

Unpacking Cognitive Reappraisal: Goals, Tactics, and Outcomes

Kateri McRae and Bethany Ciesielski
University of Denver

James J. Gross
Stanford University

Studies of emotion regulation typically contrast two or more strategies (e.g., reappraisal vs. suppression) and ignore variation within each strategy. To address such variation, we focused on cognitive reappraisal and considered the effects of goals (i.e., what people are trying to achieve) and tactics (i.e., what people actually do) on outcomes (i.e., how affective responses change). To examine goals, we randomly assigned participants to either increase positive emotion or decrease negative emotion to a negative stimulus. To examine tactics, we categorized participants' reports of how they reappraised. To examine reappraisal outcomes, we measured experience and electrodermal responding. Findings indicated that (a) the goal of increasing positive emotion led to greater increases in positive affect and smaller decreases in skin conductance than the goal of decreasing negative emotion, and (b) use of the reality challenge tactic was associated with smaller increases in positive affect during reappraisal. These findings suggest that reappraisal can be implemented in the service of different emotion goals, using different tactics. Such differences are associated with different outcomes, and they should be considered in future research and applied attempts to maximize reappraisal success.

Researchers have identified many types of emotion regulation strategies (e.g., cognitive reappraisal, expressive suppression; Gross & Thompson, 2007). Contrasting these strategies has led to important insights about differences among emotion regulatory processes (Dillon, Ritchey, Johnson, & LaBar, 2007; Goldin, McRae, Ramel, & Gross, 2008; Gross, 1998; Hayes et al., 2010; Sheppes & Meiran, 2007) but has deemphasized the variability that exists within any given strategy, such as those occasioned by differing goals (i.e., what people are trying to achieve) or tactics (i.e., what people actually do).

One promising target for examining within-strategy variation is cognitive reappraisal, which refers to altering emotions by changing the way one thinks. Successful reappraisal influences many aspects of emotional responding, including self-reported negative affect (Gross, 1998), peripheral physiology (Jackson, Malmstadt, Larson, & Davidson, 2000; Ray, McRae, Ochsner, & Gross, 2010), and neural indicators of emotional arousal (Hajcak & Nieuwenhuis, 2006; Ochsner et al., 2004; Urry et al., 2006). However, there has been notable variation in reappraisal success across studies. For example, reappraisal may be impaired in those with depression (Johnstone, van Reekum, Urry, Kalin, & Davidson, 2007), appears to operate differently in men and women (McRae, Ochsner,

Mauss, Gabrieli, & Gross, 2008), and doesn't always successfully reduce measures of negative emotion (Lam, Dickerson, Zoccola, & Zaldivar, 2009). Variability in these findings may be due to the relative freedom that participants are given to enact reappraisal. Two potentially important sources of variation are (a) the emotion goals pursued during reappraisal and (b) the specific tactics used to reappraise.

Studies of unrestricted reappraisal indicate that there may be two different emotion goals that lead to successfully regulated negative emotion (McRae et al., 2008; Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008). One route may involve the up-regulation of positive emotion (implicated neurally by activation in the ventral striatum), and the other may involve the down regulation of negative emotion (implicated by decreased activation in the amygdala and insula). Crucially, individuals who may be increasing positive affect show smaller decreases in measures of arousal (e.g., the amygdala; McRae et al., 2008). Therefore, increasing positive emotion may be a qualitative manipulation of a highly arousing state, changing arousing negative affect to arousing positive affect. By contrast, decreasing negative emotion may be a quantitative reduction of negative affect and arousal. Testing these predictions requires collecting multiple measures of multiple emotions, not only the emotion elicited by the stimulus.

A few studies have restricted the type of reappraisal tactics participants use (Koenigsberg et al., 2009, 2010; Levesque et al., 2003) and only one has directly compared two different tactics, holding the emotion goals constant (distancing vs. situational reinterpretation; Ochsner et al., 2004). These two tactics were equally successful in reducing negative affect, although they engaged partially distinct neural regions. Another study reported interactions between distancing reappraisal, positive reappraisal, and age (Shiota & Levenson, 2009), but main effects of reappraisal type were not reported, and tactics were not considered separately from emotion goals. Although these studies provide interesting comparisons of tactics, to date, no one has allowed participants to engage in unrestricted reappraisal, categorized the most commonly

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Kateri McRae and Bethany Ciesielski, Department of Psychology, University of Denver; James J. Gross, Department of Psychology, Stanford University.

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Correspondence concerning this article should be addressed to Kateri McRae, 2155 S. Race St., Denver, CO 80209. E-mail: Kateri.McRae@du.edu

used tactics, and identified those associated with reappraisal success.

This study compares the effects of two different emotion goals (increasing positive vs. decreasing negative emotion) on the success of reappraisal (defined by changes in self-reported affect and electrodermal responding). In addition, we sought to characterize the tactics that individuals use to reappraise and identify the tactics associated with reappraisal success.

Method

Participants

Fifty-eight women from the Stanford undergraduate population and the surrounding community participated.¹ Mean age was 23.2 ($SD = 5.0$) with ethnicities of 47.5% Caucasian, 18.6% Asian-Pacific Islander, 15.3% Multiple, 10.2% Hispanic-Latino, 1.7% African American, and 5.1% "other" or declined to state. Participants were assigned randomly to emotion goal groups (28 to decrease negative, 30 to increase positive), which did not differ significantly on age ($p = .29$), ethnicity ($p = .24$) or undergrad-community composition ($p = .41$).

Procedure

Participants viewed pictures (7 s) following a "look" or "change" instruction (3 s) and were asked to react naturally for *look*. For *change*, participants in the increase positive (*decrease negative*) group were told to

tell yourself something about what's going on in the photo so that that you feel as positively as you can (*less negatively*). . . change the meaning of the emotional event so that you feel as strongly positive (*minimally negative*) as you can.

For training, the experimenter offered examples of acceptable reappraisals. For increase positive, an example was, "You could tell yourself that things in the photo will change so that everyone is better off than they started, that they will be greatly rewarded later on, or that people are learning an invaluable life lesson." For decrease negative, an example was, "You could tell yourself that people in the photo aren't really in that much trouble, that things won't turn out all that badly, or that things aren't quite as bad as they seem." Then the participant generated reappraisals to several pictures not used in the subsequent task, and the experimenter paraphrased each to unambiguously fit the appropriate emotion goal. Participants were never told of the contrasting emotion goal.

After each picture, participants rated their negative affect, positive affect, and arousal on a scale from 1 to 9 (4 s each) and viewed a fixation cross between trials (2 s). Seventy-eight trials (26 each of look negative, change negative, and look neutral, not presented here) were presented in a pseudorandom order using E-Prime (Psychology Software Tools, Pittsburgh, PA; www.pst-net.com). Negative pictures were chosen from the IAPS (Lang, Bradley, & Cuthbert, 2001) for normative valence ratings less than four ($M = 2.41$ $SD = 0.65$) and assignment to instruction was counterbalanced across participants. Skin conductance level (SCL) was collected on a 32-channel Bionex 8-slot chassis from Mindware Technologies (Grahanna, OH).

Following the task, participants listed reappraisal tactics by responding to the question, "What sorts of things did you try to tell yourself to help you feel differently in response to the negative pictures?" and provided separate ratings of subjective difficulty and success for the "change" condition, ranging from 1 (*not very*) to 10 (*very*) successful/difficult.

Data Reduction and Analysis

Emotion goal analyses. For self-reported affect, we conducted mixed-model analyses of variance (ANOVAs) for positive affect, negative affect, and arousal, with trial instruction (look, change) as a within-subjects factor, and emotion goal group (increase positive, decrease negative) as a between-subjects factor. For SCL, we added the within-subjects factor of time (each of 7 s of picture presentation).

Reappraisal tactic analyses. A tactic coding system was developed by the first author based on the tactics reported in previous studies (Goldin et al., 2008; McRae et al., 2008; Ochsner et al., 2004; Ray et al., 2010). Eight tactics were included: (a) explicitly positive, (b) change current circumstances, (c) reality challenge, (d) change future consequences, (e) agency, (f) distancing, (g) technical, and (h) acceptance. See the appendix for details.

Two raters, blind to emotion goal condition, indicated which category or categories fit each tactic reported by each participant (average number of tactics used per participant = 4.00, $SD = 1.41$). Agreement between raters was adequate: good for frequently used tactics; those reported below, .77-.98) and low for infrequently used tactics (Cronbach's alpha = .42-.71). To evaluate the differential reappraisal success of participants who did and didn't use each tactic, we used t tests to compare reappraisal-related changes (change-look trials) in groups defined by whether or not each participant used each tactic type.

Skin conductance level. After artifact screening, average levels for each of 7-s of picture viewing for each condition were exported with ANSLAB (Wilhelm & Peyk, 2005). SCL data for 10 participants (5 in each group) were not recorded due to experimenter error, equipment malfunction, or excessive artifacts. Because we were uniquely interested in the effects of trial instruction and emotion goal on SCL changes during the picture period, we controlled for individual and (nonsignificant, $ps > .9$) group differences in starting SCL by using second 1 of the picture as a baseline, then compared conditions and groups.

Results

Manipulation Check

To examine compliance with emotion goal instructions, we compared the number of participants who reported using reappraisal tactics categorized as explicitly positive in each emotion goal group. As expected, a greater number of participants in the increase positive group (22 of 30) used explicitly positive tactics than those in the decrease negative group (14 of 28), $\chi^2(1, N =$

¹ Undergraduate and community participants were matched for ethnicity ($\chi^2 = .24$) but not age ($M_{\text{community}} = 24.95$, $SD_{\text{community}} = 4.74$; $M_{\text{undergraduate}} = 19.72$, $SD_{\text{undergraduate}} = 3.66$).

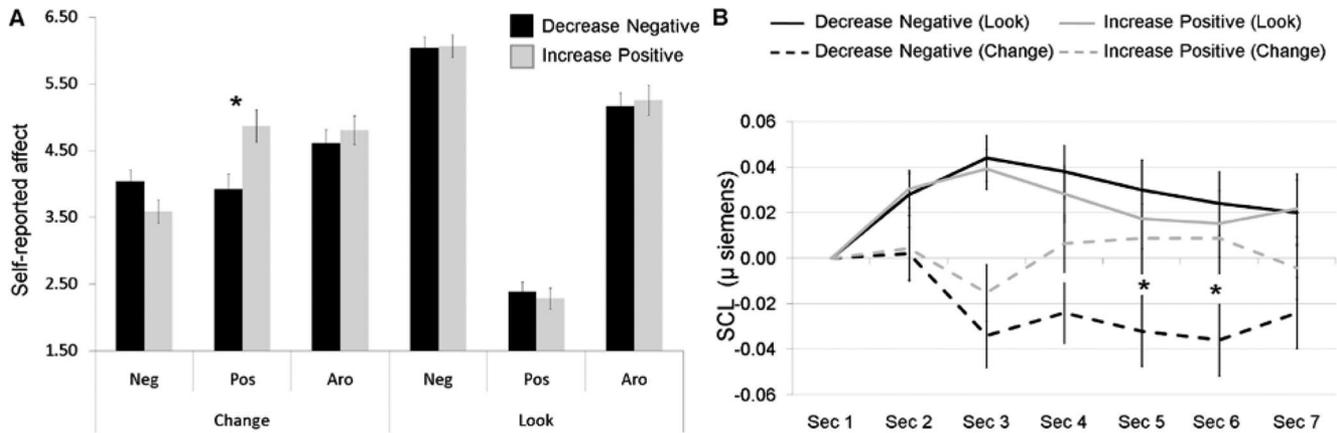


Figure 1. A: Means for self-reported negative affect (Neg), positive affect (Pos), and arousal (Aro) for the look and change trial types for participants in the decrease negative (black) and increase positive (gray) emotion goal groups. B: Skin conductance level (SCL) during the look (solid) and change (dashed) conditions for participants in the decrease negative and increase positive emotion goal groups. Error bars represent standard error of the mean. * Indicates a significant difference between emotion goal groups for the reappraisal success score (look - change) at $p < .05$.

57) = 7.40, $p < .008$. To guard against the possibility that differences between groups were due to differences in effort or perceived success, we tested posttask ratings and did not observe any significant differences between emotion goal groups on subjective difficulty or success ($ps > .40$) in following the instruction.

Emotion Goals and Reappraisal Success

Self-reported affect. As expected, the ANOVA on positive affect revealed a significant main effect of trial instruction (look, change), $F(1, 56) = 188.16$, $p < .001$, partial $\eta^2 = .771$, with positive affect higher during change than look trials. Effects of emotion goals were evident in a trial instruction X emotion goal group (increase positive, decrease negative) interaction, $F(1, 56) = 11.64$, $p < .002$, partial $\eta^2 = .172$. Planned comparisons confirmed that there were no group differences during look trials (all $ps > .74$) but during change trials, the increase positive group showed significantly greater positive affect, $t(56) = 2.82$, $p < .008$. The same analyses of negative affect and arousal revealed a significant effect of trial instruction on negative affect, $F(1, 56) = 221.21$, $p < .001$, partial $\eta^2 = .798$, and arousal, $F(1, 56) = 22.98$, $p < .001$, partial $\eta^2 = .291$, with both measures lower during change than look. However, for these measures we did not observe significant trial instruction X emotion goal group interactions, $F(1, 56) = 2.42$, $p = .140$, partial $\eta^2 = .038$; negative affect, $F(1, 56) = 0.297$, $p = .588$, partial $\eta^2 = .005$; arousal. Finally, we expressed these results as reappraisal-related changes (change—look trials) and observed greater increases in positive affect in the increase positive group compared to the decrease negative group ($M_{IP} = 2.58$, $SD_{IP} = 1.30$; $M_{DN} = 1.55$, $SD_{DN} = 0.98$; $t(56) = 3.41$; $p = .001$), but no significant difference in negative affect or arousal changes ($ps > .14$). See Figure 1A.

Skin conductance level. As expected, the ANOVA on SCL revealed a main effect of trial instruction $F(1, 46) = 11.88$, $p < .001$, partial $\eta^2 = .205$, with lower SCL during change than look trials. Effects of emotion goal were evident in a significant time X

emotion goal group interaction $F(6, 276) = 5.33$, $p < .001$, partial $\eta^2 = .104$ and a trend for a Time X emotion goal group X trial instruction interaction, $F(6, 276) = 1.80$, $p = .100$, partial $\eta^2 = 0.04$. Planned pairwise comparisons confirmed that there were no group differences in SCL during the look condition (all $ps > .50$) but we observed trends for and significantly smaller SCL during change trials in the decrease negative group at seconds 4, $t(46) = 1.66$, $p = .104$, 5, $t(46) = 1.86$, $p < .069$, and 6, $t(46) = 2.04$, $p < .048$. Finally, we also expressed these results as reappraisal-related decreases in SCL (look—change trials) and observed smaller decreases in SCL in the increase positive group compared to the decrease negative group at seconds 4, $t(46) = -1.99$, $p < .053$, 5, $t(46) = -2.10$; $p < .041$, and 6, $t(46) = -2.07$; $p < .044$, of picture presentation. See Figure 1B.

Reappraisal Tactics and Reappraisal Success

Self-reported affect. For the frequency of use for all tactics, see Table 1. We observed smaller reappraisal-related increases in positive ratings in those who used the reality challenge tactic ($M_{\text{user of reality challenge}} = 1.79$, $SD_{\text{user of reality challenge}} = 1.20$; $M_{\text{nonuser}} = 2.64$, $SD_{\text{nonuser}} = 1.17$; $t(56) = 2.612$; $p = .012$).² No such differences were observed for negative or arousal ratings ($ps > .258$). The use of no other tactics significantly predicted reappraisal success (all $ps > .11$, with the exception of arousal ratings, which tended to show smaller reappraisal-related increases for those who used the distancing tactic ($M_{\text{user of distancing}} = -0.06$, $SD_{\text{user of distancing}} = 0.81$; $M_{\text{nonuser}} = 0.57$, $SD_{\text{nonuser}} = 0.78$; $t(56) = 1.71$, $p = .09$)).

² These analyses collapsed across emotion goal group. We also examined the effects of emotion goal group on tactic use and observed that fewer participants in the increase positive group (14 of 30) used the reality challenge tactic, $\chi^2(1, N = 57) = 5.07$, $p < .03$, compared to the decrease negative group (23 of 28). The use of other tactics was not significantly different between groups ($ps > .11$).

Table 1
Number of Participants Who Used Each Type of Reappraisal
Tactic During Each of the Instruction Conditions

Strategy	Increase positive	Decrease negative	χ^2 value
Explicitly positive	22	14	6.72*
Change current circumstances	22	26	0.76
Reality challenge	14	23	4.70*
Change future circumstances	18	17	0.39
Agency	7	14	2.98
Distancing	2	3	0.15
Technical	4	6	0.33
Acceptance	7	3	2.31

* $p < .05$.

Skin conductance level. Participants who used the agency tactic demonstrated greater regulation-related decreases in SCL during second 4 $t(46) = 2.05$; $p = .046$; trend for second 7; $t(46) = -1.712$; $p = .094$. No other significant differences in SCL were observed by tactic.

Discussion

The present study demonstrates, for the first time, that reappraisal can have different effects when individuals are pursuing different emotion goals and using different tactics.

Although one might equate increasing positivity with decreasing negativity, we observed greater increases in positive affect alongside smaller decreases in skin conductance when participants were increasing positive emotion. Therefore, increasing positivity to negative stimuli appears to be a qualitative shift in valence accompanied by a smaller decrease in physiological arousal. By contrast, decreasing negativity appears to be a quantitative decrease in both valence and arousal. This is consequential because smaller decreases in measures that reflect physiological arousal, such as amygdala activation (Anderson et al., 2003), pupil dilation (Bradley, Miccoli, Escrig, & Lang, 2008), or the late positive potential (Pastor et al., 2008) may not reflect decreased reappraisal success, but rather a goal to increase positive affect (McRae et al., 2008; Wager et al., 2008).

This is the first demonstration that reappraisals can be reliably categorized with our system, which can now be applied to experimental and real-world contexts. This expands previous pairwise comparisons of tactics (Ochsner et al., 2004) and allows for a broader consideration of several types of reappraisals. The results of the present study indicate that challenging reality is a relatively less successful tactic in terms of increasing positive affect. Challenging reality may be an unrealistic, less successful tactic akin to denial (Carver & Scheier, 1999) to use in real life, but, it is striking that it was less successful in an experimental picture-viewing context, where it might be relatively realistic and effective.

Several limitations of this study are noteworthy. Our study used only female participants to minimize variation in reappraisal (McRae et al., 2008), but future studies should examine the success with which both men and women can increase positive and decrease negative emotions. Like all studies of instructed emotion regulation, it is possible that experimental demand influenced ratings of self-reported affect. Following previous studies, we have

addressed this by using a multimethod approach. In addition, we used a between-subjects design to prevent the participants from contrasting the two emotion goal conditions and responded accordingly. Finally, we used a strict coding scheme and confirmed that the increase positive group reported using tactics that were explicitly positive to a greater extent than the decrease negative group.

Future research should examine the ability of an individual to distinguish between and differentially use these different emotion goals in the service of reappraisal, which may be related to individual differences in emotional intelligence, awareness, or granularity. Future research should also examine emotion goals and reappraisal tactics in participants who are learning to use reappraisal as part of treatment for a clinical disorder. The most successful emotion goals or tactics may vary by diagnostic status or by the specific emotions to be modified by reappraisal.

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(Appendix follows)

Appendix 1: Reappraisal Tactic Coding Guide

A guideline for reappraisal tactic coding, with examples of reappraisals in each category.

1. Explicitly Positive

The reappraisal has to explicitly mention something *above* the neutral baseline. This must strongly evoke the idea that the situation is *even* better than it would have been if the tragedy never happened, not just that things will no longer be as bad. The word *better* does not automatically get this score. “He’ll get better from this illness” does not count, whereas “It will turn out even better than originally planned” does. Common reappraisals that get this score are “He’s in a better place” for death and dying pictures and the reappraisals that strongly imply that a life lesson will be learned such that the person will be grateful for the negative situation.

Note that this rating was orthogonal to the other tactic categorizations. For example, a change future consequences reappraisal for a picture of a sick woman in a hospital bed that is not explicitly positive might be “this will be over soon and she’ll be back to her normal activities,” whereas change future consequences reappraisal that is explicitly positive might be, “as soon as this is over she’ll realize how much she needed a rest, and she’ll learn a lesson she never could have if she had not fallen ill.”

2. Situation Based: Change Current Circumstances

The reappraisal changes the interpretation of what is currently depicted in the photograph. This is very similar to changing future consequences, without mentioning the future. Examples: the injury that appears serious is not as bad as it looks, someone who appears in pain isn’t suffering that badly, he’s not in that much pain, he’s lucky to even be alive. (The difference between changing future consequences is that for change current circumstances the situation never WAS that bad, and for things will improve with time, it was bad but is getting better.) This tactic could also include a sense of justice—the person deserved it, maybe the person suffering has caused suffering (it’s implied that it would be worse if a good person is being hurt).

3. Situation Based: Reality Challenge

The reappraisal challenges the authenticity of what is being depicted. Examples are: It’s not real, it’s fake, it’s from a movie, it’s staged, it’s a Halloween costume, the blood is special effects makeup, they’re pretending, it’s just a picture.

4. Situation Based: Change Future Consequences

The reappraisal invokes an explicit sense of the future to specify that the consequences will be different than one might first assume.

Examples are: The situation will improve with time, it’ll get better soon, suffering is momentary, it’ll seem silly in the morning, what seems inevitable will not actually happen, no lasting malice will result. A reappraisal involving medical help almost always fits at least somewhat into this category, but depending on the verb tense, “reality challenge” could be a stronger category.

5. Agency

The reappraisal specifically mentions a person with skills to change the current situation. Examples are: Someone will change things, the person has the ability to change, this person can handle the situation, this person has special skills to deal with the situation, the person is being helped by professionals. Note that a *person* should be specifically mentioned to get a strong agency score.

6. Distancing

The reappraisal invokes a sense of physical or psychological distance from the events depicted. Examples are: I don’t know them, this doesn’t affect me, this doesn’t relate to me, I don’t care, I’m far away from them, I tried to “take a step back” (but without a strong analytical or problem-solving component).

7. Technical–Analytic–Problem Solving

The reappraisal is practical, focusing on what steps can be taken, the technical aspects of the situation, analyzing and enumerating the causes and consequences of the situation, or outlining a detailed plan to solve the problem, making it “cooler, calmer, colder.”

8. Acceptance

The reappraisal normalizes the negative event, invoking the justification that sometimes bad things just happen. Examples are: Nothing could be done, it was no one’s fault, that’s the way life goes, it’s only frustrating to try and change it, life goes on (note that this is not the same as change future consequences). The reappraisal could also include a wider perspective—in the grand scheme of things, this isn’t that important, death is part of the circle of life, he/she isn’t the first or last person to experience this. It is important to note that this is acceptance of the situation and not of one’s own emotional response to the situation.

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