Empirical Article

Motivations to Experience Happiness or Sadness in Depression: Temporal Stability and Implications for Coping With Stress

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Abstract

Difficulties with emotion regulation in depression may be linked not only to emotion regulation strategies but also to the motivation to experience certain emotions. We assessed the degree of motivation to experience happiness or sadness in major depressive disorders outside the laboratory and prospective links to clinical outcomes over time. Depressed individuals were consistently less motivated to experience happiness and more motivated to experience sadness than nondepressed individuals. The less motivated participants were to experience happiness, the less they tried to upregulate happiness in an emotion regulation task and downregulate negative emotions during real-life stress. Importantly, the less motivated depressed participants were to experience happiness, the more clinical symptoms they exhibited months later during a stressful period, even after controlling for initial levels of symptoms. These findings demonstrate that individual differences in the degree of motivation to experience happiness in depression may carry clinical implications.

Keywords

depression, emotion regulation, motivation, happiness, sadness, stress, open materials

Depression involves difficulties in emotion regulation (e.g., Joormann & Siemer, 2014). To understand such difficulties, researchers have focused on understanding the use or misuse of emotion regulation strategies in depression (e.g., Joormann & Vanderlind, 2014; Liu & Thompson, 2017; Rottenberg, 2017). Depression has been linked to the frequent use of relatively maladaptive (e.g., rumination, suppression), rather than adaptive (e.g., reappraisal), emotion regulation strategies (Liu & Thompson, 2017; Rottenberg, 2017). The efficacy with which depressed individuals use emotion regulation strategies in the lab, however, often has been comparable to nondepressed individuals (Liu & Thompson, 2017; Rottenberg, 2017), suggesting that although depressed individuals can use emotion regulation strategies effectively when instructed, they fail to do so in daily life. To understand emotion regulation difficulties in depression, therefore, we may need to look beyond emotion regulation strategies.

Emotion regulation strategies are employed to attain desired emotional states (e.g., Gross, 2015; Tamir,

2016). Emotion regulation difficulties in depression could be related not only to the strategies people use but to the emotional states they are motivated to experience. Laboratory studies suggest that depressed individuals may differ from nondepressed individuals in how motivated they are to experience pleasant and unpleasant emotions (Millgram, Joormann, Huppert, & Tamir, 2015). Depressed (vs. nondepressed) individuals may be less motivated to experience pleasant emotions (e.g., happiness) and more motivated to experience unpleasant emotions (e.g., sadness). Might such differences carry clinical implications? We addressed this possibility by testing whether differences between depressed and nondepressed individuals in their motivation to experience happiness or sadness persist as they respond to personally relevant events outside the

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laboratory, whether such differences are stable over time, and whether they are prospectively linked to clinical symptoms.

Motivation to Experience Emotions as a Key Factor in Emotion Regulation

People regulate emotions to change what they feel into what they want to feel (Gross, 2015; Tamir, 2016). Several lines of research indicate that people vary in what they want to feel. Research on affect valuation theory (e.g., Tsai, Knutson, & Fung, 2006) focused on affective states people ideally want to feel. Ideal affect differs from actual affect and is linked to emotion regulatory behavior. Research on instrumental emotion regulation (e.g., Tamir, 2009, 2016) focused on the extent to which people want to experience discrete emotions to attain higher-order goals, regardless of whether they are considered ideal. The emotions people want to feel vary across people and contexts and set the direction and outcomes of emotion regulation. Both lines of research highlight the role of motivation to experience affective states in emotion regulation. Here, we focus on the motivation to experience happiness and sadness in depression.

We define the motivation to experience happiness and sadness as the degree to which people want to experience these emotions (see Tamir, 2009, 2016). Following research on motivation in other domains (e.g., Elliot & McGregor, 2001; Hart & Albarracín, 2009), we assessed the motivation to experience happiness and sadness in depression using self-report. We adapted a measure that has been used to assess motivation to experience various emotions and was shown to predict regulatory behavior and subsequent emotional experiences (e.g., Hackenbracht & Tamir, 2010; Millgram et al., 2015; Porat, Halperin, & Tamir, 2016; Tamir & Ford, 2012). Research using such a measure has shown that what people want to feel is conceptually and empirically independent of what people currently and typically feel (e.g., Augustine, Hemenover, Larsen, & Shulman, 2010; Ford & Tamir, 2014; Porat et al., 2016; Tsai et al., 2006) and what they expect to feel (e.g., Tamir, Bigman, Rhodes, Salerno, & Schreir, 2015).

Although people are often motivated to experience pleasant emotions and avoid unpleasant ones, people vary in how motivated they are to experience particular emotions (e.g., Gross, Richards, & John, 2006; Kämpfe & Mitte, 2009). For instance, people with lower (vs. higher) self-esteem were less motivated to repair sad moods (Wood, Heimpel, Manwell, & Whittington, 2009) and more motivated to dampen positive moods (Wood, Heimpel, & Michela, 2003). How much people want to feel certain emotions can determine whether they try to regulate these emotions, the direction of regulation

(e.g., upregulation or downregulation), and the effort they invest in regulation (Tamir & Millgram, 2017). For instance, people with lower self-esteem who were less motivated to improve their mood were less likely to choose to watch comedy clips (Wood, Heimpel, Manwell, & Whittington, 2009). Similarly, Asian (vs. European) Americans were more likely to dampen positive emotions, used more regulation strategies to dampen positive emotions, and ultimately felt less positive (Miyamoto & Ma, 2011). We propose that because the degree of motivation to experience certain emotions can determine whether and how people regulate emotions, it may shape both functional and dysfunctional emotion regulation.

Motivation to Experience Emotions in Depression

Motivation to experience specific emotions has rarely been assessed in people suffering from dysfunctional emotion regulation, such as people diagnosed with depression. Although some evidence suggests that emotional reactivity in depression is linked to cultural variation in affect valuation (e.g., Chentsova-Dutton, Tsai, & Gotlib, 2010), little research assessed the degree to which depressed individuals want to experience happiness or sadness. One investigation suggested that depressed individuals may differ from nondepressed individuals in how motivated they are to experience happiness and sadness (Millgram et al., 2015). Both depressed and nondepressed individuals were motivated to experience more happiness than sadness. However, depressed (vs. nondepressed) individuals were less motivated to experience happiness (as reflected in self-report data and one behavioral task) and more motivated to experience sadness (as reflected in self-report data and several behavioral tasks). Depressed individuals were also more likely to use regulation strategies, such as situation selection and cognitive reappraisal, to upregulate (rather than downregulate) sadness. Such efforts maintained their unpleasant feelings. This pattern is consistent with previous findings that showed depressed individuals are more likely than nondepressed individuals to use strategies that dampen rather than savor positive affect (e.g., Feldman, Joormann, & Johnson, 2008; Werner-Siedler, Banks, Dunn, & Moulds, 2013).

Such evidence suggests that emotion regulation difficulties in depression may relate to how motivated depressed individuals are to experience happiness and sadness. However, existing evidence is constrained to laboratory settings. It is unknown whether these findings persist outside the laboratory, are consistent over time, and reflect relatively stable individual differences.

Furthermore, it is unknown whether the motivation to experience emotions in depression carries clinical implications, especially as people cope with stressful events. We sought to fill these gaps with this investigation.

Motivation to Experience Emotions Outside the Laboratory and Over Time

Motivation to experience particular emotions can differ across contexts (see Tamir, 2016). For example, people were more motivated to increase anger when confronting others (e.g., Tamir, Mitchell, & Gross, 2008) and more motivated to increase sadness when seeking help from others (Hackenbracht & Tamir, 2010). Motivation to experience particular emotions also differs across individuals (see Tamir, 2016). For instance, the motivation to maintain positive feelings differs by self-esteem (e.g., Wood et al., 2009), affective dispositions (e.g., Ford & Tamir, 2014), values (Tamir et al., 2016), and culture (e.g., Miyamoto, & Ma, 2011). Such individual differences tend to remain stable over time (e.g., Izard, Libero, Putnum, & Haynes, 1993; Trzesniewski, Donnellan, & Robins, 2003), reflecting relatively stable predispositions (e.g., Ford & Tamir, 2014).

Depressed individuals may be less motivated to experience happiness and more motivated to experience sadness than nondepressed individuals (Millgram et al., 2015). If such differences reflect stable motivations, they may shape how depressed (vs. nondepressed) individuals regulate emotions over time, facilitating or undermining their ability to cope with stress. One goal of this investigation, therefore, was to assess the stability of differences in motivations to experience happiness or sadness in depression. We assessed clinically depressed and nondepressed students' motivations to experience happiness and sadness in the laboratory and in two subsequent assessments outside the laboratory as they prepared for and coped with a stressful exam period. We expected differences in the motivation to experience happiness or sadness in depression to be relatively stable over time.

Motivations to Experience Happiness or Sadness and Coping With Stress

The second goal of this investigation was to test whether individual differences in the motivation to experience happiness or sadness in depression carry any long-term clinical implications. We expected such individual differences to relate to how people regulate emotions in the moment and have prospective implications for clinical symptoms as people regulate emotional reactions to anticipated stress. We expected depressed individuals to be more likely to try to downregulate happiness and upregulate sadness in a controlled performance-based task. We also expected that during a stressful event, depressed individuals would be less likely than nondepressed individuals to try to make themselves feel better and these differences would be mediated by their motivation to experience less happiness or more sadness.

If motivation to experience certain emotions is stable across contexts, it could also carry prospective effects, shaping how people regulate emotions over time. The better people prepare for upcoming stressors, partly by regulating their emotions in anticipation of them, the better they should cope with them when they arrive. Indeed, effective emotion regulation protects individuals from developing clinical symptoms (Bardeen, Kumpula, & Orcutt, 2013; Troy & Mauss, 2011). Regulation of pleasant emotions plays a role in coping with stress specifically (Fredrickson, Tugade, Waugh, & Larkin, 2003; Tugade & Fredrickson, 2004). Depressed individuals are particularly vulnerable to stress (e.g., Burke, Davis, Otte, & Mohr, 2005; Van Winkel et al., 2015). Stressful events can predict the onset and recurrence of depression (e.g., Kendler & Gardner, 2016). Therefore, we expected the motivation to experience happiness or sadness in depression to prospectively predict how well depressed individuals cope with anticipated stress.

We sought to test how well initially depressed and nondepressed individuals cope with a subsequent stressful event. Difficulties coping with stressful events likely manifest in a range of clinical symptoms (e.g., anxiety, somatic symptoms; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; McLaughlin & Hatzenbuehler, 2009; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013). Therefore, we assessed general clinical symptoms rather than depressive status per se. We expected depressed (vs. nondepressed) individuals to experience more clinical symptoms during stress and that such differences would be partially explained by how motivated individuals were to experience happiness or sadness in the period preceding the stressful event.

Some people diagnosed with depression are more vulnerable to stress than others (e.g., Kendler & Gardner, 2016; Van Winkel et al., 2015). We hypothesized that such differences may be partly linked to differential degrees of motivation to experience happiness or sadness. If lower motivation to experience happiness prevents people from adaptively regulating their emotions in anticipation of stress, by the time the exam period comes around, they may be less equipped to handle it. Accordingly, we tested whether depressed individuals who are less motivated to experience happiness or more motivated to experience sadness are more susceptible to the adverse effects of stress.

The Current Investigation

In a longitudinal study, we assessed the degree of motivation to experience happiness and sadness and clinical symptoms among clinically depressed and nondepressed students at three time points. The first assessment took place in the lab, and the second and third assessments took place outside the lab. The second assessment was conducted during the course of an academic semester, and the third assessment was conducted at the end of the semester, during the stressful exam period. Participants were students clinically diagnosed in the first assessment with either current major depression disorder or current dysthymia and a matched group of students with no history of mental health disorders. We predicted that:

1. Initially depressed (vs. nondepressed) individuals would be less motivated to experience happiness and more motivated to experience sadness, and these differences would remain stable across time.
2. Motivation to experience happiness or sadness would be linked to regulatory behavior. To test this, the second assessment included a behavioral performance–based task in which participants chose between upregulating and downregulating their reactions to happy and sad stimuli (see Millgram et al., 2015; Sheppes et al., 2014). We predicted that participants initially diagnosed with depression would be less likely to choose to upregulate reactions to happy stimuli and more likely to choose to upregulate reactions to sad stimuli.
3. Initially depressed and nondepressed participants would differ in their efforts to downregulate negative emotions during the exam period, and this would be mediated by the motivation to experience happiness and sadness during exams.
4. The degree of motivation to experience happiness or sadness during the semester (second assessment) would partially mediate differences between initially depressed and nondepressed individuals in clinical symptoms during the exams. We focused on motivation during the semester as the mediator because we expected clinical symptoms during exams to be prospectively shaped by how well people regulate emotions as they prepared themselves for those exams during the semester. We expected that during the semester, depressed (vs. nondepressed) individuals would be less motivated to experience happiness and more motivated to experience sadness than nondepressed individuals and that these motivations would prospectively predict symptom severity during the exams.

We expected these predictions to hold when controlling for symptom severity during the semester and current happiness or sadness during exams. Because we hypothesized that the degree of motivation to experience happiness or sadness would prospectively predict clinical symptoms by changing emotion regulatory behavior during the semester, we controlled for concurrent motivations to experience happiness or sadness during the exams.

5. Within the depressed group, we predicted the motivation to experience happiness or sadness during the semester (second assessment) would prospectively predict severity of clinical symptoms during the exams. We expected that the less motivated depressed individuals were to experience happiness or the more motivated they were to experience sadness when preparing for the exams, the worst symptoms they would experience during exams even when controlling for initial symptoms and concurrent motivations for happiness or sadness.

Method

Participants

Participants were prescreened according to their scores on the Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996), administered online to a large sample of students ($N = 1,039$) 1 to 3 weeks prior to the lab assessment. Following the instructions of the ethical review board, we omitted Item 9 on suicidal thoughts. Participants who scored either 16 or above or 9 or below on the BDI-II were invited to participate (see Pe et al., 2015). To determine clinical status, trained clinical psychology graduate students individually administered the Structured Clinical Interview for *DSM–IV* Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997) during the lab assessment.

A power analysis based on previous effects (Millgram et al., 2015) indicated a desired sample size of 59 participants per group. Anticipating that some participants may not meet diagnostic criteria, we invited 152 participants to participate: 69 participants who scored 9 or below on the BDI-II and 83 participants who scored 16 or above. Participants were considered depressed[1] ($N = 63$, $M_{BDI-II} = 23.70$, $SD = 5.53$) if they scored 16 or above on the BDI-II and were diagnosed with a current major depressive disorder (MDD) or current dysthymic disorder. We excluded participants who had a Bipolar I or II diagnosis or any psychotic disorder. Participants were considered nondepressed ($N = 63$, $M_{BDI-II} = 3.24$, $SD = 1.90$) if they scored 9 or below on the BDI-II and had no history of mental health disorders, excluding

specific phobias. Participants who did not meet the inclusion criteria were excluded ($N = 26$). Overall, 126 participants completed the first assessment (63 depressed individuals, 63 nondepressed individuals), 108 participants completed the second assessment (55 depressed individuals, 53 nondepressed individuals), and 102 participants completed the third assessment (52 depressed individuals, 50 nondepressed individuals). The attrition rate was 19.1% (11 depressed participants and 13 nondepressed participants). Participants who did not complete all three assessments did not differ from participants who did complete all three assessments in severity of clinical symptoms, $t(124) = -1.01, p = .316$, or motivation to experience happiness, $t(124) = -0.13, p = .895$, or sadness, $t(124) = -0.44, p = .664$. We included only participants who completed all three assessments in the analyses. The final sample included 102 participants (52 depressed participants and 50 nondepressed participants, 74.5% females, $M_{age} = 23.75$). The depressed and nondepressed groups did not differ significantly in age, $t(100) = -0.92, p = .358$; family status, $\chi^2(1) < 0.01, p = .948$; or gender, $\chi^2(1) = 0.33, p = .568$. Participants received course credit or the equivalent of $55 for participating in the entire study. Participants who did not participate in all three assessments were compensated for the assessments they completed.

Procedure

The study included three assessments administered over time.

First assessment: lab. The first assessment was conducted in the laboratory during a period free of exams. To separate the assessment of motivation to experience emotions from the assessment of participants' clinical status, the first assessment included two sessions that were conducted approximately one week apart (2–14 days, $M = 6.19$ days). To rule out order effects, participants completed the sessions in one of two counterbalanced orders. During one session, participants first rated their current emotions and their current stress. Then, participants rated their motivations to experience happiness and sadness.[2]

In a second session, participants completed the Symptom Checklist 90–Revised (SCL-90-R; Derogatis, 1996) to assess their current clinical symptoms. Subsequently, they underwent a clinical diagnostic interview (i.e., the SCID-I; First et al., 1997) conducted by one of two trained clinical psychology graduate students and audiotaped. To assess the reliability of the diagnoses, each interviewer listened and provided independent diagnoses of 10% of the audiotaped interviews he or she did not personally conduct (5% of depressed participants' interviews and 5% of nondepressed interviews

selected at random). The evaluators agreed on 93% of diagnoses, kappa = .86, $p < .001$. During these assessments, participants completed additional tasks unrelated to this investigation.

Materials. Participants rated the extent to which they currently felt various emotions (1 = *not at all*, 9 = *extremely*). Following Millgram et al. (2015), to assess current happiness, we averaged across ratings of happy, joyful, lighthearted, and cheerful ($\alpha = .90$), and to assess current sadness, we averaged across ratings of sad, gloomy, downhearted, depressed, and melancholic ($\alpha = .96$). Participants also rated how stressed they felt (1 = *not at all*, 7 = *extremely*).

Following previous studies that assessed motivation to experience emotions (Kim, Ford, Mauss, & Tamir, 2015; Tamir et al., 2008, 2016), participants rated the degree to which they generally wanted to experience various emotions in daily life[3] (1 = *not at all*, 7 = *extremely*; e.g., "Please indicate the extent to which you generally want to feel happiness in your daily life"). To assess the degree of motivation to experience happiness, we averaged across ratings of happy, joyful, lighthearted, and cheerful ($\alpha = .84$). To assess the degree of motivation to experience sadness, we averaged across ratings of sad, gloomy, downhearted, depressed, and melancholic ($\alpha = .89$). The construct and predictive validity of this measure for assessing the degree of motivation to experience emotions has been established (e.g., Hackenbracht & Tamir, 2010; Millgram et al., 2015; Porat et al., 2016; Tamir, Ford, & Ryan, 2013).

To assess current levels of clinical symptoms, we used the Global Severity Index (GSI) of the SCL-90-R (Derogatis, 1996). The SCL-90-R is a self-report inventory that includes 90 items describing various psychiatric symptoms (e.g., "feeling low in energy and slowed down"). Each item was rated on a Likert scale indicating the degree to which the participant was bothered or distressed by the symptom in the past 4 weeks (0 = *not at all*, 4 = *extremely*; $\alpha = .98$). We were particularly interested in the SCL-90-R GSI as it is a validated and common index of general psychological distress (e.g., Marshall, Schell, & Miles, 2010; Metzger et al., 2004; Øiesvold, Bakkejord, & Sexton, 2011) and allowed us to assess reactions to stress (e.g., exams) that could involve various clinical symptoms. This measure was previously used to assess clinical and treatment outcomes among depressed and other clinical and nonclinical populations (e.g., Baer, 2003; Carryer & Greenberg, 2010; Ogles, Lambert, & Sawyer, 1995).

Second assessment: during the semester. Participants completed the second assessment online at their homes 5 to 12 months after the first assessment. It was

conducted during the academic semester when no exams were taking place. The timing of the assessment varied to ensure that for each participant there were no exams within this period.[4] Participants first rated their current emotions and stress. Then, they completed a behavioral emotion regulation task to assess whether they actively choose to upregulate or downregulate their emotions in response to happy and sad images. Subsequently, participants rated their motivations to experience happiness and sadness and completed the SCL-90-R.

Materials. In the second assessment, we used the same measures we used in the first assessment to assess current happiness (α = .95), sadness (α = .94), and stress.

We used a behavioral performance–based task to assess the direction in which participants choose to regulate their emotions (i.e., upregulate vs. downregulate reactions to happy and sad stimuli; Millgram et al., 2015). Participants first viewed three happy images and three sad images presented at random and rated the extent to which the happy images made them happy (1 = *not at all*, 9 = *extremely*) and the sad images made them sad (1 = *not at all*, 9 = *extremely*). We selected images from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2005), according to published norms (Lang et al., 2005; Mikels et al., 2005), and two additional sad images that were found to induce high levels of sadness in previous experiments (Millgram et al., 2015; Vishkin et al., 2016). We selected three happy images that were rated as inducing high levels of amusement and contentment ($M_{amusement}$ = 4.13, SD = 0.60; $M_{content}$ = 3.97, SD = 0.53). We selected three sad images that were rated as inducing high levels of sadness ($M_{sadness}$ = 5.69, SD = 1.57; Millgram et al., 2015; Vishkin et al., 2016). After rating the images, participants were instructed how to use cognitive reappraisal, which is considered an effective emotion regulation strategy (e.g., Webb, Miles, & Sheeran, 2012). Instructions appeared on the computer screen. Cognitive reappraisal was introduced as an emotion regulation strategy that can be used to either upregulate or downregulate emotional reactions by ascribing a different meaning to the stimulus (Gross, 1998). Participants were shown four examples. One example demonstrated how to use reappraisal to upregulate reactions to a happy image, one example demonstrated how to downregulate reactions to a happy image, one example demonstrated how to upregulate reactions to a sad image, and another example demonstrated how to downregulate reactions to a sad image. On each trial of the task, one of the six images previously rated by participants (three happy and three sad images) was presented on the screen in a random order. After each image appeared, participants were instructed to choose whether they wanted

to upregulate or downregulate their emotional reaction to the image. Participants then viewed the image for 6 s. They were instructed to use cognitive reappraisal to regulate their emotions in the direction of their choice during that time. Finally, to confirm that participants complied with the instructions, they were asked to describe in writing how they used reappraisal to regulate their emotional reaction to the image.[5] To confirm participants used cognitive reappraisal correctly to regulate their emotional reactions, an independent rater rated participants' written descriptions of their reappraisals on each trial. Reappraisals were considered correct when participants attributed a novel interpretation to the image that was consistent with their chosen direction of regulation, as opposed to other strategies (e.g., distraction), failure to come up with a novel interpretation, or using reappraisal in a direction opposite to the one indicted by the participant. Participants used cognitive reappraisal correctly and in the direction of their choice on 92% of the trials.

We used the same measures as in the lab assessment to assess the degree of motivation to experience happiness (α = .91) and sadness (α = .82).

As in the lab assessment, to assess current levels of clinical symptoms, we used the GSI of the SCL-90-R (α = .98; Derogatis, 1996). The validity of its online administration has been established (e.g., Vallejo, Jordán, Díaz, Comeche, & Ortega, 2007).

Third assessment: Exam period. The third assessment was conducted 1 to 3 months after the second assessment and during the exam period. Participants completed the assessment online at home. Participants first rated their current emotions and current stress. Then, they rated their degree of motivations to experience happiness and sadness and completed the SCL-90-R and a measure that assessed attempts to regulate negative emotions in one of two counterbalanced orders during the exam period. Five participants (4 initially depressed participants 1 one nondepressed participant) did not rate their attempts to regulate their emotions during the exam period because they terminated their studies before the exams took place. We retained these participants in the analyses to be conservative, but results remained identical when these participants were excluded.

Materials. For the third assessment, we used the same measures we used in the lab and the second assessment to assess current happiness (α = .91), sadness (α = .93), stress, and degree of motivation to experience happiness (α = .84) and sadness (α = .84). As in the lab and the second assessment, we used the GSI of the SCL-90-R (α = 0.98; Derogatis, 1996) to assess current levels of clinical symptoms.

For attempted emotion regulation during a stressful event, participants rated three items: one item pertaining to the degree to which they tried to downregulate negative emotions during the exam period, one item pertaining to the degree to which they tried to maintain their negative emotions during the exam period, and one item pertaining to the degree to which they tried to upregulate their negative emotions during that period (1 = *not at all*, 7 = *extremely*). To assess how much participants tried to make themselves feel less negative, we reverse scored ratings of attempts to maintain or upregulate negative emotions and averaged scores across all items (α = .66).[6]

Results

Group differences and temporal stability of the motivations to experience happiness or sadness

Table 1 presents descriptive statistics and simple correlations between our key variables. First, we tested whether self-reported stress levels increased during an academic term, as we had anticipated. We conducted a hierarchical linear modeling (HLM) analysis with mixed effects. Ratings of current stress were entered as the dependent variable. Assessment (first = 0, second = 1, third = 2) was entered as a Level 1 predictor. Group (nondepressed = 0, depressed = 0) was entered as a Level 2 predictor. We tested the following model:
Level 1:

$$\text{Stress level}_{ij} = \beta_{0j} + \beta_{1j} \times (\text{Assessment}) + r_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} \times (\text{Depression}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} \times (\text{Depression}).$$

The multilevel reliability estimate was 0.36. We report the final estimation of fixed effects with robust standard errors. We found a significant effect of group, β = 1.12, $t(100) = 2.60$, $SE = 0.43$, $p = .011$. Initially depressed participants experienced elevated levels of stress, on average, compared to initially nondepressed participants. As predicted, there was also a significant effect of assessment, β = 0.33, $t(200) = 2.97$, $SE = 0.11$, $p = .003$, indicating that stress levels increased during the exam period compared to stress levels during the lab assessment and the course of the semester. There

was no Significant Assessment × Group interaction, β = 0.09, $t(200) = 0.48$, $SE = 0.19$, $p = .631$, indicating that groups did not differ in how stress levels changed over time.

To test group differences in temporal stability of motivation to experience happiness or sadness, we ran separate models for motivation to experience happiness and motivation to experience sadness. To test group differences in the degree of motivation to experience happiness over time, we conducted an HLM analysis with mixed effects. Motivation to experience happiness was entered as the dependent variable. Assessment (first = 0, second = 1, third = 2) was entered as a Level 1 predictor, and group (nondepressed = 0, depressed = 1) was entered as a Level 2 predictor. To test whether group differences depended on current happiness, we entered group–mean centered current happiness as an additional Level 1 predictor. We tested the following model:
Level 1:

$$\text{Degree of Motivation}_{ij} = \beta_{0j} + \beta_{1j} \times (\text{Assessment}) +$$
$$\beta_{2j} \times (\text{Current Happiness}) + r_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} \times (\text{Depression}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} \times (\text{Depression})$$

$$\beta_{2j} = \gamma_{20}.$$

We sought to assess how much variance is attributed to differences between participants (i.e., stable differences between groups) and how much variance is attributed to differences within participants (i.e., changes within person). Therefore, we calculated the intraclass correlation coefficient (ICC). Between-participants variance accounted for 52.2% of the variance, and within-participant variance accounted for 48.8% of the variance. The multilevel reliability estimate was 0.77. We report the final estimation of fixed effects with robust standard errors. As expected, there was a significant effect of group, β = −0.70, $t(100) = −4.22$, $SE = 0.17$, $p < .001$. Initially depressed participants were generally less motivated to experience happiness than initially nondepressed participants. There was also a significant effect of assessment, β = −0.16, $t(201) = −2.86$, $SE = 0.05$, $p = .005$, such that the degree to which participants wanted to experience happiness declined over time, as people approached the stressful exam

Table 1. Descriptive Statistics and Simple Correlations Between Key Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Mean (SD) Depressed Individuals	Mean (SD) Nondepressed Individuals
1. Group (depressed individuals = 1, nondepressed individuals = 0)																			
Lab assessment																			
2. Motivation for happiness	−.34*																	5.87 (1.06)	6.50 (0.63)
3. Current happiness	−.39*	.08																3.02 (1.73)	4.50 (1.78)
4. Motivation for sadness	.33*	−.56*	−.09															1.80 (1.03)	1.25 (0.34)
5. Current sadness	.44*	−.13	−.28*	.35*														3.16 (1.87)	1.61 (1.31)
6. SCL-90-R GSI	.76*	−.31*	−.36*	.46*	.46*													1.13 (0.48)	.26 (0.21)
During the semester																			
7. Motivation for happiness	−.36*	.52*	.15	−.30*	−.14	−.25*												5.45 (1.28)	6.28 (0.82)
8. Current happiness	−.44*	.22*	.50*	−.08	−.21*	−.43*	.35*											3.17 (1.87)	5.09 (2.10)
9. Motivation for sadness	.28*	−.16	−.06	.47*	.21*	.36*	−.26*	−.11										1.78 (0.81)	1.40 (0.43)
10. Current sadness	.53*	−.27*	−.31*	.35*	.56*	.58*	−.28*	−.45*	.34*									3.63 (1.93)	1.73 (1.04)
11. % choices to upregulate happiness	−.31*	.27*	.18	−.03	−.18*	−.25*	.28*	.29*	.05	−.26*								69 (31)	87 (24)
12. SCL-90-R GSI	.64*	−.35*	−.35*	.36*	.43*	.79*	−.44*	−.46*	.36*	.66*	−.36*							1.05 (0.61)	0.27 (0.26)
Exam period																			
13. Motivation for happiness	−.24*	.48*	.10	−.33*	−.08	−.29*	.70*	.24*	−.20*	−.16	.23*	−.47*						5.64 (1.29)	6.16 (0.74)
14. Current happiness	−.33*	.10	.46*	−.06	−.13	−.32*	.23*	.60*	.01	−.32*	.19	−.29*	.24*					2.97 (1.39)	3.93 (1.40)
15. Motivation for sadness	.29*	−.32*	−.12	.49*	.26*	.38*	−.36*	−.07	.63*	.32*	−.06	.44*	−.45*	−.03				1.57 (.71)	1.23 (0.37)
16. Current sadness	.46*	−.32*	−.19	.31*	.38*	.53*	−.26*	−.35*	.42*	.64*	−.35*	.58*	−.24*	−.39*	.41*			2.78 (1.42)	1.61 (0.76)
17. Attempted emotion regulation	−.34*	.34*	.01	−.17	−.04	−.19	.32*	.20*	−.37*	−.36*	.32*	−.26*	.33*	.21*	−.30*	−.38*		5.19 (1.27)	5.93 (0.73)
18. SCL-90-R GSI	.64*	−.36*	−.32*	.28*	.32*	.62*	−.43*	−.44*	.33*	.55*	−.34*	.75*	−.31*	−.34*	.45*	.70*	−.34*	1.02 (0.55)	0.29 (0.27)

Note: SCL-90-R GSI = Symptom Checklist 90–Revised Global Severity Index.
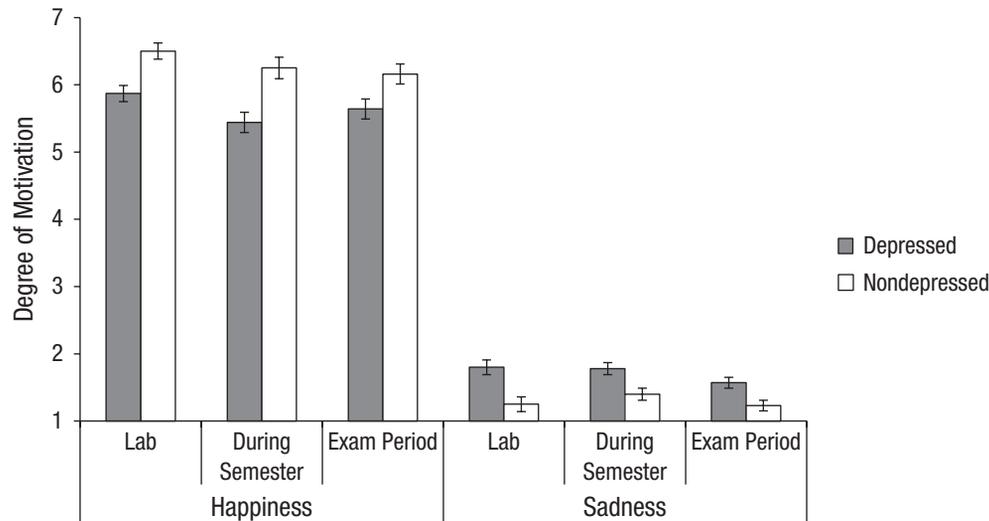
*$p < .05$

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Fig. 1. Motivation to experience happiness and sadness among initially depressed participants and nondepressed participants in the lab, during the semester, and during the exam period. Error bars refer to ±1 *SEM*. There was a significant difference ($p < .05$) between depressed and nondepressed participants for all comparisons in this graph.

period. Although we had no a priori predictions regarding such mean-level changes, they may be linked to the fact that happiness promotes the tendency to seek enjoyment (Fredrickson, 1998), which may be counterproductive as people prepare for exams. There was no Group × Assessment interaction, $\beta = 0.04$, $t(201) = 0.43$, $SE = 0.10$, $p = .667$, indicating that groups did not differ in how their motivation to experience happiness changed over time, and no significant effect of current happiness, $\beta = 0.05$, $t(201) = 1.19$, $SE = 0.04$, $p = .236$. We also found that the degree of motivation to experience happiness was fairly consistent across the lab and daily life assessments, as indicated by moderate positive correlations, $.48 < r(102) < .52$, ps $< .001$.[7]

To test for group differences and changes in motivation to experience sadness, we tested an identical model with motivation to experience sadness as the dependent variable. We entered group mean–centered current sadness as a Level 1 predictor. Between-participants variance accounted for 45.7% of the variance, and within-participant variance accounted for 54.3% of the variance. The multilevel reliability estimate was 0.72. We report the final estimation of fixed effects with robust standard errors. There was a significant effect of group, $\beta = 0.51$, $t(100) = 3.72$, $SE = 0.14$, $p < .001$. Initially depressed participants were generally more motivated to experience sadness than initially nondepressed participants. There was no significant effect for assessment, $\beta = -0.01$, $t(201) = -0.47$, $SE = 0.03$, $p = .639$, indicating that the motivation for sadness did not change significantly over time. There was no Assessment × Group interaction, $\beta = -0.09$, $t(201) = -1.29$, $SE = 0.07$, $p = .200$, and no significant effect of current sadness, $\beta = 0.06$,

$t(201) = 1.46$, $SE = 0.04$, $p = .145$. The degree of motivation to experience sadness was also fairly consistent across assessments inside and outside the laboratory, $.47 < r(102) < .49$, $p_s < .001$.

These results support our first prediction, indicating that group differences in the degree of motivation to experience happiness and sadness remained stable over time. Figure 1 depicts the means of motivations to experience happiness and sadness among initially depressed participants and nondepressed participants in the three assessments. Both initially depressed participants and nondepressed participants were more motivated to feel happy than sad and reported high levels of motivation to experience happiness and low levels of motivation to experience sadness. However, we observed a stable and significant difference between groups in the degree of their motivation to experience happiness and sadness in each of the assessments, ts > 2.49, $p < .015$.

Do initially depressed individuals and nondepressed individuals differ in how much they try to regulate their emotions in a controlled emotion regulation task?

To test whether initially depressed individuals and nondepressed individuals differed in the direction in which they chose to employ reappraisal in response to happy images, we conducted an independent-samples t test, with group (depressed, nondepressed) as the independent variable and percentage of choices to upregulate

emotional reactions to happy images as the dependent variable. We found a significant difference between groups, $t(100) = 3.30$, $p = .001$, $d = 0.66$. Participants diagnosed with depression in the first assessment were less likely to use reappraisal to upregulate their emotional reactions to happy images ($M = 68.59\%$, $SE = 4.24\%$) compared to nondepressed ($M = 86.67\%$, $SE = 3.43\%$). To test whether such group differences were driven by differential reactivity to the happy images, we ran an ANCOVA with mean reactivity to the happy images as a covariate. The effect of group remained significant, $F(1, 99) = 4.18$, $p = .043$, $\eta^2 = .04$. The effect of group also remained significant when including current happiness as a covariate, $F(1, 99) = 4.81$, $p = .031$, $\eta^2 = .05$, showing that the effect could not be explained by differences in current emotions. Finally, we tested whether our effects depended on the ability to use reappraisal correctly by including as a covariate the percentage of trials in which participants used reappraisal correctly when reappraising happy images. The effect of group remained significant, $F(1, 99) = 6.57$, $p = .012$, $\eta^2 = .06$, indicating that the group difference did not depend on the ability to implement reappraisal correctly.

Providing evidence for the link between motivation to experience happiness and active regulation attempts, we found significant positive correlations between choices to upregulate emotional reactions to happy images and self-reported motivation to experience happiness in the lab, $r(102) = .273$, $p = .006$; during the semester, $r(102) = .281$, $p = .004$; and during the exam period, $r(102) = .232$, $p = .019$. The more motivated participants were to experience happiness, the more likely they were to actively upregulate their reactions to happy stimuli and vice versa. Inconsistent with previous findings, initially depressed participants and nondepressed participants did not differ in choices to upregulate reactions to sad images ($M = 46.79\%$, $SE = 5.04\%$ and $M = 48.67\%$, $SE = 4.49\%$ for depressed participants and nondepressed participants, respectively), $t(100) = 0.28$, $p = .783$, $d = 0.05$.

These findings supported our second prediction with respect to happiness. They show that although both initially depressed participants and nondepressed participants were more likely to upregulate than downregulate their reactions to happy images, participants who were previously diagnosed with depression were significantly less likely to do so. These group differences were also significantly linked to the reported degree of motivation to experience happiness. These findings did not support our second prediction with respect to sadness because groups did not differ in choices to upregulate reactions to sad images.

Do initially depressed individuals and nondepressed individuals differ in how much they try to regulate their emotions during real-life stress?

To test whether initially depressed participants and nondepressed participants differed in their attempts to downregulate negative emotions during stress, we conducted an independent samples *t*-test with group (depressed participants, nondepressed participants) as the independent variable and ratings of attempts to downregulate negative emotions during the exam period as the dependent variable. Both groups tried to downregulate their negative emotions during exams. However, we found a significant difference between groups in the extent of such attempts, $t(95) = 3.52$, $p = .001$, $d = 0.71$. Initially depressed individuals were less likely to try to downregulate their negative emotions during the exam period ($M = 5.19$, $SD = 1.27$) compared to nondepressed individuals ($M = 5.93$, $SD = 0.73$).

Next, we tested whether these group differences in attempts to downregulate negative emotions were mediated by the degree of motivation to experience happiness using Hayes's (2013) PROCESS bootstrapping command (Model 4: 5,000 iterations). We entered group (depressed individuals, nondepressed individuals) as the independent variable, ratings of attempts to downregulate negative emotions during the exam period as the dependent variable, and the degree of motivation to experience happiness during exams as the mediator. The indirect path signifying mediation was significant, effect = −0.136, $SE = 0.075$; 95% confidence interval (CI) = [−0.339, −0.029]. Initially depressed participants were less motivated to experience happiness during the exams, and this weaker motivation for happiness was related to fewer attempts to repair negative emotions at that time. The indirect path signifying mediation was also significant when entering the degree of motivation to experience happiness during the semester as the mediator, effect = −0.173, $SE = 0.103$; 95% CI = [−0.436, −0.024]. Thus, the degree of motivation for happiness mediated the link between depression and regulation attempts during exams even when such motivation was assessed months earlier, during the semester.

We conducted an identical analysis to test whether group differences in attempts to downregulate negative emotions were mediated by motivation to experience sadness. The indirect path signifying mediation was significant, effect = −0.142, $SE = 0.086$; 95% CI = [−0.359, −0.017]. Initially depressed participants reported a stronger motivation to experience sadness during the exams, and the stronger motivation to experience sadness was related to fewer attempts to repair negative

emotions during the exams. The indirect path signifying mediation was significant when entering the degree of motivation to experience sadness during the semester as the mediator, effect = −0.174, *SE* = 0.096; 95% CI = [−0.414, −0.032].

Finally, to test whether attempts to downregulate negative emotions were related to clinical symptoms during the exams, we correlated attempts to repair negative emotions with GSI scores of the SCL-90 during the exams. We found a significant negative correlation, $r(97) = -.341$, $p = .001$. The more participants tried to repair their negative emotions during exams, the less clinical symptoms they experienced.

Together, these findings support our third prediction. Both initially depressed participants and nondepressed participants reported trying to downregulate their negative emotions during a stressful event. However, initially depressed participants were less likely than nondepressed participants to direct emotion regulation attempts toward decreasing negative emotions, and these differences were mediated by the degree to which they were motivated to experience happiness and sadness.

Do motivations to experience happiness or sadness mediate group differences in symptom severity during stress?

As expected, participants diagnosed with depression in the first assessment experienced more clinical symptoms during the exam period (*M* = 1.02, *SD* = 0.55) compared to initially nondepressed participants (*M* = 0.29, *SD* = 0.27), $t(100) = -8.29$, $p < .001$, $d = 1.67$; 95% CI = [1.21, 2.11]. These differences remained significant when controlling for SCL-90-R GSI in the lab, $F(1, 99) = 12.21$, $p = .001$; during the semester, $F(1, 99) = 10.76$, $p = .001$; or both, $F(1, 98) = 12.94$, $p = .001$, indicating they were independent of differences in initial symptom severity.

Our key prediction, however, was that differences between initially depressed participants and nondepressed participants in symptom severity during the exams would be mediated by how motivated they were to experience happiness during the semester as they were preparing for these exams. We hypothesized that initially depressed participants would be less motivated to experience happiness during the semester, which in turn would be prospectively related to more severe symptoms during the exams[8] even when controlling for symptom severity during the semester. Because motivation to experience happiness during the semester should predict subsequent symptom severity by shaping how hard people try to regulate their emotions during and in anticipation of stress, we expected the degree of motivation to experience happiness during the semester to prospectively predict symptom severity even when controlling for motivation to experience happiness during the exams. To rule out effects of current happiness on symptom severity, we controlled for happiness during exams.

To test these predictions, we employed Hayes's (2013) PROCESS bootstrapping command (Model 4: 5,000 iterations; for unstandardized coefficients, see Fig. 2). We entered group (depressed participants, nondepressed participants) as the independent variable, the SCL-90-R GSI during the exams as the dependent
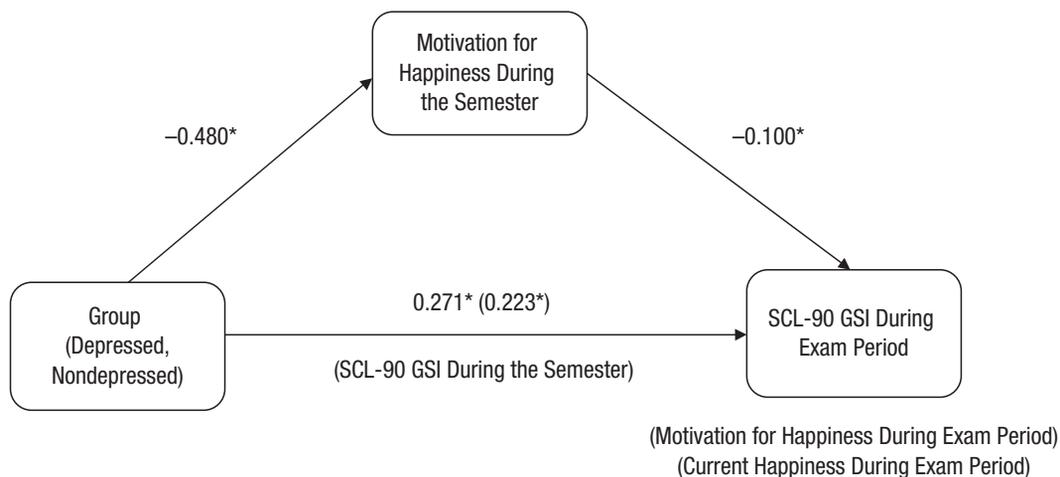

Fig. 2. Motivation to experience happiness during the semester mediates group differences between initially depressed and nondepressed participants in symptom severity during the exam period, controlling for severity of symptoms during the semester, motivation to experience happiness during the exam period, and current happiness during the exam period. **p < .05.*

variable, and the degree of motivation to experience happiness during the semester as the mediator. The SCL-90-R GSI during the semester, the degree of motivation to experience happiness during the exams, and current happiness during the exams were entered as covariates. The indirect path signifying mediation was significant, effect = 0.048,[9] *SE* = 0.034; 95% CI = [0.007, 0.175]. Depressed participants were less motivated to experience happiness during the semester, and this weaker motivation for happiness was prospectively related to worse clinical symptoms during the exams. These findings indicate that differences between initially depressed participants and nondepressed participants in symptom severity during the exams were partly associated to how motivated they were to experience happiness during the semester.

To test whether differences between initially depressed participants and nondepressed participants in symptom severity during the exams were mediated by how much participants were motivated to experience sadness during the semester, we repeated the aforementioned analysis with motivation to experience sadness during the semester as the mediator. The SCL-90-R GSI during the semester, degree of motivation to experience sadness during the exam period, and current sadness during the exam period were entered as covariates. Counter to our predictions, there was no significant mediation, effect = −0.006, *SE* = 0.015; 95% CI = [−0.643, 0.008]. Differences between initially depressed participants and nondepressed participants in symptom severity during the exam period were not explained by how motivated they were to experience sadness during the semester.

These findings support our fourth prediction with respect to happiness, showing that initially depressed participants (vs. nondepressed participants) experienced worse clinical symptoms during the exams, and this was partially accounted for by their decreased motivation to experience happiness during the semester. The findings did not support our prediction regarding sadness because group differences were not explained by the motivation to experience sadness during the semester.

Do motivations to experience happiness or sadness in initially depressed individuals prospectively predict symptom severity during exams?

We expected the degree of motivation to experience happiness during the semester to also account for differences in symptoms severity within the depressed participants group. Therefore, we tested a longitudinal model focusing on the initially depressed subsample (for unstandardized coefficients, see Fig. 3). We used a regression analysis in which the degree of motivation to experience happiness during the semester, SCL-90 GSI scores during the semester, degree of motivation to experience happiness during the exams, and current happiness during the exams were entered as predictors. The SCL-90 GSI during the exams was entered as the dependent variable. As predicted, we found a significant effect for the degree of motivation to experience happiness during the semester, β = −0.407, *SE* = 0.07, *t* = −2.38, *p* = .022. There was also a significant effect for SCL-90 GSI during the semester, β = 0.558, *SE* = 0.12, *t* = 4.13, *p* < .001, and a marginally significant effect for the degree of motivation to experience happiness during the exams, β = 0.355, *SE* = 0.08, *t* = 1.90, *p* = .064.
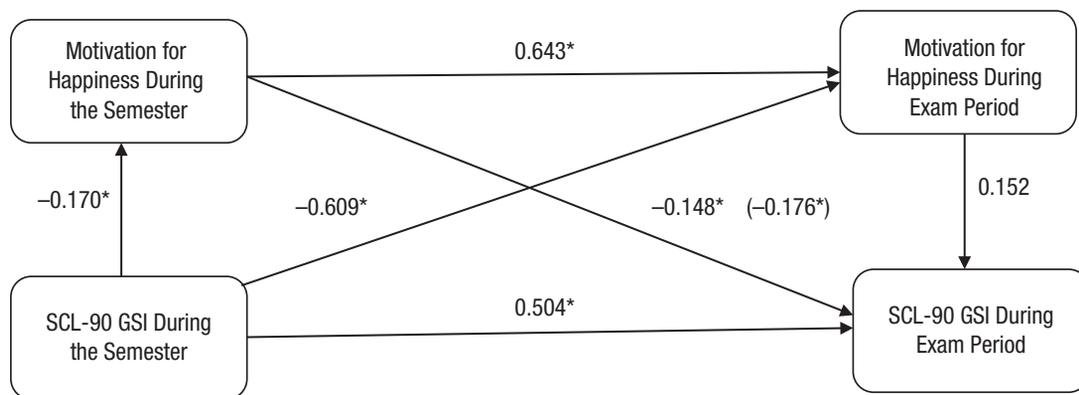

Fig. 3. Motivation to experience happiness during the semester prospectively predicts symptom severity during the exam period among initially depressed participants, controlling for severity of symptoms during the semester, motivation to experience happiness during the exam period, and current happiness during the exam period. **p* < .05.

There was no significant effect for current happiness during the exams, β = −0.145, *SE* = 0.05, *t* = −1.25, *p* = .216. These findings indicate that the less motivated initially depressed participants were to experience happiness during the semester, the worse symptoms they experienced during the stressful exam period. We repeated the analysis with motivation to experience sadness during the semester as the predictor. There was no significant effect for motivation to experience sadness during the semester, β = −0.160, *SE* = 0.09, *t* = −1.26, *p* = .215.

These findings supported our fifth and final prediction with respect to happiness. Differences between initially depressed individuals in symptom severity during stress were prospectively predicted by how motivated they were to experience happiness in the period leading up to the stressful event. Results did not support our prediction regarding sadness because motivation to experience sadness during the semester did not predict symptom severity.

Discussion

Our findings show that depressed individuals and nondepressed individuals differ in how motivated they are to experience happiness and sadness. We found that these differences are stable over time and reflected in the direction in which participants choose to regulate their emotions in a behavioral emotion regulation task. Importantly, we found that the degree of motivation to experience happiness partially mediated the relationship between depression diagnosed in the first assessment and symptom severity during a subsequent stressful event in daily life and prospectively predicted the severity of clinical symptoms in initially depressed individuals during stress. These findings provide the first demonstration of the clinical implications of motivation to experience emotions.

Motivations to experience happiness or sadness outside the laboratory and over time

Consistent with previous findings (Millgram et al., 2015), our results show that depressed individuals and nondepressed individuals differ in how motivated they are to experience happiness and sadness. Both initially depressed individuals and nondepressed individuals reported generally high levels of motivation to experience happiness and low levels of motivation to experience sadness. However, when examined inside and outside the laboratory, initially depressed individuals (vs. nondepressed individuals) were relatively less motivated to experience happiness and more motivated to experience sadness. These group differences were evident at three different time points and stable over time. These findings suggest that lower motivation to experience happiness and higher motivation to experience sadness may be stable motivational predispositions of people suffering from depression. Thus, they could carry implications for emotion regulation and well-being over time.

Implications for understanding emotion regulation in a controlled task

We found that initially depressed individuals and nondepressed individuals differ in how likely they were to actively try to upregulate happiness. Although initially depressed participants were generally likely to choose to use reappraisal to upregulate emotional reactions to happy images, they were significantly less likely to do so than nondepressed participants. This pattern in turn was linked to how motivated participants were to experience happiness. These findings demonstrate that the degree of motivation to experience happiness is linked to active attempts to savor happiness when exposed to happiness-inducing stimuli. Initially depressed individuals were less likely to actively sustain happiness when given the opportunity to do so.

Contrary to expectations, initially depressed individuals and nondepressed individuals did not differ in attempts to upregulate reactions to sad stimuli. These results are partially at odds with previous findings (e.g., Millgram et al., 2015) in which depressed individuals were more likely to upregulate reactions to sad stimuli but did not consistently differ from nondepressed individuals in regulating reactions to happy stimuli. Whereas differences in the degree of motivation to experience sadness and happiness are consistent across studies when assessed by self-report data, the behavioral correlates of these differences may be more sensitive to context and affected by additional factors other than the degree of motivation (e.g., Kruglanski et al., 2015). Differences in the task and the manner of its administration might be responsible for such inconsistencies across studies. In Millgram et al. (2015), participants completed the emotion regulation task in the lab during the session in which clinical status was assessed. The task included active training carried out by the experimenter. In contrast, in this investigation, the task was completed online, at home, at a different time than the assessment of clinical status. Instructions for the task were provided in writing without active training. Any of these differences may have influenced the results.

Future research should address these inconsistencies and also expand the current findings by using tasks that include more than one type of emotion-inducing stimuli and a larger number of trials.

Implications for understanding emotion regulation during real-life stress

Our findings indicate that initially depressed individuals did not only differ from nondepressed individuals in their regulatory behavior during a controlled task but also in how likely they were to downregulate negative emotions during a real-life stressful event. Initially depressed participants and nondepressed participants reported that they tried to downregulate their negative emotions during the exams. However, initially depressed participants were less likely than nondepressed participants to try to downregulate their negative emotions during exams, and these differences were linked to differential degrees of motivation to experience happiness and sadness during that time as well as several months earlier (during the semester).

How motivated individuals were to experience happiness also had long-term prospective implications for clinical outcomes. The degree of motivation to experience happiness in the period leading up to the exams partially mediated the link between depression diagnosed in the first assessment and symptom severity during the exams. The mediation remained significant even when controlling for initial symptom severity and concurrent motivation to experience happiness. These findings indicate that differences between initially depressed individuals and nondepressed individuals in clinical symptoms during stress might be partly due to their differential motivation to experience happiness in anticipation of the stressor. Finally, we found that within the initially depressed group, how motivated depressed participants were to experience happiness before the exams prospectively predicted the trajectory of change in symptoms they experienced during the exams. These findings persisted when controlling for initial levels of symptoms, concurrent motivation to experience happiness, and concurrent happiness.

These findings suggest that how motivated depressed individuals are to experience certain emotions might prospectively shape how they cope with future stress in their life. Compared to nondepressed individuals, depressed individuals might be more vulnerable to experience clinical symptoms during stress partially because they are less motivated to experience happiness. Furthermore, depressed individuals who are less motivated to feel happy might be more vulnerable to the adverse effects of stress independent of their initial symptom severity. From a theoretical perspective, these findings point to a new factor that could play a role in the well-being of people who struggle with depression. From a clinical perspective, if the degree of motivation to experience happiness or the motives that underlie it could be changed, these findings could point to new paths for intervention.

Findings from studies promoting motivation in work environments, academic settings, and health rehabilitation centers show that increasing motivation could be a viable target for intervention (e.g., Brandenberger, Hagenauer, & Hascher, 2018; Jungert, Van den Broeck, Schreurs, & Osterman, 2018; Weinberg, Hall, & Sverdlik, 2015). The degree of motivation may determine how hard people work to achieve desired outcomes and how likely they are to persist when confronting obstacles (e.g., Kruglanski et al., 2002). Our findings show that the degree of motivation to experience happiness predicts how hard participants try to decrease their negative emotions during stress. Such motivation also predicted the severity of symptoms they experienced. Therefore, helping depressed individuals enhance their motivation to experience happiness may promote better adjustment to stress in daily life.

Although initially depressed participants and nondepressed participants differed in their motivation to experience sadness, such motivation did not mediate the relationship between depression as assessed in the first assessment and symptom severity during stress and did not prospectively predict depressed individuals' clinical symptoms during stress. Although the degree of motivation to experience sadness has implications for emotional experience in the short term (Millgram et al., 2015), the degree of motivation for experiencing happiness may have implications for symptoms in the long term. This idea is consistent with findings regarding the unique role of pleasant emotions in predicting the course of depression and coping with stress (e.g., Fredrickson et al., 2003; Morris, Bylsma, & Rottenberg, 2009; Tugade & Fredrickson, 2004). Pleasant emotions can predict the course of depression (Morris et al., 2009). Lower levels of pleasant emotions prospectively predicted poorer depression outcomes. Unpleasant emotions also predicted depression outcomes but less strongly (Morris et al., 2009). Pleasant emotions are also hypothesized to play a role in predicting coping with stressful situations (Fredrickson et al., 2003; Tugade & Fredrickson, 2004). It is possible, therefore, that motivation to experience pleasant emotions, such as happiness, is more relevant when coping with stressful situations than motivation to experience unpleasant emotions, such as sadness.

Limitations and future directions

Our investigation has several limitations. First, we conducted clinical interviews to assess depression in the

lab assessment only and therefore cannot determine whether participants who were diagnosed with depression in the lab assessment still met diagnostic criteria during subsequent assessments. Future research should test whether the degree of motivation to experience happiness or sadness in depression prospectively predicts maintenance, recurrence, and recovery from depression. Research could also test whether differential degrees of motivation to experience happiness or sadness play a role in vulnerability to depression, for instance, by assessing these motivations in remitted depressed individuals or at-risk individuals.

Second, because of limited statistical power, we were unable to test more complex models that simultaneously take into account all our variables (e.g., Wolf, Harrington, Clark, & Miller, 2013). Future investigations could use larger samples to assess more complex relationships between emotion regulation and clinical symptoms over time. We also acknowledge that our effect sizes were generally medium in magnitude (e.g., $0.41 \leq \beta \leq 0.70$; $0.66 \leq d \leq 0.71$). Such effect sizes, however, are consistent with typical effect sizes observed in meta-analyses comparing depressed populations and nondepressed populations (e.g., Bylsma, Morris, & Rottenberg, 2008; Hallion & Ruscio, 2011).

Third, we found that the degree of motivation to experience happiness during the semester may carry prospective implications for clinical symptoms during exams. However, it remains unclear how motivation to experience happiness during the semester influences coping months later, during the exam period. It could be possible to address this question by tracking the degree of motivation to experience happiness, emotion regulation attempts, and well-being on a daily basis. For example, future research could use daily diaries for this purpose.

In this investigation, we were able to establish the consistency of differences in the motivation to experience happiness or sadness across different contexts (lab, daily life), different methodologies (self-report data, regulatory behavior task), and time. Future research could test whether effects are specific to happiness and sadness or whether they vary by valence or arousal or apply to other discrete emotions. Future research could also test the effects of motivation to experience emotions in depression on automatic emotion regulation processes and clinical symptoms in response to different kinds of stressors.

Fourth, future research could explore what underlies the differences between depressed individuals and non-depressed individuals in their motivations to experience happiness and sadness. One possibility is that depressed individuals are more motivated to experience emotions that feel self-consistent. According to self-verification

theory (Swann, 1987), people seek information that confirms their authentic sense of self (Swann, 1992; Swann & Pelham, 2002). This motivation may extend to seeking or avoiding certain emotional experiences. If depressed individuals experience happiness as less self-consistent and sadness as more self-consistent, they might be less motivated to feel happy and more motivated to feel sad. Another possibility is that depressed individuals expect to feel less happy or more sad and adjust their motivations accordingly. Future research could test these and other possibilities.

Finally, further research is needed to test whether depressed individuals' motivation to experience happiness or sadness plays a causal role in shaping clinical outcomes. Research should test the extent to which motivation to experience happiness or sadness in depression is malleable and whether interventions that target these motivations could lead to more effective emotion regulation and more adaptive coping with stress and whether current treatments impact these motivations.

Conclusions

Our findings support a novel approach that highlights the potential clinical implications of the motivation to experience emotions. The degree to which individuals diagnosed with depression want to feel certain emotions may have important implications for how they subsequently regulate their emotions and how well they cope with stressful events in their lives. The less motivated depressed individuals are to be happy, the more vulnerable they may be to stress.

Action Editor

Christopher G. Beevers served as action editor for this article.

Author Contributions

Y. Millgram and M. Tamir developed the study concept. Y. Millgram, M. Tamir, J. Joormann, and J. D. Huppert contributed to the study design. Data collection was performed by A. Lampert and Y. Millgram, and analyses were performed by Y. Millgram under the supervision of M. Tamir. Y. Millgram, M. Tamir, and J. Joormann drafted the manuscript, and J. D. Huppert provided critical revisions. All the authors approved the final manuscript for submission.

Declaration of Conflicting Interests

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Notes

1. We refer to *depressed individuals* or *initially depressed individuals* as individuals who were diagnosed with a current major depressive disorder (MDD) or current dysthymic disorder during the first assessment (lab assessment) only. We did not conduct diagnostic interviews in the second and third assessments. Therefore, participants diagnosed with depression during the lab assessment may or may not have met diagnostic criteria for depression during subsequent assessments.

2. In this session, participants also completed measures that assessed possible mechanisms that might underlie potential differences between depressed and nondepressed individuals in the degree of motivation to experience happiness or sadness (e.g., perceived authenticity of happiness and sadness). We omitted these measures from the current report because of scope and space limitations.

3. In the lab assessment, we also assessed the degree to which participants wanted to experience anger (averaged across ratings of angry, resentful, irritated, and raged, α = .83) and fear (averaged across ratings of fearful, scared, concerned, and anxious, α = .84). Depressed participants (vs. nondepressed participants) reported higher degrees of motivation to experience anger (Ms = 1.57 and 1.23 for depressed participants and nondepressed participants, respectively), $t(124) = -2.77$, $p = .006$. There was also a marginally significant difference between groups in the degree of motivation to experience fear such that depressed participants reported slightly stronger motivation to experience fear (Ms = 1.94 and 1.65 for depressed participants and nondepressed participants, respectively), $t(124) = -1.77$, $p = .078$.

4. Because of the varying time differences between the lab assessment and the assessment during the semester, we ran all analyses controlling for the temporal lag between assessments. All results persisted when entering time between assessments as a covariate.

5. The task also included three calm images. Groups did not differ in their proportion of choices to upregulate emotional reactions to these images, M = 74.4%, SE = 3.8% and M = 71.3%, SE = 4.26% for depressed participants and nondepressed participants, respectively, $t(100) = -0.53$, $p = .598$.

6. Because of the limited internal reliability of this measure, we repeated analyses using each item separately. Results remained consistent.

7. The Supplementary Material includes additional information regarding the temporal stability of the degree of motivation to experience happiness or sadness.

8. We did not use motivation to experience happiness at the lab assessment as the mediator because that assessment occurred before participants were preparing for exams, and so their motivation at that time was not expected to be linked to clinical symptoms during exams. Furthermore, the lag between the lab assessment and the exam period was substantial (more than 5 to 12 months) and differed across participants.

9. Because the independent variable is dichotomous (depressed = 1, nondepressed = 0), the effect measure (*ab* path coefficient) does not accurately represent the unstandardized indirect effect. According to Hansen and McNeal's (1996) suggested index for effect size for such two-group designs, the effect size for the mediation analysis is effect size = 0.48.

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