AMERICAN PSYCHOLOGICAL ASSOCIATION

Emotion

ISSN: 1528-3542

2022, Vol. 22, No. 7, 1595–1603
https://doi.org/10.1037/emo0000977

Increased Motivational Intensity Leads to Preference for Distraction Over Reappraisal During Emotion Regulation: Mediated by Attentional Breadth

Jiemin Yang[1], Xinyu Yan[2], Shengdong Chen[2], Weijun Liu[2], Xiling Zhang[2], and Jiajin Yuan[1]

[1] The Affect Cognition and Regulation Laboratory (ACRLab), Institute of Brain and Psychological Sciences, Sichuan Normal University

[2] Faculty of Psychology, Southwest University

Motivation is considered important in the study of emotion regulation. However, it remains unknown whether and how varied motivation may influence people's emotion regulation choice. To address this question, 51 participants first performed a global-local task that measures attentional breadth. Then, they were required to choose emotion regulation strategies, reappraisal, or distraction, to regulate their emotion in emotional contexts that varied in motivational direction and intensity. We found that distraction was chosen more often over reappraisal in high-intensity-motivated emotion, while the reverse pattern was observed in low-intensity motivated emotion. Besides, withdrawal-motivated emotion was associated with more reappraisal choices than approach-motivated emotion, an effect that, however, vanished when valence was controlled. Furthermore, participants made fewer global choices, which is indicative of narrowed attentional breadth, during high- relative to low-intensity motivated emotional contexts, and attentional breadth partially mediated the effect of motivational intensity on emotion regulation choice. These findings suggest that increased motivation promotes one's choice of distraction over reappraisal during emotion regulation, by narrowing attentional breadth.

Keywords: emotion regulation choice, motivation, distraction, reappraisal, attentional breadth

Healthy people can flexibly adjust their emotional states in various ways to fit their situational needs (Aldao et al., 2015; Gross & Thompson, 2007). Distraction and cognitive reappraisal are common emotion-regulatory strategies that have received extensive investigation (Grezellschak et al., 2015; McRae et al., 2010; Sheppes & Meiran, 2007; Strauss et al., 2016). Distraction is an early-disengagement strategy that involves diverting attention away from an emotional situation by loading working memory with independent neutral contents. Cognitive reappraisal, in contrast, is a late-engagement strategy that involves neutral or positive reinterpretation of stimulus meaning. Distraction was used more frequently in high-intensity than in low-intensity emotional situations; whereas reappraisal was more preferred in low-intensity emotional situations (Shafir et al., 2015; Sheppes & Gross, 2011). This pattern of influence of emotion intensity on emotion regulation choice was found not only in healthy people (Sheppes et al., 2011) but also in individuals with bipolar disorder (Hay et al., 2015).

Aside from emotional intensity, motivation is another factor that may influence emotion regulation choice. According to the motivational dimension model of affect (Carver & Harmon-Jones, 2009; Gable & Harmon-Jones, 2010a, 2010d), motivation is an emotional dimension independent of arousal and valence. For instance, though amusement is a highly arousing and positive emotion, amusement cannot push one to approach something (Fredrickson & Brannigan, 2005); anger is a negative emotion, however, connected with active attack and approach motivation (Carver & Harmon-Jones, 2009). The categories of motivation have been suggested to influence emotion regulation. For example, people may be motivated hedonically to maximize pleasure and minimize pain or increase negative emotion due to instrumental motives(Kalokerinos et al., 2017; Tamir, 2016; Tamir et al., 2008; Tamir & Millgram, 2017). Despite this knowledge, it is still unknown whether motivation also influences one's choice of emotion regulation strategy. Specifically, motivation can be organized by two primary dimensions, namely, motivational direction and intensity (Gable & Harmon-Jones, 2010d; Harmon-Jones & Gable, 2008). Motivational direction represents the drive to approach a goal or avoid an object. Motivational intensity refers to the strength of the motivation, which ranges from low to high in a given motivational direction (Gable & Harmon-Jones, 2010a, 2010b). Therefore, it needs to be elucidated

This article was published Online First October 4, 2021.

Jiemin Yang https://orcid.org/0000-0002-6806-1673

Xinyu Yan https://orcid.org/0000-0002-1212-6095

Shengdong Chen https://orcid.org/0000-0002-1193-5931

Xiling Zhang https://orcid.org/0000-0001-6917-8366

Jiajin Yuan https://orcid.org/0000-0002-5630-2230

This research is supported by the National Natural Science Foundation of China [31871103, 31971018, and 31671164].

Jiemin Yang and Xinyu Yan are first authors of equal contribution to this work.

Correspondence concerning this article should be addressed to Jiajin Yuan, The Affect Cognition and Regulation Laboratory (ACRLab), Institute of Brain and Psychological Sciences, Sichuan Normal University, No. 5, Jing'an Road, Jinjiang District, Chengdu 610066, China. Email: yuanjiajin168@126.com

whether motivational direction and intensity influence emotion regulation choice.

Furthermore, researchers have found that the motivational intensity of emotion could affect attentional breadth. Specifically, participants in a high-motivated positive affective state responded less to the global characteristics than those in low-motivated positive and neutral emotional states (Gable & Harmon-Jones, 2008a; Harmon-Jones & Gable, 2009). The same pattern of difference was also found in high and low-motivated negative states (Gable & Harmon-Jones, 2010c; Threadgill & Gable, 2018). In addition, event-related potential studies observed that high-motivated emotional pictures induced a greater frontal-central activity and the activity predicted a faster local-target reaction time (RT), which supports the idea that high motivation is linked with more local attention (Gable & Harmon-Jones, 2010c; Harmon-Jones & Gable, 2009).

More importantly, attentional breadth can positively predict creative performance (Forster et al., 2004; Friedman et al., 2003; Jia et al., 2009; Kasof, 1997; Liu, 2016). The increased attentional breadth makes it possible to associate different stimuli to develop a creative idea. And reappraisal is a strategy that alters emotional responses by reformulating the meaning of a situation (Gross, 1998). Fink et al. (2017) has found that the generation of reappraisals is associated with a brain pattern similar to that observed in verbal creative ideation. In line with this idea, some researchers found creativity was positively correlated with the effectiveness of reappraisal (Wu et al., 2017). Therefore, we infer that attentional breadth might be associated with the use of reappraisal, and the motivational intensity of emotion may influence emotion regulation preference via altering attentional breadth.

Specifically, in a low-intensity motivated emotional context, participants might choose reappraisal more than distraction as a result of increased attentional breadth (e.g., someone during experiencing anxiety may access multiple interpretations of the event to facilitate reappraisal); while they might show a relative preference for distraction over reappraisal in a high-intensity motivated emotional context which, as indicated (Gable & Harmon-Jones, 2008a, 2010a, 2010b), is linked with narrowed attentional breadth (e.g., an angry man focusing on the provoking situation tends to shift his attention elsewhere rather than reinterpret the situation).

Besides, motivation direction reflects the response tendency toward the stimulus, and thus may influence emotion regulation choices. The theory of attitude toward emotion (Harmon-Jones et al., 2011) suggests that people prefer approach-motivated affect like joy, which facilitates one's goal pursuit. Conversely, withdrawal-motivated emotions drive people to avoid something unpleasant, whose reinterpretation benefits the reduction of this tendency and the realization of instrumental purposes (Sheppes et al., 2014). Thus, people should be reluctant to alter the meanings of approach-motivated stimuli, whereas reinterpretation of stimulus meanings is more favorable during withdrawal-related emotions. Accordingly, we predict that subjects prefer distraction over reappraisal during approach-motivated stimulus contexts, as distraction does not involve alteration of stimulus meanings (Sheppes & Meiran, 2007). However, in withdrawal-motivated emotional contexts, people may prefer reappraisal which has a long-term adaptive effect (Denny et al., 2015; Hermann et al., 2017; Levine et al., 2012).

Method

Participants

Fifty-one healthy students[1] (21 males and 30 females) with normal or corrected-to-normal vision participated in the experiment for monetary compensation. Four participants were excluded, including three participants due to poor compliance with the regulation instructions and one because of his unfinished task. Therefore, the final sample consisted of 47 participants (18 males and 29 females), and the average age was 19.94 years (SD = 1.35). This study was approved by the ethical committee of human research at Sichuan Normal University and Southwest University.

Stimuli

Eighty-seven pictures[2,3] selected from the IAPS (48 pictures, Lang et al., 2008), CAPS (35 pictures, Bai et al., 2005), and the Internet (four pictures) were used in the experiment, which included 17 high-approach-motivated pictures, 17 low-approach-motivated pictures, 17 high-withdrawal-motivated pictures, 17 low-withdrawal-motivated pictures, and 19 neutral pictures. Another 30 subjects (M_{age} = 19.95, SD = .85) who did not participate in the formal experiment were recruited to rate arousal (1 = *low*; 9 = *high*), valence (1 = *very unpleasant*; 9 = *very pleasant*) and motivation (1 = *very eager to withdraw*; 9 = *very eager to approach*) for the selected pictures. In the arousal rating, the four types of emotional pictures were similar to one another (see Table 1) but each differed significantly from the neutral pictures ($ps < .001$).

In the valence rating, the high-approach-motivated pictures were similar to the low-approach-motivated pictures, and the same pattern was also found for the high versus low withdrawal-motivated pictures.

[1] Sample size was determined with reference to the study on the motivational dimension of affect (Threadgill & Gable, 2018). According to G*power (Faul et al., 2007), we need a sample size of at least 35 to obtain a significant interaction with a partial η2 of 0.06. Thus, we reasoned that a sample size of 51 would be sufficient to examine the relations among the motivation of emotion, emotion regulation choice and attention breadth. Additionally, we also calculated the post hoc power according to G*power and the effect sizes of results were all with a power above 0.75.

[2] High-withdrawal-motivated emotional pictures:
CAPS: 156, 168, 170, 175, 185, 194, 200, 241, 258, 519, 522, 549, 558, 585; IAPS: 1321, 9102, 9440;
High-approach-motivated emotional pictures:
CAPS: 050, 068, 076, 077, 078, 448; IAPS: 7271, 7281, 7282, 7351, 7410, 7460, 7475;
Low-withdrawal-motivated emotional pictures:
CAPS: 171, 191, 215, 229, 274, 612; IAPS: 2110, 2141, 2205, 2221, 2230, 2710, 2722, 2900, 9220, 9421, 9530.
Low-approach-motivated emotional pictures:
CAPS: 009, 019, 020, 038, 040, 045, 053, 054, 055; IAPS: 2000, 2010, 2391, 2340, 2500, 2510, 2530, 8461.
Neutral pictures:
IAPS: 7002, 7004, 7006, 7009, 7010, 7020, 7025, 7035, 7040, 7050, 7080, 7090, 7100, 7140, 7150, 7175, 7185, 7190, 7233.

[3] The materials and data are available in the link: https://drive.google.com/open?id=1gHshM0D2QsCDr3RxiwFY_NHUObI_6ZvB

Table 1
Valence, Arousal and Motivation of Selected Emotional Pictures

	Valence			Arousal			Motivation		
Direction	Approach	Withdrawal	*t*	Approach	Withdrawal	*t*	Approach	Withdrawal	*t*
High	6.82 (.31)	3.17 (.66)	20.88***	5.48 (.42)	5.46 (.34)	.18	1.79 (.25)	−2.44 (.48)	4.47***
Low	6.71 (.35)	3.11 (.54)	29.37***	5.31 (.48)	5.22 (.49)	.44	1.41 (.35)	−1.84 (.51)	2.02*
t	.91	.25		1.04	1.39		2.62*	3.14*	

* $p < .05$. *** $p < .001$.

However, approach-motivated pictures were rated with higher valence values compared to withdrawal-motivated and neutral pictures, irrespective of intensity.

In the motivation rating, we subtracted five from the raw scores to obtain the new scores, the signs of which were regarded as the motivational direction (*plus*: approach motivation; *minus*: withdrawal motivation), and the absolute value of which represented the motivational intensity. There were significant intensity and direction differences across the four categories of pictures. More details were shown in Table 1.

Dependent Measures

Breadth of Attention

We used a 16-item global-local visual processing task adapted from Kimchi and Palmer (1982) to assess attentional breadth. For each item, a stimulus triad was presented that contained a standard figure on the top and two comparison figures at the bottom. The participants chose A or B on a response form to indicate which of the two comparison figures was more similar to the standard figure. Judgments could be based either on the global-configural aspects of the standard figure or the local elements comprising it. In Figure 1, for example, the standard figure's configuration is a triangle consisted of square elements, so if they chose A (see Figure 1b), their choice was based on the global configuration of the standard figure. In contrast, if they chose the comparison figure that is a square made up of square elements (choice B in Figure 1b), that choice was based on the local detail elements of the standard figure. The participants were instructed to give their first, most immediate impression of which comparison figure looked more like the standard figure. The participant responses were recorded, and the rate of global-based reaction was obtained by calculating the percentage of global-figure choice across all trials as an index of attentional breadth.

Emotion Regulation Preference

We used the emotion regulation choice task (Sheppes et al., 2014; Sheppes & Gross, 2011) to test participants' preference for strategies in different motivational conditions (Figure 1d). The percentage that each participant chose reappraisal as the regulatory strategy across all trials was regarded as his or her emotion regulation preference for reappraisal. The higher the percentage is, the greater the preference for cognitive reappraisal.

Behavioral Procedure

The experiment consisted of two sessions and the whole procedure can be found in Figure 1. In session 1 (see Figure 1b–1c), participants completed the measure of attentional breadth following priming with different emotional pictures. Five blocks were corresponding to five motivational conditions, respectively, and the order of these blocks was counterbalanced. Each block contained 15 trials, and each trial began with a 500-ms fixation cross. Then an emotional picture was displayed for 500 ms, followed by another fixation for 500 ms. Next, the global-local picture was displayed until the participant responded. If a response did not occur within 5 s, the next trial began. There were 30-s rest periods between blocks. Four practice trials of neutral pictures were administered before the formal test started.

After the first session, there was a 5-min rest period. Then, in the second session, the emotion regulation choice task began where the participant was forced to choose reappraisal or distraction to regulate picture-induced emotions to calmness. Therefore, neutral pictures were excluded from this session. The emotion regulation choice task consists of the training phase and choice phase.

During an eight-trial training phase, participants were instructed to look at emotional pictures either by thinking about something irrelevant to the picture that was emotionally neutral (distraction; e.g., taking a shower) or by reinterpreting each picture in a non-emotional or constructive way that would keep observers calm (reappraisal; e.g., help is on the way). The training phase consisted of four distraction trials and four reappraisal trials, with one example trial offered to each motivational condition; the order of the strategy presentation was randomized in the training.

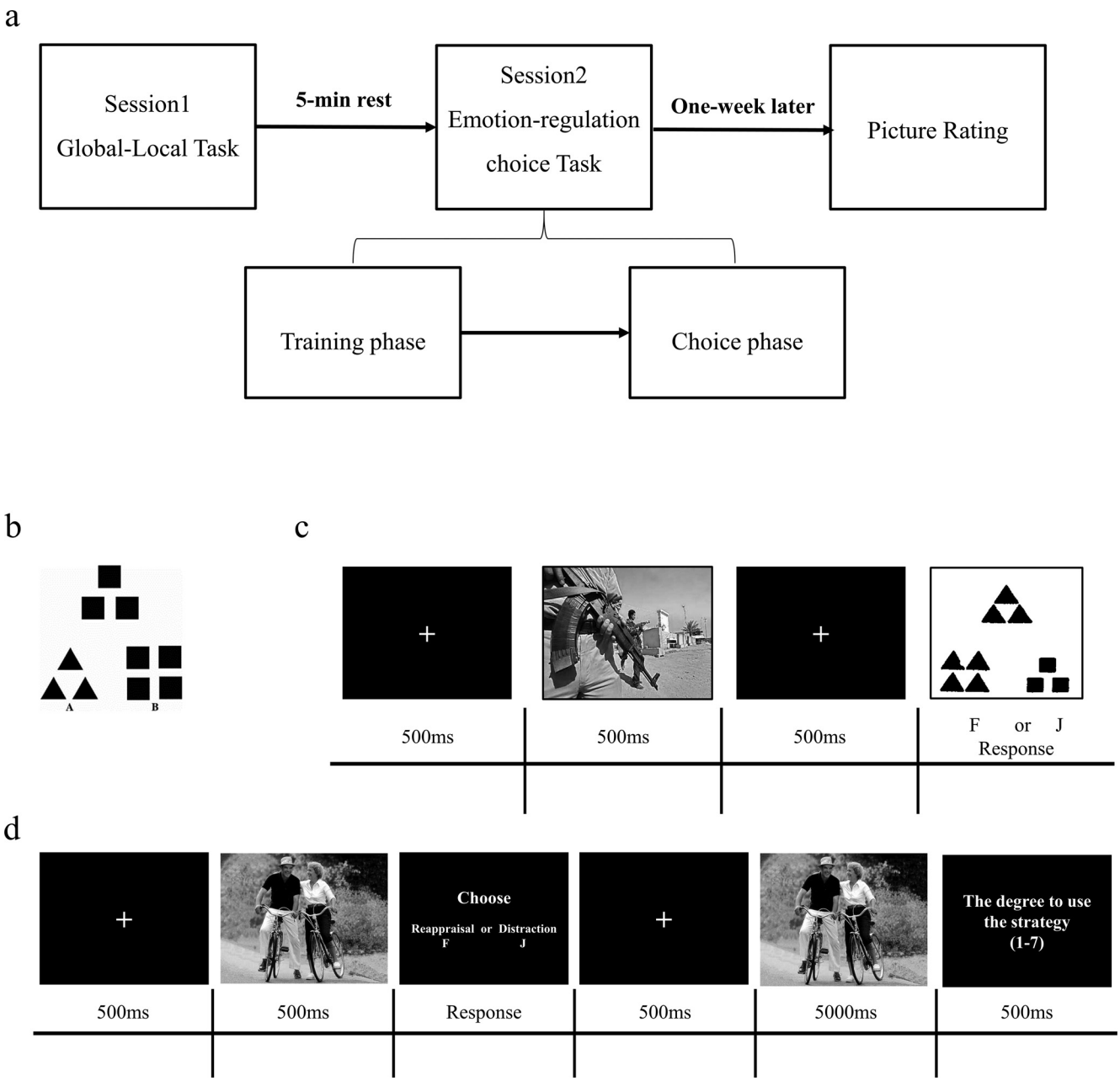
Subsequently, the participants completed the choice phase (see Figure 1d) that consisted of the 60 emotional pictures used in session 1. Each trial started with a 500-ms fixation, and then an emotional picture was displayed for 500 ms. After that, the words *distraction* and *reappraisal* were presented on the screen, and participants needed to choose one of these two strategies by pressing one of two buttons ("F" or "J"); if the response did not occur within 5 s, the next trial would begin. Assignment of the reappraisal and distraction strategies to the response buttons was counterbalanced across participants. The participants then implemented their chosen strategy while viewing the picture for 5000 ms to regulate their emotion to calmness. Finally, to confirm that they did use the strategy, participants were required to estimate the degree to which they used the chosen strategy for emotion regulation on a 1 (*not at all*) to 7 (*very much*) scale. There was a 10-s rest period after every six trials. To confirm the emotional attributes of the used pictures but minimize the strategy influences on the rating, we asked subjects, 1 week (numerals should be used with units) after the experiment, to rate the valence, arousal, and motivation of all the used pictures.

Result

Statistical analysis was performed using SPSS Statistics 21.0. The significance level was at .05 and partial η-square (η_p^2) was reported as a measure of effect size for the analyses of variance,

Figure 1

a: The Organization of Behavioral Procedure of the Study; b–c: An Example of Global-Local Task Item and the Stimulus Streamline of the Attentional Breadth Test in Session 1; d: the Schematic Illustration of the Emotion-Regulation Choice Task in Session 2



with .05, .10, and .20 indicating a small, medium, and large effect, respectively. The Bonferroni-holm method was used for post hoc comparisons if significant main or interaction effects appeared.

Manipulation Test

As predicted, the data of postexperiment emotion rating showed that our manipulations of approach versus withdrawal motivations, as well as high versus low motivations, were successful (see Table 2). Also, the four types of emotional pictures were significantly different from the neutral pictures in motivation ($M_{neutral}$ = .05, SD = .07, $t_s > 6.27$, $p_s < .001$), valence ($M_{neutral}$ = .4.90, SD = .25, $t_s > 7.79$, $p_s < .001$) and arousal ($M_{neutral}$ = 4.59, SD = .20, $t_s > 2.42$, $p_s < .05$), confirming that the pictures used for each motivational condition were emotionally evocative.

Table 2
Participant Ratings of the Motivation of the Emotional Pictures

Picture type	*M* (*SD*)	*t*			
		1	2	3	4
1. High-approach	1.35 (.37)				
2. Low-approach	.91 (.38)	3.36**			
3. High-withdraw	−1.93 (.49)	21.77***	22.70***		
4. Low-withdraw	−1.40 (.59)	2.75***	13.51***	2.65*	
5. Neutral	.05 (.07)	14.63***	7.76***	15.68***	8.62***

* $p < .05$. ** $p < .01$. *** $p < .001$.

Attentional Breadth

We compared the measure of attentional breadth between each of the four emotion conditions and the neutral condition. Figure 2a shows the proportion of global-based reactions in the different emotional contexts. We observed a lower proportion of global-based reaction in the high-approach-motivated emotional context ($M = .60$, $SD = .26$) than in the neutral context ($M = .67$, $SD = .22$, $d = -.07$, $t[46] = -2.08$, $p = .043$, 95% CI [−.14, −.00]). A similar result was found between the high-withdrawal-motivated ($M = .58$, $SD = .27$) and neutral contexts ($d = -.10$, $t[47] = -2.48$, $p = .017$, 95% CI [−.18, −.02]). By contrast, there was no significant difference between neutral and low-approach-motivated ($M = .65$, $SD = .25$, $d = .03$, $t[46] = -.73$, $p = .47$, 95% CI [−.04, .10]) or low-withdrawal-motivated emotional contexts ($M = .64$, $SD = .28$, $d = -.04$, $t[46] = -.88$, $p = .38$, 95% CI [−.05, .12]).

In addition, we tested how motivational direction and intensity influenced attentional breadth, using a 2 (motivational intensity: high vs low) × 2 (motivational direction: approach vs withdrawal) ANOVA excluding the neutral condition. We found that the interaction was not significant, $F(1, 46) = .09$, $p = .77$, $\eta_p^2 = .002$. However, the main effect of motivational intensity was significant, $F(1, 46) = 5.55$, $p = .023$, $\eta_p^2 = .11$, indicating that people paid more attention to the global structure in the low-motivated ($M = .64$, $SD = .21$) than in the high- motivated emotional contexts ($M = .59$, $SD = .25$, $d = .05$, $t[46] = 2.36$, $p = .023$, 95% CI [.01, .10]). The effect of motivational direction was not significant, $F(1, 46) = 3.88$, $p = .46$, $\eta_p^2 = .01$.

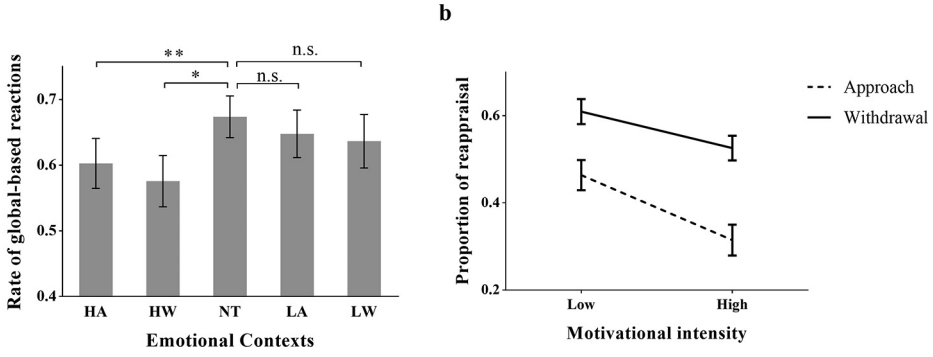
Emotion Regulation Choice

A 2 (motivational intensity: high vs low) × 2 (motivational direction: approach vs withdrawal) repeated measures ANOVA revealed that there was no significant interaction effect, $F(1, 46) = 2.79$, $p = .10$, $\eta_p^2 = .06$. However, main effects of motivational intensity, $F(1, 46) = 20.44$, $p < .001$, $\eta_p^2 = .31$, and motivational direction, $F(1, 46) = 15.47$, $p < .001$, $\eta_p^2 = .25$, were significant. Namely, proportion of reappraisal was higher in the low-motivated ($M = .54$, $SD = .14$) than in the high- motivated emotional contexts ($M = .42$, $SD = .14$, 95% CI [.06, .17]). In addition, withdrawal motivated context ($M = .57$, $SD = .16$) was associated with more reappraisal choice than the approach motivated context ($M = .39$, $SD = .21$;95% CI [.06, .17]).

To test whether the motivational direction effect depends on valence, we ran a single factor (motivational direction: approach vs withdrawal) ANOVA on the data of reappraisal choice, using subjects' valence rating as a covariate. The results showed no significant motivational direction effect after controlling for valence, $F(1, 45) = 2.69$, $p = .11$, $\eta_p^2 = .06$.

To directly test regulatory preference between distraction and reappraisal at each motivational intensity, we compared the choice of reappraisal with that of distraction in high and low intensity

Figure 2
The Proportion of Global-Based Reaction in Global-Local Task (a) and The Emotion Regulation Choice in Different Emotional Contexts (b)



Note. H = high; L = low; W = withdrawal; A = approach; NT = neutral. n.s. = no significance.
* $p < .05$. ** $p < .01$.

conditions, respectively. The results confirmed that high-intensity motivated emotion was associated with significantly more choice of distraction (t[46] = 3.94, $p < .001$, 95% CI [.05, .11]), whereas low-intensity motivated emotion was linked with more choice of reappraisal (t[46] = 1.78, $p < .05$, 95% CI [.01, .07]).

The Mediation Effect of Attentional Breadth

As described above, motivational intensity influenced attentional breadth and emotion regulation preference. Thus, we tested the role of attentional breadth in the effect of motivation intensity on emotion-regulatory preference by a mediation analysis.

First, we test whether attentional breadth significantly predicts the choice of emotion regulation strategies, using the method developed by Nunez Castellar et al. (2010). Specifically, we calculated attentional breadth and reappraisal choice for each participant in each condition. As a result, we had four attentional breadth values and four reappraisal choice values for every participant. This rendered a regression coefficient for each participant. Then, we assessed whether the standardized beta coefficient was significant for overall participants.

The results showed that the average of the regression coefficients (M = .25, SD = .70) was positive and did significantly differ from zero, $F(1, 46) = 6.10$, $p = .017$, $\eta_p^2 = .12$, 95% CI [.05, .46], indicating that the increase in attentional breadth was associated with more preference for reappraisal.

As noted above, motivational intensity significantly influenced attentional breadth and emotion regulation choice. Thus, we then tested whether including attentional breadth as a covariate would alter the relation between motivational intensity and regulation choice. The results showed that the main effect of motivational intensity was compromised after statistically controlling the contribution of attentional breadth, F_{after} (1, 44) = 15.93, $p < .05$, $\eta_p^2 = .27$. These results showed that attentional breadth partially mediated the influence of motivational intensity on emotion regulation preference (see Figure 3).

Discussion

Despite current knowledge that motivation modulates emotion regulation, it is unknown whether and how the motivational dimension of affect influences emotion regulation choice. For this purpose, the current study examined how different aspects of motivation (direction or intensity) influenced emotion regulation choice. The results showed that the intensity of motivation in emotion could impact the preference for emotion regulation strategies, with increased motivation linked with a greater preference for distraction over reappraisal. Furthermore, attentional breadth plays a mediating role in this motivational intensity effect. In addition, though we observed more reappraisal choices during withdrawal compared to approach motivation, this effect disappeared after controlling valence. These findings provide insights into people's selection of a strategy for emotion regulation in different motivational states.

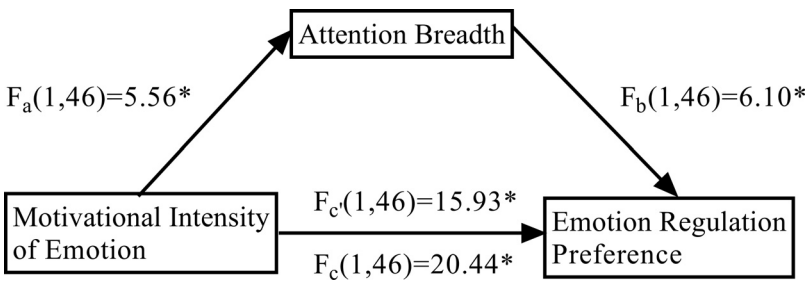
Specifically, the central findings demonstrated that high-intensity-motivated emotion narrowed attentional breadth, which in turn prompted people to choose distraction over reappraisal to regulate emotion. However, with low-intensity- motivated emotions, the participants paid more attention to the global or peripheral features and accordingly, preferred to use reappraisal to adjust their emotions. This is in line with a couple of prior studies. For example, Manera et al. (2014) found that when asked to use cognitive reappraisal to down-regulate emotion, individuals paid more attention to the peripheral regions instead of the central characters. Also, Juergensen and Demaree (2015) found that the attentional breadth was broadened during the use of reappraisal in emotion regulation.

In early studies, researchers found that the breadth of attention was positively related to creative performance (Kasof, 1997). People who scored high on creativity tests compared to less creative problem-solvers were better at taking advantage of peripheral cues. More recent studies also found beneficial effects of broad attention on creative idea generation by experimental manipulations that increased attentional breadth (Forster et al., 2004; Friedman et al., 2003; Jia et al., 2009; Liu, 2016). High creativity means that people can think of things in various and novel ways that are beneficial for cognitive reappraisal (Wu et al., 2017), which requires people to develop a new and different interpretation for the emotional stimulus. Consistent with these studies, we observed widened attentional breadth and greater reappraisal preferences during low-intensity motivated emotional contexts than during the high-intensity-motivated contexts, suggesting that low-intensity motivation facilitates more global and holistic observation of environmental cues to develop a new interpretation.

Our results replicated previous findings that high-motivated emotional context was linked with narrowed attentional breadth

Figure 3

The Relationship Between the Motivational Intensity and Emotion Regulation Preference Was Mediated by Attentional Breadth



Note. * $p < .05$.

compared to the low-motivated emotional and neural contexts, as indexed by more responses to the local figure in a global-local task (Gable & Harmon-Jones, 2008a, Gable & Harmon-Jones, 2010a, 2010b). High-approach-motivated emotions often encourage specific action tendencies, such as the exclusive pursuit of a given goal, which in turn reduces attentional breadth (Gable & Harmon-Jones, 2008a, Gable & Harmon-Jones, 2010a). Also, prior studies suggest that high-withdrawal-motivated emotion helps humans to avoid the disconcerting objective or disgusting stimuli by target-focused attention (Gable & Harmon-Jones, 2010d). A recent study demonstrated that a highly motivated emotional state, regardless of its direction (approach or withdrawal), impaired cognitive flexibility as represented by increased set-switching RT costs even after controlling the influences of arousal (Zhou & Siu, 2015). This also accounts for our observation of a preference for the early-timing, precognitive strategy of distraction, over reappraisal which relies on flexible interpretations, during highly motivated conditions.

It needs to be noted that the chosen pictures for high and low motivated conditions differed only in the motivational dimension, irrespective of motivational direction, as the high versus low motivated pictures were similar in the properties of valence and arousal. In this regard, our observation of a motivational intensity-specific effect supports the motivational dimensional model of affect from the perspective of emotion regulation. Specifically, changes of motivational intensity but not other emotional attributes led to an alteration of emotion regulation preference, which was consistent with the motivational dimension model positing that motivation serves as an independent affective dimension other than valence and arousal (Gable & Harmon-Jones, 2008b, 2010d).

Though we observed more reappraisal choices during withdrawal compared to approach motivated contexts, this effect vanished after statistically controlling valence. Tamir and colleagues proposed that motivation may influence the processes of emotion-regulation. Specifically, the hedonic motive pushes people to decrease pain or increase pleasure for immediate benefits, while the instrumental motive urges people to keep pain or reducing pleasure to achieve a long-term goal (Tamir, 2009, 2016; Tamir et al., 2008). Besides, Sheppes et al. (2014) have found that reappraisal was preferred during long-term, instrumental goal activation; while distraction was preferred for short-term, hedonic purposes. This evidence was consistent with our current findings, as the preference for reappraisal during withdrawal compared to approach motivation may reduce negative emotion reliably and attain a long-term goal, while distraction does not alter the meanings of pleasant, approach-motivated contexts and can fast meet the short-term experimental requirement, was chosen more in approach-motivated emotional contexts.

However, this motivational effect is not independent of stimulus valence. The most plausible explanation is that motivational direction, in most cases, is correlated with stimulus valence, though motivation has been verified to be an independent affective dimension (Carver & Harmon-Jones, 2009; Harmon-Jones & Allen, 1998; Harmon-Jones & Gable, 2008). For example, it has been shown that approach motivation is often accompanied by pleasant emotion while withdrawal motivation is related to negative feelings (Bradley et al., 2001; Bradley & Lang, 2007).

These findings suggest that healthy people prefer to use distraction, a disengaged strategy, for the regulation of high-intensity motivated emotion, regardless of whether the emotion is approach- or withdrawal-motivated. Violation of this regulatory preference might be related to psychological disorders. Specifically, the difficulty of choosing to disengage from high-approach motivated emotion can be seen in individuals with substance addiction. This, at least in part, accounts for the difficulty of withdrawal in terms of impaired emotion regulation (Wilcox et al., 2016; Zimmermann et al., 2017). On the other hand, the current finding may be applied for clinical intervention of depression, which is characterized by ruminative coping. Researchers have found that individuals with either addiction or depression can implement distraction after training (Beadman et al., 2015; Joormann et al., 2007). Thus, training depressive individuals to use distraction during high-intensity emotion may be of help during the rehabilitation.

There are several limitations that should be acknowledged. First, the current study did not isolate valence from motivational direction as mentioned above, despite efforts to control valence and arousal across different motivation conditions. Therefore, future studies need to disentangle the role of motivation direction from that of valence in emotion regulation. Second, although affective pictures are powerful inducers of emotions, they are nonetheless only symbolic representations of real-life events. It is necessary to test the robustness of these findings through more ecologically valid materials in the future, such as emotionally evocative videos. Furthermore, we used the global-local task to measure attentional breadth, and this task relies on the times by which participants chose the global figure to evaluate attentional breadth. Future studies need to use other measures, such as RT in the Navon letter task (Navon, 1977), to replicate the current study.

To conclude, the present study tested, for the first time, the effect of motivational direction and intensity on the choice of two emotion-regulatory strategies—distraction and reappraisal. Our main finding demonstrates that (a) withdrawal-motivated emotion is associated with more reappraisal choices than approach-motivated emotion during emotion regulation, and this effect is driven by emotional valence; and (b) high-motivated emotional context is linked with a greater preference for distraction over reappraisal during emotion regulation, partly through narrowed attentional breadth.

References

Aldao, A., Sheppes, G., & Gross, J. J. (2015). Emotion regulation flexibility. *Cognitive Therapy and Research*, *39*(3), 263–278. https://doi.org/10.1007/s10608-014-9662-4

Bai, L., Ma, H., Huang, Y., & Luo, Y. (2005). The development of Native Chinese affective picture system—A pretest in 46 college students. *Chinese Mental Health Journal*, *19*(11), 719–722.

Beadman, M., Das, R. K., Freeman, T. P., Scragg, P., West, R., & Kamboj, S. K. (2015). A comparison of emotion regulation strategies in response to craving cognitions: Effects on smoking behaviour, craving and affect in dependent smokers. *Behaviour Research and Therapy*, *69*, 29–39. https://doi.org/10.1016/j.brat.2015.03.013

Bradley, M. M., Codispoti, M., Cuthbert, B. N., & Lang, P. J. (2001). Emotion and motivation: I. Defensive and appetitive reactions in picture processing. *Emotion*, *1*(3), 276–298. https://doi.org/10.1037/1528-3542.1.3.276

Bradley, M. M., & Lang, P. J. (2007). Emotion and motivation. In J. T. Cacioppo, L. G. Tassinary, & G. Berntson (Eds.), *Handbook of psychophysiology* (3rd ed., pp. 581–607). Cambridge University Press.

Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin*, *135*(2), 183–204. https://doi.org/10.1037/a0013965

Denny, B. T., Inhoff, M. C., Zerubavel, N., Davachi, L., & Ochsner, K. N. (2015). Getting over it: Long-lasting effects of emotion regulation on amygdala response. *Psychological Science*, *26*(9), 1377–1388. https://doi.org/10.1177/0956797615578863

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/bf03193146

Fink, A., Weiss, E. M., Schwarzl, U., Weber, H., de Assunção, V. L., Rominger, C., Schulter, G., Lackner, H. K., & Papousek, I. (2017). Creative ways to well-being: Reappraisal inventiveness in the context of anger-evoking situations. *Cognitive, Affective & Behavioral Neuroscience*, *17*(1), 94–105. https://doi.org/10.3758/s13415-016-0465-9

Forster, J., Friedman, R. S., & Liberman, N. (2004). Temporal construal effects on abstract and concrete thinking: Consequences for insight and creative cognition. *Journal of Personality and Social Psychology*, *87*(2), 177–189. https://doi.org/10.1037/0022-3514.87.2.177

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition & Emotion*, *19*(3), 313–332. https://doi.org/10.1080/02699930441000238

Friedman, R. S., Fishbach, A., Forster, J., & Werth, L. (2003). Attentional priming effects on creativity. *Creativity Research Journal*, *15*(2), 277–286. https://doi.org/10.1207/s15326934crj152&3_18

Gable, P. A., & Harmon-Jones, E. (2008a). Approach-motivated positive affect reduces breadth of attention. *Psychological Science*, *19*(5), 476–482. https://doi.org/10.1111/j.1467-9280.2008.02112.x

Gable, P., & Harmon-Jones, E. (2008b). Relative left frontal activation to appetitive stimuli: Considering the role of individual differences. *Psychophysiology*, *45*(2), 275–278. https://doi.org/10.1111/j.1469-8986.2007.00627.x

Gable, P., & Harmon-Jones, E. (2010a). The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. *Psychological Science*, *21*(2), 211–215. https://doi.org/10.1177/0956797609359622

Gable, P. A., & Harmon-Jones, E. (2010b). The effect of low versus high approach-motivated positive affect on memory for peripherally versus centrally presented information. *Emotion*, *10*(4), 599–603. https://doi.org/10.1037/a0018426

Gable, P. A., & Harmon-Jones, E. (2010c). Late positive potential to appetitive stimuli and local attentional bias. *Emotion*, *10*(3), 441–446. https://doi.org/10.1037/a0018425

Gable, P., & Harmon-Jones, E. (2010d). The motivational dimensional model of affect: Implications for breadth of attention, memory, and cognitive categorisation. *Cognition and Emotion*, *24*(2), 322–337. https://doi.org/10.1080/02699930903378305

Grezellschak, S., Lincoln, T. M., & Westermann, S. (2015). Cognitive emotion regulation in patients with schizophrenia: Evidence for effective reappraisal and distraction. *Psychiatry Research*, *229*(1–2), 434–439. https://doi.org/10.1016/j.psychres.2015.05.103

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271–299. https://doi.org/10.1037/1089-2680.2.3.271

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–26). Guilford Press. https://doi.org/10.1080/00140130600971135

Harmon-Jones, E., & Allen, J. J. (1998). Anger and frontal brain activity: EEG asymmetry consistent with approach motivation despite negative affective valence. *Journal of Personality and Social Psychology*, *74*(5), 1310–1316. https://doi.org/10.1037/0022-3514.74.5.1310

Harmon-Jones, E., & Gable, P. A. (2008). Incorporating motivational intensity and direction into the study of emotions: Implications for brain mechanisms of emotion and cognition-emotion interactions. *Netherlands Journal of Psychology*, *64*(4), 132–142. https://doi.org/10.1007/BF03076416

Harmon-Jones, E., & Gable, P. A. (2009). Neural activity underlying the effect of approach-motivated positive affect on narrowed attention. *Psychological Science*, *20*(4), 406–409. https://doi.org/10.1111/j.1467-9280.2009.02302.x

Harmon-Jones, E., Harmon-Jones, C., Amodio, D. M., & Gable, P. A. (2011). Attitudes toward emotions. *Journal of Personality and Social Psychology*, *101*(6), 1332–1350. https://doi.org/10.1037/a0024951

Hay, A. C., Sheppes, G., Gross, J. J., & Gruber, J. (2015). Choosing how to feel: Emotion regulation choice in bipolar disorder. *Emotion*, *15*(2), 139–145. https://doi.org/10.1037/emo0000024

Hermann, A., Kress, L., & Stark, R. (2017). Neural correlates of immediate and prolonged effects of cognitive reappraisal and distraction on emotional experience. *Brain Imaging and Behavior*, *11*(5), 1227–1237. https://doi.org/10.1007/s11682-016-9603-9

Jia, L., Hirt, E. R., & Karpen, S. C. (2009). Lessons from a faraway land: The effect of spatial distance on creative cognition. *Journal of Experimental Social Psychology*, *45*(5), 1127–1131. https://doi.org/10.1016/j.jesp.2009.05.015

Joormann, J., Siemer, M., & Gotlib, I. H. (2007). Mood regulation in depression: differential effects of distraction and recall of happy memories on sad mood. *Journal of Abnormal Psychology*, *116*(3), 484–490. https://doi.org/10.1037/0021-843X.116.3.484

Juergensen, J., & Demaree, H. A. (2015). Approach-motivated positive affect and emotion regulation alter global-local focus and food choice. *Motivation and Emotion*, *39*(4), 580–588. https://doi.org/10.1007/s11031-015-9472-3

Kalokerinos, E. K., Tamir, M., & Kuppens, P. (2017). Instrumental motives in negative emotion regulation in daily life: Frequency, consistency, and predictors. *Emotion*, *17*(4), 648–657. https://doi.org/10.1037/emo0000269

Kasof, J. (1997). Creativity and breadth of attention. *Creativity Research Journal*, *10*(4), 303–315. https://doi.org/10.1207/s15326934crj1004_2

Kimchi, R., & Palmer, S. E. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology: Human Perception and Performance*, *8*(4), 521–535. https://doi.org/10.1037/0096-1523.8.4.521

Lang, P. J., Bradley, B. N., & Cuthbert, B. N. (2008). *International Affective Picture System (IAPS): Affective ratings of pictures and instruction manual* (Technical Report No. A-8). University of Florida.

Levine, L. J., Schmidt, S., Kang, H. S., & Tinti, C. (2012). Remembering the silver lining: Reappraisal and positive bias in memory for emotion. *Cognition and Emotion*, *26*(5), 871–884. https://doi.org/10.1080/02699931.2011.625403

Liu, S. (2016). Broaden the mind before ideation: The effect of conceptual attention scope on creativity. *Thinking Skills and Creativity*, *22*, 190–200. https://doi.org/10.1016/j.tsc.2016.10.004

Manera, V., Samson, A. C., Pehrs, C., Lee, I. A., & Gross, J. J. (2014). The eyes have it: The role of attention in cognitive reappraisal of social stimuli. *Emotion*, *14*(5), 833–839. https://doi.org/10.1037/a0037350

McRae, K., Hughes, B., Chopra, S., Gabrieli, J. D., Gross, J. J., & Ochsner, K. N. (2010). The neural bases of distraction and reappraisal. *Journal of Cognitive Neuroscience*, *22*(2), 248–262. https://doi.org/10.1162/jocn.2009.21243

Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology*, *9*(3), 353–383. https://doi.org/10.1016/0010-0285(77)90012-3

Nunez Castellar, E., Kuhn, S., Fias, W., & Notebaert, W. (2010). Outcome expectancy and not accuracy determines posterror slowing: ERP support. *Cognitive, Affective & Behavioral Neuroscience*, *10*(2), 270–278. https://doi.org/10.3758/CABN.10.2.270

Shafir, R., Schwartz, N., Blechert, J., & Sheppes, G. (2015). Emotional intensity influences pre-implementation and implementation of distraction

and reappraisal. *Social Cognitive and Affective Neuroscience*, *10*(10), 1329–1337. https://doi.org/10.1093/scan/nsv022

Sheppes, G., & Gross, J. J. (2011). Is timing everything? Temporal considerations in emotion regulation. *Personality and Social Psychology Review*, *15*(4), 319–331. https://doi.org/10.1177/1088868310395778

Sheppes, G., & Meiran, N. (2007). Better late than never? On the dynamics of online regulation of sadness using distraction and cognitive reappraisal. *Personality and Social Psychology Bulletin*, *33*(11), 1518–1532. https://doi.org/10.1177/0146167207305537

Sheppes, G., Scheibe, S., Suri, G., & Gross, J. J. (2011). Emotion-regulation choice. *Psychological Science*, *22*(11), 1391–1396. https://doi.org/10.1177/0956797611418350

Sheppes, G., Scheibe, S., Suri, G., Radu, P., Blechert, J., & Gross, J. J. (2014). Emotion regulation choice: A conceptual framework and supporting evidence. *Journal of Experimental Psychology: General*, *143*(1), 163–181. https://doi.org/10.1037/a0030831

Strauss, G. P., Ossenfort, K. L., & Whearty, K. M. (2016). Reappraisal and distraction emotion regulation strategies are associated with distinct patterns of visual attention and differing levels of cognitive demand. *PLoS ONE*, *11*(11), e0162290. https://doi.org/10.1371/journal.pone.0162290

Tamir, M. (2009). What do people want to feel and why? Pleasure and utility in emotion regulation. *Current Directions in Psychological Science*, *18*(2), 101–105. https://doi.org/10.1111/j.1467-8721.2009.01617.x

Tamir, M. (2016). Why do people regulate their emotions? A taxonomy of motives in emotion regulation. *Personality and Social Psychology Review*, *20*(3), 199–222. https://doi.org/10.1177/1088868315586325

Tamir, M., Mitchell, C., & Gross, J. J. (2008). Hedonic and instrumental motives in anger regulation. *Psychological Science*, *19*(4), 324–328. https://doi.org/10.1111/j.1467-9280.2008.02088.x

Tamir, M., & Millgram, Y. (2017). Motivated emotion regulation: Principles, lessons, and implications of a motivational analysis of emotion regulation. In A. J. Elliot (Ed.), *Advances in motivation science* (pp. 207–247). Elsevier. https://doi.org/10.1016/bs.adms.2016.12.001

Threadgill, A. H., & Gable, P. A. (2018). Negative affect varying in motivational intensity influences scope of memory. *Cognitive Emotion*, *33*(2), 332–345. https://doi.org/10.1080/02699931.2018.1451306

Wilcox, C. E., Pommy, J. M., & Adinoff, B. (2016). Neural circuitry of impaired emotion regulation in substance use disorders. *The American Journal of Psychiatry*, *173*(4), 344–361. https://doi.org/10.1176/appi.ajp.2015.15060710

Wu, X. F., Guo, T. T., Tang, T. T., Shi, B. G., & Luo, J. (2017). Role of creativity in the effectiveness of cognitive reappraisal. *Frontiers in Psychology*, *8*, 1598. https://doi.org/10.3389/fpsyg.2017.01598

Zhou, Y., & Siu, A. F. (2015). Motivational intensity modulates the effects of positive emotiona on set shifting after controlling phsysiological arousal. *Scandinavian Journal of Psychology*, *56*(6), 613–621. https://doi.org/10.1111/sjop.12247

Zimmermann, K., Walz, C., Derckx, R. T., Kendrick, K. M., Weber, B., Dore, B., Ochsner, K. N., Hurlemann, R., & Becker, B. (2017). Emotion regulation deficits in regular marijuana users. *Human Brain Mapping*, *38*(8), 4270–4279. https://doi.org/10.1002/hbm.23671

Received September 4, 2019
Revision received December 29, 2020
Accepted January 29, 2021 ■