

RUNNING HEAD: Reappraising anxiety as excitement

GET EXCITED: REAPPRAISING PRE-PERFORMANCE ANXIETY AS EXCITEMENT

IMPROVES PERFORMANCE

ALISON WOOD BROOKS  
Wharton School  
University of Pennsylvania  
3730 Walnut Street  
532.4 Jon M. Huntsman Hall  
[awbrooks@wharton.upenn.edu](mailto:awbrooks@wharton.upenn.edu)

The author thanks Maurice Schweitzer, Adam Grant, Adam Galinsky, Katy Milkman, Phil Tetlock, Francesca Gino, and Sigal Barsade for valuable feedback, as well as the Wharton Behavioral Lab and the Wharton Risk Center Russell Ackoff Doctoral Student Fellowship for financial support. The author is grateful to Aye Thu, Kathleen Ho, Derek Brooks, Tim Flank, Peter Hage, Chris Chan, Josh Carrington, and Kaity Moore for their help with data collection and coding.

### Abstract

Individuals often feel anxious in anticipation of tasks such as speaking in public or meeting with a boss. Feeling anxious immediately before or during performance tasks drains working memory, decreases self-confidence, and harms performance. Anticipating the harmful effects of anxiety, many people attempt to down-regulate anxiety. We 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, we demonstrate that reappraising anxiety as *excitement* is more effective. Compared to individuals who attempt to calm themselves down, individuals who reappraise their pre-performance anxiety as excitement increase their self-confidence, adopt an opportunity mindset (as opposed to a threat mindset), and improve their subsequent performance.

*Keywords:* Anxiety, Excitement, Reappraisal, Emotion regulation, Performance

## Get Excited: Reappraising Pre-Performance Anxiety as Excitement Improves Performance

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 Keep Calm and Carry On "resonates all over the world" (New York Times magazine, July 1, 2009). In this paper, we investigate why trying to keep calm resonates with people, and we test the effectiveness of trying to keep calm during moments of high anxiety.

Individuals often feel anxious, 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 et al., 2009).

Across several experimental studies, we 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 et al., 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 physiologically similar, and minimal interventions may be sufficient to shift valence and produce genuine feelings of excitement (Schachter & Singer, 1962).

Our 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, & Keltner's (2007) call to study the action tendencies related to both high arousal and discrete positive emotions. We 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 to low arousal (calmness).

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

Third, our 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, 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 discrete emotion characterized by high arousal, negative valence, uncertainty, and a low sense of control (Gray, 1991; Raghunathan & Pham, 1999; Smith & Ellsworth, 1985). Consistent with prior research, we 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 lifespan. For example, anxiety is triggered by anticipated separation from a primary caregiver at twelve months (Carlson & Sroufe, 1995), monsters and ghosts around age four (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 et al., 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, 2005).

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). 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., Broadhurst, 1957; Eysenck, Derakshan, & Santos; 2007).

However, feeling very anxious shortly before or during a task tends to harm cognition and performance, especially for non-experts. 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, Lerner, & Keltner, 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).

### Regulating Anxiety

Though anxiety tends to harm performance, pre-performance anxiety can be managed. Emotion regulation scholars have focused on two common strategies individuals use to down-

regulate negative emotions like anxiety: reappraisal and suppression (e.g., Gross & John, 2003). Individuals use *suppression* to inhibit the expression of negative emotions. For example, after receiving an insulting comment, an individual might "bite his tongue" to avoid showing that he is feeling hurt or angry. Suppression, while effective for down-regulating expressive behavior, has mixed effects on the experience of emotion. Suppression may reduce the experience of positive emotions, but not negative emotions (e.g., anxiety). Instead, suppression can lead to a paradoxical increase in the experience of negative emotions (Cioffi & Holloway, 1993; Gross & Levenson, 1993).

In contrast, reappraisal occurs early in the emotion-generative process and is a form of cognitive change that involves construing an emotion-eliciting situation in a way that changes its emotional impact (e.g., Hofmann et al., 2009). For example, imagine an individual who loses a loved one. He may initially appraise this event as tragic, and he may feel sad. But appraisal is not a one-shot process (Lazarus, 1966; Lazarus, Averill, & Opton, 1970; Monat et al., 1972; Scherer, 2001). Individuals constantly scan their environment and their internal state to detect new information, re-evaluate the situation, and adapt. Initial appraisal is often followed by *reappraisal*, an emotion regulation tactic that indicates high emotional intelligence (Jordan, Ashkanasy, & Hartel, 2002; Yip & Cote, forthcoming). After initially appraising the event as tragic, the individual may re-evaluate the event as symbolic, and he may feel proud rather than sad.

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). In contrast to suppression, reappraisal is effective for reducing both the experience

and the expression of emotion, and reappraisal entails relatively low physiological, cognitive, and interpersonal costs.

### Reappraising Anxiety as Excitement

Previous work has focused on reappraising anxiety as calmness (e.g., Hofmann et al., 2009). This work suggests that reappraising anxiety as calmness is more effective than suppressing anxiety for mitigating physiological arousal (i.e., heart rate) and the subjective experience of anxiety. However, this research has overlooked the effects of reappraisal on subsequent performance and has not considered reappraising anxiety in favor of other, arousal-congruent emotional states.

We break new ground by examining the reappraisal process with respect to pre-performance anxiety and pre-performance *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 et al., 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, compared to those in a neutral or anxious state (Ashby et al., 1999; Aspinwall & Taylor, 1997; Fredrickson, 2001; Schnall, Roper, & Fessler, 2010; Scheier et al., 1986).

Though they have divergent effects on cognition, motivation, and performance, the physiological experience of anxiety is quite similar to the experience of excitement. Both anxiety

and excitement are characterized by high arousal, signaled by increased heart rate (e.g., Smith & Bradley, 2005). Unlike shifting between anxiety and calmness, which have incongruent arousal states, shifting between anxiety and excitement may be easier because they are arousal-congruent. Taken together, we expect that reappraising anxiety as excitement, compared to reappraising anxiety as calm, is easier and improves performance on tasks that typically make people very anxious.

### Overview of Current Research

We test our predictions across several experimental studies. In Study 1, we test the effectiveness of reappraising pre-performance anxiety as excitement before singing in front of a stranger. In this study, we compare the excitement reappraisal strategy to two comparison conditions: acknowledging one's anxiety and no intervention. In Study 2, we investigate people's intuitions about managing pre-performance anxiety. We expect that individuals do not anticipate the benefits of reappraising anxiety as excitement. Study 2 suggests that most people believe trying to calm down (i.e., reappraising anxiety as calmness) is more effective than reappraising anxiety as excitement. In Studies 3 and 4, we 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 5, we explore a psychological mechanism underlying this phenomenon: threat versus opportunity mindsets. We expect that reappraising anxiety as excitement primes an *opportunity* mindset, which in turn improves performance.

### Study 1: Singing Performance

In Study 1, we test whether individuals can reappraise anxiety as excitement prior to a very anxiety-inducing task: singing in front of a stranger. We expect that, even when directed to

do so by an experimenter, reappraising anxiety as excitement will increase subjective excitement, boost self-efficacy, and improve subsequent singing performance.

In this study, we use self-statements of emotion to induce reappraisal. We randomly assign participants to say “I am excited” or “I am anxious” 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), we expect self-statements of emotion to be self-fulfilling.

Recent research in negotiations has found 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 et al., 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 et al., 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 we 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 et al, 1992; Van Raalte et al., 2005) and on the self-reported performance of professional gymnasts, wrestlers, and divers

(Weinberg et al., 1984; see Hardy, 2006 and Tod, Hardy, & Oliver, 2011 for a review). However, self-talk has received little attention outside of the sports domain. Most recently, Zell, Warriner, and Albarracin (2012) 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. This research, however, has not measured the behavioral effects of self-talk on performance. We investigate the effects of self-talk on emotional reappraisal and performance in this study.

## Method

### Participants

We recruited one hundred and thirteen native English-speaking students (54 male, 59 female) 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, we 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

We conducted a manipulation check with a non-overlapping sample ( $N = 97$ ) drawn from the same population as the main study. The goals of this manipulation check were 1) to test the

familiarity of the target song, and 2) to examine the physiology (heart rate) and psychology of self-statements as a means to reappraise anxiety.

We recruited ninety-seven participants ( $M_{\text{age}} = 20.27$  years, 44 males, 53 females) 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 Believing” by Journey in front of each other. We chose “Don’t Stop Believing” as the target song because it can be performed easily in three different octaves (suitable for both male and female participants). “Don’t Stop Believing” was also the 21<sup>st</sup> 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. We 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.”

Consistent with prior research (e.g., Lang et al., 1993), we used heart rate as a measure of physiological arousal. Throughout the study, each participant wore a pulse oximeter on their non-dominant pointer finger. We 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, we 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). We measured anxious and excited feelings on seven-point scales (1 = Strongly agree, 7 = Strongly disagree) across five items adapted from Brooks & 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 ( $M = 1.98$ ,  $SD = 1.86$ ),  $t(95) = 3.70$ ,  $p < .001$ . 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,  $SD = 11.88$ ),  $t = -2.80$ ,  $p = .006$ . 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,  $M = 77.81$ ,  $SD = 11.19$ ),  $p = .71$ . There were no effects of experimental condition (self-statement) on heart rate.

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 manipulations studied here.

### Study 1 Procedure

For the main study, we recruited participants to the lab such that one participant arrived every eight minutes 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 Believing" by Journey in front of an experimenter on a karaoke program and that they would be paid based on their singing accuracy score. The "singing accuracy score" payment structure is depicted in Figure 1.

-----

Insert Figure 1 about here

-----

We 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." We also included a condition where participants were not prompted for a response and did not make an emotional statement (neutral condition). It

was important to compare the effects of making a self-statement to not making a self-statement because inaction can also influence emotional experience (i.e., 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.

-----  
 Insert Figure 2 about here  
 -----

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 Believing” using Konami’s Karaoke Revolution 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 equally-weighted average of the 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 we used in the manipulation check. We also measured singing self-efficacy across three items adapted from Bandura (1997, e.g., “I am

---

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

confident in my singing ability,” 1 = Strongly disagree, 7 = Strongly agree,  $\alpha = .83$ ), and demographics (age, gender). At the end of the study, the experimenter paid participants based on their singing accuracy score.

## Results

### Singing Performance

We conducted a one-way analysis of variance (ANOVA) to test the effect of reappraisal condition on singing performance. We included reappraisal condition as the independent variable, singing accuracy score as the dependent variable, and age and gender as control variables<sup>2</sup>. There was a main effect of reappraisal condition on singing accuracy,  $F(2,107) = 8.77, p < .005$ . Consistent with our 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 ( $M = 69.27\%$ ,  $SD = 16.47$ ),  $t = 3.12, p < .01$ . 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,  $t = -3.62, p < .001$ . This pattern of results is depicted in Figure 3. There were no effects of age or gender on singing accuracy.

-----  
 Insert Figure 3 about here  
 -----

### Subjective emotions

Consistent with the results of our 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

---

<sup>2</sup> For analytical consistency and transparency, we include participant age and gender as control variables across all of our studies (Simmons, Nelson, & Simonsohn, 2011).

anxious” condition ( $M = 2.54$ ,  $SD = 1.10$ ),  $t = -2.10$ ,  $p = .041$ . There were no effects of reappraisal condition, age, or gender on self-reported anxious or neutral feelings.

### 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” ( $M = 2.29$ ,  $SD = 1.68$ ),  $t = -1.41$ ,  $p = .02$ , or after making no statement ( $M = 2.19$ ,  $SD = 1.72$ ),  $t = -1.62$ ,  $p < .02$ .

However, self-efficacy did not fully mediate the effect of experimental condition on task performance. When we included self-efficacy in the model, the effect of “I am excited” versus no-statement condition on singing performance was *reduced* in significance but did not become insignificant (from  $\beta = -5.63$ ,  $p = .007$ , to  $\beta = -4.67$ ,  $p = .02$ ), while the effect of self-efficacy remained significant ( $\beta = 2.83$ ,  $p = .008$ ). In a bootstrap analysis, we found that the 95% bias-corrected confidence interval from a 5000-sample bootstrap test did include zero (CI = [-.04, .32]), which does not indicate mediation (MacKinnon et al., 2007; Preacher & Hayes, 2004).

### Discussion

The findings from Study 1 demonstrate that self-statements of emotion can induce reappraisal. Compared to stating “I am anxious” or nothing, stating “I am excited” caused individuals to reappraise their pre-performance anxiety as excitement, which boosted their singing self-efficacy and improved their subsequent singing performance.

#### **Study 2: Intuitions about Reappraisal**

In Study 1, we compared excitement reappraisal with two comparison conditions: acknowledging anxiety and no intervention. In Study 2, we examine whether these conditions represent the most appropriate set of comparison emotions by surveying an adult population and asking how they typically contend with pre-performance anxiety.

## Method

### Participants

Three hundred participants completed this study online ( $M_{\text{age}} = 35.4$  years, 159 males, 141 females) in exchange for \$.50. 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

We asked participants to read and answer questions about a hypothetical scenario. We 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.

We recruited two independent raters to analyze the content of participants' open-ended responses. We asked the raters to indicate the extent to which participants' responses represented advice to *try to relax or calm down* (0-1), advice to *try to get excited* (0-1), both, or neither. The raters were blind to our experimental hypotheses and experimental condition, and inter-rater reliability was high ( $\kappa > .61$ ).

## Results

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* ( $\kappa = .62$ ) and 21.45% of the responses as *advice to try to get excited* ( $\kappa = .54$ ),  $\chi^2(1, N = 300) = 37.89, p < 0.001$ .

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,"  $\chi^2(2, N = 153) = 150.11, p < 0.001$ . We 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.

### Discussion

An overwhelming majority of people (more than 90%) believe the best way to manage pre-performance anxiety is to decrease arousal or "try to calm down." On average, people do not implicitly anticipate the performance benefits of reappraising pre-performance anxiety as excitement.

### **Study 3: Public Speaking Performance**

In Study 3, we directly compare the effects of reappraising anxiety as calmness versus excitement in a particularly work-relevant behavioral domain: public speaking. Public speaking is common, especially in the workplace, and makes adults very anxious (e.g., Bamber, 1974). We expect that, compared to reappraising anxiety as calmness, reappraising anxiety as excitement causes speakers to be more persuasive, confident, competent, and persistent.

### Method

#### Participants

We recruited one hundred and forty native English-speaking students (63 male, 77 female) 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 & Procedure

Each participant was given two minutes to prepare a persuasive public speech about “why you are a good work partner.” We 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.”

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 2-3 minute speech on camera. The experimenter was blind to our hypotheses.

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.

We recruited three independent raters who were blind to experimental condition and our hypotheses. The raters watched the videos of the participants’ speeches, coding them along several dimensions on 1 (Strongly disagree) to 7 (Strongly agree) scales. 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*,  $\alpha = .79$ ), persistence (*The speaker*

*was persistent*), and physical attractiveness (*The speaker was good looking*). Inter-rater reliability was acceptably high across all measures (all  $\kappa$ 's > .64).

## Results

### Speech Ratings

We averaged across the three raters' values for our analyses. We conducted several analyses of variance (ANOVA's) with speaker persuasiveness, confidence, anxiety, excitement, competence, persistence, and physical attractiveness as dependent variables, reappraisal condition ("I am excited" v. "I am calm") as the independent variable, and age and gender as control variables. A principle components analysis indicated separate factor loadings for each of the dependent measures, and we report separate ANOVA's for each dependent variable.

Ratings of the speakers' persuasiveness, competence, confidence, and persistence differed significantly across experimental conditions. Supporting our predictions, participants who stated "I am excited" before their speech were rated as more persuasive ( $F(1, 136) = 11.87, p < .001$ ), more competent ( $F(1, 136) = 4.78, p = .03$ ), more confident ( $F(1, 136) = 13.14, p < .001$ ), and more persistent ( $F(1, 136) = 3.99, p = .048$ ) than were participants who stated "I am calm" before their speech. Means and standard deviations are included in Figure 4.

-----  
 Insert Figure 4 about here  
 -----

There were no significant effects of reappraisal condition on the coders' ratings of speaker anxiety ( $p = .19$ ), excitement ( $p = .08$ ), or physical attractiveness ( $p = .48$ ). There were no effects of age or gender.

### Self-Report Measures

We conducted three ANOVA's with participants' self-reported excitement, anxiety, and self-confidence as dependent variables. We used reappraisal condition as the independent variable, and we included age and gender as control variables. Consistent with our 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" ( $M = 4.09$ ,  $SD = 1.54$ ),  $F(1, 136) = 5.60$ ,  $p < .02$ . Self-reported self-efficacy was marginally higher after stating "I am excited" ( $M = 5.62$ ,  $SD = 0.91$ ) than after stating "I am calm" ( $M = 5.27$ ,  $SD = 1.20$ ),  $F(1, 136) = 3.57$ ,  $p = .06$ .

Self-reported anxiety did not differ across conditions ( $p = .86$ ), 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.

### Discussion

Being asked to give a two-minute public speech on camera caused individuals to feel very anxious. Compared to 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 and self-confident, and to be perceived as more persuasive, competent, confident, and persistent.

### **Study 4: Math Performance**

In Studies 1-3, we 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 4, we extend our investigation in two ways: 1) we 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 2) we use a different anxiety-inducing

task, math performance, to explore high-pressure performance in a *non-public* performance domain. Math anxiety is quite pervasive (e.g., Maloney & Beilock, 2012). We expect that sincere efforts to reduce anxiety (i.e., calm down) will not decrease anxious arousal. Instead, we expect that trying to “get excited” will increase the subjective experience of excitement and improve subsequent math performance.

## Method

### Participants

We recruited 188 native English-speaking students (80 male, 108 female) 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

We 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” (calm reappraisal), “Get excited!” (excitement reappraisal), or “Please wait a few moments” (neutral). Our dependent measures included heart rate over time and performance (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 non-dominant pointer finger (so they could complete the study using their dominant hand).

Next, participants read instructions to breathe deeply for ten seconds 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 et al. (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, “Get excited!” to induce excitement reappraisal, or “Please wait a few moments” (neutral). We included a neutral condition for experimental control, but we 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 five seconds 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 we used in Studies 1-3. Participants also answered demographic questions about their age and gender and were paid based on their math performance.

## Results

### Math Performance

We conducted a one-way ANOVA with math performance (number of correct answers out of eight) as the dependent variable, reappraisal condition as the independent variable, and age and gender as control variables. We 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 ( $M = 2.94, SD = 1.91$ ). Participants in the excitement reappraisal condition scored significantly higher than did those in the calm and neutral conditions ( $M = 3.60, SD = 1.73$ ),  $t = -2.12, p = .036$ . There were no effects of age or gender on math performance.

### Heart Rate

Consistent with our expectation that heart rate increases in anticipation of a 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,  $SD = 12.15$ ),  $t = -3.22$ ,  $p = .001$ . 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 our expectation that physiological arousal is difficult to suppress, there were no significant effects of reappraisal condition on heart rate. Even when instructed to “try to remain calm,” heart rate remained high. We depict heart rate over time by experimental condition in Figure 5.

-----  
 Insert Figure 5 about here  
 -----

### Subjective excitement and anxiety

Controlling for age, gender, and 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 ( $M = 4.02$ ,  $SD = 1.50$ ),  $t = -1.54$ ,  $p = .13$ . Participants in the excitement reappraisal condition reported feeling more excited during the task by comparison ( $M = 4.73$ ,  $SD = 1.36$ ),  $t = 2.32$ ,  $p = .021$ . There were no effects of age or gender on self-reported excitement. There were no effects of reappraisal condition, task performance, age, or gender on self-reported anxiety.

### Self-efficacy

Controlling for age, gender, and performance, there was a main effect of experimental condition on self-efficacy,  $F(1,186) = 5.61, p = .019$ . We found no difference in self-efficacy between the “try to remain calm” ( $M = 5.49, SD = 1.21$ ) and neutral conditions ( $M = 5.17, SD = 1.33$ ),  $t = -1.54, p = .153$ . Participants in the “Get excited!” condition reported higher self-efficacy by comparison ( $M = 5.66, SD = 1.01$ ),  $t = -2.35, p = .021$ . 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

Since the neutral and calm reappraisal conditions did not differ on any measures, we collapsed across these two conditions to assess mediation. Subjective excitement mediated the effect of reappraisal condition on math performance. When we included subjective excitement in the model, the effect of condition was reduced to non-significance (from  $\beta = .64, p < .004$ , to  $\beta = .49, p = .07$ ) and the effect of subjective excitement remained significant ( $\beta = .30, p < .002$ ). A 5000-sample bootstrap test estimated a standardized indirect effect of .34 ( $SE = .038, 95\%$  biased-corrected CI [.13, .28]), indicating a significant indirect effect (MacKinnon, Fairchild, & Fritz, 2007).

### Discussion

Compared to reappraising anxiety as calmness or not reappraising anxiety at all, reappraising anxiety as excitement increased subjective feelings of excitement and boosted self-efficacy, which improved subsequent math performance. Once activated, an aroused state was difficult to suppress. 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 5: Psychological Mechanism

In Studies 1-4, we 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 5, we investigate *why* reappraising anxiety as excitement improves performance. Mittal and Ross (1998) suggest 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” mindset, whereas trying to calm down may perpetuate a “threat” mindset.

In turn, threat versus opportunity mindsets can profoundly influence cognition and performance. For example, recent work by Crum et al. (forthcoming) demonstrates the ease of shifting people’s stress-related mindsets with subtle reframing. They find that priming a “stress-is-enhancing” mindset, as opposed to a “stress-is-deteriorating” mindset, increases cortisol reactivity and desire for feedback. Similarly, Alter et al. (2010) demonstrate 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 issues as threats unless there is strong evidence to do otherwise (Jackson & Dutton, 1988). Reappraising anxiety as excitement may be strong enough “evidence” to motivate an opportunity mindset. We expect that reappraising anxiety as excitement will cause individuals to adopt an opportunity mindset, motivating them to focus on the positive aspects of a task and improve their performance, whereas reappraising anxiety as calmness will cause individuals to perpetuate the threat mindset typically associated with feeling

anxious. In this study, we test whether threat-opportunity mindset mediates the effect of excitement reappraisal on math performance.

## Method

### Participants

We recruited 218 native English-speaking students (94 male, 124 female) 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 & Procedure

We asked participants to complete an anxiety-inducing math task (same task as in Study 4). To manipulate reappraisal, participants read one of two phrases in large letters before they began the math task: “Try to remain calm” or “Get excited!”

We measured each participant’s threat-opportunity mindset in two ways. First, we asked participants to describe the math task (open-ended). Their responses would be coded later by two independent raters on a seven-point threat-opportunity scale. Second, participants completed a seven-item self-report measure adapted from Jackson & 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, we also manipulated the presentation order of the mediation measures. This produced a 2 (reappraisal: excitement v. calm) x 2 (mediator presentation order: before v. after math task) experimental design.

Finally, participants completed the math task, reported their demographics (age, gender), and were paid based on their performance. We recruited two independent raters, who were blind to our hypotheses and experimental condition. We 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”). Inter-rater reliability was high ( $\kappa > .73$ ).

## Results

### Math Performance

We conducted a one-way ANOVA with reappraisal condition (excitement v. calm) as the independent variable, performance (number of correct answers out of eight) as the dependent variable, and age, gender, and mediator measurement order (before v. after task) as control variables. Replicating the findings of Study 4, 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 ( $M = 2.80$ ,  $SD = 1.44$ ),  $F(1,213) = 8.09$ ,  $p < .005$ . 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.

### Threat-Opportunity Mindset

To create a single measure of threat-opportunity mindset, we first averaged across the two raters' coding to create a coded mindset score ranging from 1 (threat) to 7 (opportunity) for each participant. Participants' coded mindset score correlated positively with their self-reported mindset score ( $r = .84$ ,  $p = .01$ ). We created a single threat-opportunity mindset value by averaging each participant's coded mindset score and their self-reported mindset score. A low mindset value indicated a threat mindset, whereas a high mindset value indicated an opportunity mindset.

We conducted a one-way ANOVA with reappraisal condition (excitement v. calm) as the

independent variable, threat-opportunity mindset value as the dependent variable, and age, gender, and mindset measurement order as control variables. As we predicted, participants who reappraised their anxiety as excitement had higher threat-opportunity values than did participants who reappraised their anxiety as calm, indicating opportunity mindsets ( $M = 3.75$ ,  $SD = 0.72$  vs.  $M = 3.36$ ,  $SD = 0.72$ ),  $F(1,213) = 14.98$ ,  $p < .001$ .

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

### Mediation

We found that threat-opportunity mindset fully mediated the relationship between reappraisal and math performance (Baron and 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 mindset was included in the equation, and mindset was a significant predictor of performance ( $\beta = 0.34$ ,  $p < .001$ ). Including mindset increased explained variance significantly by 13%, from  $R^2 = .06$  to  $R^2 = .19$ ,  $p < .001$ . We also used bootstrapping to analyze mediation. Our 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, Fairchild, and Fritz, 2007).

### Discussion

Previous work has found that people tend to adopt threat mindsets when they are in negative affective states or in the absence of convincing evidence. The results of Study 5 suggest

that reappraising pre-performance anxiety as excitement, compared to reappraising anxiety as calm, primes an *opportunity* mindset, which improved subsequent math performance.

### General Discussion

People believe that trying to calm down is the best way to manage pre-performance anxiety (Study 2). Previous work finds that reappraising anxiety as calmness is more effective than suppressing or hiding anxiety (e.g., Hofmann et al., 2009). However, across several experimental studies, we find that reappraising anxiety as excitement is easier and far 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 to 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 different arousal-inducing domains: singing, public speaking, and math performance. This phenomenon was mediated by threat-opportunity mindset. Reappraising anxiety as excitement primed an opportunity mindset, which improved subsequent performance.

### Theoretical Contributions

This research makes several theoretical contributions that both challenge and fundamentally advance work on anxiety and emotion regulation more 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., 2004), no work has explored how a self-statement of emotion may influence one’s *own* experience of emotion and subsequent behavior (i.e., the *intrapsychic* effects). 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 challenge 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., Ekman, 1992; Gross & Levenson, 1993; Grandey, 2000, 2003; Cote, 2005; Morris & Feldman, 1996). In contrast, the current findings identify anxiety and excitement as an exception. Deliberately “misrepresenting” anxious arousal as “excitement” led to genuine increased feelings of excitement and improved performance. This may be the case because anxiety and excitement are arousal-congruent, whereas most work on emotional labor and emotional reappraisal has compared arousal-incongruent emotions (e.g., happiness and sadness).

Third, it points to the labile nature that exists between two discrete emotions: anxiety and excitement. A brief, simple statement (“I am excited”) or two words of advice (“Get excited”) were sufficient to shift individuals from experiencing a negative valence emotion (anxiety) to positive valence emotion (excitement). 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 calm), but we find that shifting valence and maintaining high arousal may be easier and more effective.

Lastly, the current work introduces novel methodology: measuring singing performance with voice recognition software. This approach provides an objective performance score that may be useful for future research on state anxiety, state excitement, or high-pressure performance more broadly.

### Future Directions

These findings are qualified by some limitations, which suggest a number of directions for future research. First, in our studies, we 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 (e.g., Norem & Chang, 1993). Also, in our 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.

In our studies, we focused on high arousal states. Future work could test the effects of reappraisal in low-arousal states. For example, individuals may be able to 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. On the other hand, 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.

Our 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., 2004). 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).

Consistent with prior work (e.g., Lang et al., 1993), we used heart rate to measure physiological arousal. We 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,” heart rate remained high leading up to and throughout those tasks. Future work could employ different physiological and neurological measures for a deeper understanding of anxious reappraisal. Previous work has used physiological measures to investigate the biopsychosocial model of challenge and threat as well as regulatory focus (e.g., Blascovich, 1998; Creswell et al., 2005; Higgins, 1998; Sherman et al., 2009). For example, research using fMRI data has found that a prevention focus is associated with right frontal cortical activity, whereas a promotion focus is associated with left frontal activity (Amodio et al., 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.

We 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.

We found that reappraising anxiety as excitement increased subjective feelings of excitement, but we did not find evidence that reappraising anxiety as excitement *decreased* subjective feelings of anxiety. Work on reappraisal should examine if this 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 and priming an opportunity mindset?

We find that reappraising anxiety as excitement is easier and more effective than trying to calm down leading up to 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., Ramirez & Beilock, 2011; Pennebaker, 1997; Damisch et al., 2010). 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. For example, feeling or expressing excitement during a negotiation may convey valuable information to a counterpart that would be better kept private.

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

### Practical Implications

Our 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 mindset 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 3 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 affect (Diener, Sandvik, & Pavot, 1991; Shiota, 2006). Building on this work, we 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.”

## References

- Alter, A., Aronson, J., Darley, J., Rodriguez, C., & Ruble, D. (2010) Rising to the threat: Reducing stereotype threat by reframing the threat as a challenge, *Journal of Experimental Social Psychology*, *46*(1), 166-171.
- Andrade, E., & Van Boven, L. (2010). Feelings not foregone: When people underestimate the affective impact of inaction. *Psychological Science*, *21*, 706–711.
- Ashby, F.G., Isen, A.M., & Turken, A.U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review*, *106*, 529-550.
- Aspinwall, L.G. & Taylor, S.E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychological Bulletin*, *121*, 417-436.
- Bamber, J.H. (1974). The fears of adolescents. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *125*(1), 127-140.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barsade, S.G. (2002). The ripple effect: Emotional contagion and its influence on group behavior. *Administrative Science Quarterly*, *47*, 644-675.
- Bem, D.J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review*, *74*(3), 183-200.
- Beilock, S. (2008). Math performance in stressful situations. *Current Directions in Psychological Science*, *17*(5), 339-343.
- Beilock, S. & Carr, T.H. (2005). When high-powered people fail—Working memory and “choking under pressure” in math. *Psychological Science*, *16*, 101-105.
- Blascovich, J. (2008). Challenge and threat appraisal. In *Handbook of approach and avoidance motivation*, Elliot, A.J. (Ed.). CRC Press.

- Blascovich, J., Mendes, W.B., Hunter, S.B. & Salomon, K. (1999). Social “facilitation” as challenge and threat. *Journal of Personality and Social Psychology*, 77(1), 68-77.
- Brooks, A.W. & Schwetizer, M.E. (2011). Can Nervous Nelly negotiate? How anxiety causes negotiators to make low first offers, exit early, and earn less profit. *Organizational Behavior and Human Decision Processes*, 115, 43-54.
- Campos, J., Hiatt, S., Ramsay, D., Henderson, C., & Svejda, M. (1978). The emergence of fear on the visual cliff. In M. Lewis & L.A. Rosenblum (Eds.), *The development of affect* (pp 149-182) New York:Plenum Press.
- Carlson, E., & Sroufe, L. A. (1995). The contribution of attachment theory to developmentalpsychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental processes and psychopathology: Vol. 1. Theoretical perspectives and methodological approaches* (pp.581-617). New York: Cambridge University Press.
- Chiu, C., Hong, Y., & Dweck, C.S. (1997). Lay dispositionism and implicit theories of personality. *Journal of Personality and Social Psychology*, 73, 19-30.
- Cioffi, D. & Holloway, J. (1993). Delayed costs of suppressed pain. *Journal of Personality and Social Psychology*, 64, 274-282.
- Cote, S. (2005). Emotional intelligence, cognitive intelligence, and job performance. *Administrative Science Quarterly*, 51(1), 1-28.
- Creswell, J. D., Welch, W., Taylor, S. E., Sherman, D. K., Gruenewald, T., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science*, 16, 846-851.
- Cropanzano, R., James, K., & Konovsky, M.A. (1993). Dispositional affectivity as a predictor of work attitudes and job performance. *Journal of Organizational Behavior*, 14(6), 595-606.

- Dagrou, E., Gauvin, L., & Halliwell, W. (1992). The effects of positive, negative, and neutral self-talk on motor performance. *Canadian Journal of Sport Sciences, 17*(2), 145-7.
- Damisch, L., Stoberock, & Mussweiler, T. (2010). Keep your fingers crossed! How superstition improves performance. *Psychological Science, 21*(7), 1014-1020.
- Diener, E., Sandvik, E., & Pavot, W. (2009). Happiness is the frequency, not the intensity, of positive versus negative affect. *Assessing Well-Being, 39*, 213-231.
- Dutton, J.E. & Jackson, S.E. (1987). Categorizing strategic issues: Links to organizational action. *Academy of Management Review, 12*, 76-90.
- Dweck, C.S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and reactions: A world from two perspectives. *Psychological Inquiry, 6*, 267-285.
- Ekman, P. (1992). An argument for basic emotions. *Cognition & Emotions, 6*, 169-200.
- Endler, N. S. (1980). Person-situation interaction and anxiety. In I. L. Kutash & L. B. Schlesinger (Eds.). *Handbook on stress and anxiety. Contemporary knowledge, theory and treatment* (pp. 241-266).
- Eysenck, M. W. (1979). Anxiety, learning, and memory: A reconceptualization. *Journal of Research in Personality, 13*, 363-385.
- Eysenck, M. W. (1982). *Attention and arousal, cognition and performance*. Berlin, Germany: Springer-Verlag.
- Eysenck, M.W. (1992). *Anxiety: The Cognitive Perspective*. London: Erlbaum.
- Eysenck, M.W. (1997). Eysenck, M.W. Anxiety and cognitive processes. In C.Cooper & V. Varma (Eds.), *Processes in Individual Differences*. London: Routledge.
- Festinger, L. (1957) *A Theory of Cognitive Dissonance*. Stanford University Press: Evanston, Ill.

- Filipowicz, A., Barsade, S., & Melwani, S. (2011). Understanding emotional transitions: The interpersonal consequences of changing emotions in negotiations. *Journal of Personality and Social Psychology, 101*(3), 541-556.
- Fredrickson, B.L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychology, 56*(3), 218-226.
- Garland, E., Gaylord, S., & Fredrickson, B. (2011). Positive reappraisal mediates the stress-reductive effects of mindfulness: An upward spiral process. *Mindfulness, 2*:59-67.
- Gino, F., Brooks, A.W., & Schweitzer, M.E. (2012). Anxiety, advice, and the ability to discern: Feeling anxious motivates individuals to seek and use advice. *Journal of Personality and Social Psychology, 102*(3), 497-517.
- Grandey A. A. (2000). Emotion regulation in the workplace: A new way to conceptualize emotional labor. *Journal of Occupational Health Psychology, 5*(1), 95-110.
- Grandey, A.A. (2003). When the show must go on: Surface acting and deep acting as determinants of emotional exhaustion and peer-rated service delivery. *Academy of Management Journal, 46*(1), 86-96.
- Gray, J. (1991). Fear, panic, and anxiety: What's in a name? *Psychological Inquiry, 2*(1), 77-78.
- Griskevicius, V., Shiota, M.N., & Nowlis, S.M. (2010). The many shades of rose-colored glasses: discrete positive emotions and product perception. *Journal of Consumer Research.*
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*(1), 224-237.
- Gross, J. J. (2001). Emotion regulation in adulthood: Timing is everything. *Current Directions in Psychological Science, 10*(10), 214-219.

- Gross, J.J. & John, O.P. (2003) Individual differences in two emotion regulation processes: Implication for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 248-362.
- Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology*, 64(6), 970-986.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition & Emotion*, 9, 87-108.
- Han, S., Lerner, J.S., & Keltner, D. (2007). Feelings and consumer decision making: The appraisal-tendency framework. *Journal of Consumer Psychology*, 17(3), 158-168.
- Hardy, J. (2006). Speaking clearly: A critical review of the self-talk literature. *Psychology of Sport and Exercise*, 7(1), 81-97.
- Haselhuhn, M.P., Schweitzer, M.E., & Wood, A.M. (2010). How implicit beliefs influence trust recovery. *Psychological Science*, 21(5), 645-648.
- Higgins, E.T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. *Advances in Experimental Social Psychology*, 30, 1-46.
- Higgins, E.T., Shah, J., & Friedman, R. (1997). Emotional responses to goal attainment: Strength of regulatory focus as moderator. *Journal of Personality and Social Psychology*, 72(3), 515-525.
- Hofmann, S.G., Heering, S., Sawyer, A. & Asnaani, A. (2009). How to handle anxiety: The effects of reappraisal, acceptance, and suppression strategies on anxious arousal. *Behaviour Research and Therapy*, 47, 389-394.
- Jackson, S.E. & Dutton, J.E. (1988). Discerning threats and opportunities. *Administrative Science Quarterly*, 33, 370-387.

- Jamieson, J.P., Mendes, W.B., Blackstock, E., & Schmader, T. (2010). Turning the knowts in your stomach into bows: Reappraising arousal improves performance on the GRE. *Journal of Experimental Social Psychology, 46*, 208-212.
- Jennings, J.R., Averill, J.R., Opton, E.M., & Lazarus, R.S. (1970). Some parameters of heart rate change: Perceptual versus motor task requirements, noxiousness, and uncertainty. *Psychophysiology, 7*(2), 194-212.
- Jordan, A., Monin, B., Dweck, C., Lovett, B., John, O., & Gross, J. (2011). Misery has more company than people think: Underestimating the prevalence of others' negative emotions. *Personality and Social Psychology Bulletin, 37*(1), 120-135.
- Jordan, P.J., Ashkanasy, N.M., Hartel, C. (2002). Emotional intelligence as a moderator of emotional and behavioral reactions to job insecurity. *The Academy of Management Review, 27*(3), 361-372.
- Juslin, P.N. & Laukka, P. (2003). Communication of emotions in vocal expression and music performance: different channels, same code? *Psychological Bulletin, 129*(5), 770-814.
- Kantor, L., Endler, N., Heslegrave, R., & Kocovski, N. (2001). Validating self-report measures of state and trait anxiety against a physiological measure. *Current Psychology, 20*, 3, 207-215.
- Larsen, J. & McGraw, P. (2011). Further evidence for mixed emotions. *Journal of Personality and Social Psychology, 100*(6), 1095-1110.
- Laukka, P. & Elfenbein, H.A. (2011). Emotion appraisal dimensions can be inferred from vocal expressions. *Social Psychological and Personality Science*.
- Lazarus, R.S. (1966). *Psychological stress and the coping process*. McGraw-Hill: New York.

- Lentz, K.A. (1985). The expressed fears of young children. *Child Psychiatry & Human Development, 16(1)*, 3-13.
- Lerner, J.S. & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81(1)*, 146-159.
- Lieberman, M., Inagaki, T., Tabibnia, G., & Crockett, M. (2011). Subjective responses to emotional stimuli during labeling, reappraisal, and distraction. *Emotion, 11(3)*, 468-480.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593-614.
- Maloney, E.A. & Beilock, S.L. (2012). Math anxiety: Who has it, why it develops, and how to guard against it. *Trends in Cognitive Sciences, 16*, 404-406.
- Mauss, I. B., Evers, C., Wilhelm, F. H., & Gross, J. J. (2006). How to bite your tongue without blowing your top: Implicit evaluation of emotion regulation predicts affective responding to anger provocation. *Personality and Social Psychology Bulletin, 32*, 589-602.
- Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology, 35(2)*, 63-78.
- Markus, H. & Kunda, Z. (1986). Stability and malleability of the self-concept. *Journal of Personality and Social Psychology, 51(4)*, 858-866.
- Mattarella-Micke, A., Mateo, J., Kozak, M.N., Foster, K., & Beilock, S.L. (2011). Choke or thrive? The relation between salivary cortisol and math performance depends on individual differences in working memory and math-anxiety. *Emotion, 11(4)*, 1000-1005.
- Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research, 45*, 633-644.

- McConnell, A.R., Bill, C.M., Dember, W.N., Grasha, A.F. (1993). Personality through metaphor: Optimism, pessimism, locus of control, and sensation seeking. *Current Psychology, 12*(3), 195-215.
- Mittal, V. & Ross, W.T. (1998). The impact of positive and negative affect and issue framing on issue interpretation and risk taking. *Organizational Behavior and Human Decision Processes, 76*(3), 298-324.
- Monat, A., Averill, J.R., Larus, R.S. (1972). Anticipatory stress and coping reactions under various conditions of uncertainty. *Journal of Personality and Social Psychology, 24*(2), 237-253.
- Morris, J.A. & Feldman, D. (1996). The dimensions, antecedents, and consequences of emotional labor. *Academy of Management Review, 21*(4), 906-1010.
- Norem, J. & Chang, E. (2002) The positive psychology of negative thinking, *Journal of Clinical Psychology, 58*(9), 993-1001.
- Pennebaker, J. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science, 8*(3), 162-166.
- Polman, E. (2012). Effects of self-other decision making on regulatory focus and choice overload. *Journal of Personality and Social Psychology, 102*, 980-993.
- Preacher, K.J. & Hayes, A.F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, 36*(4), 717-731.
- Raghunathan, R., & Pham, M. (1999). All negative moods are not equal: Motivational influences of anxiety and sadness on decision making. *Organizational Behavior and Human Decision Processes, 79*(1), 56-77.

- Ramirez & Beilock (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, 331, 211-213.
- Rothman, N.B. (2011). Steering sheep: How expressed emotional ambivalence elicits dominance in interdependent decision-making contexts, *Organizational Behavior and Human Decision Processes*, 116, 66-82.
- Russell, J.A., Bachorowski, J., Fernandez-Dols, J.M. (2003). Facial and vocal expressions of emotion. *Annual Review of Psychology*, 54, 329-349.
- Schacter, S. & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review*, 69(5), 379-399.
- Scheier, M.F., Weintraub, J.K., Carver, C.S. (1986). Coping with stress: Divergent strategies of optimists and pessimists. *Journal of Personality and Social Psychology*, 51(6), 1257-1264.
- Scherer, K.R. (2001). Appraisal considered as a process of multilevel sequential checking. In K.R. Scherer, A. Schor, & T. Johnstone (Eds.). *Appraisal processes in emotion: Theory, Methods, Research* (pp. 92-120). New York and Oxford: Oxford University Press.
- Schnall, S., Roper, J., & Fessler, D. (2010). Elevation leads to altruistic behavior. *Psychological Science*, 21(3), 315-320.
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.) *Advances in Experimental Social Psychology* (Vol. 38, pp.183-242). San Diego, CA: Academic Press.
- Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: The effects of self-affirmation on sympathetic nervous system responses to naturalistic stressors. *Health Psychology*, 28, 554-562.

- Shiota, M. (2006). Silver linings and candles in the dark: differences among positive coping strategies in predicting subjective well-being. *Emotion*.
- Shiota, M.N. & Levenson, R.W. (2012). Turn down the volume or change the channel? Emotional effects of detached versus positive reappraisal. *Journal of Personality or Social Psychology, 103*, 416-429.
- Simmons, J.P., Nelson, L.D., Simonsohn, U. (2011). False-positive Psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science, 22(11)*, 1359-1366.
- Smith, C., & Ellsworth, P. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology, 48(4)*, 813-838.
- Spielberger, C. D. (1985). Anxiety, cognition and affect: A state-trait perspective. In A. H. Tuna and J. D. Maser (Eds.) *Anxiety and the anxiety disorders*. New Jersey: Erlbaum.
- Spielberger, C.D. (2005). State-trait anxiety inventory. *Corsini Encyclopedia of Psychology*.
- Strack, F., Martin, L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology, 54*, 768-777.
- Tallis, F., Eysenck, M., & Mathews, A. (1992). A questionnaire for the measurement of nonpathological worry. *Personality and Individual Differences, 13(2)*, 161-168.
- Tod, D., Hardy, J., & Oliver, E. (2011). Effects of self-talk: A systematic review. *Sport and Exercise Science, 33(5)*, 666-687.
- Van Boven, L., & Johnson-Graham, L. (2007). Varieties of happiness experience: Review of Gilbert's "Stumbling on Happiness." *Journal of Positive Psychology, 2*, 269-270.

- Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004a). The interpersonal effects of anger and happiness in negotiations. *Journal of Personality and Social Psychology*, *86*(1), 57–76.
- Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004b). The interpersonal effects of emotions in negotiations: A motivated information processing approach. *Journal of Personality and Social Psychology*, *87*(4), 510-528.
- Van Kleef, G.A., De Dreu, C., Manstead, A. (2006). Supplication and appeasement in conflict and negotiation: The interpersonal effects of disappointment, worry, guilt, and regret. *Journal of Personality and Social Psychology*, *91*(1), 124-142.
- Van Kleef, G.A., De Dreu, C., Manstead, A.S. (2010). An interpersonal approach to emotion in social decision making: The emotions as social information model. *Advances in Experimental Social Psychology*, *42*, 45-96.
- Van Raalte, J.L., Brewer, B.W., Lewis, B.P, Linder, D.E., Wildman, G., Kozimor, J. (1995). Cork! The effects of positive and negative self-talk on dart throwing performance. *Journal of Sport Behavior*, *18*.
- Yip, J.A. & Cote, S., (forthcoming). The emotionally intelligent decision maker: Emotion understanding ability reduces the effect of incidental anxiety on risk-taking. *Psychological Science*.
- Zell, E., Warriner, A.B., & Albarracin, D. (2011). Splitting of the mind: When the YOU I talk to is me and needs commands. *Social Psychological and Personality Science*.

Figure Captions

Figure 1. *Singing accuracy payment scheme (Study 1)*

Figure 2. *Photo of karaoke singing setup (Study 1)*

Figure 3. *Singing performance by condition (Study 1)*

Figure 4. *Public speaking performance by condition (Study 3)*

Figure 5. *Heart rate over time in the repeated math task (Study 4)*

Figure 1.

Karaoke Accuracy Score <sup>+</sup>	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

<sup>+</sup>Accuracy score provided via Nintendo Wii “Karaoke Revolution” voice recognition software, developed by Harmonix Music Systems and published by Konami in 2009.

Figure 2.

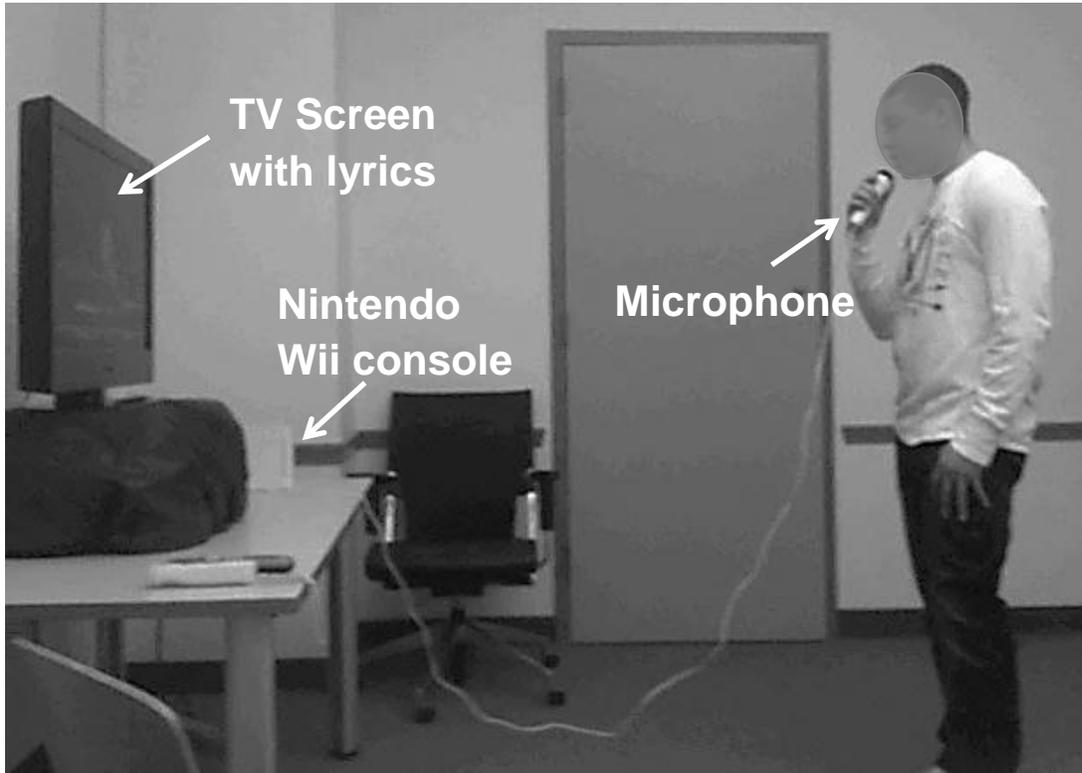


Figure 3.

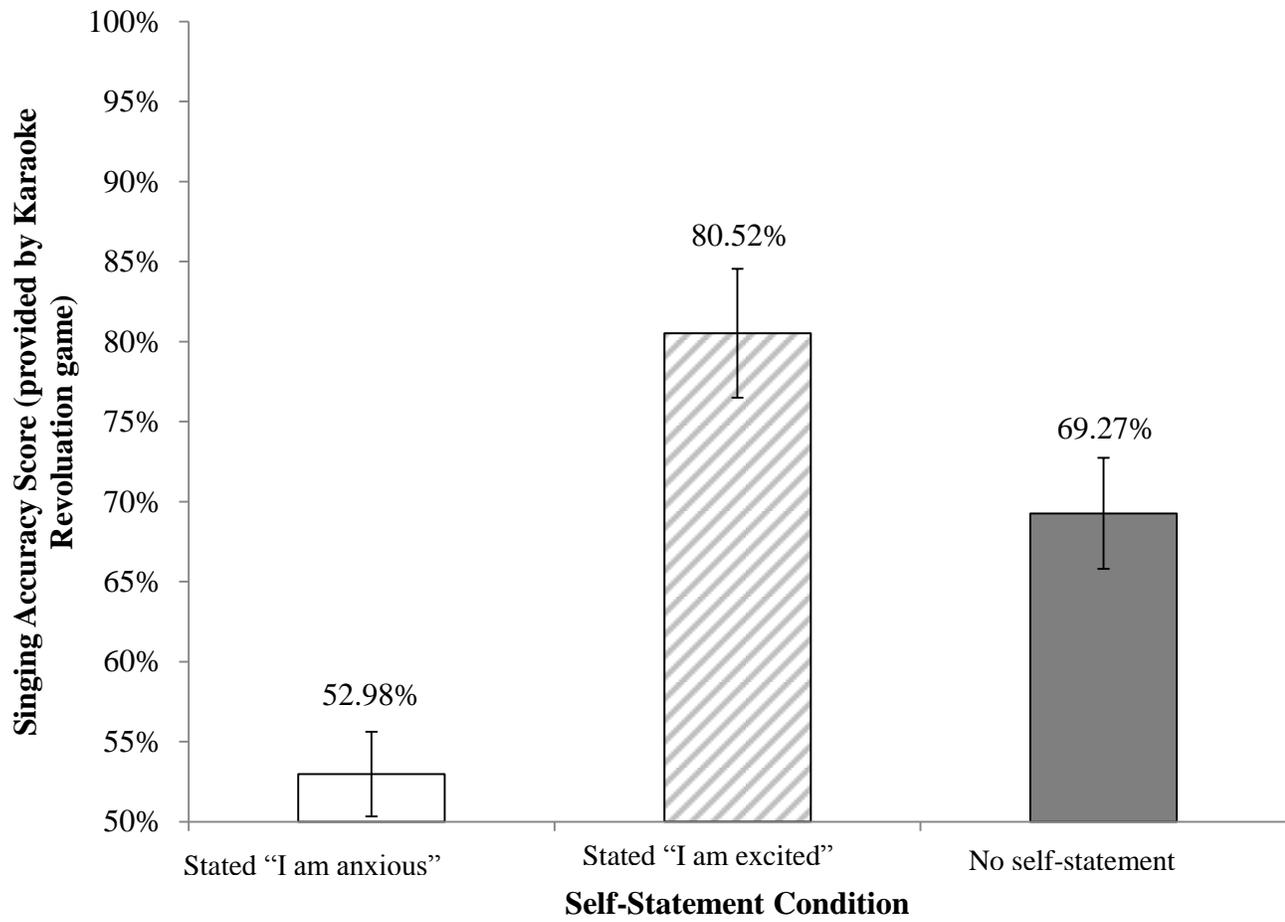


Figure 4.

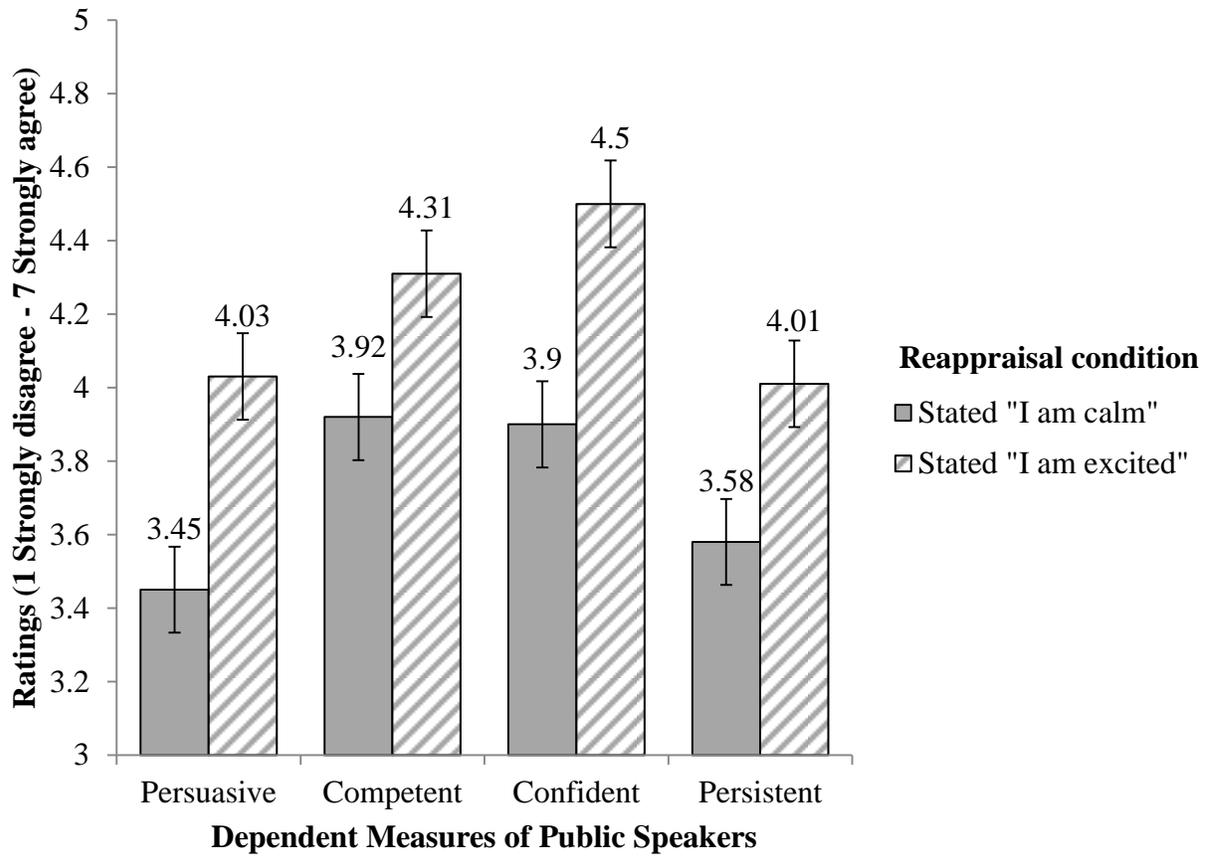


Figure 5.

