

# Everyday Emotion Regulation Goals, Motives, and Strategies in Current and Remitted Major Depressive Disorder: An Experience Sampling Study

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People with major depressive disorder (MDD) report difficulties with emotion regulation (ER), particularly in habitual strategy use. We examined ER strategy use and other aspects of ER—desired emotional states (emotion goals) and reasons for ER (ER motives)—in current and remitted MDD. In a 2-week experience sampling study, adults with current MDD ( $n = 48$ ), remitted MDD ( $n = 80$ ), and healthy controls ( $n = 87$ ) reported their negative affect (NA) and positive affect (PA), emotion goals (frequency, direction), ER motives (hedonic, instrumental), and ER strategy use (social sharing, acceptance, savoring, reappraisal, suppression, distraction). Multilevel modeling and Bayes factors were used to assess differences and similarities across groups. Compared to the remitted MDD and control groups, the current MDD group regulated emotion more frequently in general but showed weakened associations between initiating regulation and momentary affect and reported different emotion goal directions. Although all groups mostly reported emotion goals to regulate prohedonically (decrease NA, increase or maintain PA), the current MDD group was the most likely to try to amplify NA and PA simultaneously. Current MDD and remitted MDD groups endorsed hedonic motives more than controls, but the three groups did not differ in instrumental motives. The only group difference in ER strategy use was that the current MDD group used distraction more than controls. Most group differences in ER were between the current MDD group and controls, with the remitted MDD group and controls being quite similar. ER in current MDD is characterized by frequent regulation, weakened association between initiating regulation and momentary affect, increased hedonic-focused ER motives, and a greater use of distraction.

## General Scientific Summary

Individuals with major depressive disorder (MDD) report difficulties regulating their emotions, and research has mostly focused on trait emotion regulation (ER). This study took a naturalistic approach to further elucidate the ER process, including emotion goals, motives, and strategies, of adults with current and remitted MDD in comparison to a healthy control group. Most group differences were found between the current MDD group and the control group, suggesting that those with current MDD had more frequent goals to regulate their emotions, showed a weaker link between how they felt and initiating regulation, more frequently regulated their emotions because of how emotions would make them feel, and more frequently used distraction as an ER strategy.

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This study was not preregistered. Relevant data and analysis code can be found at <https://osf.io/zfaec>. The results reported in our paper have not been previously published or preposted online, although some were presented at the 2022 annual meetings of the Society for Affective Science and Association for Psychological Science.

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 The data are available at <https://osf.io/zfaec>.

 The experimental materials are available at <https://osf.io/zfaec>.

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Major depressive disorder (MDD) is one of the most prevalent, costly, and debilitating psychiatric disorders (Kessler et al., 2003). Individuals with MDD experience various emotional disturbances, such as elevated negative affect (NA) intensity, diminished positive affect (PA) intensity, and emotional instability (American Psychiatric Association [APA], 2013; Houben et al., 2015). Researchers have theorized that individuals with MDD have difficulties with emotion regulation (ER; Gross & Muñoz, 1995), and growing evidence, particularly regarding habitual ER strategy use, supports this notion. However, there are many other integral aspects of ER, such as desired emotional states (emotion goals) and reasons for regulation (ER motives). In the present study, we examine emotion goals, ER motives, and ER strategies in MDD using a naturalistic approach to assess ER constructs, extending research that has largely assessed ER using global self-reports or in a laboratory setting. In addition, we recruited adults with current MDD as well as those with recurrent but remitted MDD (hereafter remitted MDD) to understand which features of ER are specific to being in a major depressive episode (MDE) and which features characterize people with MDD regardless of current status. Given the highly recurrent nature of MDD (Sim et al., 2016), examining ER characteristics in remitted MDD informs what may represent chronic features of MDD and targets of secondary prevention efforts.

### Emotion Goals

ER is driven by the emotional state(s) people would like to achieve, or *emotion goals* (Mauss & Tamir, 2014). Emotion goals are central to the initial stage of ER (i.e., identification) and influence the remaining ER stages (e.g., selection of strategies; Gross, 2015). Emotion goals are activated when how one currently feels deviates from how one wants to feel, and these goals direct ER efforts. We posit that both the frequency and direction of emotion goals are closely linked to well-being. We define *goal frequency* as how often people want to change their emotions, and *goal direction* as the direction in which individuals want to change their emotions. Frequently activating emotion goals may represent a high demand for ER due to previously unsuccessful ER attempts.

For goal direction, people typically regulate their emotion to increase or maintain PA or decrease NA (i.e., *prohedonic goals*), but sometimes engage in ER to increase or maintain NA or decrease PA (i.e., *contra-hedonic goals*; Riediger et al., 2009). Infrequent activation of prohedonic emotion goals (e.g., decrease NA, increase PA) may contribute to psychopathology that is characterized by high NA and low PA, such as MDD. However, there may be cases where individuals show a hedonically mixed emotion goal profile, such as trying to amplify or dampen both negative and positive emotions. Amplifying emotions regardless of valence may represent a desire to feel greater vitality and aliveness, whereas dampening them may signify nonacceptance of current emotions.

To our knowledge, no research to date has directly examined emotion goal frequency in current or remitted MDD. Related research shows that people are more likely to regulate NA when experiencing higher (vs. lower) momentary NA (Riediger et al., 2009). Because

individuals with current MDD experience elevated NA, they may regulate NA more frequently than healthy controls (i.e., those without current or past psychological disorders; hereafter controls). On the other hand, individuals with MDD experience blunted PA and low motivation to engage in pleasurable activities (APA, 2013), so they may regulate PA less frequently than controls. Additionally, as elevated momentary NA is often accompanied by a greater likelihood of regulating NA (Riediger et al., 2009), it would be of interest to examine whether groups differ in the extent to which their ER frequency changes as a function of momentary affect.

Several studies have shed light on emotion goal directions in current MDD, though none in remitted MDD. Based on global self-report measures, although people generally reported wanting to experience more happiness than sadness, those with current MDD reported wanting to experience more sadness and less happiness relative to their non-depressed peers (Arens & Stangier, 2020; Millgram et al., 2015, 2019). In laboratory studies, relative to nondepressed individuals, those with current depressive disorders were more likely to choose sad stimuli and less likely to choose happy stimuli (Arens & Stangier, 2020; Millgram et al., 2015, 2019; Yoon et al., 2020). Although these findings could be interpreted to mean that depressed people desire sad moods, depressed participants have reported choosing sad stimuli to achieve increased PA (e.g., to feel calm and relaxed; Yoon et al., 2020). It is critical to directly assess emotion goals in a naturalistic context, as well as to clarify goal directions in both current and remitted MDD.

### ER Motives

Emotion goals are driven by superordinate motivations (i.e., *ER motives*; Tamir, 2016). Whereas emotion goals represent what emotional state(s) one wishes to achieve, ER motives represent why people hope to achieve them (Tamir, 2016). People have *hedonic motives* when engaging in ER simply because of how the desired emotions feel (e.g., to feel more pleasantly as an end in itself). In contrast, people hold *instrumental motives* when regulating emotion because of what emotions can do (e.g., to perform well; Tamir, 2016).

Initial evidence suggests that ER motives may be driving MDD-related differences in emotion goals. In Yoon et al. (2020), participants with current MDD frequently chose sad (over happy) music because it was calming; strikingly, they also reported improved mood after listening to it. This suggests that listening to sad music may be mood-enhancing for those with current MDD, reflecting hedonic motives, although it has been suggested that depressed individuals chose sad music because it is consistent with their mood (Arens & Stangier, 2020). It would be important to directly assess hedonic motives in MDD in daily life. It is possible that individuals with MDD are motivated to regulate for hedonic purposes more frequently due to elevated NA and blunted PA compared to controls (APA, 2013). Alternatively, less frequent regulation for hedonic purposes may contribute to more NA in those with MDD.

Common instrumental motives include performance motives (e.g., to perform well on a task) and social motives (e.g., to avoid conflict; Kalokerinos et al., 2017), but these motives have not

been examined in MDD. The social impairments characterizing those with MDD may necessitate them to consider social factors more frequently (Kupferberg et al., 2016). Conversely, these social impairments may be a consequence of individuals with MDD attending to social motives less frequently, possibly due to a high self-focus tendency in MDD (Nolen-Hoeksema et al., 2008). Taken together, examining ER motives can help elucidate what contributes to ER aberrations in MDD. Additionally, examining ER motives in remitted MDD would help clarify whether any distinct characteristics of ER motives in current MDD may be present outside depressive episodes.

### ER Strategies

Another important ER stage is choosing appropriate means to achieve one's emotion goals, or the selection of ER strategies

(Gross, 2015). Commonly examined strategies in MDD include cognitive reappraisal (hereafter, reappraisal), acceptance, expressive suppression (hereafter suppression), and distraction (Liu & Thompson, 2017; Visted et al., 2018; see Table 1 for definitions). Although researchers have mostly examined these strategies in the context of regulating NA (Liu & Thompson, 2017), it is important to examine strategies that target PA, such as savoring (Bryant, 2003), given the diminished PA in MDD (APA, 2013). Additionally, because emotions and ER often occur in social contexts (English et al., 2017), it is vital to examine how individuals utilize social resources to regulate emotion, such as social sharing (Liu et al., 2021; Rimé, 2009).

Ample research has examined the use of ER strategies, particularly habitual use assessed via global self-reports, in MDD (Liu & Thompson, 2017). However, compared to assessing ER naturalistically, global self-report measures of strategy use show lower discriminative validity by capturing tendencies of using groups of strategies

**Table 1**  
*Emotion Regulation Construct Definitions and Study Findings*

Construct definitions	Findings
Emotion goals	
<i>Goal frequency:</i> How often one regulates emotion to achieve a desired emotional state	Frequency of ER of NA: cMDD > (rMDD = CTL)
	Frequency of ER of PA: cMDD > (rMDD = CTL)
<i>Goal direction:</i> The direction in which one regulates emotion: prohedonic (increase or maintain PA, decrease NA) versus contra-hedonic (decrease PA, increase or maintain NA); amplifying (i.e., increase or maintain both NA and PA) or dampen (i.e., decrease both NA and PA)	Prohedonic (vs. contra-hedonic) ER of NA: cMDD < rMDD (cMDD = CTL; rMDD = CTL)
	Prohedonic (vs. contra-hedonic) ER of PA: cMDD = rMDD = CTL
	Amplifying both NA and PA: cMDD > (rMDD = CTL)
	Dampening both NA and PA: Did not test
ER motives	
<i>Hedonic motive:</i> To change or maintain my mood	(cMDD = rMDD) > CTL
<i>Instrumental motives</i>	
To get a task done (e.g., work)	cMDD = rMDD = CTL
To get along with others or avoid conflict	cMDD = rMDD = CTL
To help someone or protect someone's feelings	cMDD = rMDD = CTL
To make a good impression	cMDD = rMDD = CTL
To be appropriate for the situation	cMDD = rMDD = CTL
ER strategies	
<i>Social sharing:</i> Sharing one's emotional experiences and feelings with others (Rimé, 2009)	cMDD = rMDD = CTL
<i>Acceptance:</i> Accepting the situation that contributes to the emotion, or nonjudgmentally accepting one's emotions in a given situation (Garnefski et al., 2001; Hayes et al., 1999)	cMDD = rMDD = CTL
<i>Savoring:</i> Holding onto positive feelings or aspects of the situation (Bryant, 2003)	cMDD = rMDD = CTL
<i>Cognitive reappraisal:</i> Construing a potentially emotion-eliciting situation in a way that changes its emotional impact (Gross & John, 2003)	cMDD = rMDD = CTL
<i>Expressive suppression:</i> Inhibiting visible responses to an emotion eliciting event (e.g., not showing facial expressions; Gross & John, 2003)	cMDD = rMDD = CTL
<i>Distraction:</i> Actively directing the attention away from emotion experiences to more neutral thoughts (Sheppes et al., 2011)	cMDD > CTL (cMDD = rMDD; rMDD = CTL)

*Note.* > denotes that the group(s) on the left side had significantly higher ( $p < .05$ ) values than did the group(s) on the right side; < denotes that the group(s) on the left side had significantly lower ( $p < .05$ ) values than did the group(s) on the right side; = denotes that the two groups did not differ significantly from each other ( $p > .05$ ). cMDD = current major depressive disorder group; CTL = control group; ER = emotion regulation; NA = negative affect; PA = positive affect; rMDD = remitted major depressive disorder group.

(e.g., avoidance strategies) and index tendencies at other stages of ER, including identification (e.g., tendency to engage in ER) and implementation (e.g., success at using a strategy) stages (Koval et al., 2023; McMahon & Naragon-Gainey, 2020). Other than rumination, which has been consistently found to be elevated in MDD (Liu & Thompson, 2017), research is needed to examine momentary ER strategy use in naturalistic settings in those with current or remitted MDD. Evidence generally suggests that those with current MDD habitually use less reappraisal and acceptance and more suppression than do never-depressed controls (Visted et al., 2018). Laboratory research examining spontaneous use of ER strategies concurs with the self-report findings for acceptance and suppression but not for reappraisal, in which groups do not differ (Campbell-Sills et al., 2006; Smoski et al., 2014). Evidence for habitual and spontaneous use of distraction is equivocal (Liu & Thompson, 2017), and research is needed to examine savoring in MDD. Given that individuals with current MDD may be more likely to dampen PA (Werner-Seidler et al., 2013) and experience worsened mood following reminiscing positive memories (Joormann et al., 2007), they may use savoring less than controls. Although social sharing in MDD has yet to be examined, MDD may be associated with less use of social sharing due to a lack of opportunities stemming from anhedonia and social impairments (Kupferberg et al., 2016). Limited evidence on ER strategies in remitted MDD suggests that those with remitted MDD differ from controls in habitual use of some strategies (e.g., suppression, acceptance) but not others (e.g., reappraisal; Liu & Thompson, 2017; Visted et al., 2018). These findings provide preliminary evidence that aberrant ER strategy use characterizes those with remitted MDD, but more research on ER strategies in remitted MDD is clearly needed, particularly in naturalistic contexts.

### The Present Research

The extant literature has provided valuable insights into ER in MDD, but it has almost exclusively relied on global self-report measures of ER and ER assessed in laboratory settings. To build on this literature, we took a naturalistic approach to examine momentary ER (emotion goals, motives, strategies) using experience sampling methodology (ESM), which is characterized by high ecological validity and low recall bias. A naturalistic approach to ER is especially critical because our samples include individuals with MDD who consistently show a negative recall bias (Gotlib & Joormann, 2010; Williams et al., 2007).

Additionally, we investigated ER processes that characterize those with current and remitted MDD in comparison to controls. ER research has focused largely on individuals with current MDD, with less attention given to those whose MDD is in remission. Evidence suggests that ER difficulties not only persist outside MDEs, particularly in the form of frequent selection of putatively maladaptive ER strategies (Liu & Thompson, 2017; Visted et al., 2018), but also predict future depressive psychopathology (Aldao & Nolen-Hoeksema, 2012; Ebert et al., 2017). Because MDD is highly recurrent (Sim et al., 2016), examining multiple components of ER in remitted MDD can help identify what specific ER characteristics may represent chronic features of MDD and inform interventions that help reduce the risk for future episodes. Given the dearth of literature on ER in remitted MDD, we formulated hypotheses for the current MDD group and took an exploratory approach with the remitted MDD group.

The present study had three broad aims. Our first aim was to examine emotion goals—both the frequency and direction of regulating NA and PA. As the elevated and dysregulated NA in current MDD may create a high demand for ER, we hypothesized that the current MDD group would regulate NA more frequently than controls (Hypothesis 1a). In contrast, given that current MDD is associated with blunted PA and reduced interest in pleasant activities, we hypothesized that the current MDD group would regulate PA less frequently than controls (Hypothesis 1b). As goal frequency varies depending on momentary affect (Riediger et al., 2009), we also explored whether groups differed in the extent to which their frequency of ER changes as a function of momentary affect at the within-person level.

Regarding emotion goal direction, we hypothesized that both groups would report more prohedonic goals (i.e., decrease NA, increase or maintain PA) than contra-hedonic goals (i.e., increase or maintain NA, decrease PA) for both NA and PA (Hypothesis 2a). In line with previous research, we further hypothesized that compared to controls, the current MDD group would be relatively less likely to report prohedonic (vs. contra-hedonic) goals, as indexed by attempts to dampen NA (Hypothesis 2b) and amplify (increase or maintain) PA (Hypothesis 2c). We also explored the extent to which the groups attempted to generally amplify or dampen their emotional experience (e.g., increase both NA and PA).

Our second aim was to explore the frequency of ER motives. We focused on hedonic motives and instrumental motives, particularly performance and social motives. This aim was exploratory due to indirect evidence supporting conflicting hypotheses.

Our third aim was to examine ER strategy use. Although individuals with current MDD report reduced habitual use of reappraisal, we hypothesized that they would show comparable everyday reappraisal use relative to controls (Hypothesis 3a). This hypothesis was based on findings from laboratory studies (e.g., Smoski et al., 2014), which are less subject to certain biases that characterize global self-report measures (McMahon & Naragon-Gainey, 2020; Robinson & Clore, 2002). Based on the extant literature, we also hypothesized that the current MDD group would use acceptance less (Hypothesis 3b) and suppression more (Hypothesis 3c) relative to controls. Moreover, considering initial research on ER of PA in MDD (Joormann et al., 2007; Werner-Seidler et al., 2013), we expected that the current MDD group would use savoring less than controls (Hypothesis 3d). Lastly, we hypothesized that the current MDD group would use social sharing less due to fewer opportunities (Hypothesis 3e). We did not have hypotheses for distraction due to mixed evidence.

## Method

### Participants

A total of 215 individuals between 18 and 77 years of age ( $M = 44.3$ , standard deviation [ $SD$ ] = 16.1) were recruited from St. Louis, MO, to participate in a study on emotion and depression. Recruitment occurred through participant registries and online advertisements. We recruited participants so that the sample was composed of 66.0% women (34.0% men) because women are nearly twice as likely to experience an MDE as men (National Institute of Mental Health, 2017). Participants identified as 69.8% White, 19.5% Black, 7.0% multiracial, 2.8% Asian, 0.5% Native American or Alaskan Native, and 0.5% did not report their race/ethnicity. In addition, 1.4% of participants identified as Latinx/a/o.



Most participants held a bachelor's degree or higher (65.3%). Not included in the sample of 215 participants were participants who withdrew ( $n = 7$ ), had technical problems ( $n = 7$ ), low ESM compliance (i.e., completed  $< 20.0\%$  surveys;  $n = 7$ ), or whose behavior evoked concerns about data validity ( $n = 1$ ).

Eligibility criteria included speaking English as a primary language and having no severe visual or hearing impairments. Individuals needed to meet criteria for one of three groups as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5.0*; APA, 2013). The *current MDD group* ( $n = 48$ ) included people in a current MDE as part of an MDD or persistent depressive disorder diagnosis. The *remitted MDD group* ( $n = 80$ ) included people who met criteria for at least two depressive episodes (either MDEs or persistent depressive episodes), the most recent of which was in full remission. The *controls* ( $n = 87$ ) included people who never experienced any depressive disorders or anxiety disorders (specific phobias not assessed). Individuals with current comorbid anxiety disorders were eligible for the two MDD groups because of their high comorbidity rates with MDD (Kessler et al., 2003). Exclusion criteria included a bipolar I or II diagnosis and current or past psychotic symptoms. Demographic and clinical data are presented in Table 2.

## Procedures

Individuals completed a laboratory session, during which they provided informed consent and completed self-report measures and relevant modules of the Structured Clinical Interview for DSM-5.0 (First et al., 2015). Interviews were conducted by clinical psychology doctoral students. Diagnostic issues were discussed via phone consultation with the senior author, a licensed clinical psychologist. The diagnostic reliability of the interviews was calculated based on the first 30 interviews and 18 additional randomly selected interviews. Interrater reliability for current or past MDD and persistent depressive disorder diagnoses were perfect ( $\kappa = 1.0$ ). Participants completed an ESM tutorial and a practice survey. They chose their preferred 15-hr period to receive surveys on their iPhone or a provided iPod Touch 4 (Apple, Seattle, WA, United States). We used the iOS mobile application Status/Post designed by Christopher Metts, MD, which also collects data offline.

Participants received five surveys daily, which occurred randomly within each of the five 3-hr time windows, totaling 70 prompts, starting the day after the laboratory session. Participants had 15 min to begin, receiving two reminder tones. Surveys occurred at an average of 180 min apart ( $SD = 62$ ). We collected a total of 11,191 surveys. Regarding compliance, participants completed, on average, 74.8% of surveys ( $SD = 18.3$ ; range = 20.0–98.6). Survey completion rates did not differ by group (current MDD:  $M = 72.8$ ,  $SD = 19.0$ ; remitted MDD:  $M = 75.7$ ,  $SD = 16.9$ ; control:  $M = 74.3$ ,  $SD = 19.6$ ),  $F(2, 212) = 0.30$ ,  $p = 0.74$ . For the ESM period, participants were compensated \$40, with a bonus of \$10 for completing at least 80% of surveys. The research protocol was approved by a university institutional review board.

## ESM Measures<sup>1</sup>

### Momentary Negative and Positive Emotion

Participants rated their momentary levels of negative and positive emotion (0 = *not at all*, 4 = *extremely*) in response to the item, "I felt [EMOTION] at the time of the beep." The mean levels of NA (i.e.,

bored, sluggish, sad, frustrated, nervous, angry) and PA (i.e., relaxed, content, calm, happy, excited, enthusiastic) were computed for each survey for each participant. Emotion items were presented in random order at each survey. Within-person and between-person reliability as indicated by  $\omega$  for NA items were 0.63 and 0.89, respectively, and for PA items were 0.82 and 0.94, respectively. The intraclass correlations (ICCs) for mean NA and PA were 0.42 and 0.44, respectively.

### Emotion Goals

Participants reported whether and how they were trying to influence their NA (PA) by responding to two questions: "At the time of the beep, how were you trying to influence your NEGATIVE (POSITIVE) emotions?" Participants were provided with a checklist: "increase them"; "decrease them"; "maintain them"; and "I was not trying to influence them." Participants could choose only one option for NA and one for PA. NA goals were assessed before PA goals. If participants reported not trying to influence either NA or PA, they were not asked about ER motives and strategies. ICCs for whether participants were influencing NA and PA were 0.34 and 0.46, respectively. ICC for participants reporting prohedonic (vs. contra-hedonic) goals was 0.50 for NA and 0.43 for PA.

### ER Motives

To assess their ER motives, participants completed the question, "Why did you want to influence your emotions? (select as many as apply)." The seven options included one hedonic motive ("to change or maintain my mood"; ICC = 0.37), five instrumental motives, and an "other" option. The instrumental motives included one performance motive ("to get a task done [e.g., work]"; ICC = 0.22) and four social motives: "to get along with others or avoid conflict" (ICC = 0.28); "to help someone or protect someone's feelings" (ICC = 0.24); "to make a good impression" (ICC = 0.30); and "to be appropriate for the situation" (ICC = 0.33). Wording was adopted from English et al. (2017). The ER motives were presented in the same order for every survey. We categorized the option "other" as an instrumental motive when calculating relevant descriptive statistics. "Other" was treated as its own category in the main analyses because we examined group differences in each motive separately.

### ER Strategies

To assess their ER strategies, participants were presented with the following statement: "The next six questions will ask you about what you were doing to influence your emotions at the time of the beep." Then they were presented with six strategy items: "I shared my feelings with others." (social sharing; ICC = 0.18); "I accepted the situation." (acceptance; ICC = 0.32); "I savored the moment." (savoring; ICC = 0.25); "I thought about the situation differently." (reappraisal; ICC = 0.26); "I kept my emotions to myself." (suppression; ICC = 0.22); "I distracted myself." (distraction; ICC = 0.26). These items were based on ESM work assessing ER strategy use in daily life (e.g., Brans et al., 2013; Heiy & Cheavens, 2014). They were presented in the same order for every survey. Participants rated the extent to which they used each strategy to influence their

<sup>1</sup> The order in which blocks of ESM items for emotion constructs were administered in the same order as presented here.

**Table 2**  
*Demographic and Clinical Data by Group*

Variables	Current MDD ( <i>n</i> = 48)	Remitted MDD ( <i>n</i> = 80)	Control ( <i>n</i> = 87)	Difference test
Demographics				
Gender (% women)	72.9	71.3	57.5	$\chi^2(2) = 4.83, p = .09$
Age ( <i>M, SD</i> )	42.0 (14.2)	44.3 (16.3)	45.5 (16.9)	$F(2, 212) = 0.72, p = .49$
Race (%)				$\chi^2(6) = 4.91, p = .56$
African American	20.8	18.8	19.5	
Asian	4.2	0	4.6	
Caucasian	70.8	72.5	66.7	
Other/Multiracial	4.2	8.8	9.2	
Not reported	0	1.2	0	
Education (%)				$\chi^2(6) = 7.96, p = .24$
High school or lower	12.5	8.8	9.2	
Some college	31.2	21.2	23.0	
Bachelor's degree	39.6	28.8	32.2	
Professional degree	16.7	40.0	33.3	
Marital status (%)				$\chi^2(6) = 7.87, p = .25$
Never married	33.3	31.6	29.1	
Married/cohabiting	29.2	43.0	47.7	
Separated/divorced	31.2	24.1	22.1	
Widowed	6.2	1.3	1.2	
Clinical characteristics				
Depressive symptoms (CES-D) ( <i>M, SD</i> )	33.4 (10.0) <sub>a</sub>	13.3 (9.6) <sub>b</sub>	7.3 (6.2) <sub>c</sub>	$F(2, 210) = 147.0,$ $p < .001$
Current anxiety disorder (%)	70.8 <sub>a</sub>	18.8 <sub>b</sub>	0 <sub>c</sub>	$F(2, 215) = 89.4, p < .001$

*Note.* Different subscripts within a row indicate significant group differences,  $p < .05$ . CES-D = the Center for Epidemiological Studies-Depression (Radloff, 1977); MDD = major depressive disorder; SD = standard deviation.

emotions on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*).<sup>2</sup>

## Analytic Plan

All analyses were conducted using R software (V 4.1.2; R Core Team, 2021; for R code, see <https://osf.io/zfaec>). We present aggregated descriptive findings across the full sample. For group difference analyses, we used multilevel modeling (MLM) because momentary measures (Level 1 [L1]) were nested within participants (Level 2 [L2]) in our data. MLM also takes into account dependency within the data and simultaneously estimates within- and between-person effects while handling missing data and varying time intervals (Nezlek, 2012). We conducted logistic regression analyses for binary outcomes (goals and motives) and linear regression analyses for continuous outcomes (strategies) variables, using the `glmer()` and `lmer()` functions, respectively, from the `lme4` package (Bates et al., 2015). To test group differences for each hypothesis, we entered the relevant momentary ER construct as an outcome variable and dummy-coded binary group variables as L2 predictors. When examining group differences in emotion goal frequencies (Hypotheses 1a and 1b), we further tested whether they may be accounted for by momentary affect by including grand-mean-centered NA or PA as an L1 covariate. We also examined whether groups differed in the extent to which their frequencies of regulating NA (PA) change as a function of momentary NA (PA) by conducting four sets of regression analyses predicting endorsement of regulating NA (PA), in which we first entered L1 person-mean-centered NA (PA) and L2 group variables as predictors

(Step 1) and then included their interactions as a second step (Step 2). Missing data were handled by using the default method in `lme4`, which deletes observations with missing values in any variables.

Additionally, we report Bayes factors (BF) to determine the meaningfulness of our null effects (Kass & Raftery, 1995). BF is a ratio that uses model fit to determine the degree of support for a hypothesis based on the data. BFs  $> 3$  indicate strong support of the alternative (i.e., groups differ) relative to the null (i.e., groups do not differ) hypothesis, BFs ranging from 1/3 to 3 indicate that the data are ambiguous and may support the null or the alternative hypothesis (i.e., groups may or may not differ), and BFs  $< 1/3$  indicate strong support of the null hypothesis (Jeffreys, 1961). To obtain BFs, models were run using the `brms` (Bürkner, 2017) and `bayestestR` (Makowski et al., 2019) packages. Weakly informative priors were used.

## ER Variable Coding

**Emotion Goal Frequency.** For examining *frequency of regulating NA* (Hypothesis 1a), we created an L1 binary variable to indicate the presence of NA goals (1 = *trying to influence their NA in any direction*, 0 = *not trying to influence NA*). An L1 binary variable was created to index the presence of PA goals for examining *frequency of regulating PA* (Hypothesis 1b). Additionally, we created an L1

<sup>2</sup> We also examined group differences in habitual use of reappraisal and suppression, which are commonly studied in MDD, to ensure that our MDD and control samples were comparable to those in previous studies (see Section 5 in the online supplemental materials).

binary variable to indicate the presence of any emotion goals for examining frequency of regulating any emotions (1 = trying to influence NA, PA, or both, 0 = trying to influence neither NA nor PA).

**Emotion Goal Direction.** We created an L1 binary variable to indicate NA goal direction (1 = *prohedonic NA goal* [decreasing NA], 0 = *contra-hedonic NA goal* [increasing or maintaining NA]; Hypotheses 2a and 2b). Similarly, we created an L1 binary variable to indicate PA goal direction (1 = *prohedonic PA goal* [increasing or maintaining PA], 0 = *contra-hedonic PA goal* [decreasing PA]; Hypotheses 2a and 2c). We also created an L1 binary variable to indicate whether, when regulating emotion, participants were trying to amplify their emotional experience (1 = *trying to increase or maintain NA and increase or maintain PA*, 0 = *this was not the case when regulating emotion*). Similarly, an L1 binary variable was created to indicate dampening emotional experience (1 = *trying to decrease NA and PA*, 0 = *this was not the case when regulating emotion*).

**ER Motives.** Each ER motive was coded as an L1 binary variable.

**ER Strategies.** The ER strategies were treated as continuous variables (Hypotheses 3a–3e).

## Transparency and Openness

This study was not preregistered. Relevant data and R analysis code can be found at <https://osf.io/zfaec>. An *a priori* power analysis was conducted for the parent project to determine the target sample sizes. For the current study, multilevel linear or logistic regression analyses were used. For multilevel linear regression models, an L2 sample size of at least 100 produces unbiased regression coefficients and variance components, even with an L1 sample size as low as five (Maas & Hox, 2005). For multilevel logistic regression models, a minimum sample size of 50 at both levels is recommended for producing valid estimates (Moineddin et al., 2007). The current sample sizes of 215 at L2 and 70 at L1 meet the criteria of recommended sample sizes.<sup>3</sup> See the “Participants” subsection for details of data exclusion.

## Results

### Aggregated Descriptive Findings Across the Full Sample

We highlight important descriptive findings in this section. Aggregated frequencies or means of ER variables are summarized in Table 3. Within- and between-person correlations of ER variables are included in Section 1 in the online supplemental materials.

### Emotion Goals

Participants on average reported regulating their emotions in 31.1% ( $SD = 25.3\%$ ) of the surveys they completed (i.e., 16.3 ER episodes over the 2 weeks). Participants regulated emotion prohedonically (i.e., decrease NA, increase or maintain PA) in most ER episodes ( $M = 75.1\%$ ,  $SD = 27.7\%$ ) and contra-hedonically (i.e., increase or maintain NA, decrease PA) a minority of the time ( $M = 14.0\%$ ,  $SD = 22.1\%$ ). Participants were significantly more likely to engage in prohedonic (vs. contra-hedonic) regulation of NA,  $b = 1.16$ , standard error [ $SE$ ] = 0.14,  $p < .001$ , and PA,  $b = 5.16$ ,  $SE = 0.50$ ,  $p < .001$ , supporting Hypothesis 2a. Participants on average reported amplifying both NA and PA in 9.9% of ER episodes and dampening both NA and PA in less than 1% of ER episodes. The breakdown of hedonically mixed emotion goals was as follows: Maintaining NA and increasing

PA (38.6%), increasing NA and increasing PA (29.2%), maintaining NA and maintaining PA (14.7%), decreasing NA and decreasing PA (9.1%), and increasing NA and maintaining PA (8.5%).

### ER Motives

Participants on average endorsed 1.48 ( $SD = 0.55$ ) out of seven ER motives per survey. They endorsed one motive most of the time ( $M = 70.3\%$ ,  $SD = 28.5\%$ ), but also sometimes endorsed two ( $M = 17.3\%$ ,  $SD = 19.0\%$ ) and three or more motives ( $M = 12.3\%$ ,  $SD = 18.6\%$ ). Hedonic motives (i.e., “to change or maintain my mood”) were reported in roughly half of ER episodes ( $M = 53.2\%$ ,  $SD = 29.8\%$ ), whereas instrumental motives were reported more than half of the time ( $M = 69.3\%$ ,  $SD = 25.8\%$ ). Among instrumental motives, the performance motive (i.e., “to get a task done [e.g., work]”:  $M = 27.8\%$ ,  $SD = 22.2\%$ ) was endorsed more frequently than each of the social motives. Among the social motives, some (i.e., “to be appropriate for the situation”:  $M = 23.2\%$ ,  $SD = 24.5\%$ ; “to get along with others or avoid conflict”:  $M = 16.8\%$ ,  $SD = 18.3\%$ ) were endorsed more frequently than others (i.e., “to help someone or protect someone’s feelings”:  $M = 7.8\%$ ,  $SD = 13.9\%$ ; “to make a good impression”:  $M = 5.7\%$ ,  $SD = 10.5\%$ ). All pairwise comparisons of frequencies of ER motives were statistically significant except for the two least frequently endorsed motives (see Section 2 in the online supplemental materials for statistics of all pairwise comparisons).

### ER Strategies

Participants endorsed using acceptance ( $M = 2.12$ ,  $SD = 0.79$ ) and suppression ( $M = 2.03$ ,  $SD = 0.87$ ) to a similar degree and using them significantly more than using reappraisal ( $M = 1.14$ ,  $SD = 0.69$ ) and distraction ( $M = 1.10$ ,  $SD = 0.71$ ), which did not differ from each other. Participants endorsed using social sharing ( $M = 0.76$ ,  $SD = 0.66$ ) the least, significantly less than the other five ER strategies. See Section 3 in the online supplemental materials for statistics of pairwise comparisons of the use of ER strategies.

### Group Comparison Analyses

Means and SD of key ER variables and difference tests are summarized in Table 4. Findings for NA and PA intensity based on this sample are discussed in Thompson, Bailen, and English (2021).

### Emotion Goals

**Goal Frequency.** The current MDD group regulated NA significantly more frequently than did the remitted MDD group,  $b = 0.62$ ,

<sup>3</sup> For the analyses contingent on the reporting of ER episodes, the empirical L2 sample size is lower after eliminating participants who never reported ER episodes during ESM. Similarly, the empirical L1 sample size is reduced by imperfect compliance and low frequency at which participants report ER episodes. Thus, we reevaluated our statistical power based on empirical sample sizes at L2 (i.e., number of participants who reported at least one ER episode = 211) and L1 (i.e., average number of ER episodes reported = 16.3). Simulation studies suggested that, for two-level regression analyses with continuous (Maas & Hox, 2005) and binary outcomes (Moineddin et al., 2007), a large L2 sample size is more important than a large L1 sample size. Specifically, when the L2 sample size reaches 100, the biases of estimating the parameters and SEs of fixed effects were very low even with an L1 sample size of five, which our sample sizes at L2 and L1 exceed, reflecting sufficient power to produce fairly accurate estimates of the fixed effects.

**Table 3**  
*Aggregated Frequencies and Mean Levels of Key ER Variables During ER Episodes (Full Sample: N = 215)*

Variable	Frequency (%) (SD)	Mean (M) (SD)
Emotion goals		
When regulating emotion...		
Regulate both NA and PA	46.6 (30.2)	
Regulate PA only	27.7 (24.3)	
Regulate NA only	25.7 (28.2)	
Prohedonic emotion goals	75.1 (27.7)	
Contra-hedonic emotion goals	14.0 (22.1)	
Amplify both NA and PA	9.9 (15.2)	
Dampen both NA and PA	0.9 (4.2)	
When regulating NA (regardless of PA)...		
Increase NA	20.1 (29.5)	
Decrease NA	68.2 (32.3)	
Maintain NA	11.7 (19.2)	
When regulating PA (regardless of NA)...		
Increase PA	65.5 (29.6)	
Decrease PA	3.1 (10.1)	
Maintain PA	31.4 (28.4)	
ER motives		
Hedonic motive only	30.7 (25.8)	
Instrumental motive(s) only	46.7 (29.8)	
Both hedonic and instrumental motive(s)	22.6 (25.1)	
Hedonic motive (regardless of instrumental motives)	53.2 (29.8)	
Instrumental motive(s) (regardless of hedonic motives)	69.3 (25.8)	
To get a task done (e.g., work)	27.8 (22.2)	
To get along with others or avoid conflict	16.8 (18.3)	
To help someone or protect someone's feelings	7.8 (13.9)	
To make a good impression	5.7 (10.5)	
To be appropriate for the situation	23.2 (24.5)	
Other	13.5 (19.6)	
ER strategies		
Social sharing		0.76 (0.66)
Acceptance		2.12 (0.79)
Savoring		1.08 (0.81)
Reappraisal		1.14 (0.69)
Suppression		2.03 (0.87)
Distraction		1.10 (0.71)

Note. ER = emotion regulation; NA = negative affect; PA = positive affect; SD = standard deviation.

$SE = 0.25$ ,  $p = .01$ , and controls,  $b = 0.71$ ,  $SE = 0.25$ ,  $p = .004$ , who did not differ from each other,  $b = 0.10$ ,  $SE = 0.22$ ,  $p = .66$  (BF indicated strong support for the null hypothesis). The higher frequency of regulating NA in the current MDD relative to the control group supported Hypothesis 1a. Frequency of regulating PA showed the same result pattern, with the current MDD group regulating PA significantly more frequently than the remitted MDD group,  $b = 0.76$ ,  $SE = 0.32$ ,  $p = .02$ , and controls,  $b = 0.80$ ,  $SE = 0.31$ ,  $p = .01$ , who did not differ,  $b = 0.03$ ,  $SE = 0.27$ ,  $p = .90$  (BF indicated strong support for the null hypothesis). This finding contradicted our prediction that the current MDD group would regulate PA less frequently than the controls (Hypothesis 1b). Group differences in frequency of regulating any emotions showed the same pattern as findings on frequencies of regulating NA and PA.

Frequencies of regulating NA and PA by group are depicted in Figure 1a. Pseudo- $R^2$  of significant group differences in emotion goals ranged from 0.007 to 0.011. However, groups no longer differed in frequency of regulating NA, PA, or any emotion when controlling for momentary affect (for detailed results, see Section 4 in the online supplemental materials).

**Contemporaneous Associations Between Affect and Goal Frequency.** Findings on group differences in the extent to which one's attempts to regulate NA and PA were associated with momentary affect are summarized in Table 5. Result patterns were largely identical for the four sets of analyses (Figure 2). Regarding goal frequency as a function of momentary NA, higher momentary NA was associated with a greater likelihood of regulating NA,  $b = 1.55$ ,  $SE = 0.06$ ,  $p < .001$ , and regulating PA,  $b = 0.90$ ,  $SE = 0.12$ ,  $p < .001$ , across groups. Group significantly moderated associations between momentary NA and goal frequency for both NA and PA. Specifically, the positive association between momentary NA and ER of NA was significantly weaker for the current MDD group compared to the remitted MDD group,  $b = -0.92$ ,  $SE = 0.14$ ,  $p < .001$ , and the control group,  $b = -1.02$ ,  $SE = 0.16$ ,  $p < .001$ , who did not differ from each other,  $b = -0.10$ ,  $SE = 0.16$ ,  $p = .53$  (Figure 2a). The simple slopes relating momentary NA to ER of NA were significant for all three groups (current MDD:  $b = 0.94$ ,  $SE = 0.09$ ,  $p < .001$ ; remitted MDD:  $b = 1.86$ ,  $SE = 0.10$ ,  $p < .001$ ; control:  $b = 1.96$ ,  $SE = 0.13$ ,  $p < .001$ ). Similarly, the positive association between momentary NA and ER of PA was significantly weaker for the current MDD group than for the remitted MDD group,  $b = -0.40$ ,  $SE = 0.12$ ,  $p = .001$ , and the control group,  $b = -0.40$ ,  $SE = 0.15$ ,  $p = .007$ , who did not differ from each other,  $b = 0.00$ ,  $SE = 0.15$ ,  $p = .97$  (Figure 2b). Again, the simple slopes relating momentary NA to ER of PA were significant for all three groups (current MDD:  $b = 0.51$ ,  $SE = 0.09$ ,  $p < .001$ ; remitted MDD:  $b = 0.91$ ,  $SE = 0.09$ ,  $p < .001$ ; control:  $b = 0.90$ ,  $SE = 0.12$ ,  $p < .001$ ).

Regarding goal frequency as a function of momentary PA, lower momentary PA was associated with a greater likelihood of regulating NA,  $b = -1.10$ ,  $SE = 0.04$ ,  $p < .001$ , and regulating PA,  $b = -0.15$ ,  $SE = 0.04$ ,  $p < .001$ . Group significantly interacted with momentary PA in predicting the likelihood of regulating NA and PA. Specifically, the negative association between momentary PA and ER of NA was significantly weaker for the current MDD group compared to the remitted MDD group,  $b = 0.46$ ,  $SE = 0.11$ ,  $p < .001$ , and the control group,  $b = 0.49$ ,  $SE = 0.11$ ,  $p < .001$ , who did not differ from each other,  $b = -0.03$ ,  $SE = 0.10$ ,  $p = .76$  (Figure 2c). The simple slopes relating momentary PA to ER of NA were significant for all three groups (current MDD:  $b = -0.74$ ,  $SE = 0.08$ ,  $p < .001$ ; remitted MDD:  $b = -1.21$ ,  $SE = 0.07$ ,  $p < .001$ ; control:  $b = -1.24$ ,  $SE = 0.08$ ,  $p < .001$ ). The association between momentary PA and ER of PA was significantly different for the current MDD group than for the remitted MDD group,  $b = 0.34$ ,  $SE = 0.09$ ,  $p < .001$ , and the control group,  $b = 0.37$ ,  $SE = 0.09$ ,  $p < .001$ , who did not differ from each other,  $b = 0.03$ ,  $SE = 0.09$ ,  $p = .75$  (Figure 2d). The simple slopes relating momentary PA to ER of PA were significant for the remitted MDD group ( $b = -0.23$ ,  $SE = 0.06$ ,  $p < .001$ ) and the control group ( $b = -0.26$ ,  $SE = 0.06$ ,  $p < .001$ ), but nonsignificant for the current MDD group ( $b = 0.11$ ,  $SE = 0.07$ ,  $p = .11$ ).

**Goal Direction.** When regulating NA, the remitted MDD group was significantly more likely to have prohedonic (vs. contra-hedonic) NA goals than was the current MDD group,  $b = 0.76$ ,



**Table 4***Group Differences in Emotion Goals, ER Motives, and ER Strategies Measured via Experience Sampling*

Variable	Current MDD (cMDD; $n = 48$ ) $M (SE), 95\% CI$	Remitted MDD (rMDD; $n = 80$ ) $M (SE), 95\% CI$	Control (CTL; $n = 87$ ) $M (SE), 95\% CI$	BF (cMDD vs. CTL)	BF (rMDD vs. CTL)	BF (cMDD vs. rMDD)
Emotion goals						
Frequency of NA goal	0.25 <sub>a</sub> (0.04), [0.18, 0.33]	0.15 <sub>b</sub> (0.02), [0.12, 0.20]	0.14 <sub>b</sub> (0.02), [0.11, 0.18]	5.63	0.12	2.33
Frequency of PA goal	0.29 <sub>a</sub> (0.05), [0.20, 0.40]	0.16 <sub>b</sub> (0.03), [0.12, 0.22]	0.16 <sub>b</sub> (0.02), [0.11, 0.21]	3.46	0.13	2.01
Frequency of any emotion goal	0.38 <sub>a</sub> (0.05), [0.28, 0.48]	0.23 <sub>b</sub> (0.03), [0.17, 0.29]	0.23 <sub>b</sub> (0.03), [0.18, 0.30]	2.28	0.12	3.12
Direction of NA goal: Prohedonic vs. contra-hedonic	0.69 <sub>a</sub> (0.06), [0.56, 0.79]	0.83 <sub>b</sub> (0.03), [0.75, 0.88]	0.72 <sub>ab</sub> (0.04), [0.63, 0.80]	0.20	0.81	1.45
Direction of PA goal: Prohedonic vs. contra-hedonic	0.986 <sub>a</sub> (0.007), [0.960, 0.995]	0.995 <sub>a</sub> (0.002), [0.985, 0.998]	0.996 <sub>a</sub> (0.002), [0.986, 0.999]	2.22	0.26	2.02
Amplify both NA and PA	0.11 <sub>a</sub> (0.02), [0.07, 0.17]	0.05 <sub>b</sub> (0.01), [0.03, 0.07]	0.06 <sub>b</sub> (0.01), [0.04, 0.08]	2.97	0.21	22.02
ER motives						
Hedonic	0.67 <sub>a</sub> (0.04), [0.57, 0.75]	0.64 <sub>a</sub> (0.04), [0.56, 0.70]	0.44 <sub>b</sub> (0.04), [0.37, 0.52]	45.99	25.27	0.15
Instrumental						
Get task done	0.26 <sub>a</sub> (0.03), [0.20, 0.33]	0.30 <sub>a</sub> (0.03), [0.25, 0.36]	0.25 <sub>a</sub> (0.02), [0.20, 0.30]	0.11	0.25	0.17
Get along/avoid conflict	0.11 <sub>a</sub> (0.02), [0.08, 0.16]	0.15 <sub>a</sub> (0.02), [0.11, 0.20]	0.11 <sub>a</sub> (0.02), [0.08, 0.15]	0.13	0.30	0.28
Help/protect feelings	0.04 <sub>a</sub> (0.01), [0.02, 0.06]	0.06 <sub>a</sub> (0.01), [0.04, 0.09]	0.04 <sub>a</sub> (0.01), [0.03, 0.06]	0.16	0.53	0.77
Make good impression	0.04 <sub>a</sub> (0.01), [0.02, 0.07]	0.04 <sub>a</sub> (0.01), [0.03, 0.07]	0.03 <sub>a</sub> (0.01), [0.02, 0.05]	0.24	0.40	0.20
Be appropriate for situation	0.16 <sub>a</sub> (0.03), [0.11, 0.22]	0.21 <sub>a</sub> (0.03), [0.16, 0.27]	0.17 <sub>a</sub> (0.02), [0.13, 0.22]	0.15	0.20	0.33
Other	0.06 <sub>a</sub> (0.01), [0.04, 0.10]	0.06 <sub>a</sub> (0.02), [0.04, 0.10]	0.08 <sub>a</sub> (0.02), [0.06, 0.12]	0.28	0.21	0.18
ER strategies						
Social sharing	0.78 <sub>a</sub> (0.09), [0.61, 0.95]	0.80 <sub>a</sub> (0.07), [0.66, 0.94]	0.77 <sub>a</sub> (0.07), [0.64, 0.91]	0.06	0.05	0.06
Acceptance	2.03 <sub>a</sub> (0.11), [1.81, 2.24]	2.22 <sub>a</sub> (0.09), [2.05, 2.39]	2.10 <sub>a</sub> (0.09), [1.94, 2.27]	0.08	0.09	0.17
Savoring	1.05 <sub>a</sub> (0.11), [0.84, 1.26]	1.07 <sub>a</sub> (0.09), [0.90, 1.24]	1.14 <sub>a</sub> (0.08), [0.97, 1.31]	0.09	0.07	0.07
Reappraisal	1.13 <sub>a</sub> (0.09), [0.95, 1.32]	1.16 <sub>a</sub> (0.07), [1.01, 1.30]	1.13 <sub>a</sub> (0.07), [0.98, 1.27]	0.06	0.05	0.06
Suppression	2.13 <sub>a</sub> (0.11), [1.90, 2.36]	2.12 <sub>a</sub> (0.09), [1.94, 2.30]	1.93 <sub>a</sub> (0.09), [1.75, 2.11]	0.16	0.20	0.07
Distraction	1.33 <sub>a</sub> (0.10), [1.14, 1.53]	1.14 <sub>ab</sub> (0.08), [0.99, 1.30]	0.93 <sub>b</sub> (0.08), [0.78, 1.08]	7.20	0.32	0.21

*Note.* Frequency of NA (PA) goal represents the percent of time participants reported regulating NA (PA) out of completed surveys. Direction of NA (PA) goal represents percent of time participants regulated prohedonically (vs. contra-hedonically) out of all the surveys they regulated NA (PA). All other variables (e.g., amplifying both NA and PA) were calculated out of all ER episodes (i.e., when regulating emotion). Different subscripts within a row indicate significant group differences based on a frequentist approach,  $p < .05$ . BF = Bayes Factor against point null hypothesis (i.e., no group difference); CI = confidence interval; CTL = control group; ER = emotion regulation; MDD = major depressive disorder; NA = negative affect; PA = positive affect; SE = standard error.

$SE = 0.36$ ,  $p = .03$ , with controls falling nonsignificantly in between the current MDD,  $b = -0.17$ ,  $SE = 0.36$ ,  $p = .64$  (BF indicated strong support for the null hypothesis) and remitted MDD groups,  $b = 0.59$ ,  $SE = 0.32$ ,  $p = .06$  (BF indicated ambiguous support for the null hypothesis). When regulating PA, the groups did not significantly differ from each other in PA goal directions,  $ps > .05$  (BF indicated ambiguous support for the null hypothesis). These findings did not support our predictions that the current MDD group would be less likely to have prohedonic (vs. contra-hedonic) NA (Hypothesis 2b) and PA goals (Hypothesis 2c) than controls. Importantly, although we tested our hypotheses by examining prohedonic (vs. contra-hedonic) NA and PA goals, we depicted frequencies of decreasing, increasing, and maintaining NA and PA by group in Figure 1b and c.

The current MDD group was significantly more likely to amplify both NA and PA than the remitted MDD group,  $b = 0.99$ ,  $SE = 0.32$ ,  $p = .002$ , and controls,  $b = 0.75$ ,  $SE = 0.31$ ,  $p = .01$ , who did not differ from each other,  $b = -0.24$ ,  $SE = 0.29$ ,  $p = .40$  (BF indicated strong support for the null hypothesis). Because participants rarely reported dampening NA and PA simultaneously (<1%; Table 3), we did not examine group differences in this type of emotion goal.

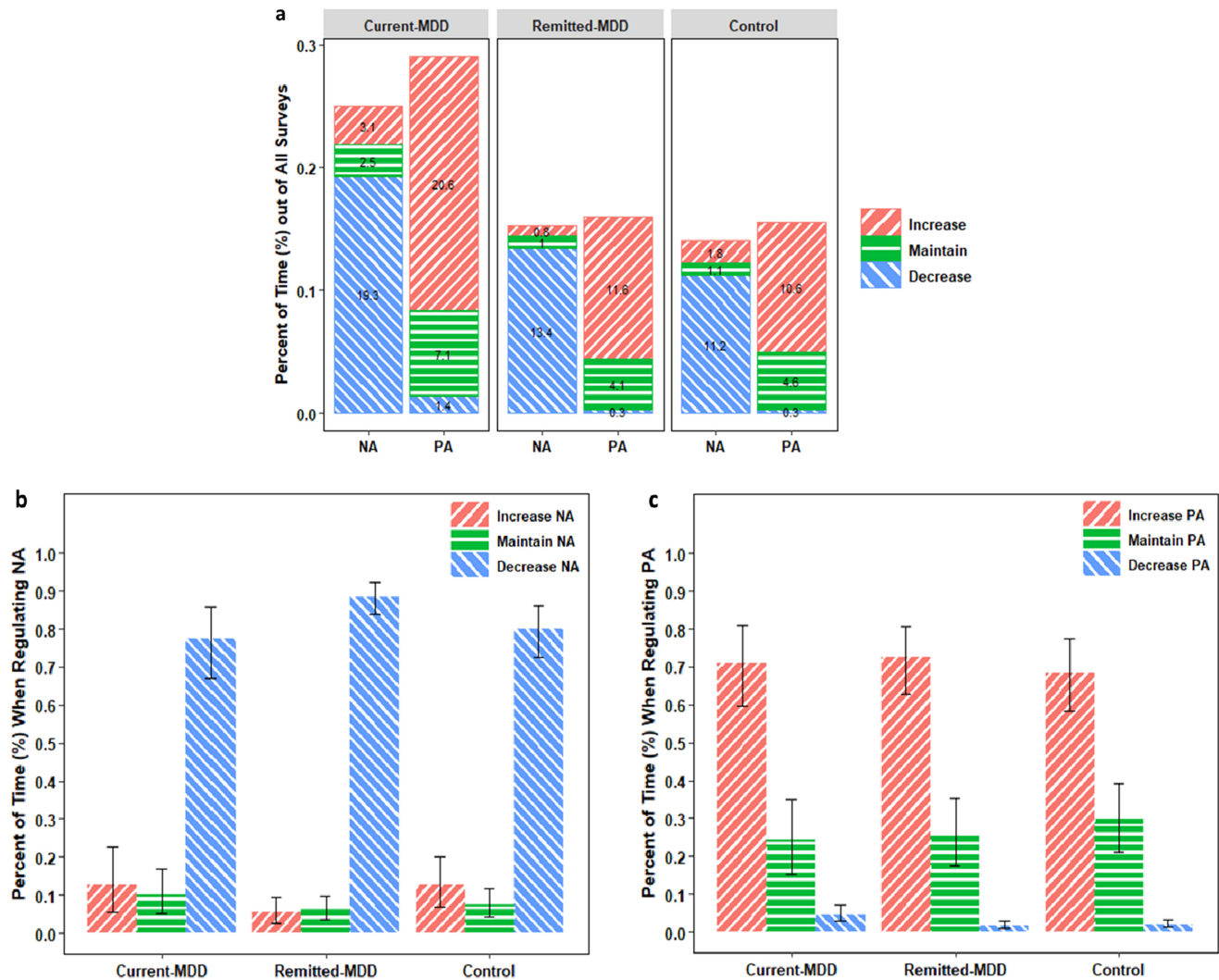
### ER Motives

The current MDD,  $b = 0.92$ ,  $SE = 0.26$ ,  $p < .001$ , Pseudo- $R^2 = 0.023$ , and remitted MDD groups,  $b = 0.78$ ,  $SE = 0.22$ ,  $p < .001$ , Pseudo- $R^2 = 0.018$ , regulated emotions for hedonic motives significantly more frequently than the controls; the two MDD groups did not differ in frequencies of endorsing hedonic motives,  $b = 0.14$ ,  $SE = 0.26$ ,  $p = .60$  (BF indicated strong support for the null hypothesis). In addition, there were no group differences in the frequency of regulating for instrumental motives (BF indicated strong support for the null hypothesis for all instrumental motives; Table 4).

### ER Strategies

The current MDD group used distraction significantly more than controls,  $b = 0.40$ ,  $SE = 0.13$ ,  $p = .002$ , Pseudo- $R^2 = 0.021$ , with the remitted MDD group falling nonsignificantly in between the current MDD group,  $b = -0.19$ ,  $SE = 0.13$ ,  $p = .13$ , and controls,  $b = 0.21$ ,  $SE = 0.11$ ,  $p = .06$  (BF indicated strong support for the null hypothesis). Supporting Hypothesis 3a, groups did not vary in reappraisal use. Contrary to Hypotheses 3b–3e, which expected group

**Figure 1**  
*Frequencies of Regulating Negative (NA) and Positive Affect (PA) in Each Direction by Group*



*Note.* The top figure (Panel a) depicts information about emotion goal frequency and goal direction of NA and PA by group. Each group's data are represented by two bars (NA and PA), which reflect the average goal frequency with which each group reported regulating NA (or PA) out of the number of completed surveys. Each bar is depicted by three stacked segments that reflect frequencies of different goal directions of each group. The bottom two figures depict emotion goal directions that each group reported when regulating NA (Panel b) or PA (Panel c). The three bars that represent the three directions within each group sum to 100%. See the online article for the color version of this figure.

differences in *acceptance*, *suppression*, *savoring*, and *social sharing*, groups did not vary in these four strategies. For strategies other than distraction, BFs indicated strong support for group similarity (i.e., null effects).<sup>4</sup>

## Discussion

MDD is frequently discussed as a psychopathology characterized by emotion dysregulation, but much remains unknown about where ER goes awry in MDD, particularly in daily settings (Liu & Thompson, 2017). The current investigation sought to gain a nuanced understanding of ER in current and remitted MDD by assessing multiple components of ER—emotion goals,

ER motives, and ER strategies—in naturalistic settings. We included both current and remitted MDD samples and a control group to clarify emotion dysregulation at different stages of MDD. In particular, considering that MDD is highly recurrent (Sim et al., 2016), examining ER in those with recurrent but remitted MDD allows us to identify what may represent chronic ER features of MDD and potentially inform targets of secondary prevention efforts.

<sup>4</sup> For all group difference analyses, we tested whether results change after accounting for age by including (grand-mean-centered) participant age at L2. All group difference findings remained significant.

**Table 5**  
*Momentary ER of NA and PA as a Function of Person-Mean-Centered Momentary NA and PA by Group*

Predictors	Outcome: ER of NA				Outcome: ER of PA			
	Predictor: Momentary NA		Predictor: Momentary PA		Predictor: Momentary NA		Predictor: Momentary PA	
	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>p</i>	Estimate (SE)	<i>P</i>	Estimate (SE)	<i>p</i>
Step 1: Momentary affect and group as predictors (Reference Group = Control)								
Intercept	-1.88 (0.16)	<.001***	-1.98 (0.16)	<.001***	-1.70 (0.19)	<.001***	-1.69 (0.19)	<.001***
Momentary affect	1.55 (0.06)	<.001***	-1.10 (0.04)	<.001***	0.75 (0.06)	<.001***	-0.15 (0.04)	<.001***
Current MDD	0.62 (0.27)	.02*	0.73 (0.27)	.006**	0.78 (0.32)	.01*	0.80 (0.31)	.01*
Remitted MDD	0.03 (0.23)	.90	0.08 (0.23)	.72	0.02 (0.27)	.95	0.03 (0.27)	.90
Step 2a: Momentary affect, group, and their interaction as predictors (Reference Group = Control)								
Intercept	-1.91 (0.16)	<.001***	-2.01 (0.16)	<.001***	-1.71 (0.19)	<.001***	-1.70 (0.19)	<.001***
Momentary affect	1.96 (0.13)	<.001***	-1.24 (0.08)	<.001***	0.90 (0.12)	<.001***	-0.26 (0.06)	<.001***
Current MDD	0.74 (0.27)	.006**	0.84 (0.27)	.002**	0.80 (0.32)	.01*	0.80 (0.31)	.01*
Remitted MDD	0.01 (0.23)	.96	0.09 (0.23)	.70	0.01 (0.28)	.98	0.03 (0.27)	.90
Momentary Affect × Current MDD	-1.02 (0.16)	<.001***	0.49 (0.11)	<.001***	-.40 (0.15)	.007**	0.37 (0.09)	<.001***
Momentary Affect × Remitted MDD	-0.10 (0.16)	.53	0.03 (0.10)	.76	0.00 (0.15)	.97	0.03 (0.09)	.75
Step 2b: Momentary affect, group, and their interaction as predictors (Reference Group = Remitted MDD)								
Intercept	-1.90 (0.17)	<.001***	-1.93 (0.17)	<.001***	-1.70 (0.20)	<.001***	-1.67 (0.19)	<.001***
Momentary affect	1.86 (0.10)	<.001***	-1.21 (0.07)	<.001***	0.91 (0.09)	<.001***	-0.23 (0.06)	<.001***
Current MDD	0.73 (0.27)	.007**	0.75 (0.27)	.006**	0.79 (0.32)	.01*	0.77 (0.32)	.01*
Control	-0.01 (0.23)	.96	-0.09 (0.23)	.70	-0.01 (0.28)	.98	-0.03 (0.27)	.90
Momentary Affect × Current MDD	-0.92 (0.14)	<.001***	0.46 (0.11)	<.001***	-0.40 (0.12)	.001**	0.34 (0.09)	<.001***
Momentary Affect × Control	0.10 (0.16)	.53	-0.03 (0.10)	.76	-0.00 (0.15)	.97	-0.03 (0.09)	.75

*Note.* ER = emotion regulation; MDD = major depressive disorder; NA = negative affect; PA = positive affect; SE = standard error.  
 \* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

**Emotion Goals**

**Goal Frequency**

Our first aim was to examine the frequency and direction of emotion goals. The current MDD group generally regulated emotion significantly more frequently than did the control and remitted MDD groups. This pattern of findings characterized both NA and PA. The higher frequency of regulating NA in current MDD was consistent with our hypothesis, but the higher frequency of regulating PA was not. The remitted MDD group regulated emotion at a similar frequency as controls, suggesting that the elevated ER frequency could be a state-dependent effect of MDD. Groups no longer differed in frequency of regulating NA, PA, or any emotion after accounting for affect, suggesting that the more frequent ER in the current MDD group may be due at least in part to their elevated NA and diminished PA. These findings are promising because they suggest that MDD-related ER problems in current MDD are not due to low motivation or infrequent attempts to regulate emotions among those with current MDD, whose emotional experiences may necessitate more frequent regulation than controls. However, a higher ER frequency does not mean that those with current MDD are always regulating when necessary. Additionally, frequent activation of emotion goals could reflect unsuccessful everyday ER attempts that warrant ongoing regulation. Other factors likely contribute to both more frequent ER and higher NA or lower PA in current MDD, such as the intensity and nature of daily stressors. Future research is needed to examine ER frequency in MDD as a function of context and ER success.

In examining emotion goals as a function of levels of momentary affect, we found that, although participants across groups were more

likely to regulate NA and PA when experiencing higher NA or lower PA, these associations were weakest for the current MDD group. More specifically, for the current MDD group, ER attempts for NA are less strongly tied to momentary NA and PA, and ER attempts for PA are less strongly tied to momentary NA and unrelated to momentary PA. Strikingly, this pattern did not characterize the remitted MDD group. In fact, the remitted MDD and control groups showed the same patterns of results for all momentary goal frequency findings, further supporting the idea that the differences in goal frequency in MDD seem to best characterize current depressive episodes.

On the one hand, this result pattern may suggest that ER attempts in current MDD are less responsive to momentary affect. Future work is needed to see if these patterns of findings replicate and if so, examine factors that predict ER attempts in those with current MDD. On the other hand, because momentary affect and emotion goal were measured contemporaneously, momentary affect could be a consequence of ER attempts. For example, frequent ER at low levels of NA and high levels of PA in the current MDD group may be because they need more frequent ER attempts to maintain those emotional states than the other two groups. Research with a more frequent sampling of emotion is needed to clarify the direction of the link.

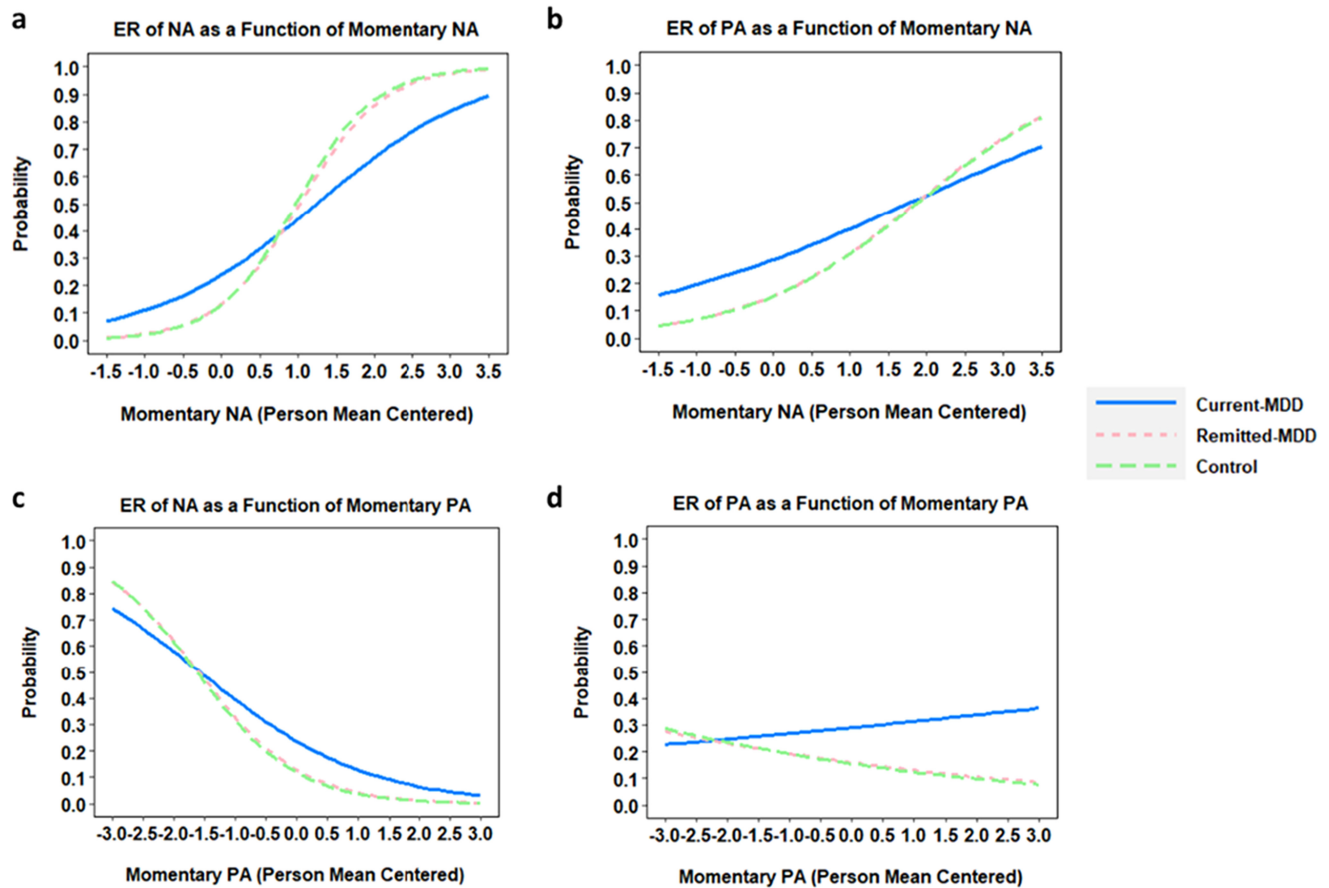
**Goal Direction**

Regarding goal direction, as expected, participants regulated NA and PA prohedonically (i.e., decrease NA, increase or maintain PA) the majority of the time. The current MDD and control groups did not differ in their goal direction for NA or PA, contradicting our hypotheses as well as self-report and laboratory evidence associating

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**Figure 2**

Probabilities of Emotion Regulation (ER) of Negative (NA) and Positive Affect (PA) as a Function of Momentary NA (Top Row) and PA (Bottom Row)



*Note.* The figures in the top row depict within-person associations between momentary NA and probabilities of regulating NA (Panel a) and PA (Panel b) by group. The figures in the bottom row depict within-person associations between momentary PA and probabilities of regulating NA (Panel c) and PA (Panel d) by group. See the online article for the color version of this figure.

the current MDD with less frequent prohedonic regulation than controls (Millgram et al., 2015, 2019). The discrepant findings may be due to the assessment context. Prohedonic regulation may be less common in response to standardized laboratory stimuli than to everyday events that are more complex and personally meaningful. Additionally, as we did not assess emotion goals by specific emotions, our findings may be obscuring differences between specific emotions or differences as a function of arousal. Nonetheless, our findings that the current MDD group generally regulated their emotions prohedonically and did so to the same extent as controls contradict the notion that those with MDD do not strive to feel better.

While all three groups regulated prohedonically most of the time, the remitted MDD group showed a greater tendency to regulate NA prohedonically than the current MDD group, which may reflect an adaptive tendency. Striving to reduce NA may act as a protective factor against the recurrence of depressive episodes. Future longitudinal research is needed to examine whether tendencies to regulate prohedonically vary as a function of the depressive course, including predicting recurrence and remission.

We also explored hedonically mixed emotion goals—amplifying or dampening NA and PA simultaneously. Perhaps unsurprisingly, mixed goals occurred infrequently (~10% of ER episodes), and attempts to dampen both NA and PA were rare. Attempts to amplify both NA and PA were most common in the current MDD group. Findings could suggest that the emotional numbness associated with MDD leads individuals to strive more towards “emotional aliveness” via enhancing emotional intensity regardless of valence. The hedonically mixed emotion goals may serve competing self-enhancing (achieved by amplifying PA) and self-verifying (achieved by amplifying NA) motivations, dovetailing findings that both excessive reassurance seeking and negative feedback seeking are elevated in current MDD (Hames et al., 2013). Notably, depressive symptoms have been associated with reduced emotional complexity (Dejonckheere et al., 2018), so mixed emotion goals may not necessarily lead to mixed emotional experiences. Alternatively, findings could reflect that the current MDD group has diminished emotional understanding (e.g., lower emotion differentiation; Thompson, Liu, et al., 2021). That is, these mixed emotion goals, which seem inconsistent, may reflect the current MDD group being confused about



how they are feeling at least some of the time. More research is needed to examine whether these findings replicate and to explore these speculations.

### ER Motives

Our second aim was to explore ER motives, which are superordinate motivations of *why* people hope to achieve their emotion goals (Tamir, 2016) and thus may provide insight into what may be driving MDD-related differences in emotion goals. Both the current and remitted MDD groups reported similar frequencies of hedonic motives, the frequencies of which were higher than what was reported by the control group. Individuals with current and remitted MDD may be motivated to seek comfortable emotional states more frequently than controls, possibly due to a greater tendency to feel nonaccepting towards their current feelings (Yoon et al., 2018). In line with research that strongly valuing and pursuing happiness may at times be harmful (Gruber et al., 2011), the greater emphasis placed on the hedonic value of emotions may contribute to the onset and maintenance of MDD. Alternatively, people likely develop a greater tendency to regulate emotion for hedonic motives as a consequence of MDD. These hypotheses await future longitudinal research to clarify them.

We found no group differences in any instrumental ER motives, suggesting that MDD-related differences in ER are not due to the five instrumental functions of emotion we assessed. The null findings for social motives (which had strong support according to BF) are notable given the social impairments present in both current and remitted MDD (Hammen & Brennan, 2002; Kupferberg et al., 2016). That is, although individuals with current and remitted MDD are characterized by interpersonal difficulties, they do not report trying to manage their emotions more (or less) for social reasons. The current MDD group not having more frequent social motives could be an indicator of social impairment. Research is needed to examine whether it would be adaptive for those with MDD to use more frequent social motives. It will be important for research to examine other types of instrumental motives (e.g., epistemic motives; Tamir, 2016) as well.

### ER Strategies

Our third aim was to examine ER strategy use. The only significant group difference was that the current MDD group used distraction more than did controls. People tend to use distraction in more (vs. less) intense negative situations (Sheppes et al., 2011), so it may be that, compared to controls, the current MDD group experienced more emotionally intense situations. Their increased distraction use may also be due to their greater fear and less tolerance of their emotions compared to controls (Yoon et al., 2018). Thus, distraction may be an adaptive strategy for those with current MDD in coping with negative events, particularly given their high rumination tendency (Nolen-Hoeksema et al., 2008). However, elevated distraction use over time may become a form of avoidance and maintain depressive episodes, but this awaits empirical examination.

Our findings on ER strategy use highlighted more similarities than differences across groups, which contradict the notion that MDD is associated with aberrant (habitual) use of ER strategies both within and outside MDEs (Liu & Thompson, 2017; Visted et al., 2018). This discrepancy may be due to differences in methodologies.

When assessed by global self-report measures, individuals with MDD may underestimate their use of putatively adaptive strategies (e.g., reappraisal, acceptance) and overestimate their use of putatively maladaptive ones (e.g., suppression), compared with controls. On the other hand, group similarities in everyday use of savoring are consistent with previous findings that MDD was unrelated to habitual use of positive rumination (i.e., repetitively thinking about PA and aspects of one's life or oneself; Feldman et al., 2008; Johnson et al., 2008; Werner-Seidler et al., 2013), a PA-focused ER strategy similar to savoring.

More work is also needed with current and remitted MDD samples to explore how flexibly they select context-appropriate strategies (i.e., ER flexibility) and how successfully they implement strategies (i.e., ER success) in daily life (Gross, 2015). It remains possible that individuals with MDD, including those whose MDD is in remission, do not implement strategies as successfully as controls in everyday life, despite demonstrating comparable capacity in the laboratory (Liu & Thompson, 2017). It is important to keep in mind that we did not assess rumination, which is usually elevated in current MDD and remitted MDD albeit to a lesser extent (Liu & Thompson, 2017).

### General Discussion and Implications

Taken together, group differences in everyday ER were generally most prevalent between the current MDD and control groups. The current MDD group regulated their emotions more frequently than did the remitted MDD and control groups (emotion goal frequency), likely due at least in part to their elevated NA and diminished PA. However, their attempts to initiate ER were less associated with momentary affect than the other two groups. Additionally, the current MDD group was more likely to simultaneously amplify their NA and PA (emotion goal direction), were more driven to use ER due to the hedonic tone of emotion (hedonic motives), and used more distraction (ER strategy). These results suggest that although those with current MDD are highly motivated to engage in ER and change how they feel in general, their ER attempts are less tied to *momentary* emotional experiences. Thus, emotion dysregulation in current MDD may not be characterized by a lack of overall ER attempts or motivation to change how one feels. Instead, current MDD may be characterized by relatively more indiscriminate regulation attempts in relation to momentary ER-relevant cues (in this case, momentary affect), though research is needed to investigate the mechanisms driving the weakened link between goal frequency and affect. MDD-related difficulties may also manifest at other stages, such as reduced ER strategy flexibility and success in implementing tactics in context-appropriate ways, though these are only speculations. Finally, the heightened use of distraction in the current MDD group may reflect a greater tendency to avoid emotion relative to controls.

The present findings have important clinical implications. Many types of psychotherapies for MDD directly or indirectly target ER skills (Bailen & Thompson, 2023; Gratz et al., 2015). However, it remains unclear which aspects of the ER process are necessary and sufficient for symptom and functioning improvement (Gratz et al., 2015). Our findings provide indirect evidence to advance this understanding. Individuals with MDD are motivated to engage in ER and to regulate emotion for the purpose of influencing their emotions. However, their ER frequency is less linked to variations of

their momentary affect. Thus, instead of motivating clients with depression to engage in ER in general, it may be helpful to focus on other aspects of ER, such as exploring what may be driving the more frequent ER efforts (e.g., lack of ER success), identifying appropriate timing of ER based on momentary emotion and context, and practicing noninfluence of emotion (i.e., mindfulness- and acceptance-based ER strategies; Wilken & Miyamoto, 2020). Importantly, treatment research is needed to directly test these hypotheses.

We found that the remitted MDD group looked similar to controls in many ER processes. This pattern of findings is particularly striking because the remitted MDD group was composed of individuals who had experienced at least two depressive episodes. Recurrent MDD is a more impairing form of MDD compared to single-episode MDD (Burcusa & Iacono, 2007). Consequently, it is reasonable to expect that those with multiple past depressive episodes would be more likely to look more similar to those with current MDD than those with one past depressive episode, but this was not what we found. In addition to regulating emotion at similar frequencies overall, the remitted MDD and control groups showed the same pattern of associations between ER frequency and momentary affect; this association was stronger than that of the current group and may indicate greater flexibility in modulating emotion goals. Unlike the current MDD group, the remitted MDD group did not report using distraction more than controls, possibly reflecting less avoidance of their emotional experiences. Moreover, the remitted MDD group was more likely than the current MDD group to have the emotion goal of decreasing NA, which may indicate a proactive tendency to take action to experience less unpleasant emotions. Thus, in working with those whose MDD is in remission, providers can capitalize on the arguably more adaptive ways in which they regulate emotion, such as encouraging clients to continue using ER strategies that engage with their emotions. Despite the similarities between the remitted MDD and control groups, difficulties with ER likely exist outside MDEs in ways not captured in the current research (e.g., ER deficits at a neural level; Kanske et al., 2012; van Kleef et al., 2022), which may be vulnerability factors for, or consequence of, MDD. It will be important to identify additional ER characteristics that represent chronic features of MDD and the contexts in which individuals with remitted MDD manifest difficulties in ER.

### Limitations and Future Directions

We note several limitations of our study. First, we focused on the identification (emotion goals, motives) and selection (i.e., the extent to which strategies were used) stages of ER, but we did not assess the implementation stage (e.g., whether strategies were implemented successfully; Gross, 2015). Second, our lists of ER motives and strategies were not exhaustive. For example, we did not examine epistemic motives (e.g., self-verification) and rumination, which may be particularly relevant to MDD (Arens & Stangier, 2020; Nolen-Hoeksema et al., 2008). As we only included one ER strategy specific to PA (i.e., savoring), more research is needed to investigate other strategies targeting PA (Feldman et al., 2008). Third, despite the advantages afforded by ESM, we did not assess contextual factors of ER (e.g., frequency and nature of emotional events), so we could not determine whether MDD-related differences may be explained by systematic variations in everyday situations across groups. Relatedly, as ESM relies on participants' awareness and accurate reporting of their

momentary experiences, our findings may have been influenced by group differences in participants' insight into their momentary ER behaviors. Researchers should consider other methods for assessing different components of ER in these samples (e.g., behavioral measures, informant reports). Lastly, because our group comparisons of ER between people at different stages of MDD were cross-sectional in nature, we could not conclude whether any group differences precede, emerge during, or develop after an MDE. Future longitudinal research is needed to clarify how various ER processes change over the course of MDD as well as their etiological roles in contributing to the risk and maintenance of MDD over time.

The present findings elucidate everyday ER processes in current and remitted MDD. We found that group differences manifest mostly between the current MDD and control groups and in emotion goals. However, it remains unclear how adaptive these ER characteristics are in MDD and whether MDD-related emotion goal differences reflect aberrations in other stages of ER. Future research will benefit from investigating other aspects of ER that may characterize emotion dysregulation in MDD, such as ER flexibility and success during the implementation stage of ER in daily life.

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