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BRIEF REPORT

Reappraisal but Not Suppression Downregulates the Experience of Positive and Negative Emotion

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The emotion regulation literature is growing exponentially, but there is limited understanding of the comparative strengths of emotion regulation strategies in downregulating positive emotional experiences. The present research made the first systematic investigation examining the consequences of using expressive suppression and cognitive reappraisal strategies to downregulate positive and negative emotion within a single design. Two experiments with over 1,300 participants demonstrated that reappraisal successfully reduced the experience of negative and positive affect compared with suppression and control conditions. Suppression did not reduce the experience of either positive or negative emotion relative to the control condition. This finding provides evidence against the assumption that expressive suppression reduces the experience of positive emotion. This work speaks to an emerging literature on the benefits of downregulating positive emotion, showing that suppression is an appropriate strategy when one wishes to reduce positive emotion displays while maintaining the benefits of positive emotional experience.

Keywords: emotion regulation, expressive suppression, cognitive reappraisal, sadness, amusement

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Emotion regulation research tends to focus on how people can upregulate positive emotions and downregulate negative emotions (Koole, 2009). The benefits of this pattern of regulation for well-being and interpersonal relationships are well documented (Gross & John, 2003). However, a growing body of research suggests that there may be benefits to downregulating positive emotions (e.g., Gruber, Mauss, & Tamir, 2011). Despite this emerging interest, little is known about how people successfully downregulate positive emotions. In two experiments, we tested the efficacy of two commonly studied forms of emotion regulation—expressive suppression and cognitive reappraisal—in downregulating positive emotional experiences. Expressive suppression involves deliberately reducing the physical expression of emotions (Gross, 2001). Suppression successfully reduces emotional expression, but it generally has adverse personal and social consequences (e.g., Butler et al., 2003). Cognitive reappraisal involves reevaluating an emotional event to reduce its impact (Gross, 2001). Broadly speaking, dispositional reappraisal is associated with greater well-being than suppression (Gross & John, 2003).

A nuanced approach to emotion regulation recognizes that positive emotions may not always be beneficial; hence, upregulating positive emotions may not always be the ideal strategy. In its most extreme form, high levels of unregulated positive affect are present in mania, suggesting a need to understand the downregulation of positive emotions (Gruber, 2011). In nonclinical populations, research suggests there are contexts in which it is important to downregulate positive emotions. For instance, undergraduates who were induced to experience positive emotion preferred reading sad newspaper articles before meeting a stranger for the first time (Erber, Wegner, & Therriault, 1996). Likewise, suppressing positive emotional displays makes winners more likable and attractive as potential friends (Kalokerinos, Greenaway, Pedder, & Margetts, 2014). Nonetheless, researchers still have very little understanding of the effect of specific emotion regulation strategies on downregulating positive emotions (Webb, Miles, & Sheeran, 2012).

The few studies that investigated the effects of suppression on downregulating positive emotion experience produced mixed results. Some found that suppression reduces positive emotional experience in comparison to a control condition (Dan-Glauser & Gross, 2011; Gross & Levenson, 1997; Vrtička, Sander, & Vuilleumier, 2011); however, others have found no effect (Korb, Grandjean, Samson, Delplanque, & Scherer, 2012). By contrast, reappraisal reliably downregulates positive and negative emotional experiences (Webb et al., 2012). However, no previous research has systematically compared the effects of suppression and reappraisal on positive emotion experience within the same experiment. Given the contradiction between the few existing studies that examined suppression in isolation, it is clear that a systematic test of positive emotion downregulation strategies is needed. Such experiments are particularly important given the emerging body of

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literature documenting situations and populations in which positive emotion is better downregulated (e.g., Gruber et al., 2011; Kalokerinos et al., 2014).

We aimed to definitively determine whether suppression does indeed downregulate experienced positive emotion and whether it does this to a greater or lesser extent than cognitive reappraisal. To do this, we tested the effects of reappraisal and suppression relative to a control condition in the regulation of positive and negative emotions within a single design. Doing so enabled us to disentangle whether the effects of emotion regulation strategies on emotional experience are due to the specific strategy used, the valence of the emotion to be regulated, or both. The effects of suppression and reappraisal on negative emotional experience are well established (Webb et al., 2012); therefore, we included a negative emotion condition to replicate these effects within our study. This comparison provides greater confidence in the results of our focal test of positive emotion downregulation. We undertook a well-powered test of this design by recruiting over 1,300 participants in two online experiments.

Experiment 1

Method

Participants and design. Participants were 401 Mechanical Turk workers paid USD$0.50 (50% women,[1] M_{age} = 36.09 years, SD_{age} = 12.73 years, range 18–80 years) in a 2 (film valence: amusement vs. sadness) × 3 (emotion regulation instruction: reappraisal vs. suppression vs. control) between-subjects design. We chose amusement and sadness because a meta-analysis demonstrated large effects of emotion regulation on these emotions (Webb et al., 2012). Felt emotions were the dependent variables. The power was 0.81 to detect a medium effect (d = 0.50; two-tailed α = .05).

Materials and measures.

Film stimuli. Participants were randomly assigned to watch one of two film clips: *Finding Nemo* (105 s) to elicit amusement or *The Lion King* (126 s) to elicit sadness.[2] Participants could not continue with the measures until they watched the film in full.

Emotion regulation instruction (adapted from Gross, 1998). Participants in the reappraisal condition were asked to adopt a detached and unemotional attitude while watching the film. Participants in the suppression condition were asked to not let their feelings show while watching the film. Participants in the control condition did not receive emotion regulation instructions.

Felt emotion. Participants rated their felt emotions using 18 emotion descriptors sourced from Gross and Levenson (1997; 1 = *none at all* to 9 = *a great deal*). Before watching the film, participants were asked to rate the extent to which they currently felt each emotion (baseline emotion). After watching the film, participants were asked to rate the extent to which they felt each of the emotions during the video. We focus on the effects on two target emotions—amusement and sadness.

Manipulation checks. Three items adapted from Gross (1998) assessed the success of the reappraisal instruction ("During the film, I tried not to feel anything at all"), the suppression instruction ("During the film, I felt emotions but tried to hide them"), and the control instruction ("I watched the film as I normally would"). One item assessed emotion regulation difficulty ("I found it difficult to follow the instructions while watching the video"; 1 = *strongly disagree* to 7 = *strongly agree*).

Results

Manipulation checks. Table 1 shows descriptive statistics and simple effects for all manipulation checks. Separate 2 × 3 analyses of variance (ANOVAs) on each manipulation check revealed the expected main effects of the emotion regulation condition. These data indicate an effective emotion regulation manipulation. There were also main effects of emotion regulation (see Table 1) and valence on difficulty, $F(1, 395) = 6.07$, $p = .014$, 95% confidence interval [CI] [0.08, 0.77], $\eta_p^2 = .02$, such that participants reported more difficulty regulating negative emotion than positive emotion ($M_{amusement} = 2.52$, $SD = 1.85$; $M_{sadness} = 2.95$, $SD = 2.10$), but no interaction.

Amusement. A 2 × 3 analysis of covariance (ANCOVA; controlling for baseline amusement[3]) revealed a significant main effect of valence, $F(1, 394) = 316.59$, $p < .001$, 95% CI [3.31,4.14], $\eta_p^2 = .45$ ($M_{amusement} = 5.76$, $SD = 2.59$; $M_{sadness} = 2.04$, $SD = 1.68$), and a significant interaction, $F(2, 394) = 3.40$, $p = .034$, $\eta_p^2 = .02$ (see Table 2). As expected, there was no effect of emotion regulation on amusement among participants who watched the sad film, $p = .809$. However, as expected, there was a significant effect of emotion regulation on amusement among participants who watched the amusing film, $p < .001$. Participants in the reappraisal condition reported less amusement than participants in the suppression, $p = .018$, 95% CI [−1.56, −0.15], and control condition, $p = .047$, 95% CI [−1.41, −0.01]. Suppression did not reduce amusement relative to control, $p = .690$, 95% CI [−0.55, 0.84].

Sadness. A 2 × 3 ANCOVA (controlling for baseline sadness) revealed main effects of valence, $F(1, 394) = 511.45$, $p < .001$, 95% CI [−4.74, −3.98], $\eta_p^2 = .57$ ($M_{amusement} = 1.62$, $SD = 1.31$; $M_{sadness} = 5.98$, $SD = 2.57$), emotion regulation, $F(2, 394) = 5.37$, $p = .005$, $\eta_p^2 = .03$, and a significant interaction, $F(2, 394) = 5.52$, $p = .004$, $\eta_p^2 = .03$. As expected, there was no effect of emotion regulation on sadness among participants who watched the amusing film, $p = .999$, but there was a significant main effect among participants who watched the sad film, $p < .001$. After watching the sad film, participants in the reappraisal condition reported less sadness than participants in the suppression, $p < .001$, 95% CI [−2.05, −0.70], and control conditions, $p < .001$, 95% CI [−1.99, −0.67]. Suppression did not reduce sadness relative to control, $p = .892$, 95% CI [−0.63, 0.72].

[1] None of the key simple effects reported in either experiment were moderated by gender.

[2] Pilot testing (N = 34) confirmed that the amusing film elicited amusement (M = 6.51) but little sadness (M = 1.23), and the sad film elicited sadness (M = 7.50) but little amusement (M = 1.38; scale: 1 = *not at all,* 9 = *a great deal*).

[3] Gross and Levenson (1997) examined changes in felt emotion ratings from baseline to film. Accordingly, we chose to report our results controlling for baseline emotion. All results remained significant without controlling for baseline emotion for amusement and sadness in Experiments 1 and 2, except for the emotion regulation × valence interaction on amusement in Experiment 1, which became marginal (p = .06), although the follow-up tests were still significant in the expected direction.

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Table 1
Descriptive Statistics and Simple Comparisons for the Manipulation and Difficulty Checks for Experiments 1 and 2

	Experiment 1					Experiment 2				
Check	Reappraisal	Suppression	Control	$F(2, 395)$	η_p^2	Reappraisal	Suppression	Control	$F(2, 878)$	η_p^2
Reappraisal check	**5.80**[a] (1.37) [5.54, 6.08]	4.83[b] (1.91) [4.57, 5.11]	2.34[c] (1.39) [2.08, 2.61]	173.33***	.48	**5.51**[a] (1.66) [5.32, 5.71]	4.88[b] (1.89) [4.66, 5.05]	2.61[c] (1.57) [2.40, 2.79]	234.36***	.35
Suppression check	4.10[b] (1.79) [3.82, 4.40]	**5.04**[a] (1.88) [4.76, 5.34]	2.57[c] (1.53) [2.29, 2.87]	72.12***	.27	4.22[b] (1.96) [4.00, 4.40]	**5.08**[a] (1.83) [4.87, 5.28]	2.74[c] (1.96) [2.51, 2.93]	125.64***	.22
Control check	3.99[c] (1.94) [3.69, 4.29]	4.60[b] (2.02) [4.30, 4.89]	**6.18**[a] (1.11) [5.89, 6.47]	56.89***	.22	4.07[c] (2.04) [3.86, 4.26]	4.73[b] (1.99) [4.53, 4.94]	**6.07**[a] (1.05) [5.86, 6.27]	97.12***	.18
Difficulty check	3.66[a] (2.06) [3.36, 3.97]	3.08[b] (2.11) [2.80, 3.40]	1.49[c] (0.82) [1.20, 1.79]	56.09***	.22	3.50[a] (2.09) [3.29, 3.68]	2.74[b] (1.88) [2.54, 2.94]	1.70[c] (1.09) [1.50, 1.91]	76.29***	.15

Note. Different superscripts (a, b, c) in the same row indicate significant differences at $p < .05$. Bolded features highlight key effects. Standard deviations are presented in parentheses. Numbers in square brackets are 95% CIs of the means.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

Participants who were asked to reappraise emotional content successfully downregulated the experience of positive and negative emotions compared with suppression and a control condition. Suppression did not reduce the experience of either positive or negative emotions relative to the control condition.

Experiment 2

The aim of Experiment 2 was to replicate the findings of Experiment 1 with a larger sample and check that participants completed the experiment with careful attention.

Method

Participants and design. Participants were 914 Mechanical Turk workers paid USD$0.50 (43% women, M_{age} = 32.34 years, SD_{age} = 10.96 years, range 18–76 years) in the same design as Experiment 1. The power was at 0.99 to detect a medium effect (d = 0.50, two-tailed α = .05).

Materials and measures. The materials were identical to Experiment 1, except that we added an attention check to ensure data quality that read, "This is a control item. Please do not respond to this question." (Maniaci & Rogge, 2014). The 29 participants (3.1%) who responded to this question were not included in analyses; however, analyses on the full sample showed the same results.

Results

Manipulation checks. Table 1 shows descriptive statistics and simple effects for all manipulation checks. As in Experiment 1, the emotion regulation manipulation was successful.[4] Replicating Experiment 1, participants in the reappraisal condition found their task more difficult than participants in the suppression and control conditions. Participants in the suppression condition found it more difficult to follow instructions than control participants.

Amusement. A 2 × 3 ANCOVA (controlling for baseline amusement) revealed main effects of valence, $F(1, 878)$ = 1,015.29, $p < .001$, 95% CI [3.88, 4.38], $\eta_p^2 = .54$ ($M_{amusement}$ = 5.89, SD = 2.42; $M_{sadness}$ = 1.81, SD = 1.55), emotion regulation, $F(2, 878) = 3.34$, $p = .036$, $\eta_p^2 = .01$, and a significant interaction, $F(2, 878) = 5.11$, $p = .006$, $\eta_p^2 = .01$ (see Table 2). As expected, the simple effect of emotion regulation on amusement was not significant among participants who watched the sad film, $p = .879$, but it was significant among participants who watched the amusing film, $p < .001$. After watching the amusing film, participants in the reappraisal condition reported less amusement than participants in the suppression, $p = .002$, 95% CI [−1.12, −0.25], and control conditions, $p < .001$, 95% CI [−1.31, −0.41]. Suppression did not reduce amusement relative to control, $p = .437$, 95% CI [−0.62, 0.27].

[4] There were also significant interactions on the reappraisal and suppression manipulation checks. Simple effects revealed that the effect of the emotion regulation manipulation was significant among participants who watched the sad film and significant but stronger among participants who watched the amusing film.

Table 2
Descriptive Statistics and Simple Effects for Self-Reported Amusement and Sadness as a Function of the Valence and Emotion Regulation Condition in Experiments 1 and 2

	Experiment 1					Experiment 2				
	Reappraisal	Suppression	Control	F(2,395)	η_p^2	Reappraisal	Suppression	Control	F(2,878)	η_p^2
Amusing film										
Amusement	**5.24_a** (2.73) [4.74, 5.74]	6.09_b (2.43) [5.60, 6.58]	5.95_b (2.56) [5.46, 6.44]	3.23*	.02	**5.35_a** (2.53) [5.02, 5.68]	6.12_b (2.33) [5.81, 6.43]	6.19_b (2.32) [5.85, 6.53]	7.93***	.02
Sadness	1.62_a (1.33) [1.16, 2.09]	1.61_a (1.35) [1.16, 2.06]	1.61_a (1.27) [1.16, 2.06]	0.76	<.01	1.55_a (1.33) [1.24, 1.92]	1.85_a (1.59) [1.56, 2.19]	1.61_a (1.46) [1.30, 1.99]	0.89	<.01
Sad film										
Amusement	2.29_a (1.92) [1.78, 2.80]	1.96_a (1.70) [1.44, 2.49]	1.85_a (1.37) [1.35, 2.36]	0.76	.01	1.86_a (1.49) [1.55, 2.14]	1.80_a (1.72) [1.41, 2.06]	1.77_a (1.46) [1.46, 2.08]	0.13	<.01
Sadness	**5.07_a** (2.67) [4.60, 5.54]	6.45_b (2.55) [5.97, 6.93]	6.40_b (2.26) [5.94, 6.87]	10.62***	.05	**4.98_a** (2.69) [4.67, 5.31]	5.67_b (2.58) [5.30, 5.98]	6.16_b (2.44) [5.75, 6.41]	11.00***	.04

Note. Effects on film emotions control for baseline emotions. Different superscripts (a, b, c) in the same row indicate significant differences at $p < .05$. Bolded and boxed features highlight key effects. Standard deviations are presented in parentheses. Numbers in square brackets are 95% CIs of the means. See the online article for the color version of this table.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Sadness. A 2 × 3 ANCOVA (controlling for baseline sadness) revealed main effects of valence, $F(1, 878) = 788.12$, $p < .001$, 95% CI [−4.15, −3.60], $\eta_p^2 = .47$ ($M_{amusement} = 1.68$, $SD = 1.47$; $M_{sadness} = 5.58$, $SD = 2.63$), emotion regulation, $F(2, 878) = 6.60$, $p = .001$, $\eta_p^2 = .02$, and a significant interaction, $F(2, 878) = 4.68$, $p = .010$, $\eta_p^2 = .01$. As expected, the simple effect of emotion regulation on sadness was not significant among participants who watched the amusing film, $p = .411$, but it was significant among participants who watched the sad film, $p < .001$. After watching the sad film, participants in the reappraisal condition reported less sadness than participants in the suppression, $p = .007$, 95% CI [−1.10, −0.18], and control conditions, $p < .001$, 95% CI [−1.54, −0.63]. Suppression did not reduce sadness relative to control, $p = .068$, 95% CI [−0.92, 0.03].

Discussion

Replicating Experiment 1, participants who reappraised successfully downregulated the experience of positive and negative emotions relative to the suppression and control conditions. Once again, suppression did not reduce the experience of positive or negative emotion relative to a control condition.

General Discussion

This research was the first systematic test of the effectiveness of cognitive reappraisal and expressive suppression in downregulating the experience of positive and negative emotions. Despite the emotion regulation literature growing at a phenomenal rate, tests of some fundamental assumptions have not yet been performed. In conducting this analysis for two of the most well-researched emotion regulation strategies, we have resolved an inconsistency troubling the field. Our findings confirm that reappraisal lessens the experience of positive and negative emotion, but suppression does not.

One key contribution of this research is the null effect of suppression on positive emotional experience. This null finding was replicated across two large samples, and it occurred despite adequate statistical power and successful manipulation checks. These findings indicate that despite some research suggesting otherwise (Dan-Glauser & Gross, 2011; Gross & Levenson, 1997; Vrtička et al., 2011), suppression may not always reduce positive emotional experience. This means that people can use suppression strategies in contexts in which positive emotional displays are socially inappropriate (e.g., suppressing the urge to laugh in a serious meeting) while maintaining the benefits of the positive emotional experience. Our results also confirmed the finding that reappraisal successfully downregulates positive emotional experience, meaning that it may have important utility in clinical populations in which persistent positive emotional experience is problematic (Gruber, 2011).

Given the mixed findings in the literature regarding the impact of suppression on positive emotion, it seems likely that there are some important moderators yet to be examined. One potential moderator is context: Short-term contextually appropriate application of suppression may not result in reduced emotional experience, but longer-term inflexible usage is likely to lead to reduced positive emotion (e.g., Gross & John, 2003). Another moderator may be how authentic the participant feels about suppressing their emotion (English & John, 2013). That is, those who feel that they can authentically suppress their positive emotion may not find the disconnect between their emotional expression and experience so cognitively taxing; hence, they may be better able to maintain experienced positive affect.

This study was conducted online; therefore, we were unable to monitor participants' attention to the video stimuli. We addressed this limitation in two ways. First, we programmed the survey so that participants were not able to progress until the video played in full. Second, in Experiment 2, we filtered out participants who did not pass an attention check. Although we could not verify that participants attentively watched the video, these precautions should largely mitigate this concern. Another limitation of this research was that we only studied the effects of the emotion regulation strategies on self-report emotional experience. In the future, research should include physiological indicators of emotion

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regulation (e.g., heart rate variability) to minimize demand characteristics.

In addition to revealing a potential upside to suppression, our findings revealed a potential downside to cognitive reappraisal. In two experiments, participants found reappraisal more difficult than suppression. Research has suggested that cognitive reappraisal is one of the lesser-used emotion regulation strategies in daily life (Brans, Koval, Verduyn, Lim, & Kuppens, 2013), indicating that participants may be unfamiliar and less practiced with this strategy; hence, they may find it difficult or confusing to implement despite its effectiveness. Therefore, our findings speak to the suggestion by Bonanno and Burton (2013) that there is no one "right" or "wrong" emotion regulation strategy; instead, strategies should be flexibly implemented as befits the context.

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