Emotion

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Online First Publication, September 20, 2018. http://dx.doi.org/10.1037/emo0000498

American Psychological Association

Emotion

1528-3542/18/$12.00

http://dx.doi.org/10.1037/emo0000498

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Research shows that cognitive reappraisal is an effective emotion regulation (ER) strategy that often has clear benefits. Yet, surprisingly, recent findings demonstrate that people use cognitive reappraisal less frequently than might be expected (Suri, Whittaker, & Gross, 2015). We employ cognitive energetics theory (CET) to explain this puzzling behavior. CET posits that the likelihood of launching any cognitive process is a function of two opposing forces: the driving force (i.e., the motivation to launch the process) and the restraining force (i.e., task difficulty). We thus hypothesized that people choose to use cognitive reappraisal relatively rarely because of the difficulty of implementing it. We also postulated that the decision to reappraise (or not) does not simply depend on stimuli emotional intensity because the latter is associated with both the driving and the restraining forces. In support of our hypotheses, we found that when the images' emotional intensity posed difficulty for reappraisal (i.e., highly intense images), reducing this difficulty by asking participants to merely predict others' (Study 1) or their own choices (Study 2) increased reappraisal choice. Finally, in Study 3, we show that a relatively easy to implement reappraisal strategy was chosen more often than the more difficult one for high (but not low) intensity images. These findings illustrate the relevance of a CET-based motivational analysis to emotion regulation choice.

Keywords: cognitive energetics, emotion regulation, emotions, motivation

Supplemental materials: http://dx.doi.org/10.1037/emo0000498.supp

Emotion regulation involves attempts to influence which emotions we have, when we have them, and how we experience or express our emotions (Gross, 1998). Sometimes, we regulate our emotions for hedonic purposes. At other times, we regulate emotions because they are instrumental or detrimental to our goals (e.g., as in the self-induction of anger to help one fight or negotiate with others; Tamir & Ford, 2012; Tamir, Mitchell, & Gross, 2008).

What drives people's decisions to carry out emotion regulation in intense emotional situations? Imagine one's reaction to the news that a close friend or family member has unexpectedly died. One might choose to *distract* oneself from the tragedy by diving into responsibilities at work (e.g., Sheppes, Scheibe, Suri, & Gross, 2011), or *suppress* one's grief by feigning a smile and pretending that all is fine (e.g., Gross, 1998). Alternatively, one might proceed to *reappraise* the situation (e.g., Gross, 1998): Instead of ruminating about the unexpected loss, one might reframe the situation by focusing on the productive life this individual had lived, the accomplishments attained, and/or the peace that in death she has finally achieved. Or one might not regulate emotion at all, let the negative emotions wash over unabated, and wallow in grief until it passes of its own accord (Suri et al., 2015).

In the present analysis, we apply cognitive energetics theory (CET; Kruglanski et al., 2012) to better understand emotion regulation decisions like those described above, particularly the decision to engage in cognitive reappraisal. From this perspective, intense emotional circumstances arouse two competing psychological forces. One force is fueled by the desire to downregulate the

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unpleasantness that intense negative emotions typically engender. The other, opponent, force derives from the difficulty of downregulating one's emotional turmoil. We begin with a discussion of emotion regulation as a general process, describe the reappraisal technique as its specific instance, and, finally, apply a CET-based analysis to elucidate the psychological conditions that shape reappraisal choice.

Although previous research has elaborated on a handful of emotion regulation strategies (e.g., distraction, suppression, reappraisal), we focus specifically on cognitive reappraisal. Reappraisal is a cognitive-linguistic strategy that changes emotional responses by altering the meaning of a situation, for example, participants can be asked to imagine how an apparently negative situation could improve or be beneficial for some goals (Gross, 2014). The advantage of cognitive reappraisal is that it allows people to change their emotional responses to the situation without escaping the situation (as happens in the distraction technique) or running away from the emotion itself (as happens in the suppression technique). Another advantage is that, compared with other emotion regulation strategies, reappraisal leads to better personal and interpersonal outcomes (Gross & John, 2003; Ortner, Ste Marie, & Corno, 2016; Sheppes & Gross, 2011). For instance, reappraisal is more effective than suppression in reducing negative emotions and negative mood (Evers, Marijn Stok, & de Ridder, 2010; Heilman, Crişan, Houser, Miclea, & Miu, 2010; Johns, Inzlicht, & Schmader, 2008; Ortner et al., 2016). Gross and John (2003) also found that people who reported habitually using reappraisal in daily life, tended to experience and express more positive and less negative emotions than those who predominantly used suppression. Moreover, reappraisal has been linked to better well-being and life satisfaction, and individuals who habitually used reappraisal had closer relationships with their peers, were more liked by others, and received more social support (relative to habitual suppressors; Gross & John, 2003; except see Haines et al., 2016).

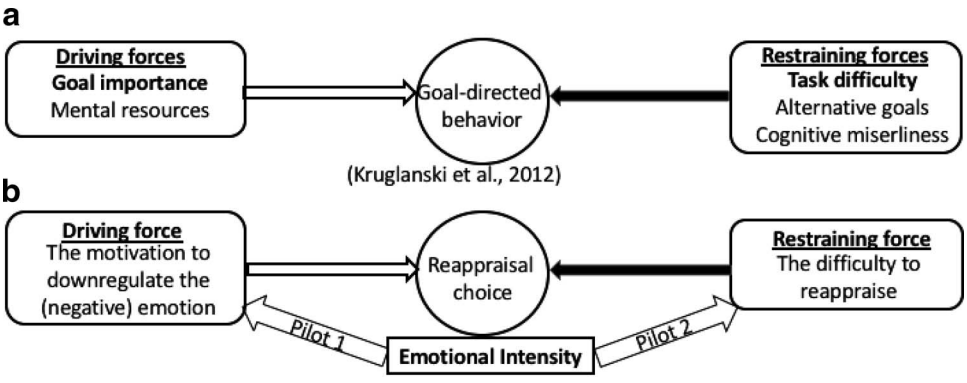
Given the positive characteristics of cognitive reappraisal, individuals might be expected to rely on this tactic often when dealing with emotionally stressing situations. Indeed, a recent study utilized a daily method in a nonclinical sample of adults, and found that people reported attempting reappraisal on as much as 67% of days assessed (Ford, Karnilowicz, & Mauss, 2017). On the other hand, there are a handful of studies showing less frequent use of reappraisal. For instance, Goldin and colleagues (2014) examined the frequency of reappraisal among individuals with social anxiety disorder. Participants in a control condition (who were waitlisted to receive cognitive–behavioral therapy) engaged in reappraisal less than 40% of the time across a 16-week period. Likewise, Suri and colleagues (2015) examined reappraisal choice with an experimental paradigm. They created a lab paradigm wherein participants were briefly presented with negative images. Participants then had to choose (and ultimately implement) to view those images as they typically would, or engage in reappraisal. Although the researchers varied the specific circumstances of this choice (i.e., whether watching normally was presented as a default option) across studies, they consistently found that reappraisal rates were surprisingly low (ranging from 12.4% to 44.5% of the trials), and never implemented by a majority of the participants. These low rates were particularly striking given that posttrial ratings showed that when participants utilized reappraisal, they did in fact express lower levels of negative affect. Thus, the question remains as to why we see such a range in how frequently reappraisal is used, despite the relative effectiveness of this strategy.

The present studies aimed to examine why, at least under certain contexts, reappraisal is used relatively infrequently. We specifically propose a motivational account of reappraisal choice that is grounded in cognitive energetics theory (CET). CET proposes that the likelihood of goal-directed activity is a function of a balance between driving and restraining forces (see Figure 1a). The driving force is a combination of two functionally interchangeable factors: *goal importance* and *resource availability*. The restraining force represents resistance to a given pursuit, which arises from three additive elements: *task demands*, *the pull of competing goals*, and one's *inclination toward resource conservation*. Thus, the likelihood that goal-directed behavior occurs is *positively* predicted by the importance of the respective goal and the available mental resources, and *negatively* predicted by the difficulty to carry out the behavior, the presence of alternative goals, and one's desire to conserve resources.

CET has been recently studied in a variety of contexts related to goal-driven behavior, including memory retrieval processes (i.e., retrieval-induced forgetting, Pica, Pierro, Bélanger, & Kruglanski, 2013), and self- and other people perception judgments (Bélanger, Kruglanski, Chen, & Orehek, 2014). Across these studies, CET frames how individuals attain cognitive goals, for instance, demonstrating that the biasing of judgments of own or other's traits is a function of their motivation to do so, the difficulty of the task, and available mental resources (Bélanger et al., 2014).

CET research has also shown that the effectiveness of emotion regulation depends on whether the driving force (motivation and available resources) matches the restraining force (task difficulty). Sharvit and colleagues (2015) found that people experienced lower levels of collective guilt only when they were motivated not to feel guilty and had available cognitive resources to downregulate guilt. Similarly, Bélanger and colleagues (Study 2, 2014) found that people experienced higher levels of guilt when they did not have sufficient cognitive resources to downregulate their emotion. That is, emotion regulation failed when the restraining force (the difficulty to downregulate guilt) did not match the driving force (available resources). Thus, CET helps explicate the conditions under which emotion regulation processes are *effective*.

In the current research, however, we used CET to explore conditions under which people decide to *engage* in emotion regulation. Indeed, ours is not the first attempt to explore these conditions. Sheppes and colleagues (2014), for instance, explored a variety of determinants. When viewed through the lens of CET, it is clear that these determinants, however disparate they may initially seem, operated on either the driving or restraining forces. For instance, participants were found to engage in greater emotion regulation when the act of regulating was attached to a monetary reward (Study 1) or long-term benefits (Study 3). Both manipulations increase goal importance. By attaching benefits to the act of emotion regulation, researchers increased the appeal and importance of engaging in emotion regulation. This increases the driving force, and increases the likelihood that emotion regulation would occur. In a separate study (Study 2), the researchers provided participants with experimenter-generated responses that would facilitate the use of the reappraisal tactic. From the perspective of CET, the provision of these responses would serve to ease task



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Study	Low difficulty to reappraise	High difficulty to reappraise
1	Prediction	Implementation
2	Prediction Choice	Implementation
3	Rethink as fake	Rethink as positive

Figure 1. The upper panel (a) depicts the Cognitive Energetics Theory (CET). Namely, the likelihood of a goal-directed behavior is increased by the driving forces and decreased by the restraining forces. The middle panel (b) depicts the model of reappraisal choice according to the CET. Namely, emotional intensity increases the likelihood of the reappraisal choice via heightened motivation to downregulate the (negative) emotion and decreases this likelihood via heightened difficulty to reappraise. The table in the lower panel (c) summarizes the manipulations of the difficulty to reappraise that were used across the three studies: Study 1 (prediction vs. implementation), Study 2 (prediction vs. choice vs. implementation), Study 3 (rethink as fake vs. rethink as positive).

demands associated with reappraisal. With task demands relaxed, the restraining force would be reduced, and use of reappraisal would be expected to increase. This is exactly what was found. Thus, although these studies were not conducted under the auspices of CET, their findings are consistent with the CET framework.

Our intention herein was to build on these findings, and apply CET specifically to instances where reappraisal (as a specific emotion regulation strategy) is attempted in the face of highly intense emotional circumstances. In CET terms, reappraisal is a goal-directed cognitive process where the goal is to change the emotional response by changing the meaning of the situation. On one hand, initiating reappraisal in response to an emotionally laden situation is directly related to whether one has available mental resources to perform the reappraisal, and how important downregulating that specific emotion is to them (e.g., how disturbed they are by the situation). On the other hand, initiating reappraisal is inversely related to the difficulty of *downregulating* the emotion, whether one is simultaneously working toward concurrent goals, and to one's inclination to conserve mental resources.

In our view, the key to understanding people's psychological reactions to intense emotional stimuli is that *emotion intensity simultaneously acts as both a driving and a restraining force*. In particular, we assume that the more intense the experienced negative emotion, the higher will be the need to regulate it (the driving force). The greater the intensity of the undesired emotion, the greater the discrepancy between one's current state and a state of emotional equilibrium, and therefore the greater the need to restore balance. We furthermore assume that the intensity of emotional stimuli determines reappraisal difficulty (the restraining force). In other words, it is more difficult (and cognitively costly) to reappraise a situation that elicits strong (vs. weak) negative emotions (Ortner et al., 2016). According to the process model of emotion regulation (Gross, 1998), reappraisal occurs after the emotion had been semantically processed. That is, individuals process the emotion, and then engage in cognitive effort to frame that experience in a neutral or positive light. As the emotional intensity increases, the processing required to reappraise that emotion increases, thus increasing the task demands of reappraisal. This is not to say that it becomes more difficult to successfully downregulate one's emotional response, simply that it becomes more difficult to engage in reappraisal. The two are likely correlated, but our intention is to focus on the difficulty of the process, not the difficulty of doing it correctly. Other emotion regulation strategies that operate prior to semantic processing, such as distraction would not be expected to evince this same relationship with emotional intensity, as has been borne out in previous research (Sheppes, Catran, & Meiran, 2009; Sheppes & Gross, 2011; Sheppes & Meiran, 2007, 2008).

In summary, our analysis suggests that people may not elect reappraisal as often as one would expect because the driving and restraining forces tend to cancel out each other. If the emotion is intense, people may have a high need for downregulation (a strong driving force), but at the same time, experience great difficulty doing so (a strong restraining force). When an emotion is less intense, the difficulty of downregulating that emotion (the restraining force) is lower. However, because the emotion is less intense, there is also less motivation to engage in regulation (lowering the driving force). Thus, CET does not propose any predictions about

the overall relationship between intensity and reappraisal choice (i.e., we do not predict how difficulty and motivation should interact with each other as intensity changes). Rather, CET proposes that the driving force (i.e., the motivation to down-regulate an emotion) should increase the probability of using reappraisal as the restraining force (i.e., the difficulty of implementing these choices) decreases.

More specifically, we examined whether the restraining force associated with the emotional intensity of the stimuli (i.e., the difficulty to reappraise the stimuli) contributes to people's decision to refrain from choosing reappraisal. We used two different experimental strategies to address this question (see Figure 1b). The first involved relaxing the association between the emotional intensity of the stimuli and the difficulty of reappraisal. We asked participants to merely predict other people's reappraisal choices versus implementing the chosen strategies (Study 1). We reasoned that difficulty is inherently linked to implementation. When people predict other people's choice, they should be less concerned with the difficulty, relative to when they must make a decision for themselves. Thus, we expected that when there is no need to implement the reappraisal strategy, emotional intensity would predict reappraisal choices more positively, because it would be more strongly associated with the need to downregulate the emotion (the driving force). In Study 2, we replicated the findings of Study 1 and ruled out two alternative explanations.

Our second experimental strategy involved varying the *perceived difficulty* of the reappraisal technique. In Study 3, we selected two reappraisal techniques that differed in difficulty, and compared the selection of these strategies in response to images of varying intensity. We expected that when reappraising becomes easier, the reappraisal choice should be better predicted from the need to downregulate the emotion (the driving force) stemming from the emotional intensity of the stimulus.

Study 1

Study 1 examined the hypothesis that the decision to reappraise an emotional situation is determined by two opposing forces—the driving force and the restraining force associated with the emotional intensity of the stimuli. Before conducting this initial study, we conducted two pilot studies to test our basic assumptions regarding these two opposing forces (see online supplemental materials for greater details; all data files and the R code that produces the analyses are available online: https://osf.io/9tg6f/).

Pilot Study 1 examined the assumption that intense negative emotions are associated with a higher need to engage in down-regulation. Participants ($N = 49$) viewed a series of 40 images that varied in emotional intensity. For each image, they indicated their motivation to eliminate the emotion. Confirming our first assumption, more negative images were rated as eliciting higher motivation to eliminate the emotion, $b = .16$, $SE = .01$, $\beta = .63$, $SE = .06$, $t = 10.74$, $p < .001$.

Pilot Study 2 examined the assumption that it is more difficult to downregulate stimuli that induce intense negative emotion. Participants ($N = 45$) viewed the same series of 40 images that varied in emotional intensity. The process of reappraisal was explained to them, and they rated the perceived difficulty of implementing that strategy for each image. Confirming our second assumption, more negative images were rated as more difficult to reappraise, $b = .15$, $SE = .02$, $\beta = 0.60$, $SE = .06$, $t = 9.67$, $p < .001$.

These results confirmed our theoretical analysis, showing that higher emotional intensity of negative stimuli is associated both with higher driving and with higher restraining forces. That is, participants were more eager to downregulate more intense negative images, and also rated the more intense images as more difficult to reappraise. Thus, it seems plausible that both the need to downregulate emotion (the driving force) and the difficulty to do so (the restraining force) jointly determine one's decision to reappraise (or not) intense emotional experiences. If so, affective image intensity should predict reappraisal choice more positively when reappraisal appears to be less difficult.

We tested this prediction in Study 1. We designed two conditions, which were implemented via successive blocks—to manipulate the relative salience of the driving force (motivation to reappraise) versus the restraining force (difficulty of implementing reappraisal). In Block 1, the *prediction condition,* participants viewed a series of images and predicted whether others would choose to view the images normally or choose to downregulate their emotions using reappraisal. By asking participants to decide for others and removing the need to implement the selected strategy, we anticipated that the reappraisal decision should be primarily influenced by the motivation to eliminate negative affect (i.e., driving force) and less so by the task difficulty considerations (i.e., restraining force).

In Block 2, the *implementation condition*, participants viewed each image briefly, indicated a choice (reappraise vs. watch normally) for themselves, and implemented that choice for an additional five seconds. In this block, the reappraisal choice should be more influenced by the task difficulty considerations (i.e., restraining force) because participants repeatedly experienced the difficulty of reappraising the images.

The images viewed in the respective blocks varied systematically in intensity. Because the *prediction condition* was designed to reduce the influence of restraining forces on reappraisal decisions, we predicted that the difference between the implementation and the prediction conditions would be particularly pronounced when the restraining forces stemming for the emotional intensity of images are high (i.e., for high intensity images), but not when the restraining forces are low (i.e., for low intensity images). More specifically, we anticipated that participants in the prediction condition would reappraise the highly intense images more often than those in the implementation condition. In contrast, a smaller or no such difference was predicted for low intensity images.

Method

Ethics statement. This research was approved by the institutional review board of the University of Maryland.

Participants. Forty undergraduate students (33 females) participated for partial course credit. To the best of our knowledge, no power analysis for cross-level interaction in GLMM has been developed. Based on the previous literature we anticipated at least a medium size effect (Sheppes et al., 2014; Suri et al., 2015). Thus, as a rule of thumb we relied on the recommendation of Judd, Westfall, and Kenny (2012) who showed that with 40 stimuli, 40 participants provide ~80% power for obtaining medium size effects.

Procedure and materials. Participants arrived at the lab to take part in a study on individual differences in image perception. To maintain the credibility of the cover story, participants first completed a few scales measuring habitual use of cognitive reappraisal (Emotion Regulation Questionnaire; Gross & John, 2003), perceptions of emotion regulation ability, and hedonic motivation.

After completing the scales, the experimenter introduced participants to the image-rating task. The experimenter first verbally defined reappraisal as "changing feelings in response to the image so they are neutral," provided detailed instructions on how to reappraise (i.e., rethink the situation within the image, such that there will be a neutral or a positive outcome), and confirmed that all participants clearly understood these instructions (see Appendix B). The image-viewing task was divided into two blocks. Images of increasing intensity were selected from the International Affective Picture System (IAPS). Each block contained 40 images that were matched on intensity level (see Appendix A).

The first block represented our *prediction condition.* For each trial, an image appeared on the computer screen for 500 milliseconds (ms). Participants were then instructed to decide what most other people would do if they had to view that image for a prolonged period of time. Participants decided whether others would (a) watch the image normally or (b) reappraise the image. Participants indicated their decision by pressing a key on the keyboard. Participants repeated this process for 40 different images.

The second block was the *implementation condition.* For each trial, participants were again shown an image for 500 ms, and chose to either watch normally or reappraise. However, in this phase, they decided this matter for themselves. Following their choice, that same image reappeared on the screen for 5 seconds and participants implemented their selected viewing strategy. Participants were further instructed not to look away from the images, as done in past research (Sheppes et al., 2011). Participants ended each trial by rating their affect on a 9-point scale (1 = *very low*, 9 = *very high*). As in Block 1, they repeated this procedure for a series of 40 images.

To further bolster the cover story, another series of scales were completed after the image-rating task, including: distress tolerance (Simons & Gaher, 2005), social desirability (Reynolds, 1982), and circadian rhythm (Smith, Reilly, & Midkiff, 1989). At the study's conclusion, participants were presented with a positive mood induction (to make them feel better after viewing a series of distressing images), probed for suspicion, and thoroughly debriefed.

Results

Reappraisal choice. We used the glmer function from the lme4 package of the R software to conduct a generalized linear mixed model (GLMM) predicting participants' choice (watch = 0, reappraise = 1). Condition (prediction = −0.5, implementation = 0.5), Image Intensity (centered on zero) and their interaction were defined as fixed factors. The stimuli intercept and the slopes of Condition, Image Intensity, and their interaction were allowed to vary randomly across the participants. In addition, following the recommendation of Judd et al. (2012), we allowed the intercept to vary randomly across stimuli (Judd et al., 2012). This model (see Appendix C) proved to have lower −2loglinear deviation than models including either (a) only random participants' and stimuli's intercepts or (b) random participants' intercept and Affective Image Intensity slope along with the stimuli's intercept, $p < .001$. To visualize the model, we transformed the logits back to probabilities (see Figure 2a). The model's coefficients and their respective statistics appear in Table D1 (see Appendix D).

The predicted Image Intensity × Condition interaction emerged significant, $b = -.04$, $SE = .01$, $\beta = -.23$, $SE = .08$, $z = -2.77$, $p = .006$ (95% confidence interval [CI] for β [−.40, −.07]; Figure 2a). To probe this interaction, we analyzed the effect of Condition for low (−1 *SD*) and high (+1 *SD*) intense images. Confirming our prediction, participants in the prediction condition chose to reappraise more often than participants in the implementation condition for highly intense images (+1 *SD*), $b = -.61$, $SE = .26$, $\beta = -.31$, $SE = .13$, $z = -2.35$, $p = .019$ (95% CI for β [−.56, −.05], but not for low intensity stimuli (−1 *SD*), $b = .31$, $SE = .25$, $\beta = .16$, $SE = .12$, $z = 1.28$, $p = .20$. We also probed the foregoing interaction by looking at the slopes between the image intensity and probability of choosing reappraisal in each of the conditions. The pattern of the slopes was consistent with our hypotheses; however, none of the slopes were significant. Specifically, in the prediction condition, the slope was positive, $b = .01$, $SE = .02$, $\beta = .17$, $SE = .18$, $z = 0.95$, $p = .34$, and in the implementation condition it was negative, $b = -.03$, $SE = .02$, $\beta = -.30$, $SE = .21$, $z = -1.38$, $p = .17$.

Affect ratings. Analyses next examined whether choosing reappraisal reduced negative affect in response to the presented stimuli. This hypothesis was tested only in the Implementation condition. A mixed-level linear model (MLM) was conducted with scores of Image Intensity (centered on zero), Chosen Strategy (watch normally = −0.5, reappraise = 0.5), and their interaction were entered as fixed factors. Image Intensity and Choice slopes and intercepts were modeled as random factors on the participant level, and intercept was varied as a random factor on the stimuli level. The dependent variable was the postimage affect ratings (see Appendix C).

The results revealed a significant main effect of Image Intensity, $b = .09$, $SE = .01$, $\beta = 0.40$, $SE = .04$, $t = 9.07$, $p < .001$ (95% CI [.32, .49]), such that the more negative images evinced higher affect. No other effects reached significance, $t < 1$ (see Figure 2b).

Discussion

The findings of Study 1 were consistent with CET predictions. In particular, we found that the effect of decision condition was only present for the highly intense images. That is, for highly intense images, participants were more likely to choose reappraisal when predicting for others, than when they made and implemented these decisions for themselves. There were no differences in reappraisal choice between the prediction and implementation conditions for the low intensity images.

These results suggest that choosing to reappraise depends both on the driving and the restraining forces. For intense stimuli, the motivation to downregulate emotions should be high. In the Implementation condition, when both motivation to downregulate and the difficulty of implementing downregulation would likely weigh on participants' decisions, participants were reluctant to reappraise high-intensity stimuli. In other words, the restraining force counteracted the motivation to reappraise. In the Prediction condition, however, when participants should be less concerned with the costs of implementing regulation, they were more inclined to reappraise high-intensity stimuli. In other words, the driving

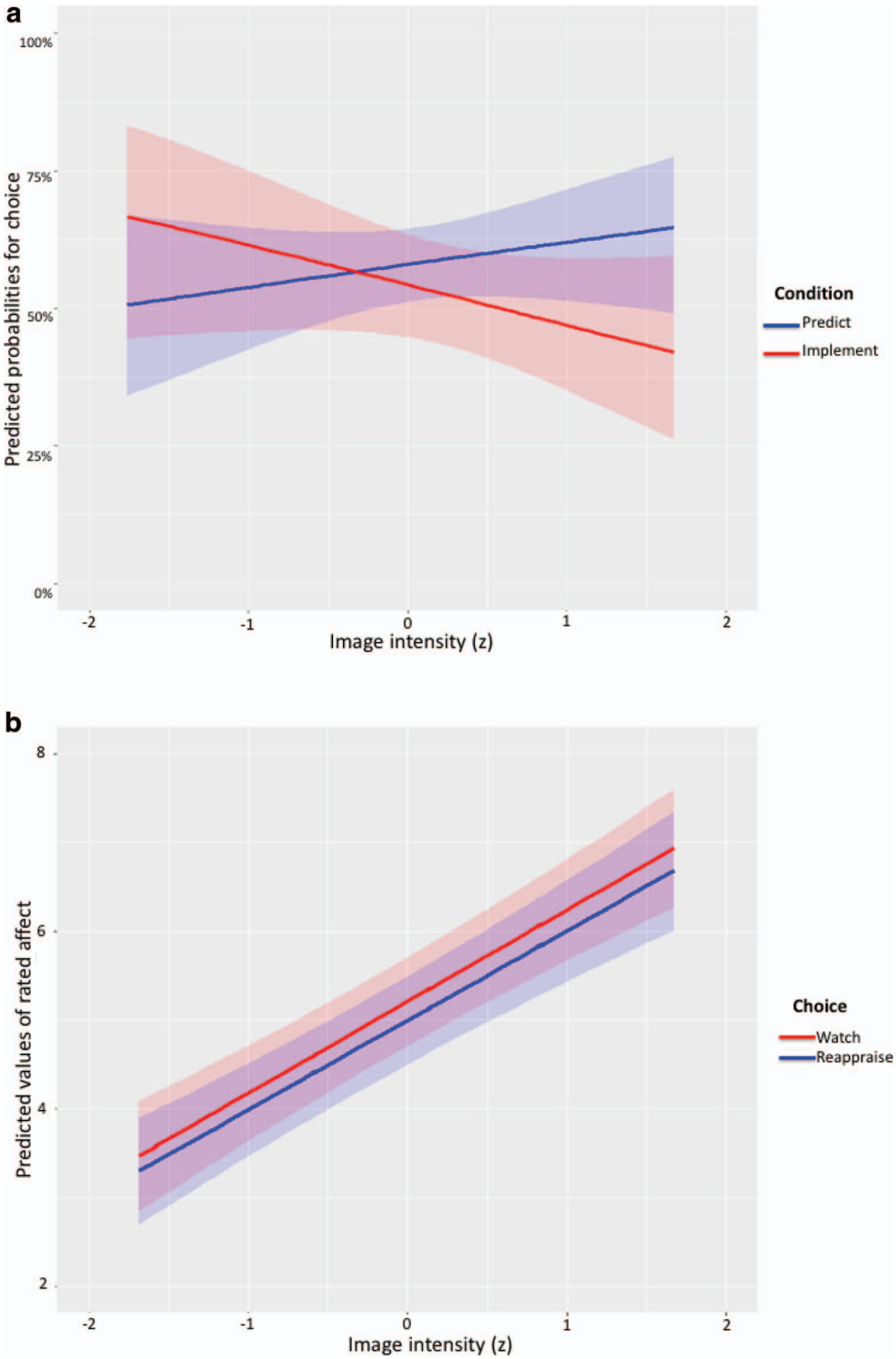

Figure 2. Panel (a) depicts the probability of the reappraisal choice as a function of the images' affective intensity (standardized) and decision condition (prediction: blue line (dark grey) vs. implementation: red line (light grey); Study 1). The blue and red bands represent the 95% confidence intervals for the Predict and Implement conditions, respectively. Panel (b) depicts affect ratings as a function of reappraisal choice (watch: red line (light grey) vs. reappraise: blue line (dark grey) and the images' affective intensity (standardized; Study 1). The red and the blue bands represent the 95% confidence intervals for the watch and reappraisal choices, respectively. See the online article for the color version of this figure.

force had a greater impact on their behavior than the restraining force. In contrast, for less intense stimuli, both the driving force and restraining force were low, and there was no significant difference between the prediction and implementation conditions.

Finally, the findings on the affect ratings are puzzling. However, we believe that this lack of effect speaks more to ambiguity of the scale used to measure participants' affect, and less to the ineffectiveness of reappraisal. Participants reported their affect from low to high. The ambiguity in this phrasing meant that some participants could interpret the meaning of "low" as "negative" instead of the intended "low intensity of negative affect." We therefore changed the anchors of the scale to "not negative" and "very negative" in the subsequent studies.

Although the current results are informative, there are several key limitations that need to be addressed. First, the order of the two tasks was not counterbalanced. Participants always completed the implementation condition after first completing the prediction condition. Thus, it could be argued that the effects found in the implementation condition only occurred as a result of cognitive depletion from first completing the prediction condition. Second, the prediction condition required participants to decide based on how they felt others would respond. We opted for this manipulation as it seemed an effective way to cleave any possible thoughts of implementation from the initial decision phase of regulation. However, it also meant that the two conditions differed on two qualities: (a) the subject of the decision (self versus other) and (b) implementation of the decision (absent versus present). It is possible that this self versus other focus could have also had an impact on the findings. Finally, the analyses were slightly underpowered. To remedy these confounds and replicate the present findings, we conducted Study 2 with some methodological changes.

Study 2

Study 2 manipulated the decision condition between-subjects, as opposed to the within-subjects design used in Study 1. This eliminated the order confound. We also added a new *choice* condition that mimicked the *prediction* condition, but asked participants to *decide for themselves*. As such, Study 2 included three conditions: (a) predicting what others would do (*prediction* condition), (b) choosing a strategy for oneself, without implementation (*choice* condition), and (c) choosing a strategy for oneself and implementing that strategy (*implementation* condition). Comparisons between the *choice* and *prediction* conditions enabled us to rule out the self–other confound of Study 1.

We expected to replicate the findings of Study 1, such that the difference between the prediction/choice conditions and the implementation condition should be more pronounced for more intense images. In terms of comparing the prediction to the choice condition, we anticipated two possible outcomes. First, the *choice* condition could operate the same way as the *prediction* condition, as both conditions have reduced the extent to which difficulty informs a participant's decision. Second, it is possible that when choosing for the self, it is inherently difficult to completely remove the influence that implementation considerations have on that decision. Thus, the restraining force could be stronger when choosing for the self than when choosing for another. If this is true, the *choice* condition may lie somewhere between the other conditions.

Method

Participants. Eighty-nine undergraduate students (73 females) participated for partial course credit. Because the main comparison of interest in this study was between two no-implementation conditions (prediction and choice) versus the implementation condition, we aimed to include slightly fewer participants per condition, namely, 30.

Procedure and materials. Participants arrived at the lab to participate in a study on individual differences in image perception. The experimenter explained to the participants that they would be presented with a series of images and that there were two strategies with which they could treat those images: watch normally versus reappraise (or rethink). Participants then proceeded to carry out the same image rating task used in Study 1, and were randomly assigned to one of three conditions. In the *prediction condition*, participants predicted which strategy (watch or rethink) most other participants would choose for each image. In the *choice condition*, participants completed the same task, but with regard to themselves, and selected whether they would watch or rethink the image if they had to view the image for an extended period of time. In the *implementation condition*, participants first previewed the image and selected one of the two strategies. The image then reappeared on the screen for 5 seconds and participants implemented the strategy they had chosen (see Appendix B). After each image disappeared they rated their affect (1 = *not negative*, 9 = *very negative*). This process was repeated for 40 images.

Results

Reappraisal choice. We used the glmer function from the lme4 package of the R software to conduct a generalized linear mixed model (GLMM) predicting participants' choice (watch = 0, reappraise = 1). Affective Image Intensity (centered on zero), Condition (prediction = 1, choice = 2, implementation = 3) and their interaction were modeled as fixed factors. We modeled participants' intercept, image intensity slope, and stimuli intercept (Judd et al., 2012) as random factors. This model (see Appendix C) proved to have lower −2loglinear deviation than models including either (a) only the participants' intercept or (b) only the participants' intercept and image intensity slope varied as random factors, $p < .001$.

We conducted two orthogonal contrasts to test our predictions. To visualize the model, we transformed the logits back to probabilities (see Figure 3a). The model's coefficients and their respective statistics appear in Table D2 (see Appendix D).

The first contrast examined whether the (combined) prediction and choice conditions led to higher reappraisal rates than the implementation condition (i.e., contrast weights of −0.5, −0.5, 1 for the Prediction, Choice, and Implementation, conditions, respectively). In essence, this contrast allowed us to test whether removing implementation concerns from the reappraisal choice (because it removes the focus on task difficulty) leads to higher reappraisal rates. The results supported this prediction. Participants in the prediction ($M = 60.81\%$) and choice ($M = 53.42\%$) conditions engaged in significantly greater reappraisal than participants in implementation condition ($M = 43.75\%$), $b = -.54$, $SE = .14$, $\beta = -.54$, $SE = .14$, $z = -3.85$, $p < .001$ (95% CI [0.81, −.26]).

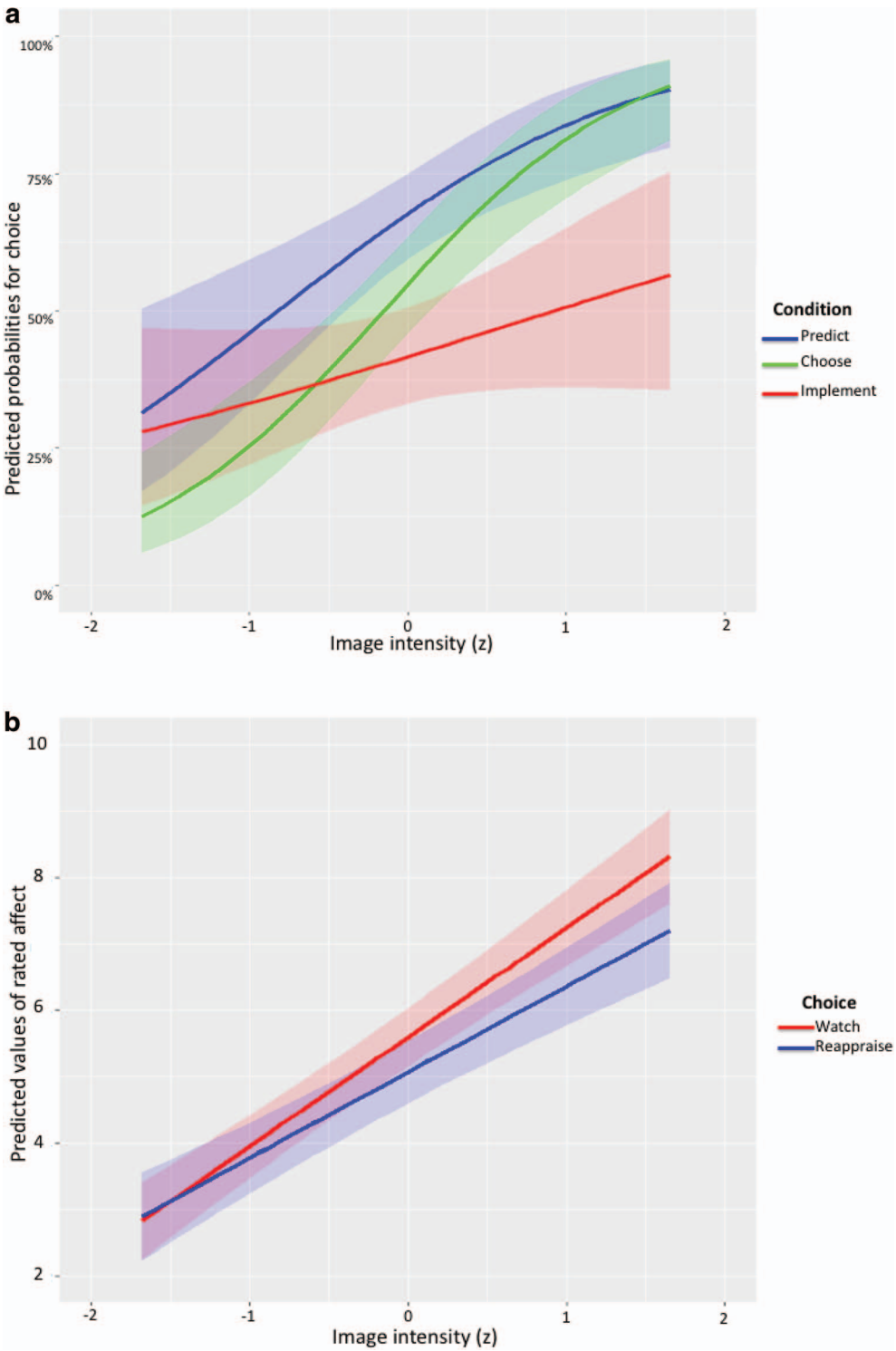

Figure 3. Panel (a) depicts the probability of the reappraisal choice as a function of the images' affective intensity (standardized) and decision condition (prediction: blue line (dark grey) vs. choice: green line (light grey) vs. implementation: red line (grey); Study 2). The blue, green and red bands represent the 95% confidence intervals for the *prediction, choice* and *implementation* conditions, respectively. Panel (b) depicts affect ratings as a function of reappraisal choice (watch: red line (light grey) vs. reappraise: blue line (dark grey)) and the images' affective intensity (standardized; Study 2). The red and the blue bands represent the 95% confidence intervals for the watch and reappraisal choices, respectively. See the online article for the color version of this figure.

The second contrast excluded the implementation condition, and only compared participants in the choice and prediction conditions (i.e., contrast weights of −0.5, 0.5, 0 for the Prediction, Choice and Implementation conditions, respectively). Results for this contrast revealed that participants in the prediction condition engaged in greater reappraisal than participants in the choice condition, $b = -.55$, $SE = .24$, $\beta = -.55$, $SE = .24$, $z = -2.28$, $p = .022$ (95% CI [−1.01, −0.08]). Combined, these results support the second of the two proposed hypotheses regarding the newly added choice condition, such that it would lie somewhere in between the other two conditions. This suggests that choosing for oneself (without implementation) did remove much of the concern with task difficulty, but not as effectively as making a choice for others.

More importantly, the first of these contrasts (i.e., contrast weights of −0.5, −0.5, 1 for the Prediction, Choice, and Implementation conditions, respectively) interacted with Image Intensity, $b = -.04$, $SE = .02$, $\beta = -.48$, $SE = .18$, $z = -2.70$, $p = .007$ (95% CI for β [−.84, −.13]). To better understand this interaction, we probed the effect of condition for both low-intensity (−1 *SD*) and high-intensity images (+1 *SD*). For highly intense images, participants in the (combined) Choice and Prediction conditions chose reappraisal ($M = .82$) more than participants in the Implementation condition ($M = .51$), $b = -1.02$, $SE = .24$, $\beta = -1.02$, $SE = .24$, $z = -4.31$, $p < .001$ (95% CI for β [−1.49, −.56]). For low intensity images, however, the decision to reappraise did not differ between the (combined) Prediction and Choice ($M = .36$) and the Implementation conditions ($M = .33$), $b = -.05$, $SE = .22$, $\beta = -.05$, $SE = .22$, $z = -.24$, $p = .81$ (see Figure 3a).

The second contrast (i.e., contrast weights of −0.5, 0.5, 0 for the Prediction, Choice and Implementation conditions, respectively) did not interact with Image Intensity, $b = .03$, $SE = .03$, $\beta = .37$, $SE = .31$, $z = 1.21$, $p = .23$. This means that the rates of reappraisal did not differ between the Prediction and Choice conditions for either low- or high-intensity images. Together, these findings replicate the pattern found in Study 1. When both the motivation to downregulate the emotion and the difficulty of reappraisal were *high* (i.e., highly intense stimuli; Implementation condition), participants reappraised less than when the motivation to downregulate the emotion was high and the difficulty or reappraisal was *low* (i.e., highly intense stimuli; Prediction and Choice conditions). However, when the images were low in intensity, there were no differences between the groups, because both difficulty and motivation to reappraise were low across all three conditions.

Another way to unpack this interaction (see Table D2 in Appendix D) was to analyze the slopes between the image intensity and the reappraisal choice in each condition separately. These analyses showed significantly positive slopes in the *prediction condition*, $b = .09$, $SE = .03$, $\beta = 1.00$, $SE = .31$, $z = 3.2$, $p = .001$, and in the *choice condition*, $b = .12$, $SE = .02$, $\beta = 1.34$, $SE = .22$, $z = 6.10$, $p < .001$, but only marginally significant positive slope in the implementation condition, $b = .03$, $SE = .02$, $\beta = .34$, $SE = .19$, $z = 1.84$, $p = .066$. Thus, further supporting our hypotheses, the results show that when there was no need to implement the chosen strategy, the intensity of images primarily increased the motivation to reappraise. This tendency was attenuated by the requirement to implement the chosen strategy.

Affect ratings. Analyses next examined whether choosing to reappraise was effective at reducing the negative affect reported in response to the stimuli. Naturally, this hypothesis was tested only in the Implementation condition. We used the lmer function from the lme4 package of the R software to analyze the data with MLM. A MLM was conducted with Affective Image Intensity (centered on zero), Chosen Strategy (watch normally = −0.5, reappraise = 0.5), and their interaction entered as fixed factors. Stimuli intercept, Image Intensity and Chosen Strategy slopes and their interaction were allowed to vary randomly between participants. In addition, we allowed the intercept to vary randomly across stimuli. The dependent variable was the postimage affect ratings (see Appendix C).

The results revealed a significant main effect of Image Intensity, $b = .13$, $SE = .01$, $\beta = 0.57$, $SE = .05$, $t = 10.72$, $p < .001$ (95% CI for β [.47, .68]), such that more intense images were rated as more unpleasant. The main effect of the chosen strategy was marginally significant, $b = -.53$, $SE = .27$, $\beta = -.10$, $SE = .05$, $t = -1.97$, $p = .059$ (95% CI for β [−.21, −.0005]), indicating that participants reported less intense negative affect after reappraising than after watching the images normally. This effect was qualified by a significant Image Intensity × Chosen Strategy interaction, $b = -.03$, $SE = .01$, $\beta = -.07$, $SE = .03$, $t = -2.66$, $p = .011$ (95% CI for β [−.12, −.02]; see Figure 3b). To probe this interaction, we analyzed the effect of chosen strategy for low intense (−1 *SD*) and highly intense stimuli (+1 *SD*). Analyses revealed that reappraisal reduced experienced affect only for high-intensity images, $b = -.88$, $SE = .35$, $\beta = -.18$, $SE = .07$, $t = -2.53$, $p = .017$ (95% CI for β [−.31, −.04]), but not for low-intensity images, $b = -.17$, $SE = .24$, $\beta = -.03$, $SE = .05$, $t = -.72$, $p = .48$.

We further probed the interaction by inspecting the slopes between the image intensity and the experienced affect within each chosen strategy. These analyses showed a more positive slope when participants chose to watch the image normally, $b = .15$, $SE = .01$, $\beta = .65$, $SE = .06$, $t = 11.23$, $p < .001$ (95% CI for β [.53, .76]) than when they chose to reappraise the image, $b = .11$, $SE = .01$, $\beta = .51$, $SE = .06$, $t = 8.31$, $p < .001$ (95% CI for β [.39, .63]). That is, reappraisal attenuated the effect of the image intensity on the experienced affect.

Discussion

Study 2 replicated the basic pattern of results found in Study 1 under conditions that eliminated the potential confounds present in Study 1. That is, when the restraining forces were high (i.e., highly intense images), participants who did not experience the difficulty of reappraisal (i.e., prediction and choice conditions) chose to reappraise more often than those who did experience the difficulty of reappraisal (i.e., implementation condition). In contrast, when the restraining forces were low (i.e., low intensity images), no significant difference between the conditions was found. Further supporting our theoretical analysis, the results also showed that across the various levels of the images' intensity, participants who did not experience the difficulty of reappraisal (i.e., prediction and choice conditions) chose to reappraise more often than those who did (i.e., implementation condition). Moreover, the more detached the participants were from the potential difficulty of reappraisal (i.e., prediction vs. choice condition) the more often they chose to reappraise.

Study 3

Studies 1 and 2 have shown that, when the difficulty of reappraisal is relaxed, image intensity was positively related to reap-

praisal choice. Although it seems fair to presume that a major difference between the implementation and the no-implementation conditions in Studies 1 and 2 was task difficulty, we never manipulated the difficulty considerations directly. Study 3 was therefore designed to manipulate task difficulty. Participants were instructed to utilize one of two different reappraisal strategies that differ on difficulty of implementation, and we examined the influence of this manipulation on the choice to reappraise. As in Study 2, we predicted that participants would choose the easy reappraisal strategy more often than the difficult one for highly intense images.

Method

Participants. One hundred thirty-five undergraduate students participated for partial course credit. In this study, we employed a new manipulation of reappraisal. We therefore did not know what effect sizes to anticipate, and ran as many participants as we could by the end of the semester. Data from seven participants were excluded from analyses because they did not understand the instructions (i.e., five participants indicated during debriefing that they did not understand the image task; two participants were unable to explain the reappraisal instructions back to the experimenter when prompted). Thus, the analyses referred to 128 participants (104 female).

Procedure and materials. Participants arrived in groups of 1–4 to participate in a study on individual differences in image perception. To maintain the cover story, participants first answered a series of questions about their current mood and chronic sleeping preferences. Once the scales were completed, participants proceeded to the image-viewing task. All participants completed the implementation condition used in Studies 1 and 2, however participants were randomly presented with one of two reappraisal techniques. The first technique was identical to that used in Studies 1 and 2, wherein participants were instructed to reappraise the images as more positive. The second technique, which has been used extensively in past research, asked participants to reappraise the images as fake ("rethink as fake"; Kanske, Heissler, Schönfelder, Bongers, & Wessa, 2011; Leiberg, Eippert, Veit, & Anders, 2012; McRae et al., 2012). Findings from a pilot study (see Pilot 3 in online supplementary materials) revealed that the "rethink as fake" technique was perceived as less difficult to implement for emotionally intense images than the "rethink as positive" strategy $b = -0.63$, $SE = .31$, $\beta = -.11$, $SE = .05$, $t = -2.05$, $p = .043$.

Participants assigned to the more difficult reappraisal strategy (i.e., rethink as positive) were given the same reappraisal instructions used in the previous studies. Participants assigned to the easier reappraisal strategy (i.e., rethink as fake), on the other hand, were told that rethinking means "to imagine that the situation depicted in the image is fake or not real" (see Appendix B). Once the researcher confirmed that participants understood these instructions, participants completed the same implementation task used in Studies 1 and 2. Namely, on each of 40 trials participants were briefly exposed to an image, chose whether to watch that image normally or to rethink it, and then implemented their chosen strategy when the image reappeared for an additional 5 seconds. After the 5 seconds elapsed, participants rated their experienced affect (1 = *not negative*, 9 = *very negative*).

Results

Reappraisal choice. We used the glmer function from the lme4 package of the R software to conduct a generalized linear mixed model (GLMM) predicting participants' choice (watch = 0, reappraise = 1). We modeled participants' intercept, slope, and stimuli intercept (Judd et al., 2012) as random factors. Image Intensity (centered on zero) and Condition (positive = −0.5, fake = 0.5) were modeled as fixed factors. This model (see Appendix C) had significantly lower −2 log likelihood deviation, $p < .001$, than models in which (a) just the participants' intercept or (b) the participants' intercept and the Image Intensity slope were varied as random factors. To visualize the model, we transformed the logits back to probabilities (see Figure 4a). The model's coefficients and their respective statistics appear in Table D3 (see Appendix D).

The Condition × Image Intensity interaction was significant, $b = .06$, $SE = .02$, $\beta = .37$, $SE = .09$, $z = 3.91$, $p < .001$ (95% CI for β [.18, .55]). We first probed this interaction by looking at differences between the easy and difficult reappraisal tactics for both low (−1 *SD*) and high (+1 *SD*) intensity images. For high intensity images, participants using the easy tactic reappraised at a significantly higher rate than did those using the difficult tactic, $b = .44$, $SE = .22$, $\beta = .22$, $SE = .11$, $z = 1.98$, $p = .048$ (95% CI for β [.002, .44]). This pattern is the same as was reported in the previous studies. For the low intensity images, however, the opposite pattern was obtained (see Figure 4a). Namely, participants using the difficult tactic reappraised the low-intensity images more often than those using the easy tactic, $b = -1.03$, $SE = .26$, $\beta = -.51$, $SE = .13$, $z = -3.93$, $p < .001$ (95% CI for β [−.77, −.26]). Although we did not expect this pattern, it highlights the fact that the more difficult reappraisal tactic of rethinking the images as positive was generally more appealing than the tactic that involved rethinking the images as fake. This pattern suggests that we may be tapping into a general preference for or appeal of positive thinking. Indeed, the low intensity images neither pose difficulty for reappraising nor evoke a particular need to be reappraised; however, thinking about the situation more positively could have provided an additional benefit of positive emotion—something that rethinking the images as *fake* could hardly do.

We then analyzed the simple slopes to further unpack the interaction. For participants using the easy reappraisal tactic, increases in image intensity were related to a higher likelihood of choosing reappraisal, $b = .07$, $SE = .01$, $\beta = .79$, $SE = .14$, $z = 5.50$, $p < .001$ (95% CI for β [.51, 1.07]). However, for participants given the difficult reappraisal tactic, image intensity was not significantly related to their reappraisal choice, $b = .005$, $SE = .01$, $\beta = .06$, $SE = .14$, $z = 0.40$, $p = .69$. These findings point to the differing forces present as images increase in intensity. Task difficulty was reduced using the rethinking as fake strategy. The motivation to reappraise present in increasing image intensity was therefore greater than the task difficulty, and thus had greater influence on participant decisions to reappraise. When reappraisal was more difficult (i.e., rethinking as positive), task difficulty associated with the more intense images cancelled out the motivation to reappraise.

Affect ratings. The following analyses examined whether reappraisal was effective at reducing negative affect reported in response to the stimuli. A MLM was conducted with Condition

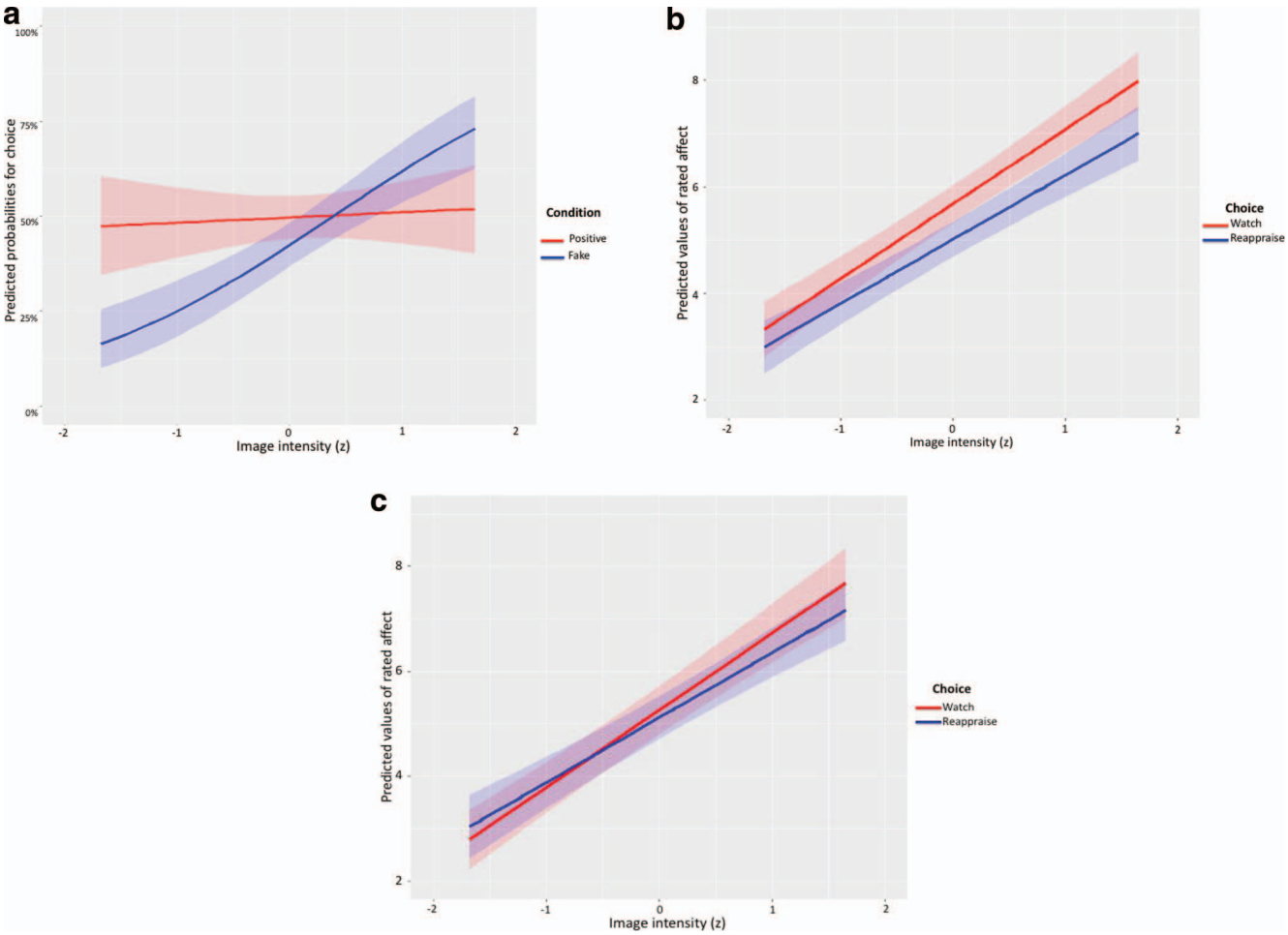

Figure 4. Panel (a) depicts the probability of the reappraisal choice as a function of the images' affective intensity (standardized) and reappraisal condition (rethink as positive: red line (light grey) vs. rethink as fake: blue line (dark grey); Study 3). The blue and red bands represent the 95% confidence intervals for the *rethink as positive* and *rethink as fake* conditions, respectively. Panels (b) and (c) depict affect ratings by reappraisal choice (watch: red line (light grey) vs. reappraise: blue line (dark grey)) and the images' affective intensity for the *rethink as positive* and *rethink as fake* conditions, respectively (Study 3). See the online article for the color version of this figure.

(difficult = −0.5, easy = 0.5), Image Intensity (centered on zero), Chosen Strategy (watch normally = −0.5, reappraise = 0.5), and their interactions entered as fixed factors. Image Intensity, Chosen Strategy and their interaction slopes, as well as the intercepts, were modeled as random factors on the participant level, and intercept was varied as a random factor on the stimuli level. The dependent variable was the postimage affect ratings. This model (see Appendix C) was more informative than other models in which only part of the above-mentioned random effects were included.

The main effect of Image Intensity was significant, $b = .12$, $SE = 0.01$, $\beta = .52$, $SE = .04$, $t = 12.18$, $p < .001$ (95% CI for β [.44, .61]). Not surprisingly, this showed that more negative images induced more intense affect. The main effect of Chosen Strategy was also significant, $b = -.39$, $SE = 0.12$, $\beta = -.08$, $SE = .02$, $t = -3.27$, $p = .001$ (95% CI for β [−.12, −.03]), indicating that reappraised images were experienced as less intense. The latter effect was qualified by the Image Intensity × Chosen Strategy interaction, $b = -.02$, $SE = 0.005$, $\beta = -.04$, $SE = .01$, $t = -3.59$, $p = .001$ (95% CI for β [−.06, −.02]) and by the Condition × Chosen Strategy interaction, $b = .60$, $SE = 0.24$, $\beta = .06$, $SE = .02$, $t = 2.47$, $p = .015$ (95% CI for β [.01, .10]; see Figures 4b and 4c). The three-way interaction was not significant, $t < 1$.

We first probed the Image Intensity × Chosen Strategy interaction by examining differences between strategies (Reappraise vs. Watch normally) at low (−1 *SD*) and high (+1 *SD*) levels of image intensity. Results revealed that reappraisal effectively reduced affect for high intensity images, $b = -.60$, $SE = .14$, $\beta = -.12$, $SE = .03$, $t = -4.23$, $p < .001$ (95% CI for β [−.17, −.06]), but not for low intensity images, $b = -.19$, $SE = .12$, $\beta = -.04$, $SE = .02$, $t = -1.48$, $p = .14$. We also probed this interaction by looking at the slopes for each chosen strategy separately. Although both slopes were significantly positive (i.e., as intensity increased, negative affect increased), the slope for the

reappraisal trials was less positive, $b = 0.11$, $SE = 0.01$, $\beta = .48$, $SE = .04$, $t = 10.91$, $p < .001$ (95% CI for β [.40, .57]) than for the *watch* trials, $b = .13$, $SE = 0.01$, $\beta = .57$, $SE = .04$, $t = 12.62$, $p < .001$ (95% CI for β [.48, .65]). That is, reappraisal was effective in reducing negative affect, especially when the affect was more intense.

We then inspected the Condition × Chosen Strategy interaction. When participants were assigned to the difficult reappraisal strategy, reappraised images were experienced as less intense than those that were watched normally, $b = -.69$, $SE = 0.17$, $\beta = -.14$, $SE = .03$, $t = -4.16$, $p < .001$ (95% CI for β [−.20, −.07]; see Figure 4b). In other words, thinking about the situation in a more positive way was effective in reducing negative affect. However, thinking about the images as fake (the easier strategy) was ineffective at reducing affect, $b = -.10$, $SE = 0.17$, $\beta = -.02$, $SE = .03$, $t = -.55$, $p = .58$ (see Figure 4c).

Another way to probe this interaction is to analyze which of the two reappraisal tactics led to less intense experienced affect. When looking only at the times participants actually employed reappraisal, the two tactics were equally effective at reducing negative affect, $t < 1$. When looking only at the trials on which participants chose to view the images normally, there was likewise no significant difference between the two strategies, $b = -.45$, $SE = 0.25$, $\beta = -.09$, $SE = .05$, $t = -1.77$, $p = .074$. This latter effect is not at all surprising given that in this case, participants were doing the exact same thing (i.e., viewing the images normally).

Discussion

In Study 3, we manipulated the task difficulty of reappraisal while keeping constant all other parameters of the emotion regulation task. The results replicated the main pattern found in Studies 1 and 2. Namely, in line with our hypotheses, when the restraining forces were high (i.e., for highly intense stimuli), the more difficult reappraisal tactic (i.e., rethinking the images as positive) was implemented less often. Although we did not expect the *fake* tactic to be chosen less often than the *positive outcome* tactic for the low intensity images, this finding can be readily explained within our theoretical framework. Reappraising a situation as more positive likely counteracts the negativity of an image by producing positive affect. Reappraising a situation as fake, however, should have no such influence on positive affect. This could decrease the relative appeal of this tactic for low-intensity images that pose lesser implementation difficulty. Moreover, when task difficulty was reduced (i.e., rethinking the images as fake), the emotional intensity of the images positively predicted the reappraisal choice. The same pattern was found in the nonimplementation conditions in Study 2. In contrast, across Studies 1–3, when reappraisal was difficult (i.e., rethinking the images as positive), the intensity of the images did not predict the reappraisal choice presumably because the driving and the restraining forces associated with the emotional intensity of the images cancelled each other out.

Study 3 also replicated the finding from Study 2 by demonstrating that less negative affect was elicited when participants chose to rethink the images as positive than when they chose to watch the images normally. In contrast, rethinking the images as fake appeared to be ineffective. This difference in the effectiveness of the two reappraisal strategies corroborates our explanation of the lower reappraisal rate in this condition. Namely, participants in the rethink as fake condition may have learned during the task that it does not produce less negative affect than watching the images normally, and thus refrained from choosing it when the need to down regulate the emotion (i.e., the driving force) was low.

General Discussion

In this paper, we applied a motivational analysis derived from cognitive energetics theory (Kruglanski et al., 2012) to explain people's surprising reluctance to use reappraisal for downregulating negative emotions. We reasoned that the intensity of a negative emotion should increase both people's motivation to eliminate the disturbing feeling (CET's driving force), and the perceived difficulty of reappraising the emotional situation (CET's restraining force). From this perspective, people refrain from reappraising intense negative experiences because they anticipate that doing so would be too difficult, and they refrain from reappraising less intense negative experiences because they are not sufficiently motivated to do so.

The initial pilot studies confirmed these assumptions, as we found comparable positive correlations between emotional intensity of the images and (a) people's motivation to downregulate the respective emotions as well as (b) the perceived difficulty of reappraising the stimuli. In Studies 1–3, participants saw negative images that varied in intensity and had to choose to reappraise those stimuli or view them normally. We reduced the strength of the restraining force associated with reappraisal by either detaching the decision to reappraise from implementation (Studies 1 and 2) or by having participants implement a reappraisal strategy that was relatively easy (Study 3). Across the three studies, we found the same pattern of results when participants viewed the more intense of the images. This pattern was such that participants in the conditions where task difficulty (the restraining force) was reduced engaged in significantly greater reappraisal of high-intensity images than did participants in conditions where task difficulty still weighed on their decisions. Participants in the conditions where difficulty was still present were likely motivated to reappraise, but the strength of this difficulty (or restraining force) counteracted that motivation, leading to lower rates of reappraisal. These results provide strong evidence for CET in showing that people's emotion regulation decisions can be better understood when the underlying forces are identified and their mutual influence on people's decisions is unpacked.

A possible alternative explanation for the findings in Studies 1 and 2 is that our manipulation of difficulty simultaneously served as an induction of normative behavior. The manipulation asked participants to make predictions about whether others would use reappraisal or not, as opposed to requiring them to make an actual choice and implement that choice. It is possible that this manipulation induced participants to think about what type of behavior would be normative in those circumstances. This focus on norms then could have increased reliance on reappraisal. This explanation, however, seems unlikely for several reasons. First, this prediction is predicated on there being normative prescriptions about using emotion regulation (and specifically reappraisal) in response to certain emotional circumstances and not others. To the best of our knowledge, we are unaware of the existence of such norms. Moreover, if this alternative explanation were correct, participants in Study 2 asked to predict for others would have been expected to

have a different pattern of results than those asked to choose for themselves, as only one of these conditions had the potential to highlight normative behavior. Yet, no such difference between these conditions was found. Finally, Study 3 manipulated difficulty in a manner not confounded with normative predictions, yet revealed a similar pattern of results. We are therefore confident in our interpretation of the data. However, it may be interesting to investigate in future research how people's normative beliefs about the appropriateness of various emotion regulation strategies guide their emotion regulation choices (Ford & Gross, 2018).

Integration of Previous Findings on Emotion Regulation Choice

The present research was designed to elucidate the reason why people may be reluctant to use reappraisal as an emotion regulation strategy (Suri et al., 2015). However, CET's application to emotion regulation choice transcends this specific phenomenon, and may generalize to other findings. Recall that according to CET, goal-directed behavior is a function of two opposing forces—a driving force comprised of motivation and mental resources, and a restraining force comprised of task difficulty, alternative goals and cognitive miserliness. As it pertains to choosing whether or not (or even how) to engage emotion regulation in a certain circumstance, an emotion regulation strategy will be chosen only if (a) its desirability and (b) the mental resources available for its implementation create a driving force that exceeds in magnitude the restraining force that opposes its execution.

As we have already mentioned in the introduction, previous findings on the determinants of the emotion regulation choice are consistent with the CET framework (Sheppes et al., 2011, 2014; Suri et al., 2015). More specifically, participants were found to engage in greater emotion regulation when researchers increased the appeal and importance (i.e., the driving force) of engaging in emotion regulation (Sheppes et al., 2014; Studies 1 and 3). Moreover, the researchers found an increase in the usage of cognitive reappraisal when they reduced the difficulty (i.e., the restraining force) associated with the implementation of reappraisal (Study 2) or with overcoming the default alternative 'no emotional regulation' (Suri et al., 2015).

CET also helps to reconcile some puzzling results found in the literature. For example, Sheppes and colleagues (2014) proposed that emotion regulation choice is more driven by effectiveness than by effort considerations. They came to this proposition after finding that participants were more likely to choose an effective emotion regulation strategy over a less effective strategy, even though the former strategy was more difficult to perform (Study 5; see also Sheppes et al., 2011). This explanation, however, seems at odds with our findings in Study 3 that show that when faced with highly intense negative stimuli participants chose the easy-ineffective "rethink as fake" strategy (vs. watching normally) more often than the difficult-effective "rethink as positive" strategy (see Study 6, Sheppes et al., 2014, for similar results). These inconsistencies can be resolved within the CET framework if we assume that emotion regulation choice is driven by both the effectiveness (i.e., the expectancy of goal attainment—the driving force, Kruglanski et al., 2012; Kruglanski, Chernikova, Rosenzweig, & Kopetz, 2014) and the effort considerations or difficulty (the restraining force). Thus, the effectiveness/difficulty ratio, rather than each of these factors alone, should determine which emotion regulation strategy people will eventually choose. Presumably this ratio was *higher* in the difficult-effective distraction task and "rethink as fake" strategy than in the easy-ineffective distraction task and "rethink as positive" strategy for highly intense stimuli, but vice versa for the low intense stimuli.

Our findings contribute to the growing literature demonstrating the usefulness of CET in explaining emotion regulatory processes. As mentioned in the introduction, previous research has shown that people managed to successfully regulate their emotions only when the driving force of the emotion regulation process exceeds the restraining force (Bélanger et al., 2014; Sharvit et al., 2015). Our present findings extend the scope of CET from the effectiveness of emotion regulation to a preceding stage—emotion regulation choice. Moreover, we show that the most basic feature of an emotional episode—its emotional intensity—can both instigate and block one's decision to engage in a particular emotion regulation strategy (i.e., cognitive reappraisal).

Avenues for Future Research

Importantly, the present analysis is the first application of CET to understanding the motivational underpinnings of emotion regulation choice. We hope our analysis inspires future explorations of this topic. We are aware that the conclusions that can be derived from the present work are undoubtedly restricted by our strict focus on reappraisal, emotional intensity, and an experimental paradigm that manipulated intensity using a within subjects design.

For instance, in wedding ourselves to this experimental paradigm, we limited our capability of testing mediation pathways. Future research should look to new paradigms that easily allow for the measuring of perceived difficulty between exposure to emotionally laden stimuli and the choice to utilize emotion regulation, as this would allow for the most direct test of the theorized model. Given the within-subjects design, we had concerns about measuring perceived difficulty repeatedly (40 times), and concerns that completing these measures would influence the subsequent choice decisions, as they were made within a matter of seconds. Instead, we opted to confirm the relationship between emotional intensity and perceived difficulty through the use of a pilot study (Pilot Study 2). After weighing the pros and cons of both approaches, we deemed this more appropriate for the current experimental paradigm.

Similarly, in wedding ourselves to this paradigm, we were unable to extend our findings to more ecologically valid contexts. We opted for methodological rigor and experimental control over external validity. Research on reappraisal, however, is not limited to laboratory settings, and a large body of literature exists examining the use of this tactic in the real world, and among clinical and nonclinical samples. Moreover, there is often a discrepancy between how reappraisal is treated in laboratory and real-world settings (McRae, 2013), and research suggests that certain contexts or individual moderators may be better suited for reappraisal (Haines et al., 2016; Webb, Miles, & Sheeran, 2012). Future studies should therefore explore the influence of driving and restraining forces outside the lab to ensure that these relationships hold in contexts that are not artificially created.

In focusing on reappraisal, we are unable to make claims about other emotion regulation tactics. CET can generate novel and interesting predictions regarding other emotion regulation strate-

gies, as well. This is particularly relevant given recent suggestions that other strategies (e.g., avoidance, rumination and problem-solving) may be particularly relevant for psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010). For instance, distraction seems to be relatively unaffected by emotional intensity, and when choosing to engage in distraction, emotional intensity should mainly constitute the driving (rather than restraining) force. Therefore, the more intense the undesired emotional stimulus, the more likely people should be to distract their attention from the emotional situation. Although past research shows that people prefer distraction to reappraisal for more intense stimuli (Sheppes et al., 2011), the more direct test of this prediction would compare the distraction strategy to experiencing the emotions as they are. Regarding another strategy—suppression—we have the opposite prediction. That is, the difficulty of suppression should increase with the intensity of emotional stimuli, and so should increase the motivation to use it. Thus, akin to our findings with reappraisal, the driving and the restraining forces may cancel each other out, yielding a low or a null correlation between emotional intensity and the suppression choice. However, when suppression is made relatively easy (e.g., by practice) or desirable (e.g., in social situations), this correlation should become positive.

Finally, we focused specifically on how emotional intensity as a form of task difficulty influences emotion regulation choice. It is possible that emotional intensity influences the restraining force for other reasons. For example, it is possible that experiencing more intense emotions requires more mental resources (Kron, Schul, Cohen, & Hassin, 2010), which makes those resources unavailable for reappraisal. Alternatively, it is possible that emotionally intense situations involve more rigid cognitions that are resistant to change, or that these intense situations tend to be more personally involving. Likewise, there are factors other than emotional intensity that deserve attention. The availability of cognitive resources is likely to influence individuals' regulatory choices. Specifically, a deficit of mental resources is likely to lead individuals to prefer less effortful strategies like distraction. In contrast, availability of mental resources should make people prefer more effortful strategies like reappraisal. Similarly, people with low need for cognition should be more reluctant to engage in effortful emotion regulation strategies such as reappraisal and more likely to engage in less effortful emotion regulation strategies such as distraction.

To conclude, motivational analysis from the CET perspective can explain previous findings in emotion regulation choice and generate new interesting hypotheses that promise to advance our understanding of emotion regulation choice and emotion regulation processes in general.

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Appendix A

The Numbers of the IAPS Images

Pilots 1 and 2, Study 1 (Block 2), Studies 2 and 3

1301, 2276, 2399, 2590, 2691, 2753, 3010, 3015, 3053, 3060, 3063, 3064, 3068, 3101, 3102, 3120, 3140, 3150, 3170, 3230, 3261, 3550, 6231, 6260, 6821, 6834, 6840, 7360, 8466, 9102, 9181, 9190, 9230, 9331, 9411, 9421, 9471, 9480, 9530, 9910.

Study 1 (Block 1)

1110, 1275, 2055, 2095, 2278, 2312, 2490, 2722, 3061, 3062, 3069, 3080, 3100, 3110, 3130, 3168, 3266, 6000, 6010, 6190, 6200, 6211, 6263, 6312, 6560, 6563, 6836, 9040, 9041, 9120, 9252, 9253, 9300, 9410, 9429, 9440, 9445, 9470, 9810, 9921.

(*Appendices continue*)

Appendix B

Instructions

Reappraisal Instructions

The "rethinking as positive" strategy was used in Pilot 2 and Studies 1–3. In Pilot 2, this explanation was provided on the computer screen, whereas it was presented verbally by the experimenter in Studies 1–3. In Studies 1–3, which were the studies in which participants had to implement the strategy, the experimenter asked participants to verbally explain the instructions back to him/her as confirmation that the instructions were understood.

The "rethinking as fake" strategy was only used in Study 3.

Rethinking as positive. Sometimes when people are faced with emotional stimuli or events, they try to change the way they think about those stimuli to make them less intense or less upsetting. We refer to this strategy as RETHINKing.

To achieve this neutral feeling, one can RETHINK the situation within the image, such that there will be a neutral or a positive outcome. What we mean here, is that while the goal is still to achieve a neutral feeling, often times this will require you to imagine that there is a positive outcome. This is especially true when you are looking at very negative images.

RETHINKing the image means changing feelings in response to the image so they are neutral. To achieve this neutral feeling, one can RETHINK the situation within the image, such that there will be a neutral or a positive outcome. For example, one can imagine that the situation depicted in the image will improve. If you see an image of an injured man, you could imagine that he will get treatment and become fully healthy again. Second, you can imagine that the scene will help raise awareness about world problems. For example, with the image of the injured man, you could imagine that his injury could help motivate people to improve the health care system.

Rethinking as fake. Sometimes when people are faced with emotional stimuli or events, they try to change the way they think about those stimuli to make them less intense or less upsetting. We refer to this strategy as RETHINKing.

To achieve this neutral feeling, one can RETHINK the situation within the image, such that there will be a neutral or a positive outcome. What we mean here is that while the goal is still to achieve a neutral feeling, often times this will require you to imagine that there is a positive outcome. This is especially true when you are looking at very negative images.

To achieve this neutral feeling, one can imagine that the situation depicted in the image is fake. If you see an image of an injured man, you could imagine that the man is not real, and that he is just a doll or CGI. Second, you could imagine that the scene is from a movie. For example, with the image of the injured man, you could imagine that he is just an actor and that his injuries are makeup.

Image-Viewing Conditions

Several different conditions of the image-viewing task were used. Instructions for these are provided below. The "implementation condition" was used in Studies 1, 2, and 3. The "prediction of others" condition was used in Studies 1 and 2. The "prediction for self" condition was only used in Study 2. The instructions varied slightly between studies (i.e., additional instructions were added to help distinguish conditions when they were completed in successive blocks in Study 1). All instructions were provided on the computer screen. Individual paragraphs were presented separately on their own screen.

Implementation condition. You will be presented with a series of images. One image will appear on the screen at a time, and you will be asked to make a choice about that image by pressing a key on the keyboard. You will have two choices. The first is WATCH. This means to watch the image normally and experience whatever emotion would be naturally aroused. The second is RETHINK. This means to think about the image so the outcome is positive or neutral (or fake in Study 3). After making your choice, that image will reappear, and it is your job to do whatever you chose: WATCH the image normally, or RETHINK the image. Should you choose to RETHINK, your goal is to think about the image in such a way that the outcome is neutral or positive. It is important that, if you choose to RETHINK, you do so as soon as the image reappears, but not before. No matter what choice you make—WATCH or RETHINK—it is very important that you keep your eyes on the image the entire time it is presented. When you press the spacebar, the task will begin. An image will briefly flash on the screen, and you will decide to WATCH or RETHINK that image. You will choose WATCH by pressing the "W" key on the keyboard. You will choose RETHINK by pressing the "R" key. After making your choice, the image will reappear, and you will implement whatever strategy you chose. That image will then disappear. A new image will flash on the screen, after which you will make a decision and then implement that decision. This process will repeat for the remainder of the images. Please place your fingers on the "W" and "R" keys.

Prediction for others. You will be presented with a series of images. One image will appear on the screen at a time, and you will be asked to make a choice about that image by pressing a key on the keyboard. This task is designed to see how well you can put yourself in someone else's shoes. While viewing the images, you will not be deciding based on how you personally feel, but based on how you think other participants in this study would react. You will have two choices. The first is WATCH. This means to watch the image normally and experience whatever emotion would be naturally aroused. The second is RETHINK. This means to think about the image so the outcome

(*Appendices continue*)

is positive or neutral. An image will flash on the screen and you will try to predict which of these two choices most other participants would make. If you think most other participants would WATCH, press the "W" key on your keyboard. If you think most other participants would RETHINK, press the "R" key. After you have made your prediction, another image will appear briefly on the screen. This process will continue until you have viewed all of the images. Once you press the spacebar, the first image will appear on the screen. Please focus on the middle of the screen. This task is easiest if your fingers are resting on the 'W' and 'R' keys throughout the task. Please place your fingers on those keys now.

Prediction for self (choice condition). You will be presented with a series of images. One image will appear on the screen at a time, and you will be asked to make a hypothetical choice about that image by pressing a key on the keyboard. You will have two hypothetical choices. The first is WATCH. This means to watch the image normally and experience whatever emotion would be naturally aroused. The second is RETHINK. This means to think about the image so the outcome is positive or neutral. Press the spacebar to continue. Regarding each image, choose the strategy (WATCH or RETHINK) that you believe you would choose if you had to watch the image for an extended period of time. Press the spacebar to continue. After you have made your hypothetical choice, another image will appear briefly on the screen. This process will continue until you have viewed all of the images. Once you press the spacebar, the first image will appear on the screen. Please focus on the middle of the screen. This task is easiest if your fingers are resting on the 'W' and 'R' keys throughout the task. Please place your fingers on those keys now. Press the spacebar to begin.

Appendix C

Statistical Models

Study 1

The model of the reappraisal choice:

```
M1 < glmer(choice ~ condition * valence _ arousal.centered
   + (valence _ arousal.centered * condition|Subj)
   + (1|Stim1), family = binomial(link = " logit"),
   data = Study1)
```

The model of the experienced affect:

```
M2 < − lmer(rated _ affect ~ valence _ arousal _ centered
   * choice _ centered + (valence _ arousal _ centered|Subj
   + (choice _ centered|Subj) + (1|Stim1), data = Study1)
```

Study 2

The model of the reappraisal choice:

```
M3 < glmer(Choice ~ valence _ arousal.centered * CondRC
   + (1 + valence _ arousal.centered|SubjRC)
   + (1|stimRC), family = binomial(link = "logit"),
   data = Study2, contrasts = list(CondRC
   = matrix(c(−1/2, −1/2, 1, −1/2, 1/2, 0), 3, 2)))
```

The model of the experienced affect:

```
M4 < − lmer(rated _ affect ~ valence _ arousal.centered
   * Choice _ centered + (valence _ arousal.centered
   * Choice _ centered|SubjRC) + (1|stimRC),
   data = Study2)
```

Study 3

The model of the reappraisal choice:

```
M5 < − glmer(choice ~ valence _ arousal.centered * Condition
   + (1 + valence _ arousal.centered|SubjRC)
   + (1|stimRC), family = binomial(link = "logit"),
   data = Study3 _ filtered)
```

The model of the experienced affect:

```
M6 < − lmer(rated _ affect ~ Condition * valence _ arousal.centered
   * choice _ centered + (1 + valence _ arousal.centered
   * choice _ centered|SubjRC) + (1|stimRC),
   data = Study3 _ filtered)
```

(*Appendices continue*)

Appendix D

Coefficients and Statistics of the Generalized Linear Mixed Models for Studies 1–3 (Tables 1–3)

Table D1
Reappraisal Choice Predicted From Image Intensity, Condition, and Their Interaction (Study 1)

Measure	*B* (*SE*)	Beta (*SE*)	*z*	*p* value(>|*z*|)
(Intercept)	.25 (.14)	.25 (.14)	1.76	.08
I	−.01 (.02)	−.06 (.18)	−0.36	.72
C	−.15 (.19)	−.07 (.10)	−0.79	.43
I × C	−.04 (.01)	−.23 (.08)	−2.77	.006

Note. I = Image intensity; C = Condition (C); I × C = Image intensity × Condition interaction.

Table D2
Reappraisal Choice Predicted From Image Intensity and Two Orthogonal Condition Contrasts (Study 2)

Measure	*B* (*SE*)	Beta (*SE*)	*z*	*p* value(>|*z*|)
(Intercept)	.20 (.12)	.20 (.12)	1.64	.10
I	.07 (.01)	.85 (.15)	5.83	.00001
C1	−.54 (.14)	−.54 (.14)	−3.85	.0001
C2	−.55 (.24)	−.55 (.24)	−2.28	.022
I × C1	−.04 (.02)	−.48 (.18)	2.70	.007
I × C2	.03 (.03)	.37 (.31)	1.21	.23

Note. I = Main effect of image intensity; C1 = contrast comparing the Implementation condition and the average of the Prediction and Choice conditions; C2 = the contrast comparing the Prediction and Choice conditions; I × C1 = interaction between the first contrast and Image Intensity; and I × C2 = interaction between the second contrast and Image Intensity.

Table D3
Reappraisal Choice Predicted From Image Intensity, Condition, and Their Interaction (Study 3)

Measure	*B* (*SE*)	Beta (*SE*)	*z*	*p* value(>|*z*|)
(Intercept)	−.16 (.09)	−.16 (.09)	−1.79	.073
I	.04 (.01)	.42 (.10)	4.04	.00005
C	−.29 (.15)	−.15 (.08)	−1.90	.057
I × C	.06 (.02)	.37 (.09)	3.91	.00009

Note. I = Image intensity; C = Condition (C); I × C = the interaction term.

Received October 3, 2017
Revision received July 1, 2018
Accepted July 5, 2018 ■