotion compared to people without a history of depression. Multiple studies demonstrate support for the first level of the model, documenting MDD-related differences in the preference for positive emotion. Further, there is robust evidence for the model at the level of habitual ER, showing that individuals with depression often engage in strategies that result in diminished levels of positive emotion. Recent research has provided preliminary evidence linking relative reductions in preference for positive emotion to reduced attempts to up-regulate positive emotion in depression. Excitingly, there are many avenues for future research. These include identifying factors that are related to the nature of positive emotion preferences in depression, further expanding on the link between emotion preferences and positive ER strategy use, and differentiating emotion preferences from emotion valuation in depression. Although future research is certainly needed to test this model, the integration of emotion preferences and habitual ER strategy use provides a holistic framework for understanding positive emotion deficits in depression.

6. Conclusion

The current review suggests that individuals with depression differ from non-depressed individuals in their emotion preferences and in their use of ER strategies used to modulate emotion. Further, the review discusses the utility of using an instrumental model of ER to understand positive emotion deficits in depression. Most notably, it integrates multiple facets of emotion research into one model. Whereas most research examines emotion preferences and ER strategy use separately,

the current paper integrates these factors to provide a holistic framework for understanding how these factors relate to each other and contribute to the phenotype of interest (i.e., positive emotion deficits). In doing so, the model also highlights the importance of future research aimed at examining whether aberrant emotion preferences underlie ER dysfunction in depression.

There are important limitations to the extant research on the habitual use of positive ER strategies and emotion preferences in depression. As noted throughout, the measurement of ER and emotion preferences is critical. There are limitations to each type of methodology, and findings occasionally differ across various forms of measurement. Across all constructs, self-report measures are at greater risk for reporting biases, including demand effects, mood-congruent reporting, and difficulties with retrospectively estimating the frequency of emotions and behaviors. At many stages of habitual ER and within work on emotion preferences, existing research adopts measures that are relatively more objective. Specifically, situation selection can be measured using behavioral choice paradigms; attention can be measured using reaction time and eye-tracking paradigms; interpretation can be measured using reaction-time and ERP paradigms as well as measures that assess individuals' ability to update interpretations in light of new information; and emotion preferences can be measured using response-time tasks (e.g., emotion-modified IAT). In contrast, most work on response-focused positive ER strategies in depression rely on global, retrospective reports of strategy use, highlighting an important limitation to the extant literature. More research using methods that repeatedly assess ER in real-time, such as EMA paradigms, are needed to address the shortcomings of retrospective self-report measures. Integration of multiple measures assessing each construct not only addresses the limitations of any one method, but it also provides a comprehensive understanding of a given construct which allows for researchers to identify where aberrations in positive ER become apparent in depression.

An additional limitation is that the current paper only focuses on one form of ER difficulty (i.e., the habitual use of ER strategies that contribute to affective dysfunction). This focus was driven by the extant literature on the regulation of negative emotion, showing that ER deficits in depression are more robustly linked to difficulties with habitual strategy use rather than a reduced ability to implement a given strategy (Liu & Thompson, 2017). Nevertheless, to date, no study has examined whether depression is linked to a reduced ability to use a given ER strategy. Researchers typically assess ER ability by giving individuals instructions on how to implement a given ER strategy and asking them to engage in the strategy during an emotion-eliciting task. Within this design, researchers commonly index ER ability by measuring the extent to which individuals demonstrate expected changes in emotion during instructed strategy use. In particular, it would be of interest as to whether individuals with depression are as able to use a given ER strategies to increase positive emotion if instructed to do so. The topic of ER ability in depression becomes especially unclear when it comes to positive rumination. Individuals with depression are "well versed" in the style of ruminative thought insofar as they habitually ruminate on negative material (see Nolen-Hoeksema et al., 2008, for a review). Further, prior research shows that, among depressed individuals, rumination on negative material potentiates negative affect (LeMoult, Yoon, & Joormann, 2016). Thus, it begs the question as to whether they can harness the same style of thought but focused on positive material (i.e., engage in positive rumination) to enhance positive affect. Research aimed at comparing diagnostic groups in their ability to up-regulate positive emotion represents an additional direction for future research.

The application of multiple ER models to the study of positive emotion in depression raises important treatment implications. Specifically, given the disorder-related reductions in preference for positive emotion (Millgram et al., 2015), existing treatments may benefit from also targeting emotion preferences rather than solely training people how to use certain ER strategies. Indeed, the ability to up-regulate positive emotion may be ineffective if one has a reduced preference for positive emotion. Relatedly, recent studies show that engagement in dampening and positive rumination has important implications for emotional responding to positive activity scheduling, a core premise of behavioral activation. The authors report that greater engagement in dampening during scheduled positive events is associated with higher levels of negative affect and lower levels of positive affect (Burr, Javiad, Jell, Werner-Seidler, & Dunn, 2017). These results suggest that habitual ER dysfunction can undermine the utility of behavioral interventions for depression. Thus, an additional implication for treatment refinement is education regarding habitual engagement in maladaptive ER and promoting flexibility among ER strategy use to match the needs of a given situation.

The ability to inform interventions aimed at improving emotion functioning, particularly positive emotion, in depression is essential. Not only does the absence of positive emotion appear detrimental (Spijker et al., 2001; Vrieze et al., 2013), but the restoration of positive emotion may be especially beneficial. Indeed, positive emotions have been linked to increased levels of creativity, sociability, altruism, life satisfaction, and resilience (Lyubomirsky, King, & Diener, 2005) and are thought to increase one's ability to cope with negative emotions (Fredrickson, 2001). Given that depression is characterized by both diminished levels of positive emotion and elevated levels of negative emotion, the restoration of positive affect may, in turn, contribute to the successful reduction of negative affect, ultimately targeting both core symptoms of the disorder.

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Contributors

Michael Vanderlind, Arielle Baskin-Sommers, Margaret Clark, and Jutta Joormann participated in identifying the primary aims of the manuscript. Michael Vanderlind conducted the literature search and wrote the initial draft of the manuscript. Yael Millgram, Arielle Baskin-Sommers, Margaret Clark, and Jutta Joormann provided feedback and contributed to the writing of the final manuscript.

Declaration of Competing Interest

The authors have no conflicts of interest to report.

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