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The Unconscious Regulation of Emotion: Nonconscious Reappraisal Goals Modulate Emotional Reactivity

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People often encounter difficulty when making conscious attempts to regulate their emotions. We propose that nonconscious self-regulatory processes may be of help in these difficult circumstances because nonconscious processes are not subject to the same set of limitations as are conscious processes. Two experiments examined the effects of nonconsciously operating goals on people's emotion regulatory success. In Experiment 1, participants engaged in an anxiety-eliciting task. Participants who had a reappraisal emotion control goal primed and operating nonconsciously achieved the same decrease in physiological reactivity as those explicitly instructed to reappraise. In Experiment 2, the effect of nonconscious reappraisal priming on physiological reactivity was shown to be most pronounced for those who do not habitually use reappraisal strategies. The findings highlight the potential importance of nonconscious goals for facilitating emotional control in complex real-world environments and have implications for contemporary models of emotion regulation.

Keywords: nonconscious goals, emotion regulation, reappraisal, dual process

Every day, people are bombarded with emotionally stimulating information. Details in the media, busy streets, and one's family life all have the potential to influence people's emotional lives, whether these influences are welcome or not. Although emotions serve important functions, such as informing people of their goal progress and signaling that one's attention is needed elsewhere (e.g., Carver & Scheier, 1990; Mandler, 1975; Simon, 1967), people often attempt to regulate intense, distressing, or otherwise disruptive emotional states. The present research examined a potential way to help people increase their control over their emotions via the operation of nonconscious regulatory goals.

When conscious attempts at emotion regulation are difficult, we suggest that nonconscious self-regulatory processes can augment these efforts and increase the likelihood of self-regulatory success. First, across a variety of goal contents, nonconsciously operating goals have been found to produce the same outcomes, and in the same manner, as when those same goals are consciously pursued (see reviews in Bargh, Gollwitzer, & Oettingen, in press; Bargh & Huang, 2009; Bargh & Morsella, 2008). Extending this principle to the domain of emotion regulation, we would expect nonconscious emotion regulation goals to be capable of successfully regulating emotional experience. Second, given that it is the nature of nonconscious processes to operate more efficiently, in parallel with other ongoing processes, and thus to not be subject to the same memory and attention limitations as are conscious thought processes (e.g., Dijksterhuis & Nordgren, 2006; Posner & Snyder, 1975; Shiffrin & Schneider, 1977), we would predict that nonconscious emotion regulation goals might be of particular value under circumstances that prevent or hinder the operation of conscious emotion regulation strategies. In what follows, we present empirical evidence bearing on the effectiveness of nonconscious goals in helping people overcome their emotion regulatory challenges.

Nonconscious Operation of Higher Mental Processes

Over the past 25 years, social psychologists have produced numerous demonstrations of nonconscious processes attaining the same outcomes as their conscious counterparts, across a variety of research domains (see Bargh & Morsella, in press). Nonconsciously primed concepts can exert significant directive influences over behavior (Aarts & Dijksterhuis, 2003; Bargh, Chen, & Burrows, 1996; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Troetschel, 2001; Dijksterhuis & van Knippenberg, 1998), suggesting that an important source of the impulses from which human action springs may be automatic environmental priming effects. For example, the simple presence of a briefcase in a room leads people to behave more competitively than they do when there happens to be a backpack in the room (Kay, Wheeler, Bargh, & Ross, 2004). Moreover, nonconsciously operating goal pursuits manifest the same underlying phenomenal qualities as when the same goal is operating consciously. Not only does nonconscious priming of the achievement goal improve participants' subsequent task performance, such as when finding solutions to anagrams, it also increases participants' perseverance on the task, the strength of their desire to complete it (Bargh et al., 2001), and even the flexibility of their responding in the face of sudden and unannounced changes

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in the task rules (e.g., in the Wisconsin Card Sorting Task; Hassin, Bargh, & Zimerman, 2009).

Nonconscious processes have thus been shown to attain the same outcomes as conscious versions of the same process, through the same processing steps and with the same phenomenal qualities. In fact, some researchers now claim that in domains such as decision making, nonconscious thought might even produce *better* outcomes than conscious processing of the same information (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Dijksterhuis & Nordgren, 2006) because conscious thinking is constrained by both the limited capacity of working memory and the serial nature of conscious processing, whereas unconscious thought is not. Although that conclusion of superior outcomes remains somewhat controversial (Lassiter, Lindberg, Gonzalez-Vallego, Bellezza, & Phillips, 2009), there is no question that nonconscious processes operate more *efficiently* than conscious processes in that they are not as affected by the same distractions and divisions of attention that are able to block their conscious brethren from operating (e.g., Bargh & Thein, 1985; Jacoby, 1991; Spencer, Fein, Wolfe, & Dunn, 1998).

Nonconscious Emotion Regulation

Historically, in the self-regulation literature, success or positive outcomes have been associated with conscious control, and the blame for negative outcomes has been laid at the feet of automatic influences (e.g., Mischel & Ayduk, 2004). For example, for individuals who are trying to lose weight, automatic impulses are seen as leading to the overconsumption of fattening foods, whereas controlled, conscious processes are seen as necessary to prevent these impulses from unduly affecting behavior (Baumeister, Heatherton, & Tice, 1994). However, research on nonconscious goal pursuit has demonstrated positive outcomes as well, such as better performance on a variety of tasks (with a primed achievement goal; Bargh & Gollwitzer, 1994), increased cooperation in a commons dilemma (with a primed cooperation goal; Bargh et al., 2001), and greater concern for the welfare of others (with indirect priming of a communal relationship orientation; Chen, Lee-Chai, & Bargh, 2001). Therefore, just as positive interpersonal goals (e.g., cooperation) can be primed to operate outside of people's awareness, we expect that helpful emotion regulatory goals can also be nonconsciously instigated, such that people need not rely solely on conscious, volitional regulation strategies to navigate their emotional lives.

Nonconscious emotion regulation can be defined as the unintentional, automatic, and relatively effortless control of one's exposure to, processing of, and response to emotionally evocative events (Bargh & Williams, 2007). The mechanism underlying nonconscious emotion regulation is posited to be nonconscious goal pursuit, which has been shown to be flexibly adaptive to dynamic, changing situational demands (Bargh & Morsella, 2008; Hassin, 2005; Hassin et al., 2009). We expect nonconscious emotion regulation to occur when a person's successful pursuit of currently active goals depends on either the up- or down-regulation of phenomenal affect.

Consistent with these hypotheses, Mauss, Cook, and Gross (2007) recently found that priming people with an emotional control goal leads to reduced anger after an experimental provocation compared with people primed with an emotional expression goal. In these studies, participants were nonconsciously primed with words related to either the full expression of emotions (*volatile, boiled*) or words related to emotional control (*stable, restrains*). After being subjected to an anger provocation, participants primed with emotional expression exhibited greater anger compared with participants primed with emotional control. These results provide initial evidence for the view that nonconscious goals can help people control their emotional states without subjective feelings of effort, intentionality, or awareness.

Research on emotion regulation has shown that people try to regulate their emotions by directly modifying their responses to emotionally evocative stimuli (a response-focused strategy) or by *reappraising* the meaning of those emotional stimuli before experiencing the emotion (an antecedent-focused strategy; Gross, 1998). A number of investigations have shown a link between the habitual use of reappraisal strategies for emotion regulation and positive psychosocial outcomes (Gross & John, 2003; Magar, Phillips, & Hosie, 2008; Richards & Gross, 2000). People who habitually use reappraisal strategies to control their emotions have better interpersonal relationships and report higher levels of well-being compared with people who habitually use suppression strategies (Gross & John, 2003). Also, recent research has found that habitual use of reappraisal strategies is negatively correlated with potentially dangerous behaviors such as smoking and alcohol-induced fights (Magar et al., 2008). Accordingly, the present studies focused on the effect of nonconscious reappraisal priming on the individual's reactivity to an emotionally evocative stressor.

We suggest that nonconscious goal pursuit can bolster a person's ability to regulate their emotions. For nonconscious goal pursuit to be initiated, all that is required is the perception of relevant stimuli to activate the goal representation; the goal will then be pursued even though there is no conscious awareness of the primes, active intention toward the goal, or active guidance of goal-directed thought and behavior (Bargh & Gollwitzer, 1994). We propose that such nonconscious goal pursuit can augment the human capacity for conscious emotion regulation, especially under conditions in which people are less likely or able to use effective conscious strategies. In Experiment 1, we assessed the benefits of a nonconscious reappraisal goal for people facing an anxiety-inducing task, a situation (e.g., delivering a counterattitudinal speech) in which emotion regulation is necessary but difficult. In the second experiment, we tested the hypothesis that the benefits of nonconscious emotion regulation (reappraisal) would be most pronounced for those individuals who are less likely to naturally or spontaneously use a conscious reappraisal strategy.

Experiment 1: Nonconscious Versus Conscious Emotion Regulation

Recent investigations have shown that people can nonconsciously regulate their emotions (Mauss et al., 2007). The present experiment builds on and extends this research in several important ways. First, it moves beyond the general goal of "emotion control" to test for the existence of nonconscious goals related to more specific emotion regulation strategies such as reappraisal (Gross, 1998). Second, it provides a first direct comparison of the effectiveness of nonconscious and conscious emotion regulation. Third, it includes a control group in which no emotion regulation goal was induced by the experimental procedures, either through explicit instruction or implicit priming, to compare the effects of experimentally manipulated conscious and nonconscious emotion regulation with those of the regulatory efforts people spontaneously and naturally use when faced with a stressor.

In Experiment 1, a third of participants was nonconsciously primed with a reappraisal goal. A second third of participants was explicitly instructed to reappraise their emotions (Gross, 1998). The remaining participants were neither primed nor received explicit reappraisal instructions and served as a control group. All participants then mentally prepared for a surprise oral speech on a counterattitudinal topic, during which we collected continuous heart rate recordings. We hypothesized that nonconsciously priming the reappraisal goal would help people regulate their emotional reactivity, as reflected in their heart rate.

Method

Participants and design. Thirty-nine undergraduates (25 women; $M = 20.6$ years, range 18–39 years) participated in a three groups (nonconscious reappraisal vs. conscious reappraisal vs. control) between-subjects design in exchange for $10. The experimental session lasted approximately 45 min.

Procedure. Upon arrival to the lab, participants were escorted into a separate room containing the psychophysiological recording equipment and were informed that the experiment was concerned with emotions and verbal abilities. Participants were then prepared for psychophysiological recordings. We attached two sensors to participants' wrists. Participants were then instructed to "sit back, clear your mind of thoughts and feelings" while a 3-min baseline assessment was recorded (prestressor recording).

Next, participants were primed with either a reappraisal goal or neutral concepts using a scrambled sentences task (Srull & Wyer, 1979). Those primed with reappraisal unscrambled five neutral sentences and five sentences containing words or phrases related to reappraisal (*reassessed, perspective, appraised again, carefully analyzed, strategy*). Participants in the conscious reappraisal and control conditions unscrambled 10 neutral sentences.

Afterward, participants were given the oral speech instructions. Specifically, they were told that they would have "3 minutes to mentally prepare a timed 2-minute oral speech which will be graded on the quality of various aspects. The topic will be why the increasing cost of tuition is a good thing." Participants in the nonconscious reappraisal and control conditions received no further instructions. Participants in the conscious reappraisal condition were provided with the following additional instructions (adapted from Gross, 1998):

> As you prepare the speech try to adopt a detached and unemotional attitude. Try strategically to reassess the situation and adopt a neutral attitude toward the speech task. In other words, as you are preparing the speech, try to think about the task objectively, in a way that is unemotionally relevant to you.

All participants were then given 3 min to prepare a speech, during which heart rate recordings were taken (poststressor recording). Following the speech preparation period, each participant delivered the speech to the experimenter. Following the speech itself, a final 3-min postspeech heart rate recording was taken to monitor participants' recovery to their baseline levels of physiological reactivity. Finally, participants were probed for suspicion and debriefed using the funneled debriefing method (see Bargh & Chartrand, 2000). No participants indicated suspicion of the prime or guessed the hypotheses of the study.

Physiological measures. During the session, physiological channels were sampled at 400 Hz using a BIOPAC Universal Interface Module (MP100). We used heart rate as a measure of physiological activity related to emotional response, consistent with recent investigations of the effect of emotion regulation on cardiovascular reactivity (Mauss, Cook, Cheng, & Gross, 2007). Cardiac R-R wave interval measurements provided mean heart rate activity for each 3-min stage. A BIOPAC electrocardiogram amplifier module was connected directly with two Ag–AgCl lead adhesive snap electrodes placed on both wrists.

Three 3-min psychophysiology recordings were taken at baseline (prestressor), during speech task preparation (poststressor), and postspeech. Heart rates (beats per minute) were averaged within each recording across 3-s intervals. The prestressor and poststressor recordings were used to calculate percentage change in physiological reactivity (see Min, Chung, & Min, 2005, for a similar treatment of psychophysiological data). This index served as the primary dependent variable.

Results and Discussion

Table 1 shows the mean heart rates for the baseline, speech preparation, and postspeech recording periods. An analysis of variance (ANOVA) on the mean baseline heart rate (prestressor) indicated that there was no initial difference in reactivity among the experimental groups, $F(2, 36) = 1.31$, *ns*. Next, we examined whether nonconsciously priming people with a reappraisal goal affects emotional reactivity to the stressful task by means of an ANOVA on the percentage change observed in heart rate activity from baseline to the speech preparation phase. As seen in Figure 1,

Table 1
Experiment 1: Mean Heart Rates (Standard Deviations) Across Recording Periods as a Function of Condition

Experimental condition	Prestressor: Baseline period	Poststressor: Speech preparation period	Recovery: Postspeech period
Nonconscious reappraisal group	$67.9\ (9.81)_a$	$70.6\ (9.99)_a$	$66.4\ (8.81)_a$
Conscious reappraisal group	$74.1\ (9.22)_a$	$78.6\ (11.8)_b$	$73.5\ (5.63)_b$
Control group	$71.4\ (10.1)_a$	$80.3\ (11.6)_b$	$70.1\ (8.58)_a$

Note. Mean heart rates collected over 3-min recording periods. Means in the same column with different subscripts differ significantly at $p < .05$ in Fisher's least significant difference test.

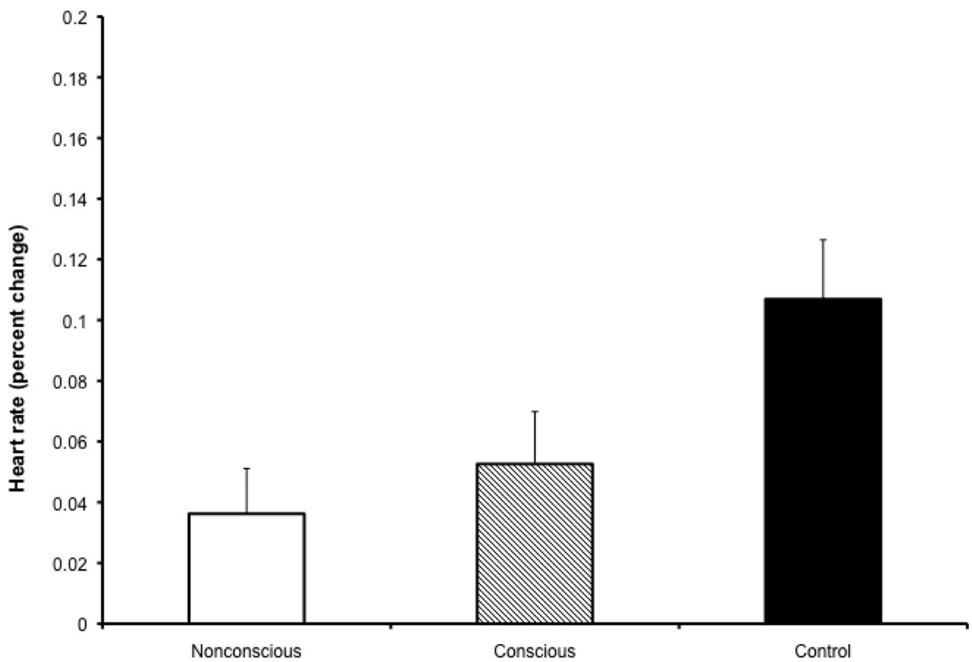

Figure 1. Mean percentage change in heart rate between baseline and speech preparation phase as a function of priming condition. Error bars represent standard errors of the mean.

there was a significant effect of experimental condition on percentage change in heart rate, $F(2, 36) = 4.56$, $p < .05$, $\eta_p^2 = .20$. Post hoc comparisons using Fisher's least significant difference test indicated that both the nonconscious reappraisal ($M = .04$) and the conscious reappraisal groups ($M = .05$) had significantly less heart rate reactivity compared with control participants ($M = .11$), ps $< .05$, with the means of the two reappraisal conditions not significantly different from each other, $p > .5$. Thus, the nonconscious reappraisal prime and the conscious reappraisal instructions were equally effective in helping people manage their emotions, compared with the control group, supporting the conclusion that nonconsciously operating emotion regulation goals can assist in self-regulatory activities.

In Experiment 1, participants primed with a reappraisal goal showed less emotional reactivity than a control group to a stressful task, as measured by the change in their mean heart rate from baseline. In harmony with Mauss et al. (2007), these findings support the hypothesis that nonconscious processes can be a boon to successful self-regulation. They also extend prior research by demonstrating the effectiveness in nonconscious form of a specific emotion regulatory strategy, reappraisal, and by furnishing a comparison of nonconscious and conscious emotion reappraisal goal effectiveness. As in many previous studies, the same outcomes were observed with nonconscious operation of the goal as when it is consciously pursued. Those primed with the reappraisal goal managed their emotions as well as participants who were explicitly instructed to reappraise their emotional situation.

In the second experiment, we assessed whether chronic, trait differences in the use of reappraisal strategies for emotion control moderate the effect of nonconscious reappraisal priming. For habitual reappraisers, the repeated pursuit of the reappraisal goal should lead that goal to become automatically associated with those situational settings requiring emotion regulation (Bargh, 1990, 1997; Bargh & Chartrand, 1999; Wood & Neal, 2007). When this occurs, the reappraisal goal will become active and operative when the individual enters those situations, without having to be consciously chosen and pursued at that time. In harmony with this analysis, it has been shown that the habitual use of reappraisal strategies does not incur high costs in terms of limited cognitive resources, compared to the use of suppression strategies (Richards & Gross, 2000).

Therefore, for individuals who chronically use reappraisal strategies, the activation of the reappraisal goal should occur automatically when the person is faced with an emotionally evocative stressor without needing temporary priming to be put into operation. For those who do not habitually reappraise, on the other hand, reappraisal priming should have a more pronounced effect because, for these individuals, the reappraisal goal is not already chronically accessible. Past research comparing chronic and temporary forms of accessibility in the domain of impression formation has shown temporary priming effects to mimic chronic accessibility effects in those individuals for whom the construct is not chronically accessible (see Bargh, 1989; Bargh, Bond, Lombardi, & Tota, 1986).

Because chronically accessible constructs operate more efficiently than other constructs, they are better able to function under conditions of cognitive load, such as distraction, arousal, or time pressure (e.g., Bargh & Thein, 1985). Thus, primed and nonconsciously operating reappraisal goals should be most helpful to those who do not chronically or habitually engage in reappraisal when faced with the difficult situations requiring emotion regulation. Nonconsciously activated goals should operate more efficiently (i.e., use less in the way of limited information processing resources) compared with deliberately activated goals, and thus the nonconscious mode of emotion regulation should be better able to function under conditions known to prevent conscious goals from operating (i.e., conditions requiring active intention, attention, or limited ego resources; Baumeister, Muraven, & Tice, 2000). In short, nonconscious emotion regulation goals may be especially useful for those who do not habitually use reappraisal strategies to meet their self-regulatory challenges (Bargh & Williams, 2007; Fitzsimons & Bargh, 2004); therefore, in Experiment 2, we examined trait tendencies toward the use of reappraisal strategies as a potential moderator of the effect of nonconscious goal pursuit on emotion regulation.

Experiment 2: Trait Reappraisal and Nonconscious Emotion Regulation

Recent data suggest that people vary in their ability to successfully control their emotions. Mauss, Cook, Cheng, and Gross (2007) demonstrated that people who habitually reappraise their emotions respond more adaptively to an emotionally evocative event compared with people who use reappraisal strategies less frequently. After an anger provocation, low reappraisers report experiencing more anger and negative emotions and have a worse cardiac output profile than high reappraisers.

On the basis of these findings, we hypothesized that nonconscious reappraisal should especially benefit those who do not frequently engage in conscious reappraisal. Participants were assigned to the same conditions as in Experiment 1 (nonconscious reappraisal vs. conscious reappraisal vs. control) and completed the same speech task while having their heart rate recorded. However, after delivering the speech, participants completed the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), which measures trait tendencies to use reappraisal and suppression emotion control strategies. Because nonconscious goal primes can produce the same effects as in automatized, habitual goal pursuit, and because people who report a low frequency of using reappraisal strategies for emotional control do not use those strategies habitually, we hypothesized that nonconscious reappraisal priming would help those who do not spontaneously use reappraisal strategies in their emotion regulation attempts to a greater extent than would explicit instructions to reappraise.

Method

Participants and design. Forty-seven undergraduate and graduate students (31 women; $M = 21.3$ years, range 18–40 years) participated in a three-group (nonconscious reappraisal vs. conscious reappraisal vs. control) between-subjects design in exchange for $10. The experimental session lasted approximately 45 min.

Procedure and materials. The procedure for this experiment was identical to the first experiment, with the sole exception being the administration of the ERQ (Gross & John, 2003) at the end of the experimental session. We averaged and centered the six reappraisal items on the ERQ into a scale to assess people's habitual use of reappraisal strategies (ERQ–R; $\alpha = .79$). Participants indicated the extent to which they agree with statements such as "I control my emotions by changing the way I think about the situation I'm in" using a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). We expected that the effects of the priming manipulation would be moderated by individual differences in people's reappraisal tendencies. We also averaged and centered the four suppression items on the ERQ into a scale to assess people's habitual use of reappraisal strategies (ERQ–S; $\alpha = .73$); however, we did not expect suppression scores to moderate the effects of the manipulations. At the end of the experimental session, participants were debriefed using the funneled debriefing technique. Again, no participants indicated suspicion of the prime or guessed the hypotheses of the study.

Results and Discussion

Table 2 shows the mean heart rates for the baseline, speech preparation, and postspeech recording periods. As in Experiment 1, we first conducted an ANOVA on mean baseline heart rate between conditions, which revealed no significant difference between groups, $F(2, 44) = 1.55$, *ns*. Next, we conducted an ANOVA that indicated that the experimental groups differed in the amount of physiological reactivity in response to the stressor, reflected in the percentage change in heart rate, $F(2, 44) = 12.06$, $p < .01$, $\eta_p^2 = .35$. Post hoc comparisons using Fisher's least significant difference test indicated that both the nonconscious reappraisal ($M = .03$) and the conscious reappraisal groups ($M = .08$) had significantly less heart rate reactivity compared with control participants ($M = .14$), ps $< .01$, replicating the pattern of results in Experiment 1. Moreover, the nonconscious reappraisal group had marginally less change in heart rate reactivity compared with the conscious reappraisal group, $p = .06$.

To examine whether the impact of nonconscious priming is moderated by trait tendency to use reappraisal or suppression strategies, we conducted a series of regression analyses predicting heart rate reactivity (percentage change) using experimental con-

Table 2
Experiment 2: Mean Heart Rates (Standard Deviations) Across Recording Periods as a Function of Condition

Experimental condition	Prestressor: Baseline period	Poststressor: Speech preparation period	Recovery: Postspeech period
Nonconscious reappraisal group	$71.2\ (9.40)_a$	$73.9\ (12.5)_a$	$68.9\ (9.19)_a$
Conscious reappraisal group	$73.2\ (10.8)_a$	$79.2\ (10.7)_a$	$72.3\ (9.60)_a$
Control group	$67.3\ (8.23)_a$	$78.8\ (8.60)_a$	$68.9\ (8.75)_a$

Note. Mean heart rates collected over 3-min recording periods. Means in the same column with different subscripts differ significantly at $p < .05$ in Fisher's least significant difference test.

ditions, ERQ scores, and their interactions as predictors. Given the three levels in our primary predictor variable (experimental condition), we created two dummy-coded variables, one indicating whether or not participants were primed, and the other indicating whether or not participants were explicitly instructed to reappraise. We then used these in separate regressions to analyze whether habitual use of reappraisal (suppression) strategies moderated the effect of experimental conditions on emotional reactivity.

Trait reappraisal. In the first analysis comparing the nonconscious reappraisal group to the conscious reappraisal and control groups, the overall model was significant, $F(3, 43) = 7.00$, $p < .01$, $r^2 = .33$. Priming condition significantly predicted heart rate reactivity, $\beta = -.46$, $t(43) = -3.65$, $p < .01$, replicating the effects of Experiment 1, but trait reappraisal scores did not, $\beta = -.19$, *ns*. Critically, the interaction between priming condition and ERQ–R scores significantly contributed to the model, $\beta = .42$, $t(43) = 2.28$, $p = .03$ (see Figure 2, which for the sake of clarity presents this interaction as a median split between high and low reappraisers).

Simple effects analyses clarify the nature of this interaction effect. For participants with high reappraisal scores on the ERQ, there was no difference between the nonconscious reappraisal and conscious reappraisal groups in terms of heart rate reactivity, $F < 1$, *ns*. However, among participants who had low reappraisal scores on the ERQ, those nonconsciously primed to reappraise had significantly less heart rate reactivity than participants consciously instructed to do so, $F(1, 27) = 5.34$, $p < .05$. The second model comparing the conscious reappraisal group with the nonconscious reappraisal and control groups was not significant, $F(3, 43) = 1.08$, *ns*, and there was no interaction between experimental condition and ERQ–R scores, $\beta = -.20$, $t(43) = -1.11$, $p > .25$. These results lend support to the conclusion that nonconscious implementation of a reappraisal strategy is most beneficial for those individuals who tend to not reappraise their emotional situations naturally on their own.

Trait suppression. We conducted an identical set of analyses examining the interactive effects of experimental conditions and ERQ–S scores. In the first model comparing the nonconscious reappraisal group with the conscious reappraisal and control groups, the overall model was significant, $F(3, 43) = 4.84$, $p < .01$, $r^2 = .25$. Priming condition significantly predicted heart rate reactivity, $\beta = -.47$, $t(43) = -3.51$, $p < .01$. However, in contrast to the reappraisal analysis, the interaction between priming condition and ERQ–S scores did not significantly contribute to the model, $\beta = .17$, $t(43) = 1.01$, $p > .30$. Furthermore, the second model comparing the conscious reappraisal group with the nonconscious reappraisal and control groups was not significant, $F(3, 43) = 0.17$, *ns*, and there was no interaction between experimental condition and ERQ–S scores, $\beta = -.08$, $t(43) = -0.45$, $p > .30$. Although caution must be used in arguing from null findings, the overall pattern of data supports the conclusion that the present nonconscious priming manipulation activated a specific emotion reappraisal goal and not merely a general emotion control goal, because only the individual difference measure of habitual use of reappraisal strategies—not of emotion suppression strategies—moderated the effect of the reappraisal prime on reactivity.

Thus, nonconscious reappraisal goals can help people successfully control their emotions. Furthermore, the effects of the nonconscious reappraisal goal were moderated by self-reported tendencies to use reappraisal strategies, benefiting those who do not reappraise habitually more than people who do. This finding is consistent with previous investigations in which nonconscious

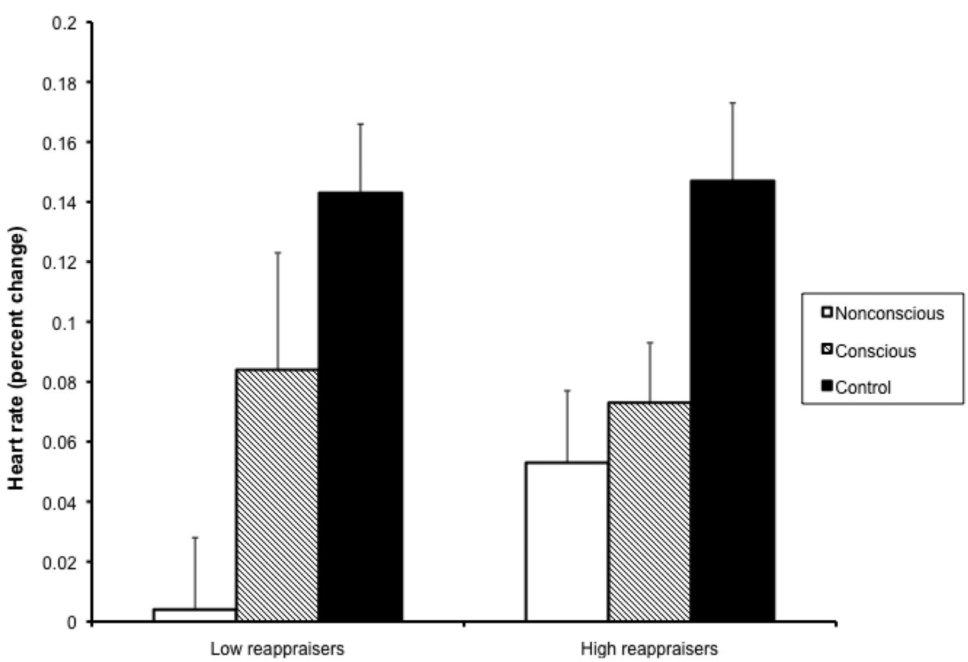

Figure 2. Mean percentage change in heart rate between baseline and speech preparation phase as a function of priming condition and Emotion Regulation Questionnaire—Reappraisal score (median split). Error bars represent standard errors of the mean.

priming effects are most pronounced in those for whom the primed concepts are not chronically activated (cf. Gardner, Gabriel, & Lee, 1999, Experiment 2). Given the common claim that many of the challenges to successful self-regulation are rooted in nonconscious or automatic impulses (e.g., Mischel & Ayduk, 2004), these results suggest a way to "fight fire with fire" by harnessing the power of nonconscious goals to control unwanted nonconscious influences (Bargh, 1999).

General Discussion

When people attempt to control their emotions, they often fail. The present results have important implications for people's ability to withstand the emotion regulatory challenges they routinely face in daily life. Nonconscious prompts to reappraise one's emotional situation can reduce reactivity to emotionally evocative events. The present experiments are in harmony with other recent findings that nonconsciously activated emotion regulation goals can help people meet such challenges (Mauss et al., 2007). Nonconscious reappraisal priming was found to be significantly more effective than people's spontaneous regulatory efforts (in the control condition). The nonconsciously operating reappraisal goal enabled participants to control their emotional reactions on a stressful task, and in Experiment 2, primed participants showed marginally more control than those who were consciously attempting to reappraise. Although participants in the priming condition were not aware of the activation and operation of this goal, it nonetheless was successful in attenuating the emotional impact of the giving-a-speech task.

The present findings also revealed that the nonconscious activation and operation of reappraisal goals help those who do not habitually use reappraisal strategies most. This is encouraging evidence that the efficiency of nonconscious goal pursuit (Bargh & Gollwitzer, 1994) can help us self-regulate effectively, especially when we are not able to do so consciously and intentionally. Thus, environmental cues associated with situational reappraisal goals can be a potentially powerful aid to the effective navigation of one's emotional world.

Although there are clear theoretical reasons to expect that nonconscious emotion regulation might be even more effective than conscious regulation, because automatic processes are less limited by constraints on information processing resources, support for this prediction was mixed. We found in Experiment 1 that the effect of nonconscious reappraisal priming on emotional reactivity was not significantly greater than the effect of conscious (explicit) reappraisal instructions, whereas in Experiment 2, there was a marginal difference such that the nonconscious reappraisal group showed less reactivity compared with the conscious reappraisal group. Future investigations could profitably examine other indices of emotion regulatory benefits, such as the amount of effort one experiences while controlling one's emotions, or the extent to which nonconscious versus conscious emotion regulation depletes self-regulatory resources (see Baumeister et al., 2000). In a related vein, the present studies featured just one index of emotional reactivity (changes in heart rate across the experimental sessions), and the use of other subjective (self-report) and physiological indices (skin conductance) could shed additional light on the effectiveness of nonconscious emotion regulation. Finally, the present research focused on emotion reappraisal strategies, but there are of course other methods for controlling one's emotions (e.g., attentional deployment, suppression of emotional response), and it remains an empirical issue whether environmental priming can activate these other methods as well. For example, it is possible that nonconscious priming of a suppression goal can have paradoxical effects on people's emotional reactivity to a stressful situation (cf. Gross, 1998; Wegner, Ansfield, & Pilloff, 1998).

In conclusion, it appears that the nonconscious mode of goal pursuit can help people control their emotions, even when they are not expert at using psychologically beneficial strategies, such as reappraisal, to do so. Traditionally, successful self-regulation has been associated with exerting conscious control over one's actions, whereas acting on automatic impulses has been associated with self-regulatory failures (Vohs & Baumeister, 2004). However, there are common conditions of daily life, such as distraction, arousal, stress, and time pressure (i.e., cognitive load), under which conscious processes are unable to operate but nonconscious processes can (e.g., Bargh & Thein, 1985; Spencer et al., 1998). Especially for these circumstances, therefore, nonconscious emotion regulatory goals can be an effective aid to self-control—and as the present Experiment 2 found, mainly of help to those who need it most: those less skilled at conscious deployment of the most effective regulatory strategy. That successful emotional control can be attained through nonconscious as well as conscious processes expands both the human repertoire of emotion regulation capacities and the sphere of influence of nonconscious processes in everyday life.

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