

# Get Excited: Reappraising Pre-Performance Anxiety as Excitement

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Individuals often feel anxious in anticipation of tasks such as speaking in public or meeting with a boss. I find that an overwhelming majority of people believe trying to *calm down* is the best way to cope with pre-performance anxiety. However, across several studies involving karaoke singing, public speaking, and math performance, I investigate an alternative strategy: reappraising anxiety as *excitement*. Compared with those who attempt to calm down, individuals who reappraise their anxious arousal as excitement feel more excited and perform better. Individuals can reappraise anxiety as excitement using minimal strategies such as self-talk (e.g., saying “I am excited” out loud) or simple messages (e.g., “get excited”), which lead them to feel more excited, adopt an opportunity mind-set (as opposed to a threat mind-set), and improve their subsequent performance. These findings suggest the importance of *arousal congruency* during the emotional reappraisal process.

*Keywords:* anxiety, excitement, reappraisal, emotion regulation, arousal congruency

During World War II, England’s Ministry of Information commissioned a public safety slogan: “Keep Calm and Carry On.” Sixty years later, the slogan resurfaced and went viral, with hundreds of thousands of retail products and derivative slogans dominating Internet marketplaces by 2007. In an attempt to explain the popularity of the slogan, one *New York Times* writer conjectured that it “resonated all over the world” (Walker, 2009). In the current article, I investigate the pervasiveness of this conventional wisdom and test its effectiveness compared with an alternative strategy: reappraising anxiety as *excitement*.

Individuals feel anxious often, especially prior to important tasks like speaking publicly or meeting with a boss. When felt immediately before or during a task, anxiety drains working memory capacity, decreases self-confidence, and harms performance (Eysenck, 1992). Anticipating the negative consequences of feeling anxious, many individuals attempt to down-regulate anxiety by trying to calm down. But decreasing anxious feelings is difficult because high arousal is automatic, and suppressing or hiding anxiety is often ineffective (e.g., Hofmann, Heering, Sawyer, & Asnaani, 2009).

Across several experimental studies, I test an alternative strategy: reappraising pre-performance anxiety as excitement. Whereas anxiety is a negative, aversive emotion that harms performance, excitement is a positive, pleasant emotion that can improve performance (Cropanzano, James, & Konovsky, 1993; Jamieson, Mendes, Blackstock, & Schmader, 2010). Anxiety and excitement have divergent effects on performance, but the experience of these two emotions is quite similar. They are both felt in anticipation of events and are characterized by high arousal. Unlike anxious versus calm feelings, which differ in high versus low arousal, anxiety and excitement are *arousal congruent*, and minimal interventions may be sufficient to produce feelings of excitement. This notion builds on seminal work on the misattribution of arousal (e.g., Schacter & Singer, 1962). We know that when a source of arousal is ambiguous, people often misunderstand the true source of their arousal. In contrast, I focus on situations in which the source of arousal is obvious, such as asking people to sing in front of strangers or to complete a difficult math task. After increasing anxious arousal, I suggest a minimal, deliberate intervention to reappraise the arousal as a positively valenced emotion, excitement.

My research makes several theoretical contributions. First, it dives deeply into an important omission in the emotion regulation literature. Previous work has not considered the role of arousal congruency during emotional reappraisal, and very few empirical studies have directly compared different substrategies of reappraisal (Shiota & Levenson, 2012). The current research addresses these omissions and answers Han, Lerner, and Keltner’s (2007) call to study the action tendencies related to both high arousal and discrete positive emotions. I expect that reappraising one high-arousal emotion (anxiety) as another high-arousal emotion (excitement) is easier and more effective than trying to shift from high arousal (anxiety) to low arousal (calmness).

Second, this research complements a body of work about misrepresenting emotions. Previous work suggests that inauthentic emotional displays differ from authentic expressions and that deliberate attempts to express inauthentic emotions are an act of

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emotional labor that can be physically and psychologically costly (e.g., Côté, 2005; Ekman, 1992; Grandey, 2000, 2003; Gross & Levenson, 1993; Morris & Feldman, 1996). In contrast, pre-performance anxiety and excitement may serve as a counterexample to these findings. By “misrepresenting” anxious arousal as excitement, I expect a genuine experience of excitement to follow.

Third, my research points to the labile nature that can exist between two seemingly discrete and disparate emotions. By highlighting the fine line between emotions like anxiety and excitement, we can better understand how individuals experience two emotions simultaneously (i.e., mixed emotions or emotional ambivalence; Ersner-Hershfield, Mikels, Sullivan, & Carstensen, 2008; Larsen & McGraw, 2011; Rothman, 2011) or shift from one emotional state to another (i.e., emotional transitions; Filipowicz, Barsade, & Melwani, 2011).

### Anxiety

Anxiety is a specific emotion characterized by high arousal, negative valence, uncertainty, and a low sense of control (Gray, 1991; Raghunathan & Pham, 1999; C. Smith & Ellsworth, 1985). Consistent with prior research, I conceptualize anxiety as “a state of distress and/or physiological arousal in reaction to stimuli including novel situations and the potential for undesirable outcomes” (Brooks & Schweitzer, 2011, p. 44). Threats that trigger anxiety can be quite minimal, such as the mere proximity of another individual or a fleeting unpleasant memory. Or they can be significant, such as the threat of failure, embarrassment, or physical harm (Tallis, Eysenck, & Mathews, 1992).

The threats that elicit anxiety change over one’s life span. For example, anxiety is triggered by anticipated separation from a primary caregiver at 12 months (Carlson & Sroufe, 1995), monsters and ghosts around age 4 (Lentz, 1985), and public speaking in adolescence and adulthood (e.g., Bamber, 1974). Extant anxiety research has largely focused on *trait* anxiety (e.g., Endler, 1980; Eysenck, 1979, 1992, 1997; Kantor, Endler, Heslegrave, & Kocovski, 2001), a personality characteristic similar to neuroticism that reflects an individual’s susceptibility to anxiety (Spielberger, 1985). Recent work has focused on *state* anxiety, a transient emotion that anyone can experience (e.g., Gino, Brooks, & Schweitzer, 2012). Trait and state anxiety are inextricably linked. Individuals high in trait anxiety experience state anxiety more frequently and in higher magnitudes than do individuals with low trait anxiety (Spielberger, 1985), but most people experience state anxiety many times each day (see Jordan et al., 2011).

Although anxiety is unpleasant and aversive, it can have positive effects on behavior. For example, if individuals feel anxious far in advance of an event, it can motivate effort and preparation through a process called *defensive pessimism*; when individuals make negative appraisals about future events, they work harder to avoid potential negative outcomes and prepare more thoroughly (e.g., Norem & Chang, 2002). Related work suggests that threat appraisals do not always harm performance but can increase effort on simple or well-learned tasks (e.g., Derks, Scheepers, Van Laar, & Ellemers, 2011; Scheepers, 2009). Similarly, the Yerkes-Dodson law describes an inverted U-shaped relationship between anxiety and performance. Very low or high levels of anxiety are harmful, but moderate levels of anxiety may improve motivation on tasks

that demand stamina or persistence (e.g., Eysenck, Derakshan, Santos, & Calvo, 2007).

However, feeling very anxious shortly before or during a task tends to harm cognition and performance, especially for nonexperts. Anxiety drains working memory and limits information processing. Anxious individuals waste working memory on processes like worrying and ruminating instead of focusing on the task at hand (see Eysenck, 1992, for a review).

Anxiety also negatively influences motivational mechanisms such as risk aversion and self-confidence (Han et al., 2007; Raghunathan & Pham, 1999). Recent work suggests that state anxiety lowers self-efficacy, the belief that one can succeed on a specific task (see Bandura, 1997, for a review). Low self-confidence, in turn, profoundly influences decision making and behavior. For example, anxious negotiators make low first offers, exit early, and earn less profit than neutral state negotiators. These effects are mediated by low negotiator self-efficacy (Brooks & Schweitzer, 2011). Similarly, anxious individuals seek out and rely more heavily on advice, even when the advice is obviously bad, because they do not feel confident in their own ability to make good judgments (Gino et al., 2012).

### Reappraising Anxiety as Calmness

Though anxiety tends to harm performance, pre-performance anxiety can be managed. Emotion regulation scholars have compared the effectiveness of different emotion regulation strategies for managing state anxiety. General consensus has emerged that *reappraisal* is the most effective strategy for mitigating the experience of state anxiety. Reappraisal has been defined as “a form of cognitive change that involves construing an emotion-eliciting situation in a way that changes its emotional impact” (Gross & John, 2003, p. 349). For example, imagine an individual who loses a loved one. He or she may initially appraise this event as tragic and feel sad. But appraisal is not a one-shot process (Jennings, Averill, Opton, & Lazarus, 1970; Lazarus, 1966; Monat, Averill, & Laras, 1972; Scherer, 2001). After initially appraising the event as tragic, he or she may search for new aspects about the situation, environment, or his or her own internal state, leading him or her to reevaluate the loss as symbolic rather than tragic, and reappraising his or her sadness as calmness or pride.

A substantial literature demonstrates that reappraising negative emotions is more effective than suppressing them (e.g., Gross, 1998, 2001; Gross & Levenson, 1993; Hofmann et al., 2009). *Suppression* means that an individual continues to feel a certain emotion, but masks or hides it from observers. Suppression can lead to a paradoxical increase in the experience of the concealed emotion. In contrast to suppression, *reappraisal* is more effective for reducing both the experience and the expression of emotion, and reappraisal entails relatively low physiological, cognitive, and interpersonal costs.

Previous work on anxiety reappraisal has focused on reappraising anxiety as calmness. For example, Hofmann et al. (2009) demonstrated that reappraising anxiety as calmness is more effective than suppressing or accepting anxiety for mitigating physiological arousal (i.e., heart rate) and the subjective experience of anxiety. However, previous research has overlooked the effects of reappraisal on subsequent performance and has not considered reappraising anxiety as emotional states other than calmness.

## Reappraising Anxiety as Excitement

In a recent review of the reappraisal literature, Jamieson, Mendes, and Nock (2013) suggest that “Much can be done during stressful experiences to promote adaptive responses. . . . Cognitive appraisals are powerful tools that help shift negative stress states to more positive ones” (p. 51). I break new ground by examining one such strategy here: reappraising pre-performance anxiety as *excitement*.

Anxiety is characterized by negative appraisal, uncertainty, and a lack of control, whereas excitement is characterized by positive appraisal and optimism (e.g., McConnell, Bill, Dember, & Grasha, 1993). Individuals who feel anxious tend to focus on the potential negative outcomes of future events and believe that those outcomes are more likely to occur (Lerner & Keltner, 2001; Raghunathan & Pham, 1999). Those beliefs lead anxious individuals to have lower self-confidence, to be more risk-averse than individuals in a neutral state, and to struggle with cognition immediately before and during performance tasks (e.g., Eysenck, 1992; Gino et al., 2012). In contrast, individuals in an excited state tend to focus on the potential positive outcomes of upcoming events and believe that they can achieve more positive outcomes (Ashby, Isen, & Turken, 1999; Aspinwall & Taylor, 1997; Brown & Curhan, 2013; Fredrickson, 2001; Jamieson et al., 2010; Scheier, Weintraub, & Carver, 1986; Schnall, Roper, & Fessler, 2010).

Though they have divergent effects on cognition, motivation, and performance, the physiological correlates of anxiety and excitement are remarkably similar. Both anxiety and excitement are characterized by high arousal, signaled by increased heart rate (e.g., J. C. Smith, Bradley, & Lang, 2005). Unlike reappraising anxiety as calmness, which requires a physiological shift from high to low arousal as well as a cognitive shift from negative to positive valence, reappraising anxiety as excitement requires only a cognitive change in valence because anxiety and excitement are *arousal congruent*. In this way, effective reappraisal may not require a decrease in anxiety in order for an increase in excitement to positively influence cognition and performance.

Taken together, I expect that reappraising anxiety as excitement, compared with reappraising anxiety as calmness, is easier and improves performance on important tasks that typically make people very anxious.

## Overview of the Current Research

I test my predictions across several experimental studies. In a pilot study, I investigate people’s intuitions about managing pre-performance anxiety. I expect that most people believe trying to calm down (i.e., reappraising anxiety as calmness) is more effective than reappraising anxiety as excitement. In Study 1, I test the effectiveness of reappraising pre-performance anxiety as excitement before singing in front of a stranger. In Studies 2 and 3, I directly compare the effects of reappraising pre-performance anxiety as excitement versus calmness in two different behavioral domains: public speaking and math performance. In Study 4, I explore the psychological mechanism underlying this phenomenon: opportunity versus threat mind-set. I expect that reappraising anxiety as excitement primes an *opportunity* mind-set, which in turn improves performance. In Study 4, I also draw a distinction between reappraising the *situation* versus reappraising one’s *internal state*.

## Pilot Study: Lay Beliefs

To motivate my series of experiments, I conducted a pilot study to investigate people’s lay beliefs related to anxiety regulation. I expect that lay beliefs align with recent research on anxiety reappraisal: People intuitively believe that trying to calm down is the best way to contend with pre-performance anxiety. I do not expect individuals to anticipate the benefits of reappraising anxiety as excitement.

## Method

**Participants.** Three hundred participants completed this study online through Amazon’s Mechanical Turk ( $M_{\text{age}} = 35.4$  years, 159 men, 141 women) in exchange for \$.50. I included several reading and comprehension checks to ensure participant engagement and to prevent automated responses. The sample was restricted to U.S. citizens. Eighty-five percent of participants reported full-time employment at the time of the survey, and 73% said they had a college degree or higher.

**Design and procedure.** I asked participants to read and answer questions about a hypothetical scenario. I manipulated the focal actor in the scenario to test whether individuals’ responses would be different for the self versus a coworker (e.g., Polman, 2012):

Imagine that you work in a large organization of about five hundred employees. Tomorrow, [you are]/[your coworker is] scheduled to give a thirty-minute keynote speech in front of the whole company, including the CEO and executive board. This makes [you]/[your coworker] feel extremely anxious.

Participants answered two questions about the scenario. First, “What advice would you give to [yourself]/[your coworker]?” (open-ended response). Second, “What is the best advice?” (multiple choice: Try to relax and calm down, Try to cancel the speech or find someone else to do it, Try to be excited instead of anxious). Participants finished by answering questions about their public speaking experience, age, and gender.

I recruited two independent raters to analyze the content of participants’ open-ended responses. I asked the raters to categorize participants’ responses as advice to accept anxiety; to hide anxiety; or to reappraise anxiety as excitement, calmness, anger, or sadness. The raters were blind to my experimental hypotheses and experimental condition, and interrater reliability was high (Fleiss’s  $\kappa > .61$ ).

## Results and Discussion

On average, the raters coded 84.94% of the participants’ responses to the question “What advice would you give?” as *advice to try to relax or calm down* (Fleiss’s  $\kappa = .62$ ) and 21.45% of the responses as *advice to try to get excited* (Fleiss’s  $\kappa = .54$ ),  $\chi^2(1, N = 300) = 37.89, p < .001$ . None of the responses were coded as advice to accept anxiety, hide anxiety, or reappraise anxiety as anger or sadness.

In response to “What is the best advice?” when the focal actor was the self, 90.97% of participants chose “Try to relax and calm down,” 1.29% of participants chose “Try to cancel the speech or find someone else to do it,” and 7.74% of participants chose “Try

to be excited instead of anxious,”  $\chi^2(2, N = 153) = 150.11, p < .001$ . I observed the same pattern of results when the focal actor was a coworker. There were no significant differences between the self and coworker conditions, and there were no effects of age, gender, or public speaking experience.

An overwhelming majority of people (more than 90%) believe the best way to manage pre-performance anxiety is to “try to calm down” (i.e., reappraise anxiety as calmness). On average, people do not implicitly anticipate performance benefits via reappraising pre-performance anxiety as excitement.

### Study 1: Singing Performance

In Study 1, I test whether individuals can reappraise anxiety as excitement prior to a very anxiety-inducing task: singing in front of a stranger. I expect that, even when directed to do so by an experimenter, reappraising anxiety as excitement will increase subjective excitement and improve subsequent singing performance.

Previous anxiety reappraisal research has used detailed manipulations like the following to induce anxiety-to-calmness reappraisals:

In a few minutes, you will be asked to give an impromptu 10 minute speech in front of a video camera about some controversial topics. It is quite normal that an impromptu speech creates some level of discomfort or even fear. Please try to take a realistic perspective on this task, by recognizing that there is no reason to feel anxious. Please realize that the situation does not present a threat to you. Regardless of what occurs during this task or how anxious you appear, it is just an experiment, and there are no negative consequences to be concerned with. You will receive a list of speech topics in a few minutes. For now, please sit quietly with your eyes closed for one minute. During this time, please handle your feelings in the manner I suggested. (Hofmann et al., 2009, p. 390)

In Study 1, I use a subtler manipulation to induce reappraisal: randomly assigned self-statements of emotion (e.g., saying “I am excited” out loud). Explicit emotional self-statements are pervasive and may do more than simply express inner feelings. They may provide evidence of one’s internal state, influencing the reappraisal process and contributing to the construction of subjective emotional experience. Like the happiness inspired by putting a pencil between one’s teeth to simulate a Duchenne smile (e.g., Strack, Martin, & Stepper, 1988), the power states induced by standing in powerful positions (Carney, Cuddy, & Yap, 2010), or the positive psychological states induced by self-affirmations (e.g., Sherman & Cohen, 2006), I expect self-statements of emotion to be self-fulfilling.

Recent research in negotiations has revealed that emotional self-statements have profound interpersonal consequences. For example, saying “I am angry” extracts concessions from a counterpart, but may harm the long-term relationship (Van Kleef, De Dreu, & Manstead, 2004a). Work in this domain has examined the interpersonal consequences of other specific emotional statements, including self-statements of guilt, happiness, disappointment, and regret (Van Kleef, De Dreu, & Manstead, 2004b, 2006, 2010). However, in this line of work, researchers have used a simulated counterpart in their methodology, neglecting the psychological and emotional processes of the individual making the emotional statement. In other words, the *observer* of emotional statements has

been the object of study rather than the person *making* the statement, which is what I explore here.

Previous work on positive self-talk in sports psychology has tested the benefits of issuing statements like “I can do it” on dart-throwing performance (Dagrou, Gauvin, & Halliwell, 1992; Van Raalte et al., 1995) and on the self-reported performance of professional gymnasts, wrestlers, and divers (Weinberg, Smith, Jackson, & Gould, 1984; see also Hardy, 2006; Tod, Hardy, & Oliver, 2011, for a review). Most recently, Zell, Warriner, and Albarracín (2011) found that individuals commonly use fragmented self-talk, characterized by the use of the second person for the self (e.g., “You can do this”), leading up to threatening tasks. And interrogative self-talk (e.g., “Will I?”), as opposed to declarative self-talk (e.g., “I will”), has been found to increase intrinsic motivation and improve anagram task performance (Senay, Albarracín, & Noguchi, 2010). However, very little research has measured the behavioral effects of self-talk on performance. I investigate the effects of self-talk on emotional reappraisal and high-pressure performance in this study.

### Method

**Participants.** I recruited 113 native English-speaking students (54 men, 59 women) from a northeastern university to participate in an experiment for pay. On average, participants were 20.30 years old ( $SD = 3.30$ ). Participants received a \$5 show-up fee and could earn additional compensation up to \$5 based on performance in the study.

**Design.** Participants performed a karaoke song on a Nintendo Wii video game console, using the “Karaoke Revolution: Glee” program. Prior to singing, I randomly assigned participants to make one of three self-statements: “I am anxious,” “I am excited,” or no statement. The main dependent variable was singing quality, as measured by the karaoke program’s voice recognition software.

**Manipulation check.** I conducted a manipulation check with a nonoverlapping sample ( $N = 97$ ) drawn from the same population as the main study. The goals of this manipulation check were (a) to test the familiarity of the target song and (b) to examine the physiology (heart rate) and psychology of self-statements as a means to reappraise anxiety.

I recruited 97 participants ( $M_{\text{age}} = 20.27$  years, 44 men, 53 women) from a non-overlapping sample to participate in a study in exchange for a \$5 show-up fee. An experimenter guided participants through the study. First, the experimenter told participants they would be singing the first verse of “Don’t Stop Believin’” by Journey (Cain, Perry, & Schon, 1981, track 1) in front of each other. I chose “Don’t Stop Believin’” as the target song because it can be performed easily in three different octaves (suitable for both male and female participants). “Don’t Stop Believin’” was also the 21st most downloaded song in iTunes history and tends to be extremely familiar to English speakers.

After announcing that they would sing in front of each other, the experimenter randomly assigned each experimental group to make an emotional statement out loud. Specifically, the experimenter read the following script: “Please deliver the following randomly assigned line out loud. When you deliver your line, really try to believe it. Here is your line: ‘I am [anxious]/[excited]/[calm]/[angry]/[sad].’” There was also a neutral condition in which participants made no self-statement. I included emotional statements

other than anxiety and excitement for a deeper understanding of how emotional self-statements influence arousal and subjective emotional experience.

After delivering their line out loud, participants were instructed to stand at the front of the room to sing the opening phrase of the song:

Just a small town girl, living in a lonely world. She took the midnight train going anywhere. Just a city boy, born and raised in South Detroit. He took the midnight train going anywhere. (Cain et al., 1981, track 1)

Consistent with prior research (e.g., Lang, Greenwald, Bradley, & Hamm, 1993), I used heart rate as a measure of physiological arousal. Throughout the study, each participant wore a pulse oximeter on their nondominant pointer finger. I asked participants to record their heart rate (in PrBPM) at three different times throughout the study: resting, after learning that they were going to sing, and after making their self-statement.

At the end of the study, I asked participants to rate the extent to which they felt anxious and excited before singing, and to rate their recognition of the song (“I recognized the song,” 1 = *Strongly disagree*, 7 = *Strongly agree*). I measured anxious and excited feelings on 7-point scales (1 = *Strongly agree*, 7 = *Strongly disagree*) across five items adapted from Brooks and Schweitzer (2011; *anxious, tense, nervous*,  $\alpha = .86$ ; *excited, enthusiastic*,  $\alpha = .91$ ). Participants also indicated their age and gender.

Across all conditions, participants rated the song as very recognizable ( $M = 6.61$  out of 7,  $SD = 1.20$ ) and indicated that they felt very anxious before singing ( $M = 5.81$  out of 7,  $SD = 1.85$ ). There were no effects of experimental condition on song recognition or self-reported anxiety.

There was a main effect of experimental condition on self-reported excitement. Participants who stated “I am excited” reported feeling significantly more excited before singing ( $M = 3.56$ ,  $SD = 1.35$ ) than did participants in the other conditions ( $M = 1.98$ ,  $SD = 1.86$ ;  $t = 3.70$ ,  $p < .001$ ,  $d = .972$ ). There were no significant differences in subjective excitement across the anxious, calm, angry, sad, and neutral conditions.

There was a significant increase in participants’ mean heart rate between resting state ( $M = 73.65$  PrBPM,  $SD = 11.92$ ) and after finding out about the singing task ( $M = 78.43$  PrBPM,  $SD = 11.88$ ;  $t = -2.80$ ,  $p = .006$ ,  $d = -.402$ ). Across all conditions, heart rate remained high leading up to the singing task. There was not a significant difference in participants’ heart rate between Reading 2 (after finding out about the singing task) and Reading 3 (after making a self-statement of emotion,  $M = 77.81$ ,  $SD = 11.19$ ;  $p = .71$ ,  $d = .054$ ). There were no effects of experimental condition (self-statement) on heart rate or self-reported anxiety.

The results from this manipulation check demonstrate that the target song was very recognizable, that being asked to sing induces high arousal, and that making an excited self-statement induces subjective excitement. Further, it demonstrates that physiological arousal (as measured by heart rate) is not altered by the reappraisal manipulation studied here.

**Procedure.** For the main study, I recruited participants to the lab such that one participant arrived every 8 min for the duration of the study. Upon arrival, an experimenter held participants in a waiting room where they completed an unrelated filler task.

A second experimenter brought participants into a second room one at a time. First, participants read that they would be singing the song “Don’t Stop Believin’” by Journey in front of an experimenter on a karaoke program and that they would be paid on the basis of their singing accuracy score. The “singing accuracy score” payment structure is depicted in Figure 1.

I told participants that when the experimenter asked, “How are you feeling?” they were required to respond with a randomly assigned emotional statement and that they should try to believe it: “I am anxious” or “I am excited.” I also included a condition in which participants were not prompted for a response and did not make an emotional statement (neutral condition). I wanted to compare the effects of making a self-statement with not making a self-statement because inaction can also influence emotional experience (Andrade & Van Boven, 2010).

After participants read these instructions, the experimenter asked the following question out loud: “How do you feel?” Participants responded by saying their assigned statement out loud. Two participants were dismissed from the study for failing to respond with the correct statement.

Next, a third experimenter accompanied the participant into a third room where a Nintendo Wii was set up with a microphone and a television screen (see Figure 2 for a photo of the experimental setup). To eliminate potential demand effects, the third experimenter was blind to the experimental condition and hypotheses.

The experimenter handed the microphone to the participant and said, “You will sing into this microphone. The lyrics will appear across the bottom of the screen.” The participant sang “Don’t Stop Believin’” using the Nintendo Wii’s “Karaoke Revolution: Glee” program while the experimenter sat in front of him or her, watching. At the end of the song, the karaoke program’s voice recognition software provided an objective performance score on a scale of 0%–100%. The singing accuracy score was an average of the

Karaoke Accuracy Score	Bonus Payment
0-19% Accurate	\$0
20-39% Accurate	\$1
40-59% Accurate	\$2
60-79% Accurate	\$3
80-89% Accurate	\$4
90-100% Accurate	\$5

Figure 1. Singing accuracy payment scheme (Study 1). The Karaoke accuracy score was calculated by the Nintendo Wii’s “Karaoke Revolution: Glee” voice recognition software, developed by Harmonix Music Systems and released by Konami Corporation in 2009.

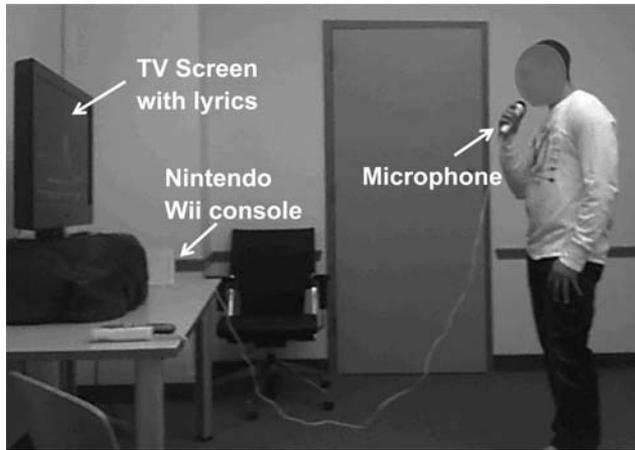


Figure 2. Karaoke singing experimental setup (Study 1).

software's measurement of volume (quiet-loud), pitch (distance from true pitch), and note duration (accuracy of breaks between notes).<sup>1</sup>

When they finished singing, participants completed the same self-report measures of anxiety ( $\alpha = .84$ ) and excitement ( $\alpha = .87$ ) as I used in the manipulation check. I also measured singing self-efficacy across three items adapted from Bandura (1997; e.g., "I am confident in my singing ability"; 1 = *Strongly disagree*, 7 = *Strongly agree*,  $\alpha = .83$ ) and demographics (age, gender). At the end of the study, to gauge suspicion and mitigate demand effects, I asked participants, "What did you think this study was about?"<sup>2</sup> Finally, an experimenter paid participants based on their singing accuracy score.

## Results

**Singing performance.** I conducted a one-way analysis of variance (ANOVA) to test the effect of reappraisal condition on singing performance. I included reappraisal condition as the independent variable and singing accuracy score as the dependent variable. There was a main effect of reappraisal condition on singing accuracy,  $F(1, 109) = 8.77, p < .005$ . Consistent with my expectation, singing accuracy was highest in the "I am excited" condition ( $M = 80.52\%$ ,  $SD = 12.54$ ) and was significantly higher than in the no-statement condition ( $M = 69.27\%$ ,  $SD = 16.47$ ;  $t = 3.12, p < .01, d = .769$ ). Singing accuracy was lowest in the "I am anxious" condition ( $M = 52.98\%$ ,  $SD = 24.54$ ) and was significantly lower than in the no-statement condition ( $t = -3.62, p < .001, d = .779$ ). This pattern of results is depicted in Figure 3. There were no effects of age or gender on singing accuracy, and the pattern of results remained the same when controlling for age and gender.

**Subjective emotions.** Consistent with the results of my manipulation check, self-reported feelings of excitement were higher in the "I am excited" condition ( $M = 3.14, SD = 1.06$ ) than in the "I am anxious" condition ( $M = 2.54, SD = 1.10$ ;  $t = -2.10, p = .041, d = .555$ ). There were no significant differences in self-reported anxiety across the "I am excited" ( $M = 4.81$ ), "I am anxious" ( $M = 4.92$ ), and no-statement ( $M = 4.97$ ) conditions

( $ps > .4, ds < .25$ ). There were no effects of age or gender on self-reported excitement or anxiety.

**Self-efficacy.** Singing self-efficacy was significantly higher after stating "I am excited" ( $M = 3.48, SD = 1.94$ ) than after stating "I am anxious" ( $M = 2.29, SD = 1.68$ ;  $t = -1.41, p = .02, d = .656$ ), or after making no statement ( $M = 2.19, SD = 1.72$ ;  $t = -1.62, p < .02, d = .704$ ).

However, self-efficacy did not mediate the effect of condition on task performance. When I included self-efficacy in the model, the effect of "I am excited" versus the no-statement condition on singing performance was *reduced* in significance but did not become insignificant (from  $\beta = -5.63, p = .007$  to  $\beta = -4.67, p = .02$ ), whereas the effect of self-efficacy remained significant ( $\beta = 2.83, p = .008$ ). In a bootstrap analysis, I found that the 95% bias-corrected confidence interval from a 5,000-sample bootstrap test did include zero (CI =  $[-.04, .32]$ ), which does not indicate mediation (MacKinnon, Fairchild, & Fritz, 2007; Preacher & Hayes, 2004). I investigate a different mediator, opportunity versus threat mind-set, in Study 4.

## Discussion

The findings from Study 1 demonstrate that self-statements of emotion can induce reappraisal. By stating "I am excited" out loud, individuals reappraised their anxiety as excitement and improved their subsequent singing performance.

### Study 2: Public Speaking Performance

In Study 2, I directly compare the effects of reappraising anxiety as calmness versus excitement in a work-relevant behavioral domain: public speaking. Public speaking is common, especially in the workplace, and makes adults very anxious (e.g., Bamber, 1974). I expect that, compared with reappraising anxiety as calmness, reappraising anxiety as excitement causes speakers to be more persuasive, confident, competent, and persistent.

## Method

**Participants.** I recruited 140 native English-speaking students (63 men, 77 women) from a northeastern university to complete a study in exchange for a \$5 show-up fee. On average, participants were 20.24 years old ( $SD = 1.80$ ).

**Design and procedure.** Each participant was given 2 min to prepare a persuasive public speech about "why you are a good work partner." I told participants that they would deliver the speech in front of an experimenter and that it would be recorded on a video camera to be "judged later by a committee of peers." These instructions were written to maximize anxious arousal.

After preparing a speech but before delivering it, participants were randomly assigned to make one of two self-statements to induce reappraisal: "I am excited" or "I am calm." Then they delivered their 2- to 3-min speech on camera. The experimenter was blind to condition and my hypotheses.

<sup>1</sup> Information provided by Konami Corporation in May 2012.

<sup>2</sup> I included this suspicion check at the end of each experiment. No participant correctly identified the research question or experimental hypotheses in any of the studies.

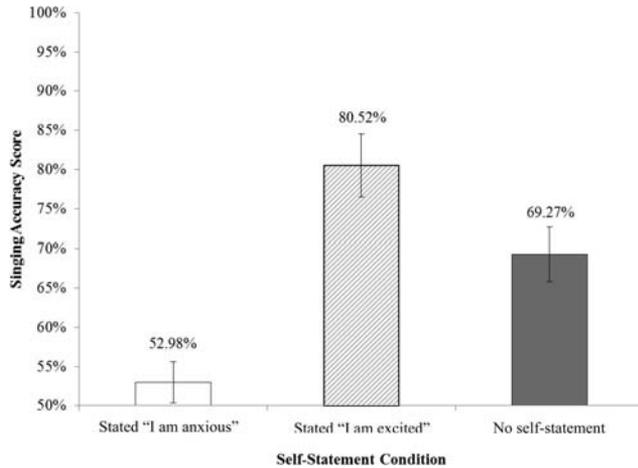


Figure 3. Singing performance by reappraisal condition (Study 1). Error bars represent 5% confidence intervals around the means.

After delivering their speech, participants completed the same self-report measures of anxiety ( $\alpha = .78$ ), excitement ( $\alpha = .87$ ), and self-efficacy ( $\alpha = .87$ ) from Study 1, as well as their age and gender.

I recruited three independent raters who were blind to experimental condition and my hypotheses. The raters watched the videos of the participants' speeches and coded them along several dimensions on a scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Participants were instructed to persuade the audience that they would be a good work partner. Therefore, the raters used a two-item measure of persuasiveness ("The speaker was persuasive," "The speaker would be a good work partner,"  $\alpha = .90$ ). The raters also scored participants' confidence ("The speaker was confident," "The speaker seemed self-assured,"  $\alpha = .92$ ), anxiety ("The speaker was anxious"), excitement ("The speaker was excited"), competence ("The speaker was intelligent," "The speaker knew what s/he was talking about," "The speech made sense,"  $\alpha = .79$ ), and persistence ("The speaker was persistent"). Interrater reliability was acceptably high across all measures (all Fleiss's  $\kappa$ s  $> .64$ ).

## Results

**Speech ratings.** I averaged across the three raters' values for my analyses. I conducted several ANOVAs, with speaker persuasiveness, confidence, anxiety, excitement, competence, and persistence as dependent variables, and reappraisal condition ("I am excited" vs. "I am calm") as the independent variable. A principle components analysis indicated separate factor loadings for each of the dependent measures, and I report separate ANOVAs for each dependent variable.

Ratings of the speakers' persuasiveness, competence, confidence, and persistence differed significantly across experimental conditions. Supporting my predictions, participants who stated "I am excited" before their speech were rated as more persuasive,  $F(1, 138) = 11.87, p < .001, d = .681$ ; more competent,  $F(1, 138) = 4.78, p = .03, d = .458$ ; more confident,  $F(1, 138) = 13.14, p < .001, d = .705$ ; and more persistent,  $F(1, 138) = 3.99, p = .048, d = .505$ , than were participants who stated "I am calm"

before their speech. Means and standard deviations are included in Figure 4.

There were no significant effects of reappraisal condition on the coders' ratings of speaker anxiety ( $p = .19$ ) or excitement ( $p = .08$ ). There were no effects of age or gender, and the pattern of results remained the same when controlling for speaker age and gender.

**Speech duration.** As an additional measure of speaker persistence, I conducted a  $t$  test of speech duration (in seconds) across reappraisal conditions. Participants were required to speak for at least 2 min and no longer than 3 min. Participants in the "I am excited" condition spoke longer during their speeches ( $M = 167$  s,  $SD = 26$  s) than did participants in the "I am calm" condition ( $M = 132$  s,  $SD = 21$  s;  $t = 8.69, p < .001, d = 1.48$ ). Speech duration (in seconds) and the coders' subjective ratings of "persistence" were highly correlated ( $r = .87, p < .002$ ).

**Self-report measures.** I conducted three ANOVAs with participants' self-reported excitement, anxiety, and self-efficacy as dependent variables, and I used reappraisal condition as the independent variable. Consistent with my findings from Study 1, participants reported feeling more excited after stating "I am excited" ( $M = 4.75, SD = 1.72$ ) than after stating "I am calm" ( $M = 4.09, SD = 1.54, F(1, 138) = 5.60, p < .02, d = .404$ ). Self-reported self-efficacy was marginally higher after stating "I am excited" ( $M = 5.62, SD = 0.91$ ) than after stating "I am calm" ( $M = 5.27, SD = 1.20, F(1, 138) = 3.57, p = .06, d = .329$ ).

Self-reported anxiety did not differ significantly across conditions ( $M = 5.06$  "I am excited" vs.  $M = 5.27$  "I am calm,"  $p = .66, d = .174$ ), but was quite high, on average, leading up to the public speaking task ( $M = 5.17$  out of 7,  $SD = 1.17$ ). There were no effects of age or gender.

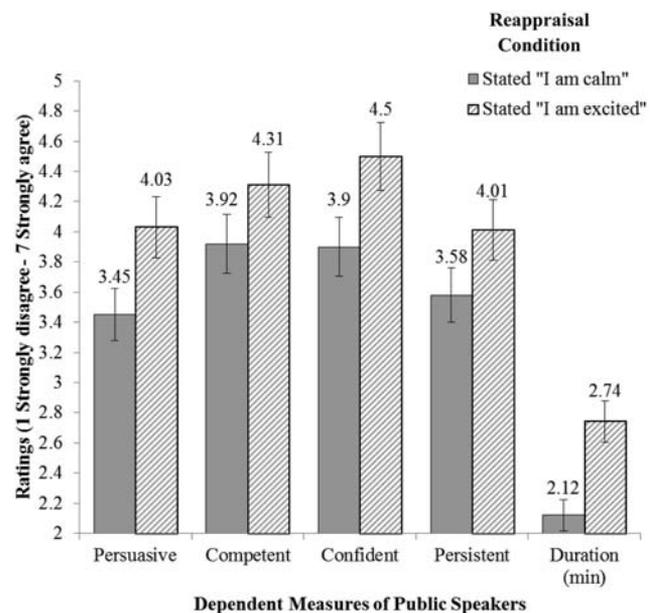


Figure 4. Public speaking performance by reappraisal condition (Study 2). Error bars represent 5% confidence intervals around the means.

## Discussion

Being asked to give a 2-min public speech on camera caused individuals to feel very anxious. Compared with reappraising their anxiety as calmness by stating “I am calm,” reappraising anxiety as excitement by stating “I am excited” caused individuals to feel more excited, to speak longer, and to be perceived as more persuasive, competent, confident, and persistent.

### Study 3: Math Performance

In Studies 1–2, I found that reappraising pre-performance anxiety as excitement can be accomplished by making a minimal self-statement (“I am excited”), which improved performance across two anxiety-inducing performance tasks: karaoke singing and public speaking. In Study 3, I extend my investigation in two ways: (a) I manipulate reappraisal using minimal instructions (e.g., telling participants to “Get excited”) rather than self-statements (e.g., asking participants to state “I am excited”) and (b) I use a different anxiety-inducing task, math performance, to explore high-pressure performance in a nonpublic performance domain. Math anxiety is quite pervasive (e.g., Maloney & Beilock, 2012). I expect that sincere efforts to reduce anxiety (i.e., calm down) will not decrease anxious arousal. Instead, I expect that trying to “get excited” will increase the subjective experience of excitement and improve subsequent math performance.

## Method

**Participants.** I recruited 188 native English-speaking students (80 men, 108 women) from a northeastern university to participate in an experiment for pay. On average, participants were 20.39 years old ( $SD = 1.88$ ). Participants received a \$5 show-up fee and could earn additional compensation up to \$4 based on performance.

**Design.** I asked participants to complete a difficult math task under time pressure. To manipulate reappraisal, participants read one of three phrases in large letters immediately before the math task began: “Try to remain calm” (calmness reappraisal), “Try to get excited” (excitement reappraisal), or “Please wait a few moments” (neutral). My dependent measures included heart rate over time and performance (the number of math questions answered correctly).

**Procedure.** An experimenter seated participants in separate cubicles in front of computers. All instructions and measures were presented to participants on the computer. First, participants learned that their heart rate would be monitored with a wireless finger pulse oximeter. They read instructions about how to place the pulse oximeter on their nondominant pointer finger (so they could complete the study using their dominant hand).

Next, participants read instructions to breathe deeply for 10 s and record their resting heart rate (Reading 1). Throughout the study, participants recorded their own heart rate by reading the beats per minute (PrBPM) displayed on the pulse oximeter and typing the value on the computer. After recording resting heart rate, they read instructions for the main task:

You will complete a very difficult IQ test made up of eight questions under time pressure. For each question, you will have five seconds to select the correct answer. You will receive feedback about your

accuracy after each question. If you answer every question correctly, you will earn \$4. For each question you answer incorrectly, you will lose fifty cents (\$.50). Good luck minimizing your loss.

These instructions were written to maximize arousal. Time pressure, loss framing, and the phrase “IQ test” tend to make people very anxious (Beilock, 2008; Beilock & Carr, 2005; Ramirez & Beilock, 2011). After reading the instructions, participants recorded their current heart rate (Reading 2).

The “IQ test” was actually a series of eight modular arithmetic math problems adapted from Mattarella-Micke, Mateo, Kozak, Foster, and Beilock (2011). Each question followed the same format using invented symbols. For example, “ $16 \equiv 4 \circ 3$ ” meant “16 minus 4, divided by 3.” For each problem, if the solution was a whole number (like here, 4), then the correct answer was “true.” If the solution was not a whole number, then the correct answer was “false.” Participants read instructions about the format of the math questions and completed one practice question.

After answering the practice question and receiving feedback, participants were randomly assigned to read one of three phrases displayed in large letters on the screen: “Try to remain calm” to induce calm reappraisal, “Try to get excited” to induce excitement reappraisal, or “Please wait a few moments” (neutral). I included a neutral condition for experimental control, but I did not expect significant differences between the neutral and calm reappraisal conditions.

After reading the task instructions and experimental manipulation, participants recorded their heart rate (Reading 3). Next, they completed the math task. For each question, participants had 5 s to answer “true” or “false” before the task progressed. After each question, participants received feedback about the accuracy of their previous answer, and they reported their heart rate (Readings 4–12). After the last question, participants received accuracy feedback and the message, “this is the end of the IQ test.”

When the task had ended, participants answered questions about their subjective experience of anxiety ( $\alpha = .69$ ), excitement ( $\alpha = .74$ ), and self-efficacy (three items,  $\alpha = .86$ ) during the study using the same measures I used in Studies 1–3. Participants also answered demographic questions about their age and gender and were paid on the basis of their math performance.

## Results

**Math performance.** I conducted a one-way ANOVA with math performance (number of correct answers out of eight) as the dependent variable and reappraisal condition as the independent variable. I found a main effect of experimental condition on math performance,  $F(1, 186) = 4.18, p = .042$ . Performance was nearly identical in the calm reappraisal ( $M = 2.94, SD = 1.75$ ) and neutral conditions ( $M = 2.94, SD = 1.91$ ). Collapsing across these two comparison conditions, participants in the excitement reappraisal condition scored significantly higher by comparison ( $M = 3.60, SD = 1.73; t = -2.12, p = .036, d = -.362$ ). There were no effects of age or gender on math performance, and the pattern of results remained the same when controlling for age and gender, and when comparing excitement to each control condition separately.

**Heart rate.** Consistent with my expectation that heart rate would increase in anticipation of the threatening task, there was a significant increase in mean heart rate between Reading 1 (resting

heart rate,  $M = 74.33$  PrBPM,  $SD = 10.19$ ) and Reading 2 (after finding out about the math task,  $M = 78.05$  PrBPM,  $SD = 12.15$ ) ( $t = -3.22$ ,  $p = .001$ ,  $d = -.332$ ). Heart rate remained high leading up to and throughout the math task. Other than the initial increase in heart rate between Readings 1 and 2, there were no significant changes in mean heart rate over time.

Consistent with my expectation that physiological arousal is difficult to control, there were no significant effects of reappraisal condition on heart rate. Even when instructed to “try to remain calm,” heart rate remained high. I depict heart rate over time by experimental condition in Figure 5.

**Subjective excitement and anxiety.** Controlling for task performance, there was a main effect of experimental condition on the subjective experience of excitement,  $F(1, 186) = 8.43$ ,  $p = .004$ . There was no difference in subjective excitement between the “try to remain calm” ( $M = 4.41$ ,  $SD = 1.39$ ) and neutral conditions ( $M = 4.02$ ,  $SD = 1.50$ ;  $t = -1.54$ ,  $p = .13$ ,  $d = .260$ ). Participants in the excitement reappraisal condition reported feeling more excited during the task by comparison ( $M = 4.73$ ,  $SD = 1.36$ ;  $t = 2.32$ ,  $p = .021$ ,  $d = -.496$ ). There were no effects of reappraisal condition on self-reported anxiety ( $M = 4.81$  “try to get excited” vs.  $M = 4.95$  “try to remain calm” vs.  $M = 4.92$  neutral). There were no effects of age or gender on self-reported anxiety or excitement.

**Self-efficacy.** Controlling for performance, there was a main effect of experimental condition on self-efficacy,  $F(1, 186) = 5.61$ ,  $p = .019$ . I found no difference in self-efficacy between the “try to remain calm” ( $M = 5.49$ ,  $SD = 1.21$ ) and neutral conditions ( $M = 5.17$ ,  $SD = 1.33$ ;  $t = -1.54$ ,  $p = .15$ ,  $d = .252$ ). But participants in the “get excited” condition reported higher self-efficacy by comparison ( $M = 5.66$ ,  $SD = 1.01$ ;  $t = -2.35$ ,  $p = .021$ ,  $d = .415$ ). There was a significant positive correlation between task performance and self-efficacy such that those who scored higher on the math task subsequently reported more confidence in their math ability ( $r = .21$ ,  $p = .03$ ). There were no effects of age or gender on self-efficacy.

**Mediation.** Because the neutral and calm reappraisal conditions did not differ on any measures, I collapsed across these two

conditions to assess mediation. Subjective excitement mediated the effect of reappraisal condition on math performance. When I included subjective excitement in the model, the effect of condition was reduced to nonsignificance (from  $\beta = .64$ ,  $p < .004$ , to  $\beta = .49$ ,  $p = .07$ ), and the effect of subjective excitement remained significant ( $\beta = .30$ ,  $p < .002$ ). A 5,000-sample bootstrap test estimated a standardized indirect effect of .34 ( $SE = .038$ , 95% biased-corrected CI [.13, .28]), indicating a significant indirect effect (MacKinnon et al., 2007).

## Discussion

Compared with reappraising anxiety as calmness or not reappraising anxiety at all, reappraising anxiety as excitement increased subjective feelings of excitement, which improved subsequent math performance. Once activated, an aroused state was difficult to control. Even with explicit instructions to try to calm down, heart rate remained high across all conditions leading up to and throughout the math task.

### Study 4: Psychological Mechanism

In Studies 1–3, I found that reappraising pre-performance anxiety as excitement can be accomplished with a subtle intervention, which improved performance across three different anxiety-inducing domains: singing, public speaking, and math performance. In Study 4, I investigate *why* reappraising anxiety as excitement improves performance. Mittal and Ross (1998) suggested that individuals in a positive affective state are more likely to interpret issues as opportunities, whereas individuals in a negative affective state are more likely to interpret issues as threats. In this way, excitement may prime an “opportunity” mind-set, whereas trying to calm down may perpetuate a “threat” mind-set.

In turn, threat versus opportunity mind-sets can profoundly influence cognition and performance. For example, recent work (Crum & Langer, 2007; Crum, Salovey, & Achor, 2013) demonstrates the ease of altering people’s stress-related mind-sets with subtle reframing. Crum and colleagues (Crum & Langer, 2007; Crum et al., 2013) found that priming a “stress-is-enhancing” mind-set, as opposed to a “stress-is-deteriorating” mind-set, increases cortisol reactivity and desire for feedback. Similarly, Alter, Aronson, Darley, Rodriguez, and Ruble (2010) demonstrated that subtly reframing a math test as a “challenge,” as opposed to a “threat,” decreases stereotype threat and improves subsequent math performance among high school and university students.

In general, individuals tend to view evaluative situations as threats unless there is strong evidence to do otherwise (Jackson & Dutton, 1988). Reappraising anxiety as excitement, even with very subtle interventions, may be strong enough “evidence” to motivate an opportunity mind-set, leading individuals to focus on the positive things that could happen rather than the negative possible outcomes. I expect that reappraising anxiety as excitement will cause individuals to adopt an opportunity mind-set and improve their performance, whereas reappraising anxiety as calmness will cause individuals to perpetuate the threat mind-set typically associated with feeling anxious. In this study, I test whether threat-opportunity mind-set mediates the effect of excitement reappraisal on math performance.

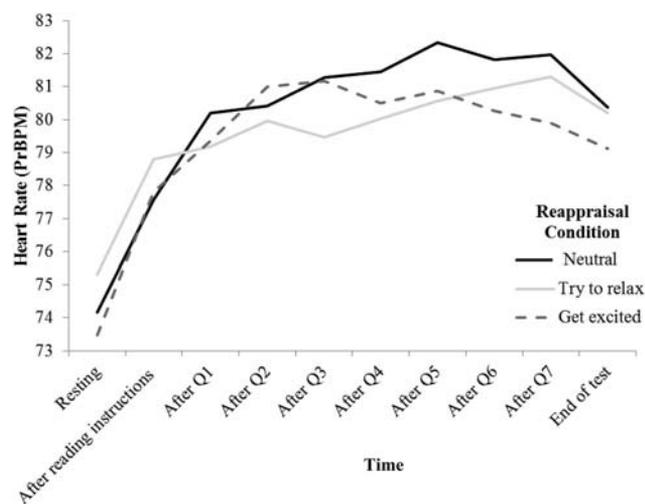


Figure 5. Heart rate over time in the repeated math task (Study 3). PrBPM = pulse rate beats per minute; Q = Question.

## Method

**Participants.** I recruited 218 native English-speaking students (94 men, 124 women) from a northeastern university to participate in an experiment for pay. On average, participants were 21.85 years old ( $SD = 3.48$ ). Participants received a \$5 show-up fee and could earn additional compensation up to \$4 based on performance.

**Design and procedure.** I asked participants to complete an anxiety-inducing math task (same task as in Study 3). To manipulate reappraisal, participants read one of two phrases in large letters before they began the math task: “Try to remain calm” or “Try to get excited.”

I measured each participant’s threat-opportunity mind-set in two ways. First, I asked participants to describe the math task (open ended). Their responses would be coded later by two independent raters on a 7-point threat-opportunity scale. Second, participants completed a seven-item self-report measure adapted from Jackson and Dutton (1988; e.g., “The IQ test is an opportunity to have fun,” “I view the test more as a challenge than as a threat”; 1 = *Strongly disagree*, 7 = *Strongly agree*,  $\alpha = .76$ ). For experimental control, I also manipulated the presentation order of the mediation measures. This produced a 2 (reappraisal: excitement vs. calm)  $\times$  2 (mediator presentation order: before vs. after math task) experimental design.

Finally, participants completed the math task, reported their demographics (age, gender), and were paid on the basis of their performance. I recruited two independent raters who were blind to my hypotheses and experimental condition. I asked them to code participants’ open-ended responses on a 7-point scale from threat (“This participant viewed the task as threatening”) to opportunity (“The participant viewed the task as an opportunity”). Interrater reliability was high (Fleiss’s  $\kappa > .73$ ).

## Results

**Math performance.** I conducted a one-way ANOVA with reappraisal condition (excitement vs. calm) as the independent variable, performance (number of correct answers out of eight) as the dependent variable, and mediator measurement order (before vs. after task) as a control variable. Replicating the findings of Study 3, there was a main effect of reappraisal condition on math performance. Participants who reappraised their anxiety as excitement scored significantly higher on the math task ( $M = 3.42$ ,  $SD = 1.74$ ) than did participants who reappraised their anxiety as calmness ( $M = 2.80$ ,  $SD = 1.44$ ),  $F(1, 216) = 8.09$ ,  $p < .005$ ,  $d = .388$ . There was also an effect of gender on math performance. Male participants scored significantly higher than did females ( $p = .03$ ). There were no effects of age or mediator measurement order on math performance, and the pattern of results remained the same when controlling for age and gender.

**Threat-opportunity mind-set.** To create a single measure of threat-opportunity mind-set, I first averaged across the two raters to create a coded mind-set score ranging from 1 (*threat*) to 7 (*opportunity*) for each participant. Participants’ coded mind-set score correlated positively with their self-reported mind-set score ( $r = .84$ ,  $p = .01$ ). I created a single threat-opportunity mind-set value by averaging each participant’s coded mind-set score and their self-reported mind-set score. A low mind-set value indicated

a threat mind-set, whereas a high mind-set value indicated an opportunity mind-set.

I conducted a one-way ANOVA with reappraisal condition (excitement vs. calm) as the independent variable, threat-opportunity mind-set value as the dependent variable, and mind-set measurement order as a control variable. As I predicted, participants who reappraised their anxiety as excitement had higher threat-opportunity values than did participants who reappraised their anxiety as calm, indicating an opportunity mind-set ( $M = 3.75$ ,  $SD = 0.72$  vs.  $M = 3.36$ ,  $SD = 0.72$ ),  $F(1, 216) = 14.98$ ,  $p < .001$ ,  $d = .542$ .

There was also a main effect of mind-set measurement order on threat-opportunity mind-set values. Participants who reported their mind-set *after* the math task viewed the task as less threatening than did participants who reported their mind-set *before* the math task ( $p = .04$ ). There were no effects of age or gender on threat-opportunity mind-set values.

**Mediation.** I found that threat-opportunity mind-set fully mediated the relationship between reappraisal and math performance (Baron & Kenny, 1986). Controlling for measurement order, the effect of reappraising anxiety as excitement was reduced (from  $\beta = 0.26$ ,  $p = .001$ , to  $\beta = 0.21$ ,  $p < .01$ ) when mind-set was included in the equation, and mind-set was a significant predictor of performance ( $\beta = 0.34$ ,  $p < .001$ ). Including mind-set increased explained variance significantly by 13%, from  $R^2 = .06$  to  $R^2 = .19$  ( $p < .001$ ). I also used bootstrapping to analyze mediation. My bootstrap analysis showed that the 95% bias-corrected confidence interval for the size of the indirect effect excluded zero [0.015, 0.203], suggesting a significant indirect effect (MacKinnon et al., 2007).

## Discussion

Previous work has revealed that people tend to adopt threat mind-sets when they are in negative affective states. The results of Study 4 suggest that reappraising pre-performance anxiety as excitement, compared with reappraising anxiety as calmness, primes an *opportunity* mind-set, which improved subsequent math performance.

These findings help to draw a distinction between reappraising one’s *internal state* versus reappraising *the situation* and suggest that the timing of these two processes might matter. The results of Study 4 show that people can reappraise their own internal emotional state first (as induced by a simple self-statement), followed by a reappraisal of the situation (as measured by threat-opportunity mind-set). But prior work on the biopsychosocial model of challenge and threat suggests that the reverse can also be true: Individuals may reappraise the situation as a challenge or threat, which subsequently changes one’s internal state (e.g., Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Blascovich, Mendes, Hunter, & Salomon, 1999; Mendes, Blascovich, Hunter, Lickel, & Jost, 2007; Mendes, Blascovich, Lickel, & Hunter, 2002). I discuss this idea further in the General Discussion.

## General Discussion

People believe that trying to calm down is the best way to contend with pre-performance anxiety (Pilot Study). However, across several experimental studies, I found that reappraising anx-

iety as excitement is more effective than trying to calm down. Individuals can exert influence on their own reappraisal process by stating “I am excited” or by being encouraged to “get excited.” Compared with reappraising anxiety as calmness or not reappraising anxiety at all, reappraising anxiety as excitement increased the subjective experience of excitement and improved performance in three important performance domains: singing, public speaking, and math. This phenomenon was mediated by threat versus opportunity mind-set. Reappraising anxiety as excitement primed an opportunity mind-set, which improved subsequent performance.

### Theoretical Contributions

This research makes several theoretical contributions that fundamentally advance work on anxiety and emotion regulation broadly. First, this research fills an important gap in the emotion regulation literature. Though prior work has examined the *interpersonal* effects of emotional statements (e.g., Van Kleef et al., 2004a) and motivational self-talk (e.g., Senay et al., 2010; Zell et al., 2011), no work has explored how a self-statement of emotion may influence one’s *own* experience of emotion and subsequent behavior. The current findings demonstrate that, before anxiety-inducing tasks, the way we talk about our feelings influences whether we feel anxious or excited, which dramatically influences subsequent performance.

Second, these findings complement previous work on misrepresenting emotions. Prior research suggests that inauthentic emotional displays differ from authentic expressions and that deliberate attempts to express inauthentic emotions represent an act of emotional labor that can be psychologically costly (e.g., Côté, 2005; Ekman, 1992; Grandey, 2000, 2003; Gross & Levenson, 1993; Morris & Feldman, 1996). In contrast, my findings identify anxiety and excitement as a boundary condition. Deliberately “misrepresenting” anxious arousal as “excitement” led to increased feelings of excitement and improved performance. This may be the case because anxiety and excitement are *arousal congruent*, whereas prior work on emotional labor and emotional reappraisal has focused on arousal-incongruent emotions such as happiness and sadness.

Third, this work points to the labile nature that can exist between two emotions. A brief, simple statement (“I am excited”) or simple words of advice (“Get excited”) were sufficient to increase the experience of excitement, overshadowing the experience of anxiety. These findings shed light on the relative roles of valence (positive-negative) and arousal (high-low) in the reappraisal process. Most previous work has focused on shifting both valence and arousal (e.g., from anxiety to calmness), but I find that maintaining high arousal can be more effective. This suggests the importance of *arousal congruency* during emotional reappraisal.

### Future Directions

These findings are qualified by some limitations, which suggest a number of directions for future research. First, in my studies, I randomly assigned participants to issue very simple self-statements of emotion (e.g., “I am excited”). However, characteristics of the self-statement are likely to matter. For example, whether the statement originates from the self (“I am excited”) or another person (“You are excited”) may be important. Or, the

timing of the emotional statement may matter. Saying “I am excited” immediately before a performance task was beneficial, but perhaps saying “I am anxious” a week in advance would motivate effort and preparation. Indeed, there is a body of research demonstrating the perverse effects of positive emotions and the benefits of negative emotions (e.g., Ford & Mauss, 2013; Gruber, Mauss, & Tamir, 2011; Mauss, Tamir, Anderson, & Savino, 2011; Norem & Cantor, 1986; Scheepers, 2009). Also, in my studies, participants made an emotional statement in front of one experimenter. In the future, researchers could vary the extent of publicity; self-statements may operate differently when an individual says it out loud to an empty room, in front of a mirror, in front of one observer, or in front of multiple observers.

The current findings point to a distinction between reappraising the situation versus reappraising one’s internal state. In Study 4, individuals reappraised their internal emotional state first (by making a randomly assigned self-statement), which caused them to then view the situation differently (measured by threat-opportunity mind-set), which influenced subsequent performance. Previous work suggests that the reverse is also possible: Individuals can reappraise the situation as a challenge or threat, which then influences their internal state (Blascovich et al., 1999, 2001; Mendes et al., 2002, 2007). It may be interesting for future work to directly compare these two reappraisal pathways.

In my studies, I focused on high-arousal states. Future work should test how *arousal congruency* applies to other emotions, particularly low-arousal states. For example, individuals may be able to easily reappraise feelings of boredom (negative valence, low arousal) as calmness (positive valence, low arousal). Or perhaps for an individual in a low-arousal state, saying “I am excited” alone can increase arousal, energy, and motivation. However, consistent with work on emotional labor, making a high-arousal statement in a low-arousal state may be psychologically and physically taxing (e.g., Grandey, 2003). Additionally, mismatched arousal states and self-statements may seem obviously insincere or sarcastic. It is important to note here that my findings represent a first step in investigating arousal-congruent reappraisal by focusing on one of the most pervasive emotions that people experience: anxiety. But anxiety is just one emotion in a constellation of critical emotional states, and there is much work left to do to understand the reappraisal processes surrounding other emotions like anger, sadness, boredom, envy, contempt, disgust, and guilt.

My results reveal the effects of minimal emotional self-statements on one’s own emotional experiences and subsequent performance. But when people talk about their feelings, they often do so strategically for impression management (e.g., Van Kleef et al., 2004a, 2004b). An extension of the current work could explore how self-statements of anxiety and excitement are perceived by others. Perhaps saying “I am excited” causes observers to change their expectations or perceptions of the decision maker’s personality and performance. Or the stated emotion may become contagious (e.g., Barsade, 2002). Perceptions of self-statements are likely to be moderated by a number of factors, such as profession or task type. For example, individuals might prefer a surgeon to express calmness, whereas individuals might prefer the CEO of a start-up venture to express excitement.

Consistent with prior work (e.g., Lang et al., 1993), I used heart rate to measure physiological arousal. I found that heart rate increased sharply in anticipation of a difficult math task and singing in front of

strangers. Even when explicitly told to “try to calm down,” individuals’ heart rates remained high, leading up to and throughout those tasks. Future work could use different physiological and neurological measures for a deeper understanding of anxiety reappraisal. Previous work has used physiological measures to investigate the biopsychosocial model of challenge and threat as well as regulatory focus (e.g., Blascovich, 2008; Creswell et al., 2005; Higgins, 1998; Sherman, Bunyan, Creswell, & Jaremka, 2009). For example, research using functional magnetic resonance imaging data has revealed that a prevention focus is associated with right frontal cortical activity, whereas a promotion focus is associated with left frontal activity (Amodio, Shah, Sigelman, Brazy, & Harmon-Jones, 2004). Similarly, recent work by Carney, Cuddy, and Yap (2010) used neuroendocrine profiles to identify two key hormones—testosterone and cortisol—that differentiate powerful individuals from powerless individuals. Separately, Shiota and Levenson (2012) found differences between detached versus positive reappraisal with respect to the subjective and physiological experience of sadness and disgust. In line with this work, researchers may be able to use testosterone, cortisol, blood pressure, or brain imaging analyses to further differentiate pre-performance anxiety and excitement.

I focused on math, singing, and public speaking as performance domains because they make people feel very anxious. It will be important to explore the generalizability of this phenomenon to other behavioral domains. For example, future work could investigate how emotional statements influence job performance for individuals with stressful jobs, especially over time with longitudinal data.

I found that reappraising anxiety as excitement increased subjective feelings of excitement, but I did not find evidence that reappraising anxiety as excitement decreased subjective feelings of anxiety. To interpret this finding, imagine that anxiety and excitement are like the bass and treble knobs on a stereo. By reappraising anxiety as excitement, it seems individuals turn the excitement knob up, without necessarily turning the anxiety knob down. Following this logic, it is surprising that I did not see an overall increase in arousal by adding excitement on top of anxiety. Therefore, there may have been a ceiling effect on arousal as measured by heart rate. Perhaps in order to increase heart rate further, researchers might need to make participants afraid for their physical safety (i.e., fear).

Future work should examine whether this idea generalizes to other mixed emotions. For example, consider a guilty pleasure. Does reappraising guilty feelings as pleasurable decrease guilt or only increase happiness, momentarily masking one’s guilt? It is possible that emotional reappraisal often operates in an additive way. That is, one emotional state may build on another emotional state, rather than a shift or a replacement of one emotional state by another.

I find that reappraising anxiety as excitement is easier and more effective than trying to calm down before anxiety-inducing events. However, there may be effective strategies—such as meditation, rituals, or expressive writing—that people can use to calm down and reduce arousal effectively before high-pressure tasks (e.g., Damisch, Stoberock, & Mussweiler, 2010; Pennebaker, 1997; Ramirez & Beilock, 2011). More work is needed to understand the most effective ways for reducing arousal in high-stress domains. Similarly, there may be situations in which expressing or feeling excitement is not beneficial (Gruber et al., 2011; Mauss et al., 2011). For example, feeling or expressing excitement during a negotiation may convey valuable information to a counterpart that would be better kept private.

Finally, positive emotions have been found to be less differentiated than negative emotions (Han et al., 2007; C. Smith & Ellsworth, 1985; Van Boven & Johnson-Graham, 2007). More research is needed to understand how the excitement elicited by saying “I am excited” relates to other positive emotional states such as happiness, pride, or enthusiasm (Griskevicius, Shiota, & Nowlis, 2010).

## Practical Implications

My findings demonstrate the profound control and influence we have over our own emotions. The way we verbalize and think about our feelings helps to construct the way we actually feel. Saying “I am excited” represents a simple, minimal intervention that can be used quickly and easily to prime an opportunity mind-set and improve performance. This tool may be particularly helpful for managers in organizations to motivate their employees. For example, advising employees to say “I am excited” before important performance tasks or simply encouraging them to “get excited” may increase their confidence, improve performance, and boost beliefs in their ability to perform well in the future.

Studies 1 and 2 demonstrate that saying “I am excited” improves subsequent performance, but the converse may also be true. Highly skilled individuals may be more likely to say “I am excited” before they tackle challenging tasks. In this way, emotional self-statements could operate in an upward spiral process in which successful individuals are more likely to express excitement, and saying “I am excited” then improves subsequent performance. High performers may be even more likely to express excitement the next time, and so on (Garland, Gaylord, & Fredrickson, 2011). Prescriptively, we should consider building self-confidence early. A small, early boost of self-confidence may set individuals on a positive trajectory that could proliferate over time.

Important work in positive psychology suggests that happiness in life comes from the frequency, not the intensity, of positive versus negative emotional experiences (Diener, Sandvik, & Pavot, 2009; Shiota, 2006). Building on this work, I expect that issuing multiple positive self-statements such as “I am excited” does not produce diminishing marginal returns. On the contrary, the more often individuals reappraise their pre-performance anxiety as excitement, the more likely they may be to trigger upward motivational spirals, and the happier and more successful they may become. Instead of trying to “Keep Calm and Carry On,” perhaps the path to success begins by simply saying “I am excited.”

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