

# Committing to Emotion Regulation: Factors Impacting the Choice to Implement a Reappraisal After Its Generation

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Cognitive reappraisal, changing the way one thinks about an emotional event, is one of the most effective and extensively studied emotion regulation strategies. Previous research has dissociated the generation of reappraisals (i.e., generating candidate alternative meanings of the event) from the implementation of reappraisals (i.e., selecting and elaborating on one reappraisal), finding that while generation slightly changes positive feelings, implementation yields the most substantial changes in positive emotion. Because they are two discrete processes, people might not always choose to implement a reappraisal they generated, and it is unclear what factors might influence implementation choice. We addressed this question in three preregistered studies. In Studies 1 ( $N = 52$ ) and 2 ( $N = 58$ ), we examined whether people's choices to implement a generated reappraisal are influenced by (a) their positive emotion after generation and/or (b) the plausibility of that reappraisal (the degree to which a reappraisal reflects what might be actually happening and/or could potentially happen). The results suggest that people monitor their positive emotion when choosing to implement a positive reappraisal, while monitoring plausibility when choosing to implement a negative reappraisal. In Study 3 ( $N = 134$ ), we found that people primarily monitored their positive emotion (vs. plausibility) both when given a motive to feel better and a motive to understand the stressor. Taken together, we propose that positive emotion after reappraisal generation and reappraisal plausibility are indices of making progress toward the goal of regulation. Our results suggest that these indices influence people's choice to further implement the reappraisal. Our findings further our understanding of reappraisal generation and reappraisal implementation and reveal how and why people might choose to continue to regulate their emotions.

**Keywords:** emotion regulation, cognitive reappraisal, positive emotion, plausibility

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Negative emotions are inevitable in our daily life, such as the sadness of losing a beloved pet or the anger of getting cutoff in traffic. In such situations, people are often motivated to exert control over their emotional states, a process known as emotion regulation (ER; Gross, 1998). Cognitive reappraisal, which involves changing the way one thinks about the situation to alter one's feelings (Gross, 2015), has been repeatedly shown to reduce negative emotion and increase positive emotion effectively (McRae, 2016; Webb et al., 2012). A large body of literature has examined when people choose to use reappraisal over other strategies (Sheppes et al., 2014; Webb et al., 2012). However, people do not always commit to the strategy

they initially pick, which raises the question: What determines people's choice to continue using reappraisal once they have started?

According to the extended process model (EPM; Gross, 2015), the emotion regulation process can be divided into three stages: identification of the need to regulate, selection of an emotion regulation strategy, and implementation of that strategy. Extending the EPM to reappraisal, Waugh et al. (2022) suggested that the implementation of reappraisal can be further divided into three similar stages: the generation stage (i.e., coming up with several possible reappraisals), the selection stage (i.e., choosing one

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candidate reappraisal), and the implementation stage (i.e., using the selected reappraisal). For accessibility, we refer to the implementation stage in the EPM as “strategy implementation” and the implementation stage in the extension as “(reappraisal) implementation” or “use a reappraisal.” *Waugh et al. (2022)* argued that the negative event’s meaning is not truly changed until the positive reappraisal is implemented, when individuals elaborate on the reappraisal focusing on it, adding details and thinking logically to make themselves fully believe it. For example, when experiencing a breakup, one might generate a reappraisal such as “Now I can meet someone better.” While it might remain vague how knowing them would make one happier, the meaning of the breakup can be changed from negative to positive by vividly imagining all the good times one might share with them (i.e., implementation). Indeed, *Waugh et al. (2022)* found that although the generation of positive reappraisals is associated with slight increases in positive emotion, the most substantial increases in positive emotion occur during the implementation phase.

We suggest that because the two subprocesses are separable, it is possible that individuals might generate a reappraisal without then implementing it. This is because, despite the mood-enhancing effects of implementation, spending time elaborating on a poor-quality reappraisal may be less helpful than generating a better reappraisal or switching to a different ER strategy. Indeed, there is evidence that people will switch from reappraisal to other strategies when the context in which they are in does not fit reappraisal very well (*Dorman Ilan et al., 2019*). Therefore, one of the goals of our study is to show that people may generate reappraisals that they then choose not to implement, when given a choice. Our second and primary goal is to identify some potential mechanisms of the choice to implement a reappraisal or not.

### Reappraisal Implementation Choice

While there is research suggesting that the initial choice to use reappraisal is determined by situational intensity (*Sheppes et al., 2014*), this tendency does not necessarily translate to predicting reappraisal implementation choice. This is because implementation requires processing the emotional information and generating a reappraisal first, while the initial choice to use a reappraisal strategy does not. Instead, we suggest that implementation choice is influenced by people’s awareness of potential discrepancies between the regulatory process and contextual demands (i.e., emotion regulation monitoring; *Pruessner et al., 2020*). According to the cognitive energetics theory (*Milyavsky et al., 2019*), the decision to initiate a cognitive process is determined by the trade-off between the driving force (i.e., the motivation to launch the process) and the restraining force (i.e., task difficulty). Theoretically, one should monitor their emotion regulation success and flexibly choose to (a) maintain the current strategy as long as it is effective and there is still a gap between the current and desired emotional states (i.e., high driving force, low restraining force), (b) switch to a different strategy if the current one is ineffective and the desired state is not yet reached (i.e., high driving force, high restraining force), and (c) stop emotion regulation if the desired state is reached or the goal changed (i.e., low driving force; *Gross, 2015; Pruessner et al., 2020; Sheppes et al., 2014*).

In the current set of studies, we focus on positive reappraisals, in which the goal of reappraisal is to increase one’s positive emotions toward an emotional event (*McRae & Mauss, 2016; Waugh et al., 2016*). Research suggests that increasing positive emotions toward stressors is a powerful stress regulation strategy (*Waugh, 2020*) that is critical for stress resilience (*Fredrickson et al., 2003*). Our own work shows that reappraising negative pictures has the effect of diminishing negative emotion and increasing positive emotion (*Waugh et al., 2016*). This work, and theoretical research on stress resilience, suggests that increasing positive emotion is an especially powerful strategy, not only for momentary changes in emotion but also for long-term stress resilience (*Fredrickson et al., 2003; Gloria & Steinhardt, 2016*). Given the goal to feel better, the positive emotions one feels after generating a reappraisal may indicate good goal progress (*Martin et al., 1993*) and prompt people to continue to use that strategy by implementing their reappraisals (*Pruessner et al., 2020*). In support of this hypothesis, when people have the goal to reduce negative emotions and they still feel negative emotions after trying a strategy, they tend to switch strategies (*Birk & Bonanno, 2016*). Although positive and negative emotions are separable constructs (*Larsen et al., 2003*), it is possible that positive emotion serves a similar function in helping people gauge successful goal progress.

Alternatively, experiencing positive emotion may serve as a signal that one has achieved the regulatory goal, prompting people to stop regulation (*Martin et al., 1993*), and attend to other opportunities (*Carver, 2003*). In this case, higher positive emotion after generation could indicate successful goal accomplishment, prompting people to not continue to implement a cognitively effortful reappraisal strategy. Therefore, one of the aims of this study is to test these alternative hypotheses to examine whether positive emotion after reappraisal generation predicts the choice to implement reappraisals at all, and if so if it positively (goal progress) or negatively (goal achievement) predicts those implementation choices.

Another potential indicator of reappraisal effectiveness is reappraisal plausibility, defined as the degree to which a reappraisal reflects what might be actually happening and/or could potentially happen. First, reappraisal plausibility might indicate that the reappraisal can be more easily imagined and elaborated on during implementation (*Sharman & Scoboria, 2009*). Second, it might directly help goal progress by increasing positive emotion because it increases confidence that one has found a possible viable reappraisal to implement later. Finally, besides pro-hedonic motives (i.e., to feel better), people might also have instrumental motives, such as the desire to understand or to make meaning from the stressor (*Tamir, 2016*). Plausibility might be particularly helpful for the instrumental motives by facilitating information processing.

### Overview of the Present Studies

In these studies, we aimed to investigate whether and why people choose to implement a reappraisal after its generation. Following our preregistration (<https://osf.io/jk5we>), Study 1 examined the influence of positive emotion after generation on people’s choices to implement positive reappraisals. Study 2 replicated the effects of positive emotion and additionally examined whether people are more likely to implement a plausible reappraisal, regardless of its

valence. Finally, Study 3 investigated whether motives to (a) feel better or to (b) understand the stressor guide people to focus on different indices when making implementation choices.

### Study 1: Positive Emotion and Implementation Choice

In Study 1, we investigated whether people's positive emotion (PE) after reappraisal generation influences their choices to implement positive reappraisals. Participants were shown negative images and were instructed to either (a) generate only positive reappraisals and could choose to use a positive one later (i.e., GENERATE ++/USE +), (b) generate mixed reappraisals (both positive and negative) and could choose to use a positive one later (i.e., GENERATE +-/USE +), or (c) generate mixed reappraisals and could choose to use a negative one later (i.e., GENERATE +-/USE -). They then made a choice between implementing a reappraisal and distracting themselves by memorizing six letters superimposed on the image. Distraction was selected as the alternative choice because it is a common alternative to reappraisal, and is thought to be roughly matched in terms of cognitive resources/effort required. Our main hypotheses in Study 1 primarily centered on trials in which people could choose to use a positive reappraisal (i.e., USE + trials = GENERATE ++/USE + and GENERATE +-/USE +)—see methods for rationale behind the other trial types.

We made three preregistered alternative hypotheses about the relationship between positive emotion and implementation choice. If positive emotions indicate making good progress toward the regulatory goal, then we hypothesized that people would be more likely to choose implementation when their PE after generation is high (Hypothesis 1a) and that implementation frequency would be higher for positive reappraisal trials, which lead to moderate increases in positive emotions, than on mixed reappraisal trials, which lead to lower increases in positive emotions (Hypothesis 2a; [Waugh et al., 2022](#)). If, however, positive emotions reflect successful goal achievement, then we hypothesized that the pattern would be reversed; people would be more likely to choose implementation when their PE after generation is low (Hypothesis 1b) and on mixed reappraisal trials (Hypothesis 2b). Finally, we also considered the possibility that both mechanisms play a role, which could result in a curvilinear relationship between PE and the likelihood of implementation (Hypothesis 1c) such that low PE indicates that people are not close to achieving their goal and might continue to implement to get closer, that high PE indicates that they have been very successful, which reinforces their desire to continue to implement, but medium levels of PE indicate that they have been just successful enough to perhaps feel ok about stopping but not so successful as to reinforce continuing. In this case, there may not be a significant difference in implementation between positive reappraisal trials and mixed reappraisal trials.

We also offered two auxiliary hypotheses that replicate effects reported in a previous study ([Waugh et al., 2022](#)). First, we predicted that individuals would report higher PE on positive reappraisal than on mixed reappraisal trials. Second, we hypothesized that people would have higher PE after implementation than PE after generation. Third, if implementation (but not generation) truly changes the stimulus's meaning, it should have enduring emotional effects: When being reexposed to the same stimulus after the reappraisal task, we hypothesized that people would have higher PE when being reexposed to stimuli for which they implemented

positive reappraisals for versus those they generated but did not implement for (i.e., external distraction).

### Method

#### *Transparency and Openness for All Studies*

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures across three studies. All data, analysis code, and research materials are made publicly available at <https://osf.io/42jhs/files/osfstorage>. All studies' design and analyses were preregistered (<https://osf.io/jk5we>), and the procedure was approved by the Wake Forest University Institutional Review Board.

#### *Participants*

The sample size of 75 was selected a priori. A sample of 37 participants was needed to achieve >95% power at  $\alpha = .05$  (two-tailed) to detect an effect size of .61 (the effects of intensity on choice of strategy; [Matthews et al., 2021](#)). Considering the difference in our experimental task and the difference in our main predictor (positive emotion vs. intensity), we conservatively doubled the sample size to 75. To preempt attrition and preregistered exclusions, we recruited 100 participants from the Wake Forest Introductory Psychology subject pool. Following our preregistration (<https://doi.org/10.17605/OSF.IO/JK5WE>), we excluded individuals who completed fewer than 90% of trials in the main task or the reexposure task ( $n = 3$ ), rated positive emotion as the same score for over 80% of the trials ( $n = 5$ ), failed to briefly describe in writing the task instructions in the posttask survey ( $n = 17$ ); six participants who did not complete the survey due to a research assistant's negligence were not excluded based on this criterion), or chose the same strategy (i.e., implementation vs. distraction) over 80% of the time in USE + trials ( $n = 26$ ). A final sample of 52 participants was left.<sup>1</sup>

Although we excluded more participants than anticipated using our preregistered criteria, 52 was larger than the sample size determined by our power analysis (37). Among the 52 participants, 20 (38.5%) responded to our question "how do you describe yourself" and answered male, 32 (61.5%) answered female, and no one answered nonbinary, chose to self-describe, or chose not to answer. They were 18.77 years old ( $SD = .96$ ) on average. Ethnic/racial representation was as follows: 73.1% White/Caucasian ( $n = 38$ ), 9.6% Asian ( $n = 5$ ), 9.6% Black/African American ( $n = 5$ ), 3.8% identified as Asian and White ( $n = 2$ ), 1.9% unknown/not reported ( $n = 1$ ), and 1.9% did not answer ( $n = 1$ ). In addition, 13.5% of participants identified as Hispanic/Latino ( $n = 7$ ). Participants received 1.5 credits towards their psychology course for taking part in the study.

### Materials

Consistent with [Waugh et al.'s \(2022\)](#) study, the same set of 100 images from the Geneva affective picture database ([Dan-Glauser & Scherer, 2011](#)) was used to create four different versions of the main

<sup>1</sup> Because there was less variability in participants' choices than expected, we also tried excluding participants who chose the same strategy more than 90%, instead of 80%, of the time in USE + trials. This resulted in a sample of 61 participants, and the same pattern of results was found between these two samples (see the [Supplemental Material](#) for full analyses).

task, with equivalent emotional valence and counterbalanced across participants (see the [Supplemental Material](#) for detailed information for each version).

### Reappraisal Choice Task

**Overview.** The main task used in this study was based on a reappraisal task designed by [Waugh et al. \(2022\)](#). There were two types of trials: reappraisal trials and look trials, both of which consisted of two phases (see [Figure 1](#)). At the beginning of each trial, participants viewed an instruction screen for 2 s. On the top of the screen was the instruction for Phase 1, and on the bottom of the screen was the instruction for Phase 2 of each trial. At the end of both look and reappraisal trials, participants viewed a fixation cross for 2 s, 4 s, or 6 s (duration was randomly assigned to each trial), during which they could briefly rest before the next trial. Participants also took a 20-s break after completing every 25 trials.

**Generation.** The two phases in the reappraisal trials were GENERATE (Phase 1) and USE (Phase 2). Participants were shown a negative image for 5 s in the GENERATE phase. If the instruction was “GENERATE ++,” participants generated only positive reappraisals (“reinterpretations, or reframings, or reconsiderations of the meaning of the picture”) of events in the image; if the instruction was “GENERATE +-,” participants generated both positive and negative reappraisals of events in the image. Specifically, they were told to “really focus on changing the meaning of the emotional event but do not focus on any single explanation at this point in time.” We also provided examples of different tactics, including changing future consequences (e.g., everyone will be better off than they started) and being explicitly positive (e.g., people are learning an invaluable life lesson). See [Waugh et al. \(2022\)](#) for an explanation of how these two trial types can help dissociate the generation and implementation phases.

**Implementation Choice.** In each reappraisal trial, participants made a choice to use (“focus on and elaborate on that selected reinterpretation”) one of the reappraisals they generated or not.

**Implementation.** In the use phase, if participants chose to use a reappraisal, they were shown the same image with the USE instruction on the bottom of the screen for another 5 s. If the instruction was “USE +,” participants selected and used a positive reappraisal to make themselves feel better. If the instruction was “USE -,” participants selected and used a negative reappraisal to make themselves feel worse. Specifically, they were told that “you will focus on and elaborate on that selected reinterpretation to make yourself feel better/worse.”

**Distraction.** In the use phase, if participants chose not to use a reappraisal, they were shown the same image with a six-letter string superimposed on it for another 5 s and asked to remember the six letters. To ensure that participants distracted themselves by memorizing the letters, later in the trial, they completed a simple memory test (5 s) by answering whether a specific letter was in the string.

It is noteworthy that we informed participants of the USE + or USE - instruction during both phases to exclude potential confounding effects of goal uncertainty (see [Waugh et al., 2022](#)) and make sure people were aware of the reappraisal valence when making the choice.

**Positive Emotion.** Following both Phase 1 and Phase 2, participants rated their positive emotion on a scale from 1 (*not positive at all*) to 5 (*very positive*) in 5 s. Participants used a “double-tap” procedure in which they pressed the number keys twice to give a response ([Waugh et al., 2022](#)). Answers were transformed as the average of the two numbers (e.g., pressing 1 twice = 1, pressing 1 and then 2 = 1.5). This allowed us to use five keys in order to get responses on a 1–10 scale, which we often use in preparation for the constraints of the functional magnetic resonance imaging environment.

**Look.** The two phases in the look trials were LOOK 1 (Phase 1) and LOOK 2 (Phase 2). In both phases, participants were asked to simply LOOK at negative or neutral images and react naturally to what was happening in the image (see [Figure 1](#)).

### Reexposure Task

Immediately after completing the reappraisal choice task, participants were introduced to the reexposure task and were shown the same images again in random order. Participants were informed of the second part but were not told beforehand that they would see the same images again. Each image was presented for 5 s, followed by a question asking participants to rate their positive emotion toward it now on the same scale.

### Procedure

The study took place in person at Wake Forest University. After participants provided consent, the experimenter explained how to perform the experimental task to them. Then, participants completed five practice trials, the reappraisal choice task, and the reexposure task. After finishing the reexposure task, they completed the posttask survey in which they described the task instructions in writing, rated the difficulty of following each instruction, and rated the percentage of time they were able to follow the instructions. Participants also provided their demographic information, including age, gender identity, ethnicity, education level, income level, and marital status. Finally, participants were provided with a debriefing form and assigned 1.5 credits toward their psychology course.

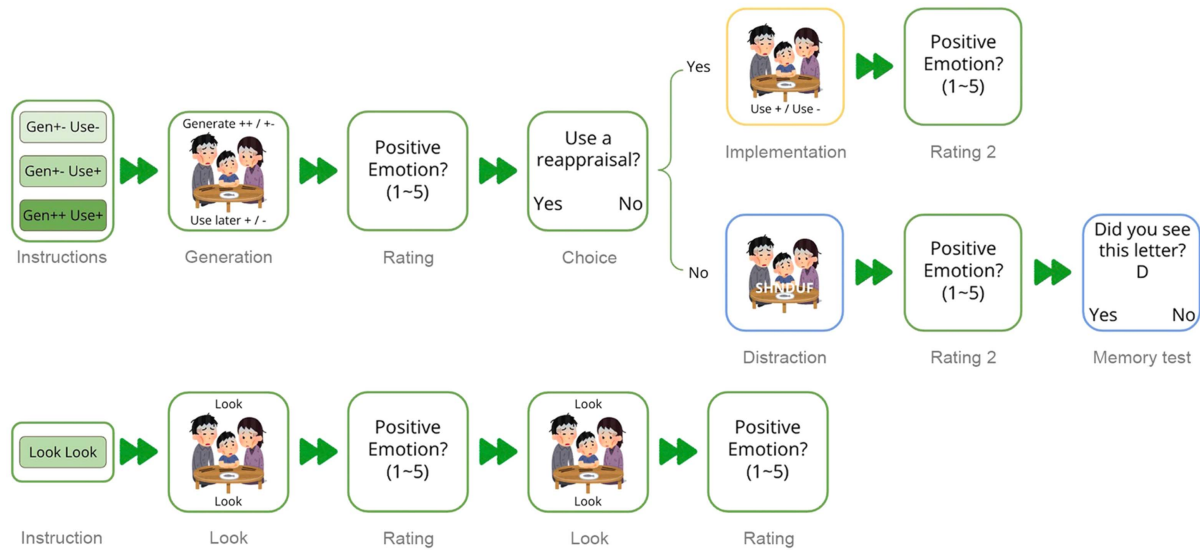
### Preregistered Analytic Approach

Binomial generalized linear mixed models were used to analyze the data using the lme4 package (Version 1.1.35.1) in RStudio (Version 4.3.2). Multilevel modeling was used in several preregistered models to account for the repeated measures structure of the data. Unless stated otherwise, the analyses focused on trials in which participants used a positive reappraisal (i.e., USE +). We also conducted *t* tests in SPSS.

When included as a predictor, PE after generation (i.e., within-subjects PE) was mean-centered to account for collinearity and entered as a fixed effect. Participants’ average PE after generation (i.e., between-subjects PE) across the instructions was entered as a covariate to account for between-subjects variance. Results on between-subjects PE and separate trials (i.e., GENERATE ++, GENERATE +-) are reported in the [Supplemental Material](#). Choice was dummy-coded as distraction = 0 and implementation = 1.



**Figure 1**  
*Procedure for a Reappraisal Trial (Upper) and a Look Trial (Lower)*



*Note.* "SHNDUF" represents an example six-letter string. Images used in this figure are examples and are not used in the experiments. Images are adapted from Illustration of a Poor Family, by Irasutoya, 2018 ([https://www.irasutoya.com/2018/04/blog-post\\_0.html](https://www.irasutoya.com/2018/04/blog-post_0.html)). Copyright 2018 by Irasutoya. Adapted with permission. See the online article for the color version of this figure.

## Results

### *Preregistered Question 1: The Effects of PE After Generation on Implementation Choice*

Consistent with Hypothesis 1a—the goal progress hypothesis—participants were more likely to implement a reappraisal (vs. distract)

when having higher PE after generation,  $b = 0.43$ ,  $SE = .058$ ,  $z = 7.38$ ,  $p < .001$ , 95% CI [0.32, 0.55],  $OR = 1.54$  (see Figure 2). A quadratic term added to the model to test the curvilinear hypothesis was nonsignificant,  $b = -0.03$ ,  $SE = .052$ ,  $z = -0.56$ ,  $p = .579$ , 95% CI [-0.13, 0.08],  $OR = 0.97$ .

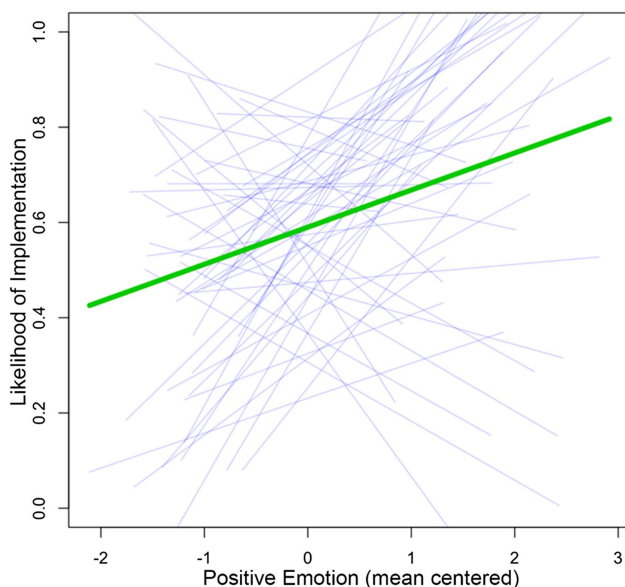
### *Preregistered Question 2: Whether Implementation Choice Differs for GENERATE +- and ++ Trials*

Consistent with past research and our expectations, participants reported higher PE after generation on GENERATE ++ trials ( $M = 2.40$ ,  $SE = .03$ ) than on GENERATE +- trials ( $M = 2.12$ ,  $SE = .03$ ),  $t(1010) = 7.49$ ,  $p < .001$ . Given that we found that the likelihood of implementation increases as PE increases, it seemed logical to expect higher implementation in GENERATE ++ (vs. +- ) trials. Surprisingly, we found the opposite result: The odds of implementing a reappraisal (vs. distract) were lower on GENERATE ++ trials than on GENERATE +- trials,  $b = -0.27$ ,  $SE = .092$ ,  $z = -2.95$ ,  $p = .003$ , 95% CI [-0.45, -0.09],  $OR = 0.76$ . Together, the analyses present a counterintuitive finding: Although participants preferred implementation when having higher PE and reported higher PE in GENERATE ++ trials, they chose implementation more frequently in GENERATE +- trials. See discussion for potential explanations.

### *Preregistered Question 3: Whether Implementing a Positive Reappraisal Increases PE*

Replicating [Wagh et al. \(2022\)](#), participants experienced a significant increase in PE from generation to implementation in both GENERATE +- USE+ trials (GENERATE +-:  $M = 2.23$ ,  $SE = 0.07$ ; USE+:  $M = 2.76$ ,  $SE = 0.09$ ),  $t(51) = -9.15$ ,  $p < .001$ ,  $d = .42$ , 95% CI [-1.632, -.899], and GENERATE ++ USE+ trials (GENERATE ++:  $M = 2.58$ ,  $SE = 0.09$ ; USE+:  $M = 2.90$ ,  $SE =$

**Figure 2**  
*The Relationship Between Positive Emotion and the Likelihood of Implementation*



*Note.* See the online article for the color version of this figure.

0.09),  $t(51) = -5.75, p < .001, d = .41, 95\% \text{ CI} [-1.107, -0.482]$ . See the [Supplemental Material](#) for the full Phase X Instruction analysis of variance.

#### ***Preregistered Question 4: Whether Implementing a Positive Reappraisal Leads to Higher PE When Being Reexposed to the Same Stimuli***

To examine whether implementing a positive reappraisal led to enduring changes in people's appraisals of the stimuli, we conducted a linear mixed-effects model to compare participants' PE when being reexposed to images for which they implemented positive reappraisals versus those for which they used distraction with. PE after generation was included as a covariate. Participants experienced significantly higher PE to those images that they had implemented reappraisals for ( $M = 1.99, SE = 0.03$ ) than those images they had distracted themselves from ( $M = 1.86, SE = 0.03; b = 0.11, SE = .036, t(2013) = 3.11, p = .002$ ).<sup>2</sup>

#### ***Exploratory Analyses: Negative Reappraisals***

Although not preregistered, we also conducted paired samples  $t$  tests to examine whether implementing a negative reappraisal significantly decreased PE. Replicating previous work, participants experienced a significant decrease in PE from generation to implementation in GENERATE +-/USE - instruction (GENERATE + -:  $M = 1.97, SE = 0.06$ ; USE -:  $M = 1.48, SE = 0.06, t(51) = 11.92, p < .001, d = .30, 95\% \text{ CI} [1.230, 2.069]$ ). Despite this decrease, participants frequently chose to implement a negative reappraisal ( $M = 0.69$ ) rather than to distract. However, their choices to implement a negative reappraisal were not predicted by PE after generation,  $b = 0.11, SE = .102, z = 1.08, p = .282, 95\% \text{ CI} [-0.09, 0.31], OR = 1.12$ . See discussion for potential explanations.

#### **Discussion**

In Study 1, we examined people's choice between further implementing a generated reappraisal and distracting oneself by memorizing a six-letter string. For the first time, we demonstrated that there is substantial variability in whether people choose to implement a generated reappraisal or not and that people's choices were influenced by how positive they felt after generation. Consistent with the goal progress hypothesis, participants were more likely to implement a positive reappraisal when feeling more positive after generating that reappraisal. This suggests that positive emotion signals that the generated reappraisals might be effective in further progressing toward the ER goal of feeling better about the emotional event, thus prompting people to further implement it to achieve these sought-for emotional outcomes.

People's implementation choices for the two USE + trials, however, showed a pattern inconsistent with the goal progress hypothesis. Specifically, they were more likely to implement a positive reappraisal for mixed reappraisal (GENERATE +-) trials, in which they felt less positive, than for positive reappraisal (GENERATE ++) trials, in which they felt more positive. Notably, their likelihood of implementation still increased as positive emotion increased within each instruction. However, differences in positive emotion did not lead to different implementation likelihood across instructions. After generating solely positive reappraisals, people might find it

challenging to envision how using one of them would further improve their moods. On the contrary, the contrasts between positive and negative reappraisals may make implementing a positive reappraisal more attractive in mixed reappraisal trials (i.e., trade-off contrast; Simonson & Tversky, 1992). In this case, for these mixed reappraisal trials, the goal achievement hypothesis—that people might continue to implement because their goal has not yet been achieved—might be more a factor than in the positive reappraisal trials. Another potential explanation is that, because people only needed to generate one type of reappraisal in GENERATE ++ trials, they might have extra time and start to implement during the generation phase. Hence, further implementation became less helpful in this condition. Future investigations should test these possibilities.

In support of Waugh et al.'s (2022) proposition that reappraisal's generation and implementation are two separable processes, we found significant and moderate increases in participants' positive emotion after implementing a positive reappraisal (vs. generation). Furthermore, individuals reported feeling more positive when being reexposed to images for which they implemented positive reappraisals (vs. those for which they generated positive reappraisals, but then distracted themselves). These findings point out a qualitative difference between generation and implementation: While generation makes people feel a little better in the moment, implementation may actually change how they feel both in the moment and in the longer term by replacing the initial negative appraisal with a positive reappraisal in an enduring way. For feasibility, participants were presented with the same images again right after they finished the main task. Future research should explore whether reappraisal implementation has longer enduring adaptive effects.

Although not preregistered, the most surprising finding might be that overall, people frequently chose to implement negative reappraisals rather than to distract themselves. Moreover, people reported lower positive emotion after using negative reappraisals, indicating that they were probably aware that doing so would make themselves feel worse. According to some participants' posttask reports, negative reappraisals were perceived to be more truthful. Considering that people sometimes are willing to sacrifice their positive moods for instrumental purposes (Tamir, 2016), it is possible that participants implemented negative reappraisals to better understand the true situation depicted in the stimuli. If this is the case, then people should prefer negative reappraisals that are more plausible, as far-fetched negative reappraisals will dampen their moods while providing information of limited use. Additionally, plausible, positive reappraisals should also be preferred over implausible ones because they are helpful at increasing positive emotion. Therefore, we investigated the role of plausibility in determining people's implementation choice in Study 2.

#### **Study 2: Positive Emotion, Plausibility, and Implementation Choice**

In Study 2, we first aimed to replicate Study 1's finding that PE after generation predicts a greater likelihood of implementing positive reappraisals. We also examined whether plausibility, defined as the extent to which a reappraisal reflects what people

<sup>2</sup> We preregistered  $t$  tests for this question. However, we chose to use a linear mixed-effects model to account for the potential effects of PE after generation.

think might be actually happening and/or could realistically happen in the stimuli, influences people's choices to implement generated reappraisals. Several changes were made to the paradigm to answer this question. First, the image was shown for 3 s at the beginning of every trial, allowing individuals to develop an initial appraisal before trying to change its meaning. This step ensured that individuals created alternative rather than original interpretations during the generation phase. Second, we no longer used a mixed reappraisal trial type and instead simplified the three types of reappraisal trials into just positive (GENERATE +/USE +) and negative reappraisals (GENERATE –/USE –) because data from our study and published studies (Vaughn et al., 2022) suggest that participants followed our instructions on separating generation and implementation, thus reducing the need for the mixed reappraisal trials.

Another significant change in the present study is that we added a condition in which participants read reappraisals that had already been generated instead of generating their own. There were several reasons for this change. First, this design allowed us to test whether positive emotion after either generating or reading a reappraisal has the same influence on implementation choice, given that the positive emotion may reflect different parts of goal progress. In the generated condition, positive emotion reflects the degree to which the participants themselves have *made goal progress* toward an ER goal given what they have generated and can then continue to implement to feel better. By contrast, in the read other reappraisal condition, this positive emotion may more reflect the promise of *anticipated goal attainment* toward the end goal of feeling better after implementation, despite the fact that the participant did not accomplish this progress themselves (Gollwitzer & Sheeran, 2006). Second, this design allowed us to investigate the influence of both self-reported and manipulated plausibility on choice, thus allowing for identifying causal effects of plausibility.

While individuals are generally motivated to make themselves feel better when having negative emotions (Tamir & Millgram, 2017), an implausible reappraisal will make emotion regulation more difficult and may weaken their motivation to implement it. Thus, we hypothesized that people would be more likely to implement a positive reappraisal when it is more plausible (both self-reported and manipulated) and that plausibility likely predicts higher positive emotion because it increases the perception of goal progress, which positive emotions index.

Although using a negative reappraisal decreased people's positive emotion, many of them still chose to do so in Study 1. We theorized that this tendency was driven by an instrumental rather than hedonic motive: to better understand the situation depicted in the stimuli. Indeed, individuals sometimes sacrifice immediate pleasure in exchange for utility, such as increasing anger to perform better at a confrontational task (Tamir et al., 2008). Considering that undergraduate participants might be rarely exposed to stimuli used in the experiment (e.g., animal mistreatment, people experiencing homelessness), it is possible that they implemented negative, plausible reappraisals to better understand what is happening. Thus, we also explored whether the likelihood of implementing a negative reappraisal increases as plausibility increases. Because the contents of the stimuli were normed to be negative, which matched the valence of negative reappraisals, we also hypothesized that negative reappraisals should be perceived as more plausible than positive reappraisals.

## Method

### Participants

Given the significant results from a sample of 52 people in Study 1, we aimed to recruit 75 participants in total to achieve a similar usable sample size ( $N = 52$ ) for Study 2. Seventy-four participants were recruited from the Wake Forest Introductory Psychology subject pool. Following our preregistration (<https://doi.org/10.17605/OSF.IO/W2XTU>), we excluded individuals whose PE or plausibility scores were the same in 10 or more consecutive trials ( $n = 4$ ), chose the same strategy (i.e., implementation vs. distraction) over 90% of the time in USE + trials ( $n = 11$ ), or failed to briefly describe in writing the task instructions in the posttask survey ( $n = 1$ ). The exclusion criteria were slightly different from Study 1 to better identify participants who did not answer seriously. A final sample of 58 participants remained. Among the 58 participants, 22 (37.9%) responded to our question “how do you describe yourself” and answered male, 36 (62.1%) answered female, and no one answered nonbinary, chose to self-describe, or chose not to answer. They were 18.67 years old ( $SD = .83$ ) on average. Ethnical/racial representation was as follows: 79.3% White/Caucasian ( $n = 46$ ), 8.6% Black/African American ( $n = 5$ ), 10.3% Asian ( $n = 6$ ), and 1.7% American Indian or Alaskan Native ( $n = 1$ ). In addition, 12.1% of participants identified as Hispanic/Latino ( $n = 7$ ). Participants received 1.5 credits towards their psychology course for taking part in the study as partial course credit.

### Materials

**Images.** The set of images from Study 1 was used to create ten different versions of the main task, with equivalent emotional valence, equivalent number of highly and lowly plausible provided reappraisals, and counterbalanced across participants (see the [Supplemental Material](#) for each version).

**Plausibility of Reappraisals Manipulation.** Eight pilot participants generated one positive and one negative reappraisal for 80 negative images. Four pairs of trained research assistants rated the plausibility of reappraisals associated with 20 images (1 = *not plausible at all*, 5 = *very plausible*; ICC = 0.767, 0.719, 0.705, 0.739). The most ( $M_{\text{positive}} = 4.34$ ,  $M_{\text{negative}} = 4.83$ ) and least ( $M_{\text{positive}} = 1.91$ ,  $M_{\text{negative}} = 2.58$ ) plausible reappraisals for each image were selected for the READ trials.

### Reappraisal Choice Task

**Overview.** The task consisted of four trials: (a) GENERATE +, (b) GENERATE –, (c) READ +, and (d) READ –. In each trial, participants first looked at the image for 3 s. Next, the instruction showed up (a–d above) and participants generated or read reappraisals within 5 s. They then rated their current positive emotion (5 s) and made a choice to implement the reappraisal or not (until respond). If participants chose to implement a reappraisal, they were given 5 s to look at the image while elaborating on one selected reappraisal. If participants chose not to implement a reappraisal, they were given 5 s to memorize a six-letter string superimposed on the image. They then rated their current positive emotion (5 s). Participants who memorized the letters additionally completed a simple memory test. Following each reappraisal trial,

participants reported whether they had successfully generated a reappraisal or understood the reappraisal they had read.

**Plausibility.** If they had generated/understood the reappraisal, participants then rated the reappraisal's plausibility on a scale from 1 (*not plausible at all*) to 5 (*very plausible*).

### Procedure

The overall procedure was identical to Study 1, which included practice trials, the reappraisal choice task, and a posttask survey. However, there was no reexposure task in this study.

### Preregistered Analytic Approach

The analytic approach was identical to Study 1 except for the following changes. First, both binomial generalized linear mixed models and linear mixed-effects models were used to analyze the data. Second, when included as a predictor, self-reported plausibility was also mean-centered to account for collinearity and entered as fixed effects. Participants' average self-reported plausibility (i.e., between-subjects plausibility) across the instructions was entered as a covariate to account for between-subjects variance. Third, when included as a predictor, manipulated plausibility was coded as low versus high and entered as a fixed effect. For those analyses in which we do not compare self-generation and reading a reappraisal, separate analyses for these trial types are reported in the [Supplemental Material](#).

## Results

### Preregistered Question 1: The Effects of PE After Generation on Implementation Choice for Positive Reappraisals

Consistent with Study 1, participants were more likely to implement a positive reappraisal (vs. distract) when having higher PE,  $b = 0.58$ ,  $SE = .089$ ,  $z = 6.47$ ,  $p < .001$ , 95% CI [0.40, 0.75],  $OR = 1.78$ .

### Preregistered Question 2: The Effects of Plausibility on Implementation Choice for Positive Reappraisals

Consistent with our hypothesis, self-reported plausibility across both trial types positively predicted implementation choice,  $b = 0.31$ ,  $SE = .074$ ,  $z = 4.24$ ,  $p < .001$ , 95% CI [0.17, 0.46],  $OR = 1.37$ . Preliminary analysis revealed that our manipulation of high ( $M = 3.33$ ,  $SE = .06$ ) versus low ( $M = 3.01$ ,  $SE = .06$ ) plausibility was moderately successful for positive reappraisals,  $b = 0.31$ ,  $SE = .081$ ,  $t(604.13) = 3.86$ ,  $p < .001$  (see the [Supplemental Material](#) for details); however, contrary to our hypothesis and the self-report finding, manipulated plausibility for READ + trials did not predict implementation choice,  $b = -0.20$ ,  $SE = .191$ ,  $z = -1.04$ ,  $p = .301$ , 95% CI [-0.57, 0.18],  $OR = 0.82$ .

### Preregistered Question 3: The Effects of Plausibility on PE

We next tested our hypothesis that the plausibility of the generated reappraisal predicts increased positive emotion after generation/reading. Consistent with our hypothesis, participants felt more positive after generating or reading a positive reappraisal

of higher self-reported plausibility,  $b = 0.31$ ,  $SE = .023$ ,  $t(1142.39) = 13.37$ ,  $p < .001$ . However, contrary to our hypothesis and the self-report findings, participants reported the same level of positive emotion after reading a positive reappraisal of low ( $M = 2.62$ ,  $SE = .06$ ) and high ( $M = 2.51$ ,  $SE = .05$ ) manipulated plausibility,  $b = -0.13$ ,  $SE = .068$ ,  $t(623.27) = -.89$ ,  $p = .600$ . Together, analyses on manipulated and self-reported plausibility in Questions 2 and 3 presented different results: While self-reported plausibility predicted individuals' implementation choice and PE after generation/reading, manipulated plausibility did not. See discussion for potential explanation.

### Exploratory Follow-Up for Questions 1–3

Since self-reported reappraisal plausibility predicted higher PE after generating/reading the reappraisal, it raises the possibility that the effects of plausibility on implementation choice were mediated by PE after generation. A Bayesian mediation analysis revealed that plausibility had a significant indirect effect on implementation choice through PE after generation,  $b = 0.15$ , 95% CI [0.09, 0.22]. Plausibility positively predicted PE after generation,  $b = 0.31$ , 95% CI [0.27, 0.36], and PE after generation, in turn, positively predicted implementation choice,  $b = 0.49$ , 95% CI [0.29, 0.69]. The direct effect of plausibility on implementation choice was also positive,  $b = 0.16$ , 95% CI [-0.00, 0.32], indicating partial mediation. However, the credible interval slightly overlaps with zero, indicating some uncertainty about the effect's magnitude. See the [Supplemental Material](#) for the mediation figure.

### Additional Exploratory Analyses: The Effects of Plausibility on Implementation Choice for Negative Reappraisals

Although there was not a significant effect of self-reported plausibility on implementation choice for both trials combined,  $b = 0.11$ ,  $SE = .077$ ,  $z = 1.42$ ,  $p = .157$ , 95% CI [-0.04, 0.26],  $OR = 1.12$ , there was the expected effect on the GENERATE – trials in which participants were more likely to implement a negative reappraisal (vs. distract) when it was rated as more plausible,  $b = 0.26$ ,  $SE = .128$ ,  $z = 2.00$ ,  $p = .046$ , 95% CI [0.00, 0.51],  $OR = 1.29$ . This effect, however, was nonsignificant for READ – trials,  $b = 0.12$ ,  $SE = .103$ ,  $z = 1.18$ ,  $p = .237$ , 95% CI [-0.08, 0.32],  $OR = 1.13$ .

Preliminary analysis revealed that our manipulation of high ( $M = 3.97$ ,  $SE = .06$ ) versus low ( $M = 3.71$ ,  $SE = .06$ ) plausibility was successful for negative reappraisals (see the [Supplemental Material](#) for the analyses). Contrary to our hypothesis and the above findings for self-reported plausibility on GENERATE – trials, there was not a significant effect of manipulated plausibility for READ – trials,  $b = 0.23$ ,  $SE = .187$ ,  $z = 1.23$ ,  $p = .219$ , 95% CI [-0.14, 0.60],  $OR = 1.26$ .

### Preregistered Question 4: Whether Plausibility Differs for Positive and Negative Reappraisals

Consistent with our hypothesis, participants rated positive reappraisals ( $M = 3.15$ ,  $SE = .03$ ) as less plausible than negative reappraisals ( $M = 3.77$ ,  $SE = .03$ ),  $b = -0.63$ ,  $SE = 0.043$ ,  $t(2323.58) = -14.78$ ,  $p < .001$ .



## Discussion

Replicating results of Study 1, participants were more likely to implement a positive reappraisal when feeling more positive, demonstrating the consistent and strong impact of positive emotion on reappraisal implementation choice. We further investigated whether the plausibility of the reappraisal increases the likelihood of choosing. Partially supporting our hypothesis, participants were more likely to implement a positive reappraisal when it was perceived to be more plausible (i.e., self-reported plausibility), but not when it was manipulated as of high (vs. low) plausibility.

The likely explanation for the lack of an effect of manipulated plausibility on choice rests on the finding that, although our manipulation was successful, the difference in self-reported plausibility between reappraisals we manipulated as high versus low manipulated plausibility was relatively small—and much smaller than the rating generated during piloting. This suggests that there may be some effect of how the reappraisals were presented/rated in the two groups on their evaluation of their plausibility. Alternatively, plausibility may be a highly idiosyncratic evaluation given participant's differing initial appraisals of the stimuli. For these reasons, we focus on self-reported plausibility in the rest of the discussion.

As predicted, individuals felt more positive after generating/reading a more plausible positive reappraisal. Further analyses revealed that positive emotion mediated the relationship between plausibility and implementation choice, suggesting that, as hypothesized, generating plausible reappraisals may have directly advanced goal progress toward feeling better, and the resulting positive emotions served as indicator to continue to implement those reappraisals.

Similar to Study 1, participants in Study 2 also frequently chose to implement negative reappraisals rather than to distract themselves (see the [Supplemental Material](#) for choice variation analyses). Consistent with our hypothesis, negative reappraisals were rated as more plausible than positive ones. Furthermore, exploratory analyses revealed that plausibility increased the likelihood of implementing a generated, but not provided, negative reappraisal.

Although plausibility influenced implementation choices for both positive and negative reappraisals, data suggest different underlying mechanisms. While the implementation of plausible positive reappraisals helped individuals increase their positive emotion, implementing plausible negative reappraisals did not (see the [Supplemental Material](#) for the analyses). As healthy individuals usually do not want to make themselves feel worse (Liu et al., 2023), it is likely that participants used negative reappraisals for instrumental rather than antihedonic purposes. When faced with stimuli that evoke negative emotions, people sometimes feel the need to understand what is happening (Schwarz, 1990) and negative stimuli that feature poignant portrayals of human behaviors could lead one to question life's purpose (Oliver, 2008). In other words, people might sometimes choose to implement reappraisals because they are motivated to further understand what is happening in the image (epistemic motive; Tamir, 2016). We investigated the role of emotion regulation motive in influencing implementation choice in Study 3.

### Study 3: Emotion Regulation Motive and Implementation Choice

Studies 1 and 2 answered whether and why people choose to implement a generated reappraisal, suggesting that pro-hedonic (i.e.,

to feel better) and epistemic (i.e., to know) motives might guide people to monitor different things when making implementation choices. We addressed this question in Study 3. We also examined whether our findings using static images of no personal importance can be generalized to real-life stressors.

Individuals are inherently driven to seek pleasure and avoid pain (Higgins, 2014). As such, it is not surprising that people often try to make themselves feel better (i.e., pro-hedonic motive) when experiencing negative emotion (Tamir & Millgram, 2017). As Studies 1 and 2 have already shown, one important source of monitoring pro-hedonic goal progress is positive emotion. We hypothesized that when having a pro-hedonic motive, PE after generation would predict increased implementation. Based on PE's higher predictive power than plausibility in Study 2's positive reappraisal trials and its direct relation to the motive to feel better, we also hypothesized that when having a pro-hedonic motive, PE after generation is a better predictor of implementation choice than is plausibility.

Despite the common assumption that people always want to feel good, empirical evidence suggests that sometimes individuals are willing to sacrifice immediate pleasure in exchange for utility (Tamir, 2016). Indeed, in Study 2, participants were more likely to implement self-generated negative reappraisals that were perceived to be more plausible, potentially to gain a deeper understanding of the images. Based on this finding, we hypothesized that when having the motive to understand the stressor (i.e., epistemic motive), plausibility would predict increased likelihood of implementation choice. Furthermore, PE after generation did not predict implementation for negative reappraisals in Study 2, presumably because participants had an epistemic rather than pro-hedonic motive. Thus, we hypothesized that when having an epistemic motive, plausibility is a better predictor of implementation choice than PE after generation. Notably, people may not generate many negative reappraisals when not instructed to do so, as they typically do not want to feel worse. As a result, it is likely that positive emotion would still influence implementation to some extent.

We also explored some additional questions. Studies on the effectiveness of reappraisal have demonstrated the mood-improving effects of creative reappraisals, both in the moment and in the long term (e.g., Southward et al., 2022; Wu et al., 2017). Given that previous studies mostly used artificial stimuli, we explored whether creativity predicts increased implementation for real-life stressors. We also explored whether real-life reappraisal frequency predicts increased implementation choice because people who often use reappraisal are more skillful (Ortner et al., 2016) and whether stressor intensity predicts decreased implementation choice because implementation for highly intense stressors may be cognitively demanding (Sheppes et al., 2014).

## Method

### Participants

Following Studies 1 and 2, we now had robust effect size estimates for the effect of positive emotion on implementation choice. Using more traditional power goals (>80% power at  $\alpha = .05$  [two-tailed]), a sample size of 180 was required to detect the odds ratio of 1.57 (positive emotion's effects on implementation choice from Study 2). To account for potential exclusions, we recruited

224 participants from Prolific. To be eligible for the study, participants had to be 18–64 years old, fluent in English, and reside in the United States. Following our preregistration (<https://doi.org/10.17605/OSF.IO/KQBW5>), we excluded individuals who answered both practice questions incorrectly ( $n = 2$ ), described at least one motive incorrectly during the instruction section and failed to choose the two assigned motives at the end of the study ( $n = 21$ ), and described the same stressor twice or reported making up one or both stressors ( $n = 12$ ; one participant met two exclusion criteria). A sample of 190 participants remained. In prior studies, we also excluded participants who consistently made the same choice. We mistakenly left this criterion out of the preregistration. To rectify this, we additionally excluded individuals who made the same choice (i.e., implementation vs. distraction) over 90% of the time (i.e., chose the same strategy for all eight reappraisals;  $n = 56$ ). This resulted in a sample of 134 participants. We present the findings based on this exclusion, which should have been in preregistration and is consistent with Studies 1 and 2. We also present the results without this exclusion in the [Supplemental Material](#) to be true to the preregistration. We note in the Results section where the significance of results differs between the two samples.

Among the 134 participants, 65 (48.5%) responded to our question “how do you describe yourself” and answered male, 65 (48.5%) answered female, 3 (2.2%) answered nonbinary, 1 (0.7%) did not answer, and no one chose to self-describe. They were 36.86 years old ( $SD = 11.23$ ) on average. Ethnic/racial representation was as follows: 69.4% White/Caucasian ( $n = 93$ ), 12.7% Black/African American ( $n = 17$ ), 9.7% Asian ( $n = 13$ ), 2.2% American Indian or Alaskan Native ( $n = 3$ ), 3.7% identified as other ( $n = 5$ ), and 2.2% did not answer ( $n = 3$ ). In addition, 11.9% of participants identified as Hispanic/Latino ( $n = 16$ ).

### Reappraisal Choice Task

**Overview.** Participants reported on two stressors—one for each motive condition (pro-hedonic, epistemic). After describing the first stressor, they provided information on the stressor, were given a regulatory motive, then provided reappraisals, and then indicated their implementation choice and other characteristics of the reappraisals. They then did the same for the other stressor with the other motive condition. The order of the conditions was counterbalanced across participants (see the [Supplemental Material](#) for the effects of order on choice).

**Stressor Description.** Participants were asked to think of one ongoing, negative stressor and briefly describe it. They then reported the intensity of their current emotion, their positive emotion, and their negative emotion (1 = *not at all*, 7 = *very*). Considering that negative emotion is frequently measured in other emotion regulation studies, we included it here to have a more complete picture of reappraisals’ emotional effects. Emotion ratings for the stressor were used to explore the effects of intensity on people’s implementation choice.

**Motive Assignment.** For each stressor, participants were randomly assigned one of the two motives: to make themselves feel better about the stressor (i.e., pro-hedonic) or to better understand the stressor (i.e., epistemic). After participants briefly described the goal for the reappraisals, the instruction was shown again to make sure they remembered the assigned motive.

**Generation.** Next, participants wrote down four reappraisals for the stressor, one at a time. To remind them of the negative experience and to limit the effect of generating each reappraisal, the stressor description was presented every time they tried to generate a new reappraisal. Following each generated reappraisal, participants rated how positive/negative coming up with that reappraisal made them feel, and the plausibility (“the extent to which the reappraisal reflects what actually happened or could potentially happen”) and creativity (“the use of original ideas that are difficult to obtain from others”) of the current reappraisal on a 7-point Likert scale (1 = *not at all*, 7 = *very*). Participants also made a choice on whether they wanted to use the reappraisal later or not.

**Implementation/Distraction.** After generating and evaluating the four reappraisals, one reappraisal was randomly selected, and participants followed through with their choice for just that reappraisal. Participants were informed of this procedure in the earlier instruction/practice phase to ensure that they genuinely considered their decisions to potentially implement each reappraisal or not, a tactic commonly used in decision-making studies (e.g., [Gneezy & Potters, 1997](#)). If participants chose to use the selected reappraisal, they were shown it for 15 s while elaborating on it (i.e., implementation). They did not write down the elaborations. If participants chose not to use the selected reappraisal, they were shown the stressor description for 15 s and counted the number of a certain letter in it (i.e., distraction). After using the reappraisal or distraction task, participants rated their current positive and negative emotions separately (1 = *not at all*, 7 = *very*). If they chose not to use the reappraisal, they additionally reported their count of the selected letter.

### Procedure

The study was hosted through the online platform Qualtrics (<https://www.qualtrics.com>). After giving consent to participate, participants were informed that the present study was about how people deal with their daily-life stressors. They then read an introduction about the task procedure and completed two practice trials. Next, participants completed the reappraisal task for each assigned motive. Following the main task, participants completed the reappraisal scale of the Emotion Regulation Questionnaire ([Gross & John, 2003](#); see the [Supplemental Material](#) for scale introduction) and a posttask survey. They were then debriefed and compensated \$6 for their time.

### Preregistered Analytic Approach

The analytic approach was identical to Study 2, except that there was no manipulated plausibility in Study 3.

### Results

#### Preregistered Question 1: The Effects of PE on Implementation Choice in the Pro-Hedonic Condition

Consistent with our hypothesis and replicating Studies 1 and 2, for the pro-hedonic motive and when only including PE as a predictor in the model, participants were more likely to choose implementation (vs. distraction) when having higher PE,  $b = 0.63$ ,  $SE = .104$ ,  $z = 6.07$ ,  $p < .001$ , 95% CI [0.43, 0.83],  $OR = 1.87$ .

### Preregistered Question 2: Whether PE Is a Better Predictor Than Plausibility in the Pro-Hedonic Condition

Consistent with Study 2, in the pro-hedonic condition, when including only plausibility in the model, participants were more likely to choose implementation (vs. distraction) when reporting higher plausibility,  $b = 0.40$ ,  $SE = .096$ ,  $z = 4.12$ ,  $p < .001$ , 95% CI [0.21, 0.58],  $OR = 1.49$ . However, consistent with our hypothesis, PE after generation was more predictive of implementation choice than plausibility when they were included as predictors in the same model—PE after generation:  $b = 0.57$ ,  $SE = .106$ ,  $z = 5.36$ ,  $p < .001$ , 95% CI [0.36, 0.77],  $OR = 1.76$ ; plausibility:  $b = 0.26$ ,  $SE = .104$ ,  $z = 2.55$ ,  $p = .011$ , 95% CI [0.06, 0.47],  $OR = 1.30$  (see Figure 3).

Furthermore, likelihood ratio tests revealed that the addition of PE after generation to the model including only plausibility resulted in more improvement in model fit,  $\chi^2(2) = 38.03$ ,  $p < .001$ , than the addition of plausibility to the model including only PE,  $\chi^2(2) = 7.63$ ,  $p = .022$ . Taken together, these results suggest that PE after generation is a stronger and better predictor of implementation choice than plausibility when people aim to make themselves feel better.

### Preregistered Question 3: The Effects of Plausibility on Implementation Choice in the Epistemic Condition

Consistent with our hypothesis, when including only plausibility in the model for the epistemic motive, participants were more likely to choose implementation (vs. distraction) when reporting higher plausibility,  $b = 0.56$ ,  $SE = .108$ ,  $z = 5.14$ ,  $p < .001$ , 95% CI [0.34, 0.77],  $OR = 1.74$ .

### Preregistered Question 4: Whether Plausibility Is a Better Predictor Than PE in the Epistemic Condition

When including only PE after generation in the epistemic model, participants were more likely to choose implementation

(vs. distraction) when having higher PE,  $b = 0.67$ ,  $SE = .102$ ,  $z = 6.53$ ,  $p < .001$ , 95% CI [0.47, 0.86],  $OR = 1.94$ . Contrary our hypothesis, however, PE after generation was still more predictive of implementation choice than was plausibility when they were included as predictors in the same model—PE after generation:  $b = 0.63$ ,  $SE = .103$ ,  $z = 6.09$ ,  $p < .001$ , 95% CI [0.42, 0.83],  $OR = 1.87$ ; plausibility:  $b = 0.46$ ,  $SE = .111$ ,  $z = 4.10$ ,  $p < .001$ , 95% CI [0.24, 0.67],  $OR = 1.58$  (see Figure 3).

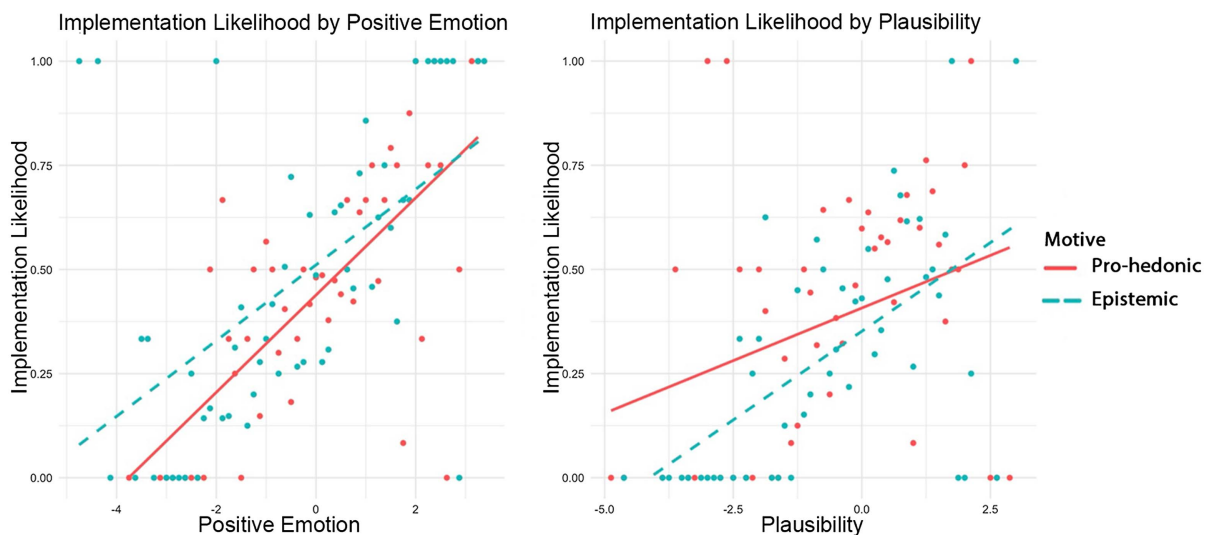
Furthermore, likelihood ratio tests revealed that the addition of PE after generation to the model including only plausibility resulted in more improvement in model fit,  $\chi^2(2) = 47.72$ ,  $p < .001$ , than the addition of plausibility to the model including only PE,  $\chi^2(2) = 30.13$ ,  $p < .001$ . Taken together, these results suggest that PE after generation remains a stronger predictor of implementation choice than plausibility, even when people aim to understand the stressor.

### Exploratory Analyses

For exploratory analyses, we preregistered tests examining the effects of creativity, habitual use of reappraisal, and stressor intensity on implementation choice (see the Supplemental Material for models and analyses for separate trials). Implementation likelihood was positively predicted by reappraisal creativity,  $b = 0.37$ ,  $SE = .060$ ,  $z = 6.23$ ,  $p < .001$ , 95% CI [0.26, 0.49],  $OR = 1.45$ , and negatively predicted by stressor intensity,  $b = -0.23$ ,  $SE = .100$ ,  $z = -2.28$ ,  $p = .022$ , 95% CI [-0.43, -0.03],  $OR = 0.80$ . Importantly, the addition of PE after generation to the model including only intensity resulted in more model fit improvement,  $\chi^2(2) = 108.14$ ,  $p < .001$ , than the addition of intensity to the model including only PE after generation,  $\chi^2(2) = 11.44$ ,  $p = .003$ . There was no main effect of reappraisal tendency on implementation choice,  $b = 0.08$ ,  $SE = .072$ ,  $z = 1.13$ ,  $p = .258$ , 95% CI [-0.06, 0.22],  $OR = 1.08$ .

**Figure 3**

*The Relationship Between Positive Emotion and Implementation (Left) and the Relationship Between Plausibility and Implementation (Right)*



Note. See the online article for the color version of this figure.



## Discussion

In Study 3, we examined whether different emotion regulation motives guide how properties of generated reappraisals relate to the decision to implement it or not. Consistent with our hypothesis and with Studies 1 and 2, when having a pro-hedonic motive, positive emotion predicted increased implementation choice and was a stronger predictor than was plausibility. When the goal of reappraisal is to feel better, positive emotion directly reflects people's progress toward their goal and reinforces their motivation to continue to implement the reappraisal in the service of that goal. Moreover, positive emotion was also a better predictor of choice than was stressor intensity, a well-established, strong predictor of regulatory choices (Sheppes et al., 2014). This underlies the importance of differentiating regulatory choices at different phases—although characteristics of the stressor might be more important before one initiates emotion regulation, one's feelings may be more valuable when deciding to continue emotion regulation.

When having an epistemic motive, participants were also more likely to implement a reappraisal when perceiving it to be more plausible. However, contrary to our hypothesis, positive emotion remained a stronger predictor of choice than plausibility in the epistemic condition. One possibility is that plausibility does not directly reflect goal progress toward understanding the stressor like positive emotion does in the pro-hedonic condition. Instead, there may be another construct that might better predict implementation choice in the epistemic condition. For instance, people might care more about whether the reappraisal provides an epistemic closure (Neuberg et al., 1997) or whether it reveals any deeper meaning (Ryan & Deci, 2001). It is also possible that the two motives do differ much in predicting implementation choice. However, the alternative and more likely explanation is that people might still have a pro-hedonic goal in the epistemic condition—although it is not strong enough to produce significant increases in positive emotion (see the [Supplemental Material](#) for analysis comparing PE after generation and implementation), it might be salient enough to make people monitor positive emotion. This motive could be generic, secondary, and coexist with other motives people have. Notably, plausibility remained a unique predictor of implementation choice and significantly improved model fit in both motive conditions. Despite not being the strongest predictor, plausibility is still something people consider when making implementation choices.

Exploratory analyses revealed for the first time that creativity predicted increased implementation likelihood, suggesting that it might be an important construct to measure in future studies on implementation choice (Southward et al., 2022; Weber et al., 2014). The habitual use of reappraisal did not predict implementation choice (except in the full sample that included participants who constantly made the same choice, in which it positively predicted implementation), suggesting that the inclination to select reappraisal as a strategy in one's life is not the same as the inclination to further implement reappraisals once one has generated them.

## General Discussion

Existing literature on emotion regulation choice often explores the trade-offs between initiating two different strategies, such as

reappraisal and suppression (e.g., Cutuli, 2014) or reappraisal and distraction (e.g., Sheppes et al., 2014). The present study takes a different approach and focuses on choices to continue using an instructed strategy versus discontinue and switch to another. Specifically, we examined people's choice between moving on to the next stage of a strategy (i.e., reappraisal implementation) and diverting their attention to something else (i.e., distraction) after investing some effort in the strategy (i.e., reappraisal generation). We further investigated the role of positive emotion and plausibility in predicting these choices using both negative pictures (Studies 1 and 2) and real-life stressors (Study 3).

We first replicated the dissociation between reappraisal generation and implementation across three studies (Waugh et al., 2022). Consistent with previous literature showing the effectiveness of reappraisal (McRae, 2016; Webb et al., 2012), people felt more positive after implementing a positive reappraisal rather than distracting themselves by memorizing or counting the letters. Like previous studies, this change in positive emotion was stronger following implementation than generation of the reappraisals. Furthermore, we demonstrated for the first time that implementation-related increases in positive emotion persisted when they were reexposed to the same negative pictures, indicating that reappraisal implementation changed the stimuli's meaning much more enduringly than just generating possible reappraisals.

Despite its effects on increasing positive emotion, people did not always choose implementation over distraction when given the choice. Instead, they monitored the effectiveness of each reappraisal and flexibly chose to implement it or not. Specifically, we found evidence that positive emotion and plausibility are important indicators of people's progress toward their regulation goals—either to feel better or to understand the stressor. Across three studies, people favored implementing reappraisals that made them feel more positive and reappraisals that were more plausible. Although these findings do not support the goal achievement mechanism (Martin et al., 1993)—that high positive emotion and plausibility signal people to attend to something else—it may still have been a factor when generating mixed reappraisals in Study 1. It is also possible that people might still monitor positive emotion after multiple rounds of implementation to determine that they have succeeded and can attend to other things. Future investigations should examine people's choices to stop implementing once they have started to test this formulation.

Interestingly, people favored external distraction over reappraisal implementation when feeling only slightly positive following generation, which is arguably when effective emotion regulation is most needed. When increases in positive emotion after generation are relatively small, the generated reappraisals may seem ineffective and therefore not quality candidates for implementation. In certain situations, this could be considered a reasonable choice—after all, why invest time in an ineffective strategy instead of switching to an alternative that might work? However, if people fail to switch to a helpful strategy, or if they mistakenly believe they have changed the stressor's negative meaning during generation, not moving on to implementation could be problematic. In fact, some people drop out of cognitive behavioral therapy after perceiving improvement, yet research suggests that they face a greater risk of psychological problems than those who continue (Bados et al., 2007). Similarly, in clinical settings, individuals who are able to generate candidate reappraisals but choose not to implement them may repeatedly



suffer from similar upsetting events. Rather than focusing on generating possible reappraisals, more targeted training in selecting and elaborating on candidate reappraisals might help them cope with recurring stressors.

Although the effect of plausibility on reappraisal is relatively understudied, previous literature has shown that people are motivated to be authentic (Jongman-Sereno & Leary, 2019), which requires plausible reinterpretations as reappraisals. Plausibility's predictive power is also consistent with individuals' tendency to prefer counterfactual thoughts (i.e., conditional alteration of a past event) that are more likely to be true (Petrocelli et al., 2011). However, if these repetitive attempts at reappraising the stressor continue unabated, it could give rise to rumination and lead to detrimental emotional outcomes (Cohen et al., 2014). As such, future investigations should examine how people who regularly ruminate perceive the plausibility of their thoughts. Future studies should also examine the determinants of plausibility, such as different reappraisal tactics (e.g., perspective-based reappraisal; Anderson et al., 2020) or construal level (i.e., spatial, temporal, social, and hypothetical distances; Abraham et al., 2023).

Notably, positive emotion was a more important predictor of choice than was plausibility, both when people aim to make themselves feel better and when people aim to understand the stressor. This finding indicates that people might have a pro-hedonic motive to some extent even when they are instructed to primarily focus on an instrumental one. Meanwhile, positive emotion and plausibility are just two possible indicators of a reappraisal's potential success. Many other possible candidates, such as creativity, are also worthy of exploration. Future research should investigate other potential indicators and varying criteria for different motives. Besides hedonic and epistemic motives, Tamir's (2016) taxonomy of emotion regulation motives identifies additional motives for future research to explore: behavioral (i.e., to perform well), social (i.e., to create and maintain social relationships), and eudaimonic (i.e., to find meaning) motives. For example, when having the motive to perform well, people might strive for a more neutral emotional state (vs. positive) to avoid potential interference (Erber & Erber, 1994). Researchers should also examine whether people generate and use different reappraisal tactics for different motives (McRae et al., 2012; Vlasenko et al., 2024).

The study of implementation should not be restricted to reappraisals generated by oneself. People are active support seekers and often turn to their close ones when having emotional experiences (e.g., Bazarova et al., 2015; Schachter, 1959). Those close ones might generate reappraisals that people can implement for themselves, in other words, interpersonal reappraisal. Not only is interpersonal reappraisal effective in lowering emotional distress (Nils & Rimé, 2012), but it might also be more effortless than intrapersonal reappraisal, as no generation is required. Such a technique could be particularly helpful for people who have difficulties in generating reappraisals on their own. Although we provided participants pregenerated reappraisals in Study 2, they were different from reappraisals provided by close others, who might know the target better, and were not communicated in a social context (Sahi et al., 2021). Future research should examine whether the effects of positive emotion and plausibility can be replicated in an interpersonal context where reappraisals are provided by others.

In conclusion, replicating and extending Vaughn et al.'s (2022) study on dissociating reappraisal generation and implementation, these studies demonstrated that the likelihood of implementation

increases as positive emotion after generation and plausibility increase. Importantly, positive emotion is strongly associated with more frequent reappraisal implementation, such that individuals monitored it when having a motive to feel better as well as when having a motive to understand the stressor. Our findings also speak to what could happen if people try and fail to generate reappraisals or reappraisals of good quality—they may simply give up. These findings shed light on how people monitor their emotion regulation success and highlight the importance of studying reappraisal's subprocesses.

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