Title

Conceal and Don't Feel as Much? Experiential Effects of Expressive Suppression.

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Publication Date

2024-11-06

DOI

10.1177/01461672241290397

Abstract

Emotion regulation research has routinely pitted the antecedent-focused strategy of cognitive reappraisal against the response-focused strategy of expressive suppression. This research has largely yielded that reappraisal is an effective strategy by which to change emotional experience, but implications of expressive suppression are not as clear. This may be due to variations in experimental methodologies, which have not consistently evaluated suppression against a within-subject control condition, as well as conceptual limitations that have muddled the implications of significant findings. Across two high powered, within-subject paradigms, the present study demonstrates that expressive suppression induces significant decreases in negative emotion relative to one's general attempts to downregulate negative emotion (Study 1) and respond naturally (Study 2). Our findings add to a growing body of literature that demonstrate that suppression may facilitate emotion regulation at both the expressive and experiential levels, and underscore the importance of incorporating flexibility and goal-focused frameworks in future research.

Keywords: expressive suppression, cognitive reappraisal, emotion regulation, emotion experience, affect

Conceal and Don't Feel as Much? Experiential Effects of Expressive Suppression

The field of emotion regulation has grown significantly over the past several decades (Gross, 2015), contributing a great deal to our understanding of how people may enact efforts or goal-directed behaviors to manipulate or maintain the magnitude or duration of an emotion experience and/or expression of emotions (e.g. Gross & Thompson, 2007; Davidson, Putman, & Larson, 2000; Andreotti et al., 2011). Both foundational and current emotion regulation theory and research focus heavily on contrasting the effects and implications of specific regulation strategies against one another, particularly cognitive reappraisal and expressive suppression. While cognitive reappraisal is thought to occur ahead of a full-blown emotional response and focuses on changing the way one thinks about the situation or their emotion to change their feelings, expressive suppression is reasoned to occur once an emotional experience has already begun, directing efforts instead towards inhibiting facial and bodily expressions (Gross, 1998).

The consensus that has emerged from this body of work is that the antecedent-focused strategy of cognitive reappraisal is effective in producing change in emotion experience, but that expressive suppression, a response-focused strategy, impacts primarily expressive behavior while leaving emotional experience intact. However, a closer inspection of the literature suggests that the evidence on expressive suppression's emotion regulatory function is somewhat mixed. Specifically, a non-negligible number of studies have found that suppression actually leads to reductions in negative emotional experience when compared to control conditions (e.g., no regulation or respond naturally) manipulated within-subjects (e.g., Bebko et al., 2011; Goldin et al., 2008; Shiota & Levenson, 2009). Despite this evidence that suppression may improve emotional experience, these findings have often been attributed to methodological artifacts or theoretical confounds. This is likely because prevailing theoretical models make strong claims

about why expressive suppression should not alter emotion experience (i.e., process model; Gross, 1998, 2015b; Gross & Thompson, 2007) and because findings from between-subjects experimental studies have largely adhered to the predictions of this model.

In light of this, the question of if and when expressive suppression might effectively alter emotional experience warrants further examination. For example, in its effects on emotional experience, is suppression similar to doing nothing or does it afford a regulatory advantage? If the latter, are these effects better captured using within-subjects designs that have more power to detect smaller effects? The present research aimed to answer these questions in two high-powered, within-subject experiments while ruling out key methodological ambiguities that have prevented researchers from taking significant suppression effects seriously in past research.

Paradoxical Findings on Expressive Suppression

To organize and understand the ways in which people may commonly regulate their emotions, the influential process model of emotion regulation (e.g., Gross, 1998, 2015b; Gross & Thompson, 2007) creates families of different strategies according to when they impact the emotional process. In this model, expressive suppression is a response-focused strategy, occurring later in the emotion generative sequence and after a full-blown emotional response has begun. Because of this, suppression is not thought to impact the emotion experience itself but instead be effective in modulating the outward displays of emotion. This theoretical assumption has been supported by a relatively large corpus of evidence from between-subjects experiments demonstrating that expressive suppression is not as effective as reappraisal in modulating emotion (e.g., Hofman et al., 2009; Kalokerinos et al., 2015; cf. Butler et al., 2003; Ehring et al., 2010; Rohrmann et al., 2009) and leaves emotional experience intact similar to a no-regulation control condition (e.g., Butler et al., 2003, 2006; Demaree et al., 2006; Gross, 1998; Gross &

Levenson, 1997; Richards & Gross, 1999, 2000, 2006; Richards et al., 2003; Roberts et al., 2008; Schmeichel et al., 2008; cf. Davis et al., 2009, Yuan et al., 2014).

Co-existing with these findings, however, is a smaller literature relying heavily on within-subjects designs. These studies have shown expressive suppression to be an effective strategy in modulating emotion experience relative to unregulated control conditions while viewing images (positive: Li et al. 2020; Ortner et al., 2016; Pedder et al., 2016; negative: Bebko et al., 2011; Livingstone & Isaacowitz, 2018; Mohammed et al., 2021; Ortner et al., 2016; Paul et al., 2013) and negative film clips (Goldin et al., 2008; Shiota & Levenson, 2009; cf. images: Bonanno et al., 2004; Dillon et al., 2007; Hendricks & Buchanan, 2016; negative: Pedder et al., 2016; cf. films: Labuschagne et al., 2019; Robinson et al., 2009). The aforementioned studies have observed this effect as changes in intensity (i.e., lowest value represented little to no emotion and the highest value represented extreme or very high levels of emotion; Bebko et al., 2011; Goldin et al., 2008; Li et al., 2020; Mohammed et al., 2021; Ortner et al., 2016; Shiota & Levenson, 2009) or changes in valence and intensity (i.e., lowest values corresponded to extremely/very negative and highest values corresponded to extremely/very positive; Davis et al., 2009; Pedder et al., 2016). Moreover, the regulatory effects of suppression observed in these individual studies were consistent with results from a comprehensive meta-analysis (Webb et al., 2012), which found that expressive suppression exerted a small but significant reduction in the experience of emotion relative to control conditions across the totality of within and between-subject experiments.

Despite this evidence, assumptions about the ineffectiveness and long-term maladaptiveness of expressive suppression have largely persisted. This was most clear in a recent special issue of *Emotion* that explored fundamental questions in emotion regulation, which

described expressive suppression as an "ineffective" strategy (Nozaki & Mikolajczak, 2020, p. 12) and summarized its emotional effects as "weak, null, or paradoxical (reversed)," (McRae & Gross, 2020, p. 3). Even though some authors discussed potential situations in which suppression could be adaptive (e.g., Colombo et al., 2020; English & Eldesouky, 2020), many of these articles ultimately continued to operate on the assumption that expressive suppression is an ineffective strategy for producing change in emotional experience.

Methodological Practices Promoting Present Assumptions

Why have the significant experiential effects of expressive suppression found in some prior work been largely overlooked in recent reviews? One possible reason for this is the simple fact that there are more individual studies that find null rather than significant suppression effects on emotion experience. This may partly be due to the field's heavy reliance on between-subjects paradigms to quantify emotion regulation efficacy at the group level, largely contrasting the experiential effects of expressive suppression with those of cognitive reappraisal or an unregulated or natural emotional response condition. Many, though not all (e.g., Bonanno et al., 2004; Dillon et al., 2007; Gross, 1998), findings showing null effects of suppression have arisen from these paradigms (e.g., Butler et al., 2003, 2006; Demaree et al., 2006; Gross, 1998; Gross & Levenson, 1997; Richards & Gross, 1999, 2000, 2006; Roberts et al., 2008; Schmeichel et al., 2008).

Fewer studies have utilized within-subject approaches, where each individual's unregulated reactivity to the eliciting stimulus is assessed in addition to their regulated response. For instance, Webb et al.'s (2012) meta-analysis revealed that only 24 out of 98 cognitive reappraisal and 16 out of 56 expressive suppression studies analyzed included a control condition within-subject wherein participants were instructed to respond naturally or avoid specific

regulation tactics. To the extent that experiential effects of expressive suppression may be small and difficult to detect when contrasted with reappraisal or no regulation, reliance on between-subjects paradigms might fail to detect suppression effects as they afford less statistical power. Thus, because null effects of suppression are consistent with existing theory, the literature showing contradictory effects may have been too small to create the impetus needed to reexamine current assumptions and expectations about expressive suppression. However, although the regulatory function of suppression may be best studied in within-subject paradigms, such designs are not without limitations. On the contrary, they raise separate concerns about methodological artifacts that can make the interpretation of findings ambiguous. These concerns must be explicitly addressed if new studies are to move the field forward.

One such limitation of within-subject paradigms is that they may be more vulnerable to demand (e.g., Charness et al., 2012; Orne, 2017; Zizzo, 2010). That is, having multiple conditions specifying different desired emotional outcomes (e.g., emotion goals such as feel less negative, hide your emotions, or respond naturally) may make the overall goals of the study more transparent, leaving participants more susceptible to experimenter demand. Although demand concerns around experience are less applicable to suppression than to reappraisal conditions, the latter of which often include explicit instructions to decrease or increase emotional experience, this issue is one reason why the emotion regulation field has historically relied more heavily on between- rather than within-subjects designs.

Another issue concerns possible carryover effects (see Livingstone & Isaacowitz, 2018), which can occur because participants are exposed to multiple emotion regulation conditions in within-subject paradigms. Specifically, carryover effects may occur if participants use strategies or instructions from previous portions of the experiment in subsequent trials or blocks, such as

using an earlier instructed reappraisal strategy in a later trial or block where they are instructed to use suppression. In this case, lower negative emotion during instructed suppression periods may simply be due to the uninstructed implementation of reappraisal, which is a challenging confound to rule out.

Conceptual Limitations in Unpacking Paradoxical Suppression Effects

The persistent assumption that expressive suppression is ineffective is also supported by the practice of attributing individual prohedonic suppression effects (i.e., wherein negative mood is dampened) to methodological artifacts or theoretical confounds post-hoc. For instance, Shiota and Levenson (2009) speculated that the unexpected decreases in negative affect observed in their study during the suppression (vs. unregulated) block were due an inadvertent difference in stimulus intensity. Specifically, they reasoned that the film clip shown while participants were asked to suppress was simply less intense and thus induced lower negative affect compared to other conditions. Likewise, after finding that suppression led to significant reductions in negative affect relative to a natural response condition, Bebko and colleagues (2011) raised the possibility that trying to minimize expressive behavior during suppression might have served as a distraction, redirecting attention away from the emotion experience itself, thereby dampening its intensity (see also Goldin et al., 2008 for a similar argument).

Indeed, if a stimulus is less intense, it may be less difficult to regulate the resulting emotional reactivity. For instance, cognitive reappraisal has been shown to be more effective at regulating affect for low vs. high-intensity images (Sheppes & Meiran, 2007, 2008). By contrast, to the best of our knowledge, only one study has examined whether the impact of expressive suppression on emotion experience (vs. no regulation) varied as a function of intensity (Ortner et al., 2016). However, as Ortner and colleagues (2016) were primarily interested in the effects of

cognitive reappraisal, it is unclear whether suppression's effects varied significantly by negative image intensity as pairwise contrasts were not reported.

Unfortunately, additional evidence does not clarify whether stimulus intensity is a modulating factor in suppression's regulatory effectiveness. For instance, when given the option to choose a strategy in the face of highly intense stimuli, people tend to prefer to use disengagement strategies like distraction over engagement strategies like reappraisal because the former enable more shallow processing and thus reduced reactivity (Sheppes et al., 2011). Thus, if suppression indeed involves disengagement (as suggested by Bebko et al., 2011 and Goldin et al., 2008), one might expect that participants would use suppression more than reappraisal when stimulus intensity is heightened. However, while some studies have indicated that suppression use increases with intensity relative to reappraisal (e.g., Lennarz et al., 2019), others have shown that participants tend to use expressive suppression *less* than reappraisal when faced with highly intense stimuli (e.g., Dixon-Gordon et al., 2015). Some studies have even yielded null effects of stimulus intensity on the use of suppression vs. reappraisal (e.g., Wylie et al., 2022). These contradictions are further complicated by the fact that strategy use appears to be a distinct construct from strategy efficacy (Ford et al., 2017; Goldin et al., 2014; McRae et al., 2012). Thus, not only is it unclear if and how emotional intensity modulates expression suppression's effectiveness, but the reduced tendency to use a strategy does not necessarily indicate that that strategy would be less effective when enacted.

The Current Research

In short, there are several explanations that may help to illuminate why there has not been a more thorough investigation into the question of if and when expressive suppression effectively alters emotional experience. These reasons include the relative dominance of between-subjects

studies, which are less sensitive to detecting small(er) effects, the challenges of using within-subject paradigms to study emotion regulation, as well as methodological and theoretical confounds noted in studies that revealed suppression to be effective[1]. However, given the accumulating evidence, the possibility that suppression has legitimate, positive experiential effects warrants further investigation. Therefore, the current research was meant to serve as proof-of-concept, investigating whether expressive suppression influences the experiential components of emotion using within-subjects designs to maximize power while evaluating key methodological issues that have been raised as concerns in past research (i.e., demand, carryover effects, stimulus intensity). Overall, our expectation was that expressive suppression would modulate emotional experience when compared to people's natural unregulated responses, but would nonetheless be less effective than cognitive reappraisal.

With this goal in mind, we first re-analyzed data from a previously published study by Livingstone and Isaacowitz (2018). This dataset utilized a blocked, mixed design where participants reported their affect[2] while viewing images and applying general regulation (control), expressive suppression, or cognitive reappraisal. Second, to replicate these effects, we utilized data from an experimental study that employed a randomized within-subject design in which all participants reported their negative affect while viewing images and applying no regulation (control), expressive suppression, or cognitive reappraisal.

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[1] Although expressive suppression's effectiveness is typically operationalized via changes in expressivity, since the present investigations were focused on changes in emotional experience, we use terms like "effectiveness" for both reappraisal and suppression strategies to simplify our descriptions of regulation-associated changes in our primary outcome, negative affect.

[2] Previous emotion regulation paradigms have employed methods to induce and measure changes in discrete emotions or general affect. However, as we did not have specific predictions regarding expressive suppression's effect on discrete emotions, the present studies utilized data and employed measures to assess changes in negative affect.

These experimental designs and data analysis were not pre-registered: Study 1 data were collected as part of a larger study exploring age-related differences in emotion regulation, while Study 2 data were collected as part of a larger study exploring individual differences in emotion regulation. Given that our goals were to assess moderators in regulatory effectiveness and previous studies had observed small effect sizes for expressive suppression (e.g., Webb et al., 2012), Study 2 aimed to recruit as large of a sample possible while utilizing in-person data collection across three academic semesters, with a target sample size of at least 200 participants. Across both studies, no exclusions were applied and all available data pertaining to the central research question were used. Data were analyzed using the statistical program "R" Version 4.3.1 (R Core Team, 2023) and the "nlme" (Pinheiro et al., 2023) and "emmeans" packages (Lenth et al., 2023). All data, analysis code, and supplemental materials are available at https://osf.io/6z37b/?view_only=92ff6ea74d33415aa4d1fc32232595ab.

These designs permitted us to extend emotion regulation literature by evaluating prior explanations for suppression's effects related to demand (Study 1 and 2), carryover effects (Study 2), and stimulus intensity (Study 2). To lessen demand concerns, Study 1 equated emotion experiential goals across within-subject conditions and Study 2 utilized traditional expressive suppression instructions that do not include an experiential goal (e.g., Gross, 1998; Gross & Levenson, 1993, 1997). To minimize carryover effects, Study 2 used a randomized trial design that permitted us to examine whether the prior regulation cue moderated affect during the subsequent trial. Last, Study 2 utilized negative stimuli that were rated as low, moderate, or high in intensity, which permitted us to examine whether emotional intensity modulated both expressive suppression and cognitive reappraisal's effects on experience relative to no regulation.

Study 1

Study 1 examined how negative affect was influenced by expressive suppression and cognitive reappraisal when compared to an individual's non-specific attempts to decrease negative affect. To do this, raw emotion regulation data collected by Livingstone and Isaacowitz (2018) was obtained and re-analyzed at a more sensitive level with direct respect to the present research question. This study utilized a mixed design in which participants were instructed to downregulate negative affect using multiple strategies that varied at the within-subject level across three blocks, with the specific grouping of strategies varying at the between-subjects level across three experimental groups. All participants rated their level of negative affect continuously throughout the task.

Participants in the emotion regulation groups employed instructions to expressively suppress, cognitively reappraise, or generally regulate while viewing negative images. In contrast to a typical "watch" or "view" control condition, Livingstone and Isaacowitz's (2018) general regulation instructions encouraged participants to downregulate negative affect but stipulated no specific manner by which to do so. This contrast provided a more stringent examination of the relative experiential effects of suppression and reappraisal: since participants shared a common goal to reduce negative affect, any observed effects can be more clearly attributed to the nature by which one attempted to attain this goal (e.g., changing expression or appraisals). Additionally, by aligning emotion goals across strategies, concerns about strategy differences in demand characteristics are lessened. In consideration of prior work (e.g., Goldin et al., 2008; Gross, 1998), we hypothesized that an individual's level of negative affect would be lowest when they employed cognitive reappraisal, but that expressive suppression would also result in lower negative affect relative to when the participant used non-specific regulation.

Furthermore, similar to other between-subjects designs (e.g., Gross & Levenson, 1993; Richards et al., 2003; Richards & Gross, 2000), a subset of Livingstone and Isaacowitz's (2018) participants were instructed to simply view negative stimuli and report their unregulated negative affect. Therefore, this design also allowed us to test for the possibility that changes in negative affect were not due to emotion regulation, but instead simply a byproduct of habituating to the negative stimuli. The latter possibility would be supported if those in the view condition reported decreases in negative affect across consecutive blocks.

These data were previously collected with the goal to examine age differences in emotion regulation efficacy (Livingstone & Isaacowitz, 2018). During the original analytic steps, continuous affect ratings were averaged in order to provide a single rating for each instructional block at the participant level. In light of both factors, previously published analyses related to affect included age as a moderating factor and were conducted using ANOVA. In the present set of analyses, we treat affect continuously and model the data using multilevel modeling techniques. This approach allows for a more sensitive analysis and accounts for random variability introduced by the nested structure of the data (i.e., affect ratings and instructional blocks were nested at the level of the individual), providing a more direct test of the questions of interest in this paper.

Method

Participants

Emotion regulation data were available for 163 participants whose age ranged from 18 to 88 years (M = 43.15 years, SD = 25.43) and identified as predominantly female (98 female, 62 male, 5 declined to state) and White/European American (108 White/European American, 26 Asian/Asian American, 8 Hispanic/Latino, 6 Black/African American, 4 multiracial, 8 declined

to state, and 5 identified with a race/ethnicity not listed). Participants were recruited from introductory psychology classes for course credit (n = 83) and the Boston area via flyers and print and online advertisements for $10/hr ($n$ = 80). This study was approved by the Institutional Review Board (IRB) at Northeastern University.

Procedure

After providing informed consent, participants answered demographic items and were then randomized into one of three experimental groups before receiving specific instructions for the emotion regulation task. Regardless of condition assignment, all participants completed three separate blocks of the task. Each block began with instructions for how to view the upcoming stimuli, which consisted of a series of images. Participants pressed a single button to begin and conclude each block, and provided continuous affect ratings during each block.

Stimuli

Ninety negative pictures were selected from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) and displayed using GazeTracker software (Eye-Tellect, Charlottesville, VA). Pictures were divided into three pseudo-randomized sets (one for each block), and valence and arousal ratings did not differ by block (p's > .23; see Table S1 for average valence and arousal ratings). Finally, a fixation cross was shown in the center of the screen for 1 second before every image, which meant that all blocks were approximately 3 minutes long.

Emotion Regulation Instructions

Each block of the experiment presented participants one of five emotion regulation strategies (see Table 1). Participants were randomized into one of three between-subjects

experimental groups that dictated which instructions they received in each of the three blocks that comprised the experiment (see Figure 1).

Negative Affect

While viewing each block of images, participants provided continuous affect ratings using an analog slider, with ratings from "most negative" (0) to "most positive" (100). The actual scale was labeled with numbers 0-10 to simplify the response procedure for participants, and the slider was set at the midpoint before each block. Participants were asked to keep their hand on the slider throughout the task and rate their current emotion while viewing the pictures. The experimental software sampled affect once per second. To encourage participants to maintain attention to their emotional state and continually update their affect rating while viewing images, a visual representation of the slider appeared on the screen approximately every minute during each 3-minute block, which reminded participants to check that their current rating accurately represented how they were feeling. Participants pressed the space bar to indicate that they had checked the slider's position, which then allowed the series of images to continue. Since we aimed to examine decreases in negative affect, we reverse scored each affect rating for easier interpretation. This score captured an index of negative affect (i.e., lower ratings = less negative affect) while just viewing, generally regulating, reappraising, or suppressing. Using this reverse-scored variable, average affect across all blocks and instruction cues was negative (M = 67.35, SD = 22.52), indicating that participants largely used the negative side of the rating dial while viewing negative images.

Results

Analytic Plan

In order to examine whether there were overall differences in self-reported negative affect throughout the emotion regulation task, multilevel modeling techniques were used to account for the nested structure of the data. We carried out the following steps for both preliminary[3] and main analyses: first, a base model was fit using fixed effects of Instruction Block, Experimental Group, and the Block x Group interaction as well as random intercepts for participant. Second, since blocks were nested within subject, a final model fit was assessed including the random slope of Instruction Block, which significantly improved model fit in both the preliminary ($\chi^2(16) = 143.28$, $p < .0001$) and primary analytic models ($\chi^2(13) = 11601.65$, $p < .0001$). For all models, pairwise comparisons were conducted with Bonferroni corrections, which also generated estimated marginal means and 95% confident intervals. In subsequent results, effect sizes (*d*) and 95% confidence intervals are reported for fixed effects derived from the multilevel models (Lenth, 2023).

Primary Analysis: Changes in Negative Affect

Our primary analysis of interest pertained to whether continuous affect ratings differed across blocks or experimental groups, which was assessed using a two-way mixed effects model. The results of this model showed a significant main effect of Instruction Block ($F(2, 102575) = 48.99$, $p < .0001$) and a significant main effect of Experimental Group ($F(2, 160) = 10.33$, $p < .0001$), qualified by a significant Block x Group interaction ($F(4, 102575) = 10.02$, $p < .0001$). To further explore this interaction, two sets of pairwise comparisons were conducted to examine

[3] Study 1's preliminary analyses indicated that more samples were collected for all participants during Block 1, likely while acclimating to the experimental task. This effect did not vary by group. Observed power analyses for the primary model are also included in this section (see Supplemental Materials for full analyses).

both within- (Instruction Block) and between-subject (Experimental Group) effects (see supplemental materials, Figure S1).

Within-Subject Comparisons

The first set of pairwise comparisons examined the estimated marginal means for each block within each group (see Table 2). Results revealed that negative affect did not significantly differ by instruction block for those in Group 1. However, participant's affect significantly differed by instruction block in Group 2 and Group 3. These results suggest that participants reported significantly lower negative affect when using positive (Group 2) or detached (Group 3) reappraisal relative to general regulation and expressive suppression, but that expressive suppression also significantly lowered negative affect relative to general regulation in both groups.

Between-Subject Comparisons

The second set of pairwise comparisons examined the estimated marginal means for each experimental group within instruction block (see Table 3). Results revealed that negative affect did not significantly differ by group during Block 1. During Block 2, participants who deployed positive and detached forms of reappraisal, respectively, reported significantly lower negative affect than those who just viewed stimuli. Positive and detached reappraisal did not produce significant differences in negative affect. Finally, during the third and final block, participants who deployed expressive suppression reported significantly lower negative affect than those who just viewed images. Groups 2 and 3 did not report significant differences in negative affect during Block 3, where both groups deployed expressive suppression.

Study 2

Study 1's re-analysis of previously published data (Livingstone & Isaacowitz, 2018) supported our hypotheses and suggested that expressive suppression can reduce an individual's negative emotional experience relative to their attempts to regulate with no specific strategy in mind. However, this experiment and data were not originally conducted or collected for the purpose of testing these predictions. Therefore, in Study 2, we aimed to provide corroborating evidence of the emotion findings observed in Study 1 via an experimental paradigm that was designed to assess individual differences in emotion regulation efficacy. This paradigm engaged participants in an emotion regulation task in which they were instructed to employ expressive suppression, cognitive reappraisal, and no regulation in randomized application to negative images. To prevent habituation to the negative content, neutral images were also randomized into the task. Participants provided self-report ratings of negative affect after each trial.

Since Study 1 equated emotion goals across all regulation conditions (i.e., decrease negative emotion), these findings indicate that demand cannot entirely account for specific regulatory effects on emotion. However, because Study 1's suppression instructions also included an experiential goal, one may argue that participants utilized additional methods to lower negative affect in addition to behavioral modification (i.e., minimizing expressiveness). This cue also diverges from more commonly used traditional expressive suppression instructions (e.g., Webb et al., 2012), which do not include experiential goals and instead encourage participants to not let any feelings show and behave in such a way that a person watching you would not know how you are feeling (e.g., Gross, 1998; Gross & Levenson, 1993, 1997). Therefore, Study 2 complemented Study 1 via the use of different instructions: within our suppression condition, no experiential goals were provided, and we utilized a simplified version of traditional expressive suppression instructions that were more recently employed (Dan-

Glauser & Gross, 2011, 2013). Additionally, in contrast to a non-specific regulation condition, a no regulation condition was used as our control. In consideration of Study 1, we predicted that we would observe the same pattern of regulation-driven effects on experience: negative affect would be lowest when an individual employed cognitive reappraisal, but expressive suppression would also result in lower negative affect relative to the participant's own natural response levels of negative affect.

Study 2 also expanded upon Study 1 in two ways. First, we assessed whether observed experiential effects of suppression were due to carryover effects, a potential confound in within-subject designs. If these effects were to occur, then negative affect on suppression trials preceded by a reappraisal cue might be lower than those preceded by a no regulation cue. Second, we investigated whether changes in affect induced by specific regulation strategies varied as a product of image intensity. If stimulus emotional intensity were to modulate expressive suppression and cognitive reappraisal's effects on experience relative to no regulation, then regulation-induced changes in negative affect may be lower for more intense stimuli. In light of the limited research on carryover effects and contradictory findings on intensity, Study 2 explored these effects without committing to specific hypotheses.

Method

Participants

Participants ($N = 234$) were drawn from an undergraduate sample whose age ranged from 18-33 years ($M_{age} = 20.49$ years, $SD_{age} = 1.78$) and identified as predominately female (174 females, 51 males, 2 selected other, and 7 did not disclose their sex). This sample was also ethnically diverse (106 Asian/Asian American, 55 White/European American, 38 Latino/Hispanic, 7 Middle Eastern, 6 Black/African American, 18 identified with multiple

ethnicities, and 8 declined to state) and socioeconomically diverse in terms of current household income (51 reported <$25,000, 38 $25,000-50,000, 48 $50,000-$100,000, 73 >$100,000, and 18 declined to state). Participants received course credit for their participation. The study was approved by the Committee for the Protection of Human Subjects (CPHS) at University of California, Berkeley.

Procedure

After providing informed consent, participants answered demographic items and then received instructions for the emotion regulation task. Participants were informed that they were to view a series of images on the screen in one of three ways, indicated by an instruction cue displayed prior to the presentation of images. After viewing each image series, participants rated their negative affect. Participants completed three practice trials to acquaint them with the timing of the stimulus presentations (depicted in Figure 2) before completing the experimental task, which consisted of 36 trials.

Stimuli.

Eighty-one negative and 27 neutral pictures were selected from the International Affective Picture System (IAPS; Lang et al., 2008). Negative images were evenly divided into groups of low, moderate, and high intensity (i.e., 27 images per intensity level; see Table S2 for average valence and arousal ratings); valence and arousal ratings differed significantly by intensity (p's <.05), such that images of higher intensity were more negative and arousing. The trial design aimed to decrease the risk for habituation while a consistent emotional experience occurred (highly negative, moderately negative, low negative, or neutral) and task instructions were applied. To achieve this, each trial in the emotion regulation task displayed either 3 high, 3 moderate, or 3 low negative images or 3 neutral images, presented sequentially for 6 seconds

each. While images were grouped by intensity, they were selected, grouped, and paired with instruction cues randomly by the presentation software, Inquisit Version 4.0 (Millisecond Software, Seattle, WA).

Instruction Cues.

Participants were provided instructions at the start of the task regarding what to do when they saw each of the following instruction cues: reappraise, suppress, or respond naturally (see Table 1). Each cue was randomly paired with 3 high, 3 moderate, and 3 low negative image trials as well as 3 neutral image trials throughout the task. To prevent habituation to the negative content, the trial order was pseudo-randomized such that a neutral image trial occurred at least once every 4 trials. That is, the order of negative and neutral trials were randomized; however, if 4 negative trials occurred consecutively, the presentation software inserted a neutral trial.

Negative Affect.

After viewing each image series, participants responded to the item, "How negative do you feel?" by selecting a rating that best represented how they felt at that current point in time, from not at all negative (1) to extremely negative (5).

Results

Analytic Plan

Consistent with Study 1, we employed multilevel modeling techniques to account for the nested structure of the data. We carried out the following steps in both preliminary[4] and main analyses, which focused on the effects of image valence and instruction cue, respectively: first, a

[4] Study 2's preliminary analyses indicated that affect was more negative for more intense images (p's < .0001) and did not differ significantly by instruction cue while viewing neutral images (p's > .12). Observed power analyses for the primary model are also included in this section (see Supplemental Materials for full analyses).

base model was fit using fixed effects of our predictor variable as well as random intercepts for participant. Second, since both images and instruction cues were nested within individuals, final model fits were assessed including random slope for these variables, which significantly improved model fit in both the preliminary ($\chi^2(6) = 320.16$, $p < .0001$) and primary analytic models ($\chi^2(10) = 53.87$, $p < .0001$). For all models, pairwise comparisons were once again conducted with Bonferroni corrections, which also generated estimated marginal means and 95% confident intervals; effect sizes (*d*) and 95% confidence intervals are reported for fixed effects derived from the multilevel models (Lenth, 2023).

Primary Analyses: Changes in Negative Affect

Our primary analysis of interest pertained to whether affective responses to negative images differed across instruction cue, which was assessed using a mixed effects model. Results from this model demonstrated that negative affect significantly differed by instruction cue ($F(2, 5175) = 139.38$, $p < .0001$). Pairwise comparisons in Study 2 indicate that negative affect was significantly lower when participants used Cognitive Reappraisal relative to No Regulation ($t(5175) = -16.53$, $b = -0.68$, $p < .0001$; $d = -0.52$, CI[-0.59, -0.46]) or Expressive Suppression ($t(5175) = -6.94$, $b = -0.30$, $p < .0001$; $d = -0.23$, CI[-0.29, -0.16]). However, negative affect was also significantly lower when participants used Expressive Suppression relative to No Regulation ($t(5175) = -9.52$, $b = -0.38$, $p < .0001$; $d = -0.30$, CI[-0.36, -0.23]) (see Table 4 and supplemental materials, Figure S2). These results suggest that when an individual uses a strategy such as cognitive reappraisal in the face of negative stimuli, they are able to downregulate negative affect more effectively than when they use expressive suppression or no regulation at all. However, these results also suggest that expressive suppression, which did not explicitly instruct

participants to reduce negative affect, may subsequently have that effect, as evidenced by this strategy's effect on emotion relative to no regulation.

Secondary Analyses

Carryover Effects

Due to the nature of Study 1 and 2's experimental designs, it is plausible that individuals "carried over" the use of emotion regulation strategies between blocks and trials. To test for this effect, primary analyses were rerun with an interaction term for the prior trial's cue. These secondary analyses indicated that negative affect reported during reappraisal, suppression, and no regulation trials were not moderated by the previous trial's cue ($F(4, 5028) = 1.88$, $p = .11$; pairwise contrasts p's > .46; see Table 4), which suggests that there were no carryover effects of regulation between different trials.

Intensity Effects

To assess whether the effect of instruction cue on negative affect varied by image intensity, primary analyses were rerun with an interaction term for the trial's intensity (high, moderate, or low), as well as a random slope for this term, which significantly improved model fit ($\chi^2(25) = 24.91$, $p = .003$). These secondary analyses indicated that, there were main effects of instruction cue ($F(2, 5169) = 130.43$, $p < .0001$) and intensity ($F(2, 5169) = 427.32$, $p < .0001$), but the interaction term was non-significant ($F(4, 5169) = 1.96$, $p = .10$; see Table 4). Consistent with preliminary and primary analyses, these results suggest that affect was less negative when reappraising relative to suppressing and suppressing relative to not regulating, and was also less negative for images of lower intensity. However, the effect of reappraisal and suppression on negative affect did not vary by image intensity.

General Discussion

Across two studies that manipulated strategy use within-subjects, findings showed that deploying expressive suppression significantly reduced levels of negative affect compared to control conditions in which people tried to reduce negative affect without a specific strategy in mind or simply responded naturally without regulating. These findings suggest that decreasing negative emotion by downregulating one's expression may be an efficacious strategy relative to attempting to do so in a non-specific manner or using no regulation at all.

These studies utilized within-subject and mixed designs, which have previously raised concerns that prohedonic experiential effects of suppression were due to demand characteristics or confounds, such as carryover effects (Livingstone & Isaacowitz, 2018; Webb et al., 2012) or variations in stimulus intensity (e.g., Shiota & Levenson, 2009). However, our findings provide evidence against these alternative explanations. To lessen demand concerns, in Study 1, all regulation conditions shared the same emotion goal (downregulate negative affect), varying only in method by which to do so, and in Study 2, instructions for expressive suppression contained no reference to experiential emotion goals. To address concerns of confounds, we confirmed that suppression's experiential effects were not explained by participants habituating to negative stimuli throughout the course of the task, as indicated by consistent and even increasing negative affect across blocks for those who just viewed stimuli in Study 1. They were also not explained by participants experiencing lower negative affect after reappraising, as indicated by the absence of carryover effects, or experiencing different levels of regulatory success for less vs. more intense stimuli in Study 2. Together, these findings compliment a growing body of literature that has observed that expressive suppression significantly impacts emotional experience (Bebko et al., 2011; Goldin et al., 2008; Li et al. 2020; Mohammed et al., 2021; Paul et al., 2013; Pedder et al., 2016; Shiota & Levenson, 2009; Webb et al., 2012).

The present set of studies was also consistent with prior literature in observing that expressive suppression did not lower negative emotion as effectively as cognitive reappraisal. In both studies, whether non-specific, positive, or detached, reappraisal decreased negative affect to greater degree than did expressive suppression, exerting medium-sized significant effects on one's own negative experience relative to the smaller significant effects of suppression. These findings are consistent with a large body of work demonstrating reappraisal's effectiveness for inducing experiential changes in emotion (e.g., Gross, 1998; McRae et al., 2010; Troy et al., 2010).

However, despite the fact that reappraisal is generally revered as an effective tactic for inducing adaptive emotional change, it may not always be feasible or desirable to implement (see Ford & Troy, 2019, for a review). That is, not all individuals are able to effectively utilize reappraisal (e.g., Ford et al., 2017), not all situations allow reappraisal to be used successfully (e.g., McCrae et al., 2012; Perez & Soto, 2011; Sheppes et al., 2009; Troy et al., 2013), and it is generally used less frequently than other strategies in daily life (e.g., Brans et al., 2013; Heiy & Cheavens, 2014). Additionally, goals for emotion regulation are diverse and may not be achieved via the deployment of reappraisal (e.g., Greenaway et al., 2021; Tamir, 2016) nor have adaptive implications simply because reappraisal was used (Millgram et al., 2015). In daily life, people may also use strategies to achieve their emotion goals in surprising ways. For instance, Greenaway et al. (2021) observed that when their goal was to neither experience nor express emotion, participants tended to select expressive suppression with equal or even greater frequency to reappraisal. In short, there are myriad of circumstances in which individuals might default to strategies such as suppression (Dixon-Gordon et al., 2015) or distraction (Sheppes et

al., 2014) instead of using reappraisal. This possibility necessitates a deeper evaluation of the present findings and consideration of the pros and cons of using suppression in everyday life.

Limitations and Future Research

The present set of findings are not without limitations and highlight open questions for future research to address. For one, although we aimed to lessen concerns that are particularly relevant to within-subjects paradigms (e.g., demand, carryover effects), we cannot fully eliminate the possibility that participants may have intuited the overall goals of the experiment or used a strategy other than (or in addition to) their instructed cue. While our findings of significant experiential differences by cue provide support that, on average, participants used different tactics when instructed to, prior research has also found that participants incorporate other strategies into their instructed method (e.g., Demaree et al., 2007; Rohrmann et al., 2009) or use multiple strategies simultaneously when permitted to (e.g., Aldao & Nolen-Hoeksema, 2013). Future research should aim to establish whether these tendencies are simply an issue related to within-subjects designs, or perhaps are more representative of the ways in which participants regulate emotions in daily life (e.g., Blanke et al., 2019).

The present findings are also limited by their potential generalizability to other contexts and regulatory motives. Both studies utilized static images to induce negative affect, which have been argued to be less ecologically valid than film clips (Rottenberg et al., 2007) and social interactions (for suppression in particular; e.g., Butler et al., 2003), and focused only on attempts to downregulate negative affect (i.e., prohedonic motives). While emotion regulation is generally deployed more often to satisfy prohedonic motives (e.g., English et al., 2017; Riediger et al., 2009), people may alternatively use emotion regulation in daily life to satisfy contrahedonic motives (i.e., feel less positive) or achieve more instrumental goals (e.g., minimize excitement to

get work done). Indeed, suppression use is reported more frequently in social contexts among non-close others and in association with instrumental goals (English et al., 2017) as well as perhaps surprising hedonic goals (e.g., Greenaway et al., 2021). Future research should seek to clarify the role that contexts, motives, and goals play in the selection and success of regulatory strategies, as well as whether people's beliefs about the utility of these strategies influence their efficacy and implications.

With this in mind, the current investigation may also be limited in its generalizability to other cultures and countries. Although Study 2's sampe was more ethnically diverse, all participants were from the United States and neither study assessed cultural values, which represent significant and important sources of variability in emotion regulation outcomes. For instance, contrary to the majority of work with European American participants, using suppression is typically not associated with markers of poor well-being in Chinese participants (Soto et al., 2011) or in Asian Americans who held bicultural values (Butler et al., 2007), and implementing suppression is not associated with elevated physiological reactivity (Asian Americans: Soto et al., 2016; Chinese participants: Yuan et al., 2014). Additionally, Le and Impett (2013) observed that suppressing to benefit one's partner was associated with higher feelings of authenticity and in turn, improved well-being and relationship quality among Canadian students with more interdependent values. These non-negative and even positive implications of suppression are often attributed to differences in collectivistic (vs. individualistic) cultural norms, which encourage actions like suppression of emotional expression in order to maintain relational harmony and avoid social harm (e.g., Matsumoto et al., 2008). However, the role that cultural values and norms play in the experiential effects of suppression as well as beliefs about this strategy's utility are less clear and should be investigated in future work.

Lastly, as these studies focused on changes in momentary affect, they cannot speak to longer-term implications for well-being. Most of what we know about suppression's connection to maladaptive outcomes originates from studies demonstrating that the general tendency to use suppression in daily life is linked with lower well-being (e.g., Aldao et al., 2010; English & Eldesouky, 2020; English & John, 2012; Goldin et al. 2014; Gross & John, 2003; Nezlek & Kuppens, 2008). By contrast, there is no consistent evidence linking suppression efficacy, measured behaviorally as strategy-induced changes in the emotion (also called strategy ability, success, or capacity; McRae & Gross, 2020; Troy et al., 2010, 2013) to reduced well-being (e.g., Gruber et al., 2014; Millgram et al. 2015; Quigley & Dobson, 2014; Smoski et al., 2014; Troy et al. 2010).

Coupled with the present studies' findings, this evidence collectively raises the possibility that being able to up and downregulate expressive behavior in and of itself might be beneficial for long term well-being or social adjustment because it affords strategic expressive flexibility. In turn, expressive flexibility may allow people to adjust their behavior according to their current goals or the demands of a particular situation (Bonanno et al., 2004). For instance, being able to expressively suppress may actually be advantageous in certain social contexts, such as when it is enacted to protect another's feelings, in an environment where authenticity or expressivity are not highly valued (as reasoned in English & Eldesouky, 2020), or by people lower in social power (Catterson et al., 2017). Therefore, it is possible that expressive suppression has emotional and instrumental utility, becoming maladaptive only when deployed exhaustively or indiscriminately. This is supported by more recent evidence indicating that the assumed relationship between suppression and poor well-being may actually be context dependent, appearing when this strategy is frequently used around close others, but not when used around

non-close others, and is even predictive of better well-being when frequently used alone (Paul et al., 2023). Future research should aim to increase understanding of the role that motives and affective antecedents play in the implications of regulatory strategies, as these factors represent how empirical and theoretical frameworks are moving beyond traditional categorizations of adaptive and maladaptive strategies and towards more comprehensive considerations for person- and context-specific effects.

In line with this shift, future research should aim to examine executive- and attention-based mechanisms in service of identifying which specific regulatory pathways contribute to adaptive vs. maladaptive forms of suppression. For instance, cognitive control resources, like working memory or attentional deployment, have previously been implicated in successful emotion regulation (e.g., Butler et al., 2006; Gross, 1998; McRae et al., 2012; Pruessner et al., 2020; Schmeichel et al., 2008) and are associated with decreased negative emotion during expressive suppression and cognitive reappraisal specifically (Hendricks & Buchanan, 2016). However, attentional mechanisms may also enable one to disengage from emotional stimuli while suppressing, effectively downregulating negative affect in the short-term while impeding adaptive, long-term adjustment (e.g., Bonanno et al., 2004; Dillon et al., 2007; Richards & Gross, 1999; cf. Pedder et al. 2016; Wang et al., 2017). Therefore, these cognitive control mechanisms may convey complex implications for regulation, particularly in the case of suppression.

Finally, it is plausible that suppression-related changes in emotion experience may be indicative of individual differences in a broader regulatory skill. That is, an individual may be able to use a strategy such as expressive suppression to decrease their negative emotions because they are generally capable of using many different tactics (alone or in combination) to achieve

their desired emotional state. For instance, although expressive suppression's effect on emotion experience is small, previous research has suggested that small effects can have long-term implications due to repetition and cumulative effects within and across individuals (e.g., Abelson, 1985; Funder & Ozer (2019). Thus, suppression's smaller effects may still permit more intense negative feelings to decrease to a more moderate level while maintaining more engagement than distraction, allowing the experience to then be managed by more elaborate techniques like cognitive reappraisal. Over time, this type of regulatory flexibility would be considered adaptive (e.g., Aldao et al., 2015; Bonanno & Burton, 2013), encapsulating the ability to flexibly deploy different emotion regulation strategies depending on one's needs or the needs of the situation and has been associated with better well-being and long-term adjustment (e.g., Blanke et al., 2019; Bonanno et al., 2004; Rodin et al., 2017; Westphal et al., 2010). Therefore, future investigations into suppression-related changes in experience may benefit from the simultaneous examination of multiple strategies to better discern if, and under which circumstances, individuals are more akin to emotion regulation "specialists" or "generalists."

Conclusion

Collectively, the current study's findings as well as the extensive body of existing research on expressive suppression and cognitive reappraisal suggest that current assumptions about the effects of specific emotion regulation strategies may benefit from continued reexamination. Additionally, future research should continue to explore shared foundations between various regulation strategies in service of understanding and assessing broader skills that allow for flexible recruitment and deployment of emotion regulation. Such information could provide insight into the mechanisms that incentivize strategy use as well as an

understanding of why the relationships between suppression and emotional outcomes are more nuanced than once assumed.

Table 1

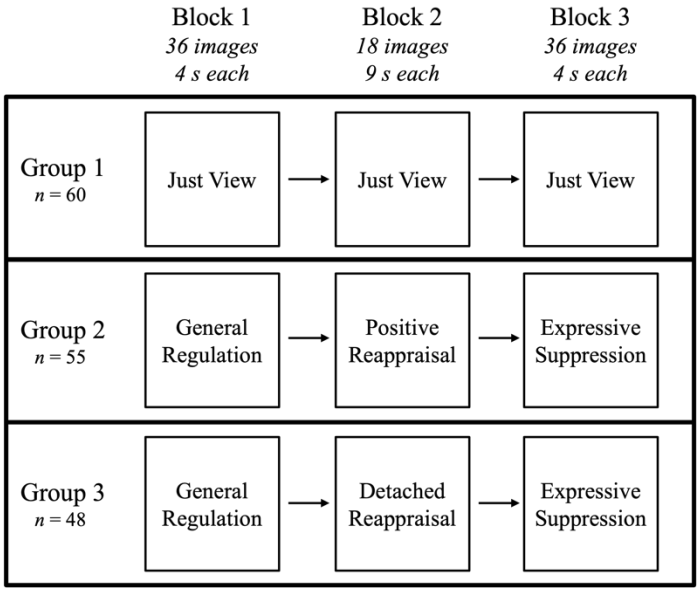
Emotion Regulation Instructions Provided During Each Study

Study	Strategy	Instruction
Study 1	Just view	*"While you are looking at the pictures, your goal is to look naturally at what interests you, as if you were home watching TV."*
	General regulation	*"While you are looking at the pictures, your goal is to try to minimize your negative emotions or feelings."*
	Positive reappraisal	*"This time, while you are looking at the pictures, your goal is to try to minimize your negative emotions or feelings by thinking about the positive aspects of what you are seeing."*
	Detached reappraisal	*"This time, while you are looking at the pictures, your goal is to try to minimize your negative emotions or feelings by adopting a detached and unemotional attitude."*
	Expressive suppression	*"This time, while you are looking at the pictures, your goal is to try to minimize your negative emotions or feelings by not letting your emotions show on your face, so someone watching you would not be able to know how you are feeling."*
Study 2	No regulation	*"Try your best to attend to the image and understand its content. Allow yourself to experience and/or feel any emotional response the image might naturally elicit."*
	Cognitive reappraisal	*"Try your best to feel less negative about the image by attending to the image and trying to change the meaning of it. That means you think of something to tell yourself about*

	the picture that helps you feel less negative about it. For example, you could tell yourself something about the outcome, so that whatever is going on will soon be resolved or that help is on the way. You could also focus on a detail of the situation that may not be as bad as it first seemed. We want you to stay focused on the image and not think of random things that make you feel better, but rather to change something about the picture that helps you to feel less negative about it. Once again, keep focusing on the picture but tell yourself something about the picture that makes you feel less negative about the picture."
Expressive suppression	*"Try your best to attend to the picture but don't let any emotion you may feel on the inside show in your behavior. In other words, try to behave in such a way that a person watching you would not know that you are feeling an emotion. Remember that you don't show, but you can feel."*

Figure 1

Experimental Design of Study 1's Emotion Regulation Task



Note. Each image was shown for longer during Block 2 to accommodate the prediction that reappraisal may take longer to unfold than general regulation or expressive suppression. Therefore, fewer images were shown during reappraisal (Block 2) in order to accommodate longer trials while equating task lengths across blocks (3 minutes each).

Table 2

Within-Subject Post-Hoc Estimated Marginal Means and Contrasts for Affect Ratings Provided during Study 1

Experimental Group	Instruction Block
Group 1	Block 1 (JV): M = 74.15, SE = 1.80, CI[70.55, 77.75]
	Block 2 (JV): M = 73.24, SE = 1.90, CI[69.43, 77.05]
	Block 3 (JV): M = 76.04, SE = 1.71, CI[72.62, 79.47]
	Block 1 (JV) vs. 2 (JV): t(38491) = 0.60, d = 0.03, CI[-0.08, 0.15]
	Block 1 (JV) vs. 3 (JV): t(38491) = -1.34, d = -0.07, CI[-0.18, 0.04]
	Block 2 (JV) vs. 3 (JV): t(38491) = -2.38 †, d = -0.11, CI[-0.20, -0.02]
Group 2	Block 1 (GR): M = 69.76, SE = 2.33, CI[65.75, 73.50]
	Block 2 (PR): M = 56.20, SE = 2.39, CI[52.53, 60.38]
	Block 3 (ES): M = 62.60, SE = 2.87, CI[60.70, 68.62]
	Block 1 (GR) vs. 2 (PR: t(29741) = 8.53 ***, d = 0.46, CI[0.33, 0.59]
	Block 1 (GR) vs. 3 (ES): t(29741) = 3.80 ***, d = 0.17, CI[0.04, 0.31]
	Block 2 (PR) vs. 3 (ES): t(29741) = -4.57 ***, d = -0.29, CI[-0.40, -0.18]
Group 3	Block 1 (GR): M = 69.62, SE = 1.93, CI[65.08, 74.45]
	Block 2 (DR): M = 56.46, SE = 1.96, CI[51.40, 61.00]
	Block 3 (ES): M = 64.66, SE = 1.97, CI[56.82, 68.38]
	Block 1 (GR) vs. 2(DR): t(34343) = 6.98 ***, d = 0.51, CI[0.39, 0.63]
	Block 1 (GR) vs. 3 (ES): t(34343) = 2.54 *, d = 0.27, CI[0.13, 0.41]
	Block 2 (DR) vs. 3 (ES): t(34343) = -5.22 ***, d = -0.24, CI[-0.34, -0.13]

Note. † p < .10, * $p \leq .05$, ** $p \leq .001$, *** $p \leq .0001$; instructions are noted as: JV = just view, GR = general regulation, PR = positive reappraisal, DR = detached reappraisal, or ES = expressive suppression.

Table 3

Between-Subjects Post-Hoc Contrasts for Affect Ratings Provided during Study 1

Instruction Block	Experimental Group
Block 1	Group 1 (JV) vs. Group 2 (GR): $t(156) = 1.55$, $d = 0.20$, CI[-0.05, 0.45]
	Group 1 (JV) vs. Group 3 (GR): $t(156) = 1.58$, $d = 0.20$, CI[-0.06, 0.46]
	Group 2 (GR) vs. Group 3 (GR): $t(156) = -0.02$, $d = 0.003$, CI[-0.26, 0.27]
Block 2	Group 1 (JV) vs. Group 2 (PR): $t(159) = 5.79$ **, $d = 0.84$, CI[0.54, 1.14]
	Group 1 (JV) vs. Group 3 (DR): $t(159) = 5.85$ **, $d = 0.86$, CI[0.55, 1.17]
	Group 2 (PR) vs. Group 3 (DR): $t(159) = -0.12$, $d = 0.02$, CI[-0.28, 0.32]
Block 3	Group 1 (JV) vs. Group 2 (ES): $t(157) = 4.37$ ***, $d = 0.52$, CI[0.25, 0.80]
	Group 1 (JV) vs. Group 3 (ES): $t(157) = 3.81$ **, $d = 0.62$, CI[0.33, 0.91]
	Group 2 (ES) vs. Group 3 (ES): $t(157) = -0.66$, $d = 0.10$, CI[-0.19, 0.39]

Note. ** $p \leq .001$, *** $p \leq .0001$; instructions are noted as: JV = just view, GR = general regulation, PR = positive reappraisal, DR = detached reappraisal, or ES = expressive suppression.

Figure 2

Sample Trial Progression in Study 2's Emotion Regulation Task

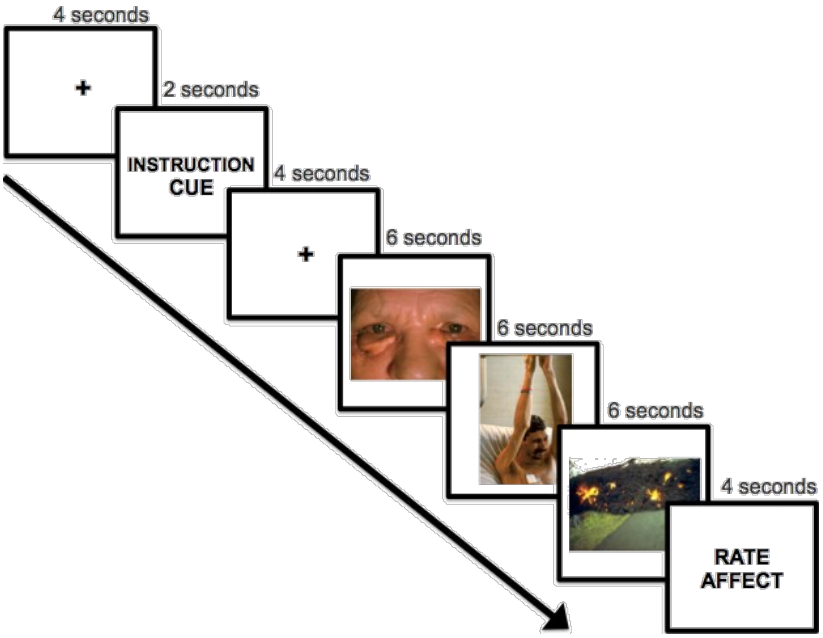


Table 4

Post-Hoc Estimated Marginal Means, Standard Errors, and 95% CIs for Affect Ratings Provided during Study 2

Instruction Cue	Primary Analyses	Carryover Effect Analyses		Image Intensity Analyses	
No Regulation	M = 3.34, SE = 0.05, CI[3.23, 3.44]	No regulation	M = 3.34, SE = 0.06, CI[3.21, 3.46]	Low	M = 2.75, SE = 0.06, CI[2.64, 2.87]
		Expressive suppression	M = 3.41, SE = 0.06, CI[3.29, 3.54]	Moderate	M = 3.36, SE = 0.06, CI[3.24, 3.48]
		Cognitive reappraisal	M = 3.29, SE = 0.06, CI[3.16, 3.41]	High	M = 3.89, SE = 0.06, CI[3.76, 4.01]
Expressive Suppression	M = 2.95, SE = 0.05, CI[2.85, 3.06]	No regulation	M = 2.96, SE = 0.06, CI[2.83, 3.08]	Low	M = 2.43, SE = 0.06, CI[2.31, 2.55]
		Expressive suppression	M = 2.99, SE = 0.06, CI[2.86, 3.11]	Moderate	M = 2.99, SE = 0.06, CI[2.87, 3.12]
		Cognitive reappraisal	M = 2.92, SE = 0.06, CI[2.79, 3.04]	High	M = 3.42, SE = 0.06, CI[3.30, 3.55]
Cognitive Reappraisal	M = 2.65, SE = 0.05, CI[2.56, 2.75]	No regulation	M = 2.72, SE = 0.06, CI[2.60, 2.83]	Low	M = 2.16, SE = 0.06, CI[2.05, 2.27]
		Expressive suppression	M = 2.60, SE = 0.06, CI[2.48, 2.71]	Moderate	M = 2.63=, SE = 0.06, CI[2.52, 2.74]
		Cognitive	M = 2.64, SE = 0.06,	High	M = 3.18, SE = 0.06,

	reappraisal	CI[2.53, 2.76]	CI[3.06, 3.29]

Note. Affect ratings in carryover analyses reflect self-reported negative affect during a cued trial when preceded by the noted instruction.

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