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# Worry at Work: How State Anxiety Influences Negotiations, Advice, Reappraisal, and Performance

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# Worry at Work: How State Anxiety Influences Negotiations, Advice, Reappraisal, and Performance

## **Abstract**

At work, sources of anxiety abound. Individuals worry about the quality of their work, their job security, and impressing their bosses. At the same time, many managers induce anxiety, incidentally or deliberately, in an effort to motivate their employees. Until now, the study of anxiety in organizations has been surprisingly sparse. Previous anxiety research has focused on anxiety as a personality trait. In contrast, I focus on state anxiety, an unpleasant emotional state triggered by novelty and the potential for adverse consequences, which has profound effects on cognition and behavior.

Across three chapters, I examine the intrapersonal experience and interpersonal effects of state anxiety. Using a variety of methods, including survey, archival, and experimental data, I test the influence of anxiety on negotiations, advice taking, emotional reappraisal, and high-pressure performance. In Chapter 1, I find that anxious negotiators tend to make low first offers, exit prematurely, and ultimately obtain worse outcomes. In Chapter 2, I find that feeling anxious leads individuals to rely more heavily on advice, even when the advice is obviously bad. These effects are mediated by low self-efficacy; Feeling anxious lowers self-efficacy, which causes negotiators to exit negotiations and causes individuals to rely more heavily on others' advice. Finally, in Chapter 3, I investigate a counterintuitive strategy to contend with the harmful effects of anxiety: reappraising anxiety as excitement. I find that, compared to the intuition to calm down or reduce anxiety, reappraising pre-performance anxiety as excitement primes an opportunity mindset (as opposed to a threat mindset) and improves subsequent performance across public and private performance tasks.

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WORRY AT WORK: HOW STATE ANXIETY INFLUENCES NEGOTIATIONS,  
ADVICE, REAPPRAISAL, AND PERFORMANCE

Alison Wood Brooks

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in

Operations and Information Management

For the Graduate Group in Managerial Science and Applied Economics

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in

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DEDICATION

This dissertation is dedicated in memory of my grandparents:

Ralph and Joyce Wood  
William and Charlotte Wuerdeman

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## ABSTRACT

WORRY AT WORK: HOW STATE ANXIETY INFLUENCES NEGOTIATIONS,  
ADVICE, REAPPRAISAL, AND PERFORMANCE

Alison Wood Brooks

Maurice E. Schweitzer

At work, sources of anxiety abound. Individuals worry about the quality of their work, their job security, and impressing their bosses. At the same time, many managers induce anxiety, incidentally or deliberately, in an effort to motivate their employees. Until now, the study of anxiety in organizations has been surprisingly sparse. Previous anxiety research has focused on anxiety as a personality trait. In contrast, I focus on *state* anxiety, an unpleasant emotional state triggered by novelty and the potential for adverse consequences, which has profound effects on cognition and behavior.

Across three chapters, I examine the *intrapersonal* experience and *interpersonal* effects of state anxiety. Using a variety of methods, including survey, archival, and experimental data, I test the influence of anxiety on negotiations, advice taking, emotional reappraisal, and high-pressure performance. In Chapter 1, I find that anxious negotiators tend to make low first offers, exit prematurely, and ultimately obtain worse outcomes. In Chapter 2, I find that feeling anxious leads individuals to rely more heavily on advice, even when the advice is obviously bad. These effects are mediated by low self-efficacy; Feeling anxious lowers self-efficacy, which causes negotiators to exit negotiations and causes individuals to rely more heavily on others' advice. Finally, in Chapter 3, I investigate a counterintuitive strategy to contend with the harmful effects of anxiety: reappraising anxiety as excitement. I find that, compared to the intuition to calm down or reduce anxiety, reappraising pre-performance anxiety as *excitement* primes an opportunity mindset (as opposed to a threat mindset) and improves subsequent performance across public and private performance tasks.

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## INTRODUCTION

Anxiety is extremely common. In the workplace, individuals worry about the quality of their work, their job security, meeting deadlines, and impressing their colleagues and bosses. At the same time, many managers induce anxiety, incidentally or deliberately, in an effort to motivate their employees. Outside of work, people worry about short-term threats like whether they left the coffee-maker on in the morning, as well as long-term threats and values like their health, finances, and family.

Understanding anxiety is important not only because it is pervasive, but also because feeling anxious profoundly influences cognition and behavior (e.g., Eysenck, 1997; Raghunathan & Pham, 1999). For example, recent work demonstrates how anxiety interferes with cognitive reasoning (e.g., Eysenck et al., 2007) and causes people to avoid risk (e.g., Raghunathan & Pham, 1999).

Previous anxiety research has largely focused on anxiety as a personality trait similar to neuroticism (e.g., Eysenck, 1979, 1992; Kantor et al., 2001; Spielberger, 1985). In this dissertation, however, I focus on *state* anxiety, an unpleasant emotional state triggered by novelty and/or the potential for adverse consequences (Brooks & Schweitzer, 2011), an emotional state anyone can experience at any time.

I fundamentally advance anxiety research by providing a concrete definition of state anxiety: “a state of distress and/or physiological arousal in reaction to stimuli including novel situations and the potential for undesirable outcomes” (Brooks & Schweitzer, 2011). In other words, anxiety is a discrete emotion experienced internally as physiological arousal (e.g., increased heart rate) paired with negative cognitive



appraisal (e.g., threat). Consistent with prior work (e.g., Gray, 1991), I conceptualize anxiety to include fear, worry, apprehension, and nervousness. Anxious feelings can be short-lived or long-lasting, and the magnitude of anxiety can range from minor (e.g., worry) to dramatic (e.g., fear). Within Russell's (1980) affective circumplex model, anxiety is high in activation (i.e., arousal) and unpleasantness (i.e., negative valence), and within Smith and Ellsworth's (1985) appraisal framework, anxiety is characterized by high uncertainty and a lack of control (Raghunathan & Pham, 1999).

Though the experience of state anxiety is intrapersonal, the world is inherently social. As individuals navigate interactions and relationships, feeling and expressing anxiety may have profound *interpersonal* consequences as well. Until now, the interpersonal consequences of state anxiety have been largely overlooked by organizational scholars.

In this dissertation, I focus on state anxiety in two separate interpersonal domains that have fascinated organizational scholars and are often characterized by feeling anxious: negotiations and advice. The prospect of negotiating makes people feel very anxious, and individuals often seek out and rely on advice from others when they feel anxious or uncertain about their own judgments.

In addition to examining the effects of anxiety in these interpersonal domains, I also turn my attention to the *intrapersonal* regulation of anxiety. Previous research in anxiety regulation has focused on suppressing or decreasing the experience and/or expression of anxiety. However, the arousal associated with anxiety is automatic and very difficult to hide or diminish. Instead of trying to calm down or hide anxious

feelings, I investigate an alternative strategy: reappraising anxiety as *excitement*, another high-arousal emotion that tends to improve cognition and performance.

### Overview of Chapter 1

In Chapter 1 (co-authored with Maurice E. Schweitzer), I examine the effects of feeling anxious prior to and during negotiations. In a series of experimental studies, we demonstrate that state anxiety is the most commonly anticipated negotiator emotion, and feeling anxious motivates flight behaviors across several negotiation and bargaining contexts. Compared to non-anxious individuals, anxious negotiators make lower first offers, respond more quickly to counteroffers, make steeper concessions, and exit prematurely, sacrificing value and achieving poorer negotiated outcomes. These effects are moderated by negotiator self-efficacy. When negotiators believe they are good negotiators (i.e., high negotiator self-efficacy), they can avoid the negative effects of state anxiety.

Chapter 1 makes several theoretical contributions. First, this work addresses a gap in the emotion and negotiation literature. Though previous work has emphasized the importance of emotions in negotiations (Van Kleef et al., 2004), no work has investigated the role of state anxiety, the most pervasive negotiator emotion. Second, we fundamentally advance the negotiation literature by showing that negotiator self-efficacy is both labile and consequential.

### Overview of Chapter 2

In Chapter 2 (co-authored with Francesca Gino and Maurice E. Schweitzer), I shift focus to another organizationally-relevant interpersonal domain characterized by

anxiety: advice. When individuals face important decisions, such as how to invest savings or how to complete a difficult task, they often feel anxious and seek advice from colleagues and managers. Across eight experiments, we describe the influence of anxiety on advice seeking and advice taking. We find that anxious individuals are more likely to seek and rely on advice than are those in a neutral emotional state. Supporting our findings in Chapter 1, the relationships between anxiety and advice seeking and anxiety and advice taking are mediated by self-confidence; anxiety lowers self-confidence, which increases advice seeking and reliance upon advice. Finally, we find that anxious individuals fail to discriminate between good and bad advice, and between advice from advisors with and without a conflict of interest.

### Overview of Chapter 3

Taken together, Chapters 1 and 2 demonstrate that feeling anxious can harm important *interpersonal* outcomes. However, the experience of anxiety is inherently *intrapersonal* (physiological and cognitive). In Chapter 3, I examine the *intrapersonal* regulation of state anxiety. I find that most people believe the best way to contend with pre-performance anxiety is try to decrease anxiety or calm down. However, decreasing anxiety is very difficult because arousal is automatic.

Instead, I test an alternative strategy: reappraising pre-performance anxiety as *excitement*. The experience of anxiety and excitement is quite similar. They are both felt in anticipation of events and are characterized by *high arousal*. However, 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). Because these two emotions are *arousal congruent*, I find that minimal interventions can shift anxiety to produce genuine feelings of excitement (Schachter & Singer, 1962).

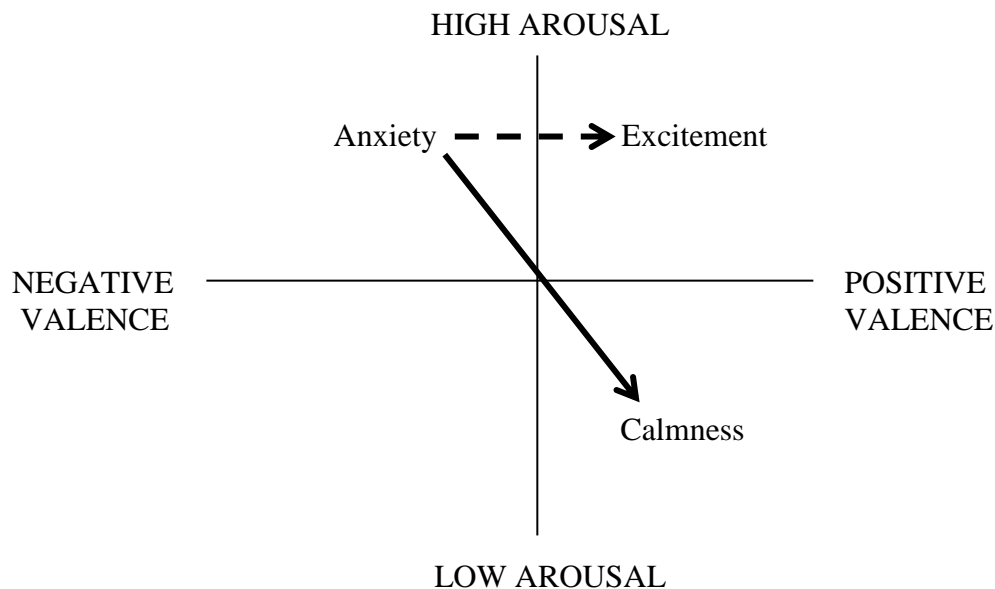
Across several experimental studies and an archival field study, I find that individuals who reappraise their pre-performance anxiety as excitement—compared to those who try to calm down—increase their self-confidence, adopt an opportunity mindset (as opposed to a threat mindset), and improve their subsequent public speaking, karaoke singing, and math performance. These findings are consistent with archival field data from the popular television show “American Idol.”

This work makes several theoretical and methodological 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). 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 serve as a counterexample to these findings. Third, this research points to the labile nature that can exist between two seemingly discrete and disparate emotions, such as anxiety and excitement.

### Summary

Chapters 1-3 demonstrate that state anxiety is extremely common, profoundly influences interpersonal cognition and behavior, and can be managed *intrapersonally* with arousal-congruent reappraisal. Feeling anxious harms performance in negotiations and causes individuals to rely too heavily on advice. However, individuals can reappraise pre-performance anxiety as excitement with minimal interventions such as positive self-talk (e.g., saying “I am excited” out loud).

Building on the affective circumplex model of emotion (e.g., Posner, Russell, & Peterson, 2005), the findings from this dissertation suggest an integrated framework of state anxiety, excitement, and calmness (see diagram below). Though people aspire and attempt to move from anxiety to calmness (and often fail), people *can* successfully move from anxiety to excitement. This framework shows that people attempt to regulate anxiety by shifting both their arousal and valence. A far more effective approach for regulating anxiety is to shift only valence, holding arousal constant.



## CHAPTER 1.

CAN NERVOUS NELLY NEGOTIATE? HOW ANXIETY CAUSES  
NEGOTIATORS TO MAKE LOW FIRST OFFERS, EXIT EARLY, AND EARN  
LESS PROFIT

Alison Wood Brooks

Maurice E. Schweitzer

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## ABSTRACT

Negotiations trigger anxiety. Across four studies, we demonstrate that anxiety is harmful to negotiator performance. In our experiments, we induced either anxiety or neutral feelings and studied behavior in negotiation and continuous shrinking pie tasks. Compared to negotiators experiencing neutral feelings, negotiators who feel anxious expect lower outcomes, make lower first offers, respond more quickly to offers, exit bargaining situations earlier, and ultimately obtain worse outcomes. The relationship between anxiety and negotiator behavior is moderated by negotiator self-efficacy; high self-efficacy mitigates the harmful effects of anxiety.

CAN NERVOUS NELLY NEGOTIATE? HOW ANXIETY CAUSES  
NEGOTIATORS TO MAKE LOW FIRST OFFERS, EXIT EARLY, AND EARN  
LESS PROFIT

In almost every social and organizational setting, people face the challenge of negotiating with others to achieve their goals (Barry & Oliver, 1996; Pruitt & Carnevale, 1993; Rapoport, Budescu, Erev, & Zwick, 1998). Although a substantial literature has developed our understanding of negotiations (see Bazerman, Curhan, Moore, & Valley, 2000 for a review), relatively little work has explored how emotions influence negotiator behavior. Important work that has studied emotions in negotiations has focused almost exclusively on anger and happiness (e.g., Allred et al., 1997; Barry, 2008; Van Kleef, De Dreu, & Manstead, 2004). Surprisingly, prior research has not directly studied one of the most ubiquitous negotiator emotions: anxiety. In this paper, we demonstrate that anxiety is commonly felt before negotiating and harmful to both negotiator behavior and negotiated outcomes.

*Moods and Emotions*

Both moods and emotions can influence negotiations. *Moods* are diffuse feelings characterized by either positive or negative valence (Forgas, 1998). In contrast to moods, *emotions* are discrete, intense, and complex feelings that last for shorter durations (Smith & Ellsworth, 1985). Unlike moods that are characterized along a single dimension, valence (good to bad), emotions can be characterized along several dimensions (Smith & Ellsworth, 1985). For example, anger, sadness, and guilt are all

negatively-valenced emotions, but these emotions differ along the dimension of control; anger is typically triggered by another person, sadness is typically triggered by a situation, and guilt is typically triggered by one's own actions.

In this paper, we study incidental emotion. *Incidental emotions* are triggered by a prior, unrelated situation (Lerner, Small, & Loewenstein, 2004). For example, a colleague you meet for lunch may feel angry about a disagreement she had with her spouse earlier in the day. In contrast to incidental emotions, *directed emotions* are triggered by aspects of the situation itself. Though negotiations are likely to be influenced by both incidental and directed emotions, in our studies, we induce incidental anxiety. Because they are normatively irrelevant (i.e., not related to the task at hand), incidental emotions offer a conservative approach for studying the influence of emotions on judgment and behavior (Dunn & Schweitzer, 2005).

### *Affect in Negotiations*

Early work studied the influence of mood on negotiations. This work found that positive moods promote cooperative behavior, and that negative moods promote competitive behavior (Barry & Oliver, 1996). In particular, positive moods increase concession making, stimulate creative problem solving, and increase preferences for cooperation (Baron, Fortin, Frei, Hauver, & Shack, 1990; Forgas, 1998). In contrast, negative moods decrease initial offers, decrease joint gains, promote the rejection of ultimatum offers, and increase the use of competitive strategies in negotiations (Forgas, 1998; Pillutla & Murnighan, 1996).



More recent research has studied the effects of specific emotions on negotiations. This work has identified a number of important relationships between specific emotions and negotiator behavior (e.g., Steinel, Van Kleef, & Harinck, 2008; Van Beest, Van Kleef, & Van Dijk, 2008; Van Kleef, De Dreu, & Manstead, 2004). For example, negotiators concede more to someone who expresses anger than they do to someone who expresses happiness (Van Kleef et al., 2004). Feeling angry, however, can harm negotiators' ability to reach integrative outcomes (Allred et al., 1997). In addition to investigating anger, negotiation scholars have studied emotions including envy, disappointment, guilt, and regret (e.g., Van Kleef, De Dreu, & Manstead, 2006). For example, negotiators who feel envy are more likely to lie to their envied counterpart (Moran & Schweitzer, 2008). The relationships between specific emotions and negotiator behavior are moderated by a number of factors such as the target of the emotion (e.g., whether the emotion is directed toward a person or a specific behavior) and the number of people negotiating. In extant research, anger and happiness are the most commonly studied emotions in negotiations (Allred et al., 1997; Van Dijk, Van Kleef, Steinel, & Van Beest, 2008; Van Kleef et al., 2004). Surprisingly, the literature on emotions in negotiations has neglected the study of anxiety. This is an important omission because anxiety may be one of the most pervasive negotiator emotions (Wheeler, 2004).

### *Anxiety*

Although prior work has studied anxiety as a trait, a motive, and a drive (Endler, 1983), we consider anxiety as a state emotion that arises in response to a threat. We

integrate prior research on stress and trait anxiety (Gray, 1991; Greenhalgh, 2002; Kantor, Endler, Heslegrave, Kocovski, 2001; O'Connor, Arnold, Maurizio, 2010; Raghunathan & Pham, 1999; Spielberger, 1966) to introduce the following definition of state anxiety:

*Anxiety is a state of distress and/or physiological arousal in reaction to stimuli including novel situations and the potential for undesirable outcomes.*

Consistent with prior work (e.g., Gray, 1991), we define anxiety to include fear, frustration, stress, tension, worry, apprehension, and nervousness. Within Russell's (1980) affective circumplex model, anxiety is high in activation and unpleasantness, and within Smith and Ellsworth's (1985) appraisal framework, anxiety is characterized by high uncertainty and a lack of control (Raghunathan & Pham, 1999). We expect anxiety to be particularly important in negotiations. Anxiety differs from other negatively-valenced emotions, such as anger, because it triggers a "flight" rather than a "fight" response (Marks & Nesse, 1994). For example, whereas feelings of anger motivate individuals to escalate conflict, feelings of anxiety motivate individuals to escape or avoid conflict.

A few scholars have speculated that anxiety may be important for negotiations (Adler, Rosen, & Silverstein, 1998; Small, Gelfand, Babcock, & Gettman, 2007; Wheeler, 2004). For example, Babcock, Gelfand, Small, and Stayn (2006) suggest that women may avoid negotiations because they feel anxious. In their studies, women were more likely to avoid negotiations than men, and women were more likely than men to report feeling anxiety and discomfort. Although anxiety may be a prevalent negotiator

emotion, no prior work has directly investigated how anxiety influences negotiator behavior.

### *Anxiety and Flight in Negotiations*

Anxiety is triggered by novel situations that have the potential for undesirable outcomes (Gray, 1991). In many negotiations, such as the process of purchasing a home, the situation involves unfamiliar people, unfamiliar issues, and the prospect of unfavorable outcomes (Pruitt & Carnevale, 1993). For example, an unsuccessful negotiator may upset a counterpart, obtain an adverse outcome, or both. Almost every negotiation is characterized by the potential for undesirable outcomes, and as a result, we expect negotiation settings to trigger anxiety.

Anxiety is an aversive state that motivates individuals to escape or flee from anxiety-producing situations (Marks & Nesse, 1994). In our investigation, we study the influence of adding incidental anxiety to negotiation and bargaining settings. We expect individuals who feel high levels of anxiety to be eager to escape from anxiety-producing situations, such as negotiation and bargaining situations.

We consider two ways in which individuals might escape from negotiation and bargaining situations. First, individuals can terminate the process and exit negotiations without reaching a deal. Compared to individuals who experience neutral feelings, we expect individuals who feel anxious to be more likely to exit negotiation and bargaining situations early.

Second, anxious individuals may seek to reach a quick agreement, even when persisting might yield a better economic outcome. To increase the likelihood of reaching

a quick agreement, individuals may lower their aspirations, lower their expectations, make low first offers, respond quickly to offers, and make quick concessions. Compared to individuals who experience neutral feelings, we expect individuals who feel anxious to be more likely to lower their aspirations, lower their expectations, make low first offers, and respond more quickly to offers.

We expect anxiety to harm outcomes. Behaviors triggered by anxiety, such as developing low aspirations and expectations (Brophy, 1983), making low first offers (Galinsky, Seidin, Kim, & Medvec, 2002; Liebert, Smith, Hill, & Keiffer, 1968; Neale & Bazerman, 1991; Yukl, 1974), and exiting early (Giebels, De Dreu, & Van de Vliert, 2000) have each been linked with poor negotiation outcomes. As a result, compared to individuals who experience neutral feelings, we expect individuals who feel anxiety to attain worse negotiation and bargaining outcomes.

In our studies, we also consider self-efficacy, the belief that one can succeed, as a potential moderator of the relationship between anxiety and bargaining behavior. Individuals with high self-efficacy persist in tasks longer than do individuals with moderate or low self-efficacy (Lenta, Browna, & Larkina, 1984). In our investigation, we expect individuals with high self-efficacy to persist in bargaining tasks longer than those with moderate self-efficacy, even when they feel anxious.

#### Pilot Survey

Although a few scholars have suggested that anxiety is important for negotiations (Adler, Rosen, & Silverstein, 1998; Wheeler, 2004), extant research has neither documented its importance nor directly studied the influence of anxiety on

negotiations. To motivate our investigation, we conducted a pilot study with an adult population.

### *Method*

Participants. We recruited participants from a large Northeastern train station to complete a one-page survey in exchange for a candy bar. A total of 185 participants (67 female, 84 male) completed the survey. Most respondents had more than three years of work experience (88%), and on average, participants were 38.6 years old ( $SD = 16.11$ ).

Design and Procedure. The survey contained three sections. In the first section, we asked participants to imagine that they and a stranger were about to negotiate, and to rank the three emotions that they would feel the most before the negotiation. For the ranking task, we gave participants a list of the eight most common emotions from the PANAS basic emotion scale (Happy, Sad, Excited, Guilty, Anxious, Proud, Calm, Angry).

In the second section, we asked participants to imagine “negotiating for a car” and “negotiating for a higher salary.” For both of these scenarios, we asked participants to rate the extent to which they would feel each of five emotions using a 5-point scale (Happy, Sad, Anxious, Excited, Angry).

In the third section, we asked participants to provide demographic information (gender and age).

### *Results and Discussion*

In the first section of the survey, participants ranked the emotions they expected to feel before a generic negotiation. A majority of participants (61.08%, 113 out of 185) ranked anxiety as the emotion they would feel the most before a negotiation.

In the second section, when participants imagined negotiating over the acquisition of a car, excitement was rated most highly ( $M = 3.64$ ,  $SD = 1.06$ ) and anxiety was rated second-most highly ( $M = 3.27$ ,  $SD = 1.16$ ). In a repeated-measures analysis of variance (ANOVA), we found significant differences between the participants' five emotion ratings,  $F(4, 158) = 149.53$ ,  $p < .0001$ ,  $\eta^2 = .487$ . When participants imagined negotiating for a higher salary, anxiety was rated most highly of the five emotions ( $M = 3.71$ ,  $SD = 1.15$ ). In a repeated-measures ANOVA, we found significant differences between the participants' five emotion ratings,  $F(4, 161) = 145.40$ ,  $p < .0001$ ,  $\eta^2 = .474$ . We depict participants' emotion ratings in Figures 1 and 2.

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Insert Figures 1 and 2 about here  
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Both men and women expected to feel high levels of anxiety. Though we found no significant gender differences, our results are directionally consistent with Babcock et al.'s (2006) conjecture; women anticipated feeling slightly more anxiety than did men (and men anticipated feeling slightly more excitement than did women).

Although prior negotiation work has studied anger and happiness, this work has neglected the study of anxiety. Results from our pilot study reveal that anxiety is commonly felt before negotiating.

## Study 1

In Study 1, we explore the influence of anxiety on negotiation processes and outcomes. In this study, we induce either anxious or neutral feelings and ask participants to complete a free-form negotiation task based on the cell-phone negotiation case developed by Van Kleef, De Dreu, and Manstead (2004). In this study, participants negotiated with each other via computer instant messaging.

### *Method*

Participants. One hundred thirty six students at a Northeastern university participated in the study for pay (81 female, 55 male). Participants received a \$10 show-up fee and had the opportunity to make up to an additional \$15.20 based on their decisions and the decisions of others in the experiment. On average, participants were 20.1 years old ( $SD = 1.46$ ).

Design. We randomly assigned participants to one of two between-subject conditions: Anxiety vs. Neutral. We induced anxiety or neutral emotions by having participants listen to music via headphones during the negotiation. Prior research has used music to manipulate mood and emotions (e.g., Pham, 1998; see Brown & Volgsten, 2006 for a review). As a cover story, we informed participants that they would be asked to evaluate the music as part of a separate study.

In the Anxiety condition, we had participants listen to the theme from the movie *Psycho*. In the neutral condition, we had participants listen to Handel's *Water Music: Air*. Both of these audio clips are orchestral compositions with no vocal parts. The

segments we used were approximately three minutes in length, and we played these clips on a continuous loop.

*Pilot Study.* We conducted a pilot study to check the effectiveness of our audio clip inductions. We recruited a non-overlapping sample of 162 participants who completed a series of studies in exchange for \$10. Participants listened to either the anxiety or the neutral clip and rated their emotions while they listened. To measure anxiety, we averaged responses for *anxious*, *apprehensive*, *worried*, and *nervous* ( $\alpha=.86$ ). To measure neutral feelings, we averaged responses for *neutral*, *indifferent*, *unemotional*, and *calm* ( $\alpha=.91$ ).

As expected, mean ratings of anxiety were higher in the Anxiety condition than in the Neutral condition,  $t(160)=10.00$ ,  $p<.001$ , and mean neutral feelings were higher in the Neutral condition than they were in the Anxiety condition,  $t(160)=6.41$ ,  $p<.001$ . Importantly, ratings of other emotions (e.g., sadness, anger, disgust) did not differ across conditions. We report these results in Table 1.

Procedure. For each session, we recruited even numbers of participants. Our minimum group size was six and the maximum group size was fourteen. After participants arrived, we seated participants in separate cubicles in front of computers with headphones. Participants read all of the instructions and completed the experimental tasks, including the negotiation, via computer.

First, we asked participants to complete an instant messaging practice round to ensure familiarity with the instant messaging platform. Next, participants read background information and prepared for the negotiation task. We then had participants



put on headphones. As a cover story, we informed participants that they would be asked to evaluate music as part of a separate study. Participants listened to either the anxiety or the neutral music. While the music played, participants reported their aspiration levels (“What do you hope to earn in the negotiation?”) and expectations (“What do you expect to earn in the negotiation?”). After responding to these two questions, participants negotiated with their counterpart.

Participants negotiated via instant message, and we recorded the text of their negotiation. After participants negotiated, we collected demographic information and paid participants based on the outcome of their negotiation.

*Negotiation Task.* Consistent with prior emotion and negotiation research, we used a three-issue cell-phone shipment negotiation (De Dreu & Van Lange, 1995; Van Kleef et al., 2004). We informed participants that they would be randomly assigned to the role of either buyer or seller.

Participants negotiated the price, warranty period, and service period of a cell phone shipment with their counterpart. Price was a distributive issue (i.e., win-lose), and warranty period and service period had integrative potential. Participants could expand the size of the total dyadic outcome by trading across these issues. We provided participants with a payoff chart that represented payoffs associated with nine different levels of outcomes for each of the three issues. We depict the Buyer and Seller payoff charts in Table 2. Sellers preferred a high price, short warranty period, and short service period. Buyers preferred a low price, long warranty period, and long service period. The maximum possible individual outcome for both buyers and sellers was \$15.20. The

minimum possible individual outcome was \$0. The maximum possible joint outcome was \$17.60. The minimum possible joint outcome was \$12.80.

We did not provide participants with their counterpart's payoff table, but participants understood that it differed from their own. We told participants that the negotiation could end in one of three ways: they reached a deal, one of the negotiators decided to exit by typing "EXIT," or time ran out before they reached an agreement. We gave participants 10 minutes to negotiate. If they reached an agreement, we told them they would earn the negotiated amount. If one of the counterparts exited before the end of the 10 minutes, we told them that both counterparts would earn \$4. And if they did not reach an agreement before the end of 10 minutes, we told them that both negotiators would earn \$0. Participants completed the negotiation task over an instant messaging platform using an anonymous screenname (e.g., *NegotiatorA*, *NegotiatorB*).

### *Results*

We report results for both the negotiation process and negotiated outcomes. Across our analyses, we found no significant differences for age or gender, and we report results collapsed across these variables.

Aspirations and Expectations. We conducted an analysis of variance (ANOVA) on aspiration level as a function of emotion condition (Anxiety v. Neutral) and role (Buyer v. Seller). We did not find a significant effect of emotion on aspiration level ( $p = .60$ ). Anxious participants ( $M = \$11.55$ ,  $SD = 3.60$ ) aspired to earn as much as non-anxious participants did ( $M = \$11.93$ ,  $SD = 3.50$ ). We also did not find an effect of negotiator role on aspiration level ( $p = .57$ ).

We conducted an ANOVA on expectations as a function of emotion condition (Anxiety v. Neutral) and role (Buyer v. Seller). We found a significant effect of emotion on expectations. Controlling for role, anxious participants expected to earn less ( $M = \$6.95$ ,  $SD = 2.57$ ) than did non-anxious participants ( $M = \$8.31$ ,  $SD = 2.97$ ),  $F(1,139) = 8.46$ ,  $p = .004$ . We found no effect of negotiator role on expectations ( $p = .79$ ).

First Offers. Sixty five of the 136 participants made complete first offers that specified values for all three issues. About half (31 of 65) of the first offers were made by sellers.

We converted each three-issue initial offer into a total dollar value for the participant who made the offer. We conducted an ANOVA on first offer value as a function of emotion condition (Anxiety v. Neutral) and role (Buyer v. Seller). We found a significant main effect of emotion condition on first offers. Anxious participants made significantly lower first offers ( $M = \$8.36$ ,  $SD = 1.63$ ) than did non-anxious participants ( $M = \$9.55$ ,  $SD = 2.29$ ),  $F(1,63) = 5.63$ ,  $p = .021$ . We found no effect of negotiation role on first offer ( $p = .93$ ). These results are depicted in Figure 3.

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Insert Figure 3 about here  
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Response Times. We measured response time (in seconds) for each message sent during the negotiation. For each participant, we computed averaged response time. We conducted an ANOVA on each participant's mean response time as a function of the negotiator's emotion (Anxious v. Neutral), the counterpart's emotion (Anxious v.

Neutral), and the negotiator's role (Buyer v. Seller). We found a significant main effect of the negotiator's emotion on response time. Anxious participants responded significantly more quickly ( $M = 14.78$  seconds,  $SD = 5.87$ ) than did non-anxious participants ( $M = 18.42$  seconds,  $SD = 9.19$ ),  $F(1,135) = 7.32$ ,  $p = .008$ . We did not find a main effect of the counterpart's emotion ( $p = .70$ ), a main effect of role ( $p = .28$ ), or interaction effects between the negotiator's emotion, the counterpart's emotion, or role on response time.

Exit Decisions. Only four out of the 142 participants chose to exit before reaching an agreement. Consistent with our predictions, all of the participants who chose to exit were in the anxiety condition, but the total number who exited is too small for us to draw inferences about exit decisions. We investigate exit decisions directly in Studies 3 and 4.

Individual Outcomes. Four dyads failed to reach agreement because one negotiator chose to exit. We excluded these eight participants from our analysis of negotiation outcomes. For each of the 134 participants who reached a deal, we computed the total profit they earned.

We conducted an ANOVA on individual profit as a function of the negotiator's emotion, the counterpart's emotion, and the negotiator's role. We found a significant main effect of the negotiator's emotion on individual profit. Anxious participants earned less profit ( $M = \$7.19$ ,  $SD = 2.16$ ) than did non-anxious participants ( $M = \$8.04$ ,  $SD = 1.56$ ),  $F(1,130) = 8.53$ ,  $p = .004$ . We also found a significant main effect of the counterpart's emotion on individual profit. Participants who were paired with an anxious

counterpart earned significantly more profit ( $M = \$7.99$ ,  $SD = 1.89$ ) than did participants who were paired with a non-anxious counterpart ( $M = \$7.18$ ,  $SD = 1.92$ ),  $F(1,129) = 6.03$ ,  $p = .015$ . We did not find a significant interaction effect of the negotiator's emotion and the counterpart's emotion ( $p = .40$ ) or a significant main effect of the negotiator's role ( $p = .52$ ) on individual outcomes. We report negotiated outcomes by condition and role as well as the number of dyads per experimental condition in Table 3.

Expectations as Mediator. Following Baron and Kenny's (1986) four-step mediation approach, we analyzed expectations as a mediator of the relationship between anxiety and individual profit. We regressed emotion condition on individual profit. Anxiety was a significant predictor of individual profit ( $\beta = -.903$ ,  $SE = .314$ ,  $p < .005$ ). We then regressed emotion condition and expectations on individual profit. By including expectations in the model, the influence of anxiety on individual profit was reduced in significance (from  $\beta = -.903$ ,  $p = .0047$  to  $\beta = -.729$ ,  $p = .024$ ), and we increased the amount of explained variance from  $r^2 = .059$  to  $r^2 = .093$ . This suggests that expectations partially mediate the relationship between anxiety and individual profit.

Dyadic Outcomes. We conducted an ANOVA on the total profit dyads earned as a function of the buyer's emotion condition, the seller's emotion condition, and an interaction between the two. We did not find significant effects for the buyer's emotion condition ( $p = .78$ ), the seller's emotion condition ( $p = .75$ ), or the interaction between the two ( $p = .21$ ) on dyadic profit.

*Discussion*

Study 1 demonstrates that anxiety harms negotiation processes and outcomes. In this study, anxious negotiators set lower expectations, made lower first offers, responded more quickly to offers, and attained worse individual outcomes. Though anxiety caused negotiators to lower their expectations, anxiety did not cause negotiators to lower their aspirations. This pattern of results suggests that anxiety temporarily lowers negotiators' self-efficacy, the belief that one can succeed in a negotiation (i.e., short-term expectations), but does not influence long-term goals (i.e., aspirations). Importantly, Study 1 lacked experimental control over some of our process measures. For example, we did not control the amount of discussion participants had before they made their first offers.

### Study 2

In Study 2, we extend our investigation to explore the link between anxiety and initial offers. The first offer is a critical element of negotiations because it anchors the negotiation. In our setting, negotiators had a complete payoff matrix that bounded the negotiation space. As a result, in our setting, the first offer represents the first opportunity for negotiators to make concessions. Previous work has linked first offers with subsequent patterns of concessions and, ultimately, negotiated outcomes (Galinsky, Seidin, Kim, & Medvec, 2002; Liebert, Smith, Hill, & Keiffer, 1968; Neale & Bazerman, 1991; Yukl, 1974).

Unlike Study 1, we use a very controlled computer-mediated negotiation procedure. We adapted this approach from Van Kleef, De Dreu and Manstead (2004). Though this study lacks the interpersonal interaction of Study 1, it affords us greater

control over issues such as the amount of information exchanged and self-selection issues that might influence first offers. We also extend our investigation in Study 2 by using a different emotion induction.

### *Method*

Participants. We recruited 159 students at a Northeastern university to participate in a laboratory experiment for pay (72 female, 87 male). Participants received a \$10 show-up fee and had the opportunity to make up to an additional \$5 based upon their decisions in the experiment. On average, participants were 19.8 years old ( $SD = 2.42$ ).

Design. We randomly assigned participants to one of two between-subject emotion-induction conditions (Anxiety vs. Neutral). We induced emotions by showing participants one of two film clips. Participants in the anxiety condition viewed a clip from the movie *Vertical Limit* (Frederickson & Branigan, 2005). In this video clip, a family climbs the face of a cliff and some of the climbers plummet to their death. Participants in the neutral condition viewed a clip from *Planet Earth*. This video shows fish swimming in an ocean, accompanied by calm, descriptive narration.

*Pilot Study.* We conducted a manipulation check of our video clip induction with a non-overlapping sample of 64 participants who completed a series of studies in exchange for \$10. These participants watched one of the two video clips (Anxiety vs. Neutral) and rated their emotions after watching the video. To measure anxiety, we averaged responses for *anxious*, *apprehensive*, *worried*, and *nervous* ( $\alpha=.84$ ). To measure neutral feelings, we averaged responses for *neutral*, *indifferent*, *unemotional*, and *calm* ( $\alpha=.95$ ).

After our manipulation, feelings of anxiety were significantly higher in the anxiety condition than in the neutral condition,  $t(62) = 7.48, p < .001$ , and neutral feelings were higher in the neutral condition than in the anxiety condition,  $t(62)=5.80, p<.001$ . Importantly, other negatively-valenced emotions (e.g., sadness, anger, and disgust) did not significantly differ across conditions.

Procedure. For each session, we recruited even-numbered groups of participants (minimum group size was six participants) to the laboratory. We seated participants in separate cubicles in front of computers with headphones. We presented all of the instructions and experimental tasks on the computer screen. We told participants that they would complete a computer-mediated negotiation with another participant (whose behavior was in fact simulated by the computer). We tested their understanding of the negotiation with a comprehension check. Participants who failed the comprehension check twice were dismissed from the study ( $n = 8$ ).

After completing the comprehension check, participants watched the video clip. We explained this task to participants as a separate study about memory. After watching the video, participants made their first offer in the negotiation.

*Negotiation Task.* Consistent with Study 1 and previous work, we used a three-issue cell-phone shipment negotiation (De Dreu & Van Lange, 1995; Van Kleef et al., 2004). However, unlike Study 1, in Study 2 the counterpart was simulated by a pre-programmed set of computer responses. We informed participants that they would be assigned to either the role of buyer or seller. After a brief pause during which the



computer purportedly assigned roles to each participant, we assigned every participant to the role of seller.

We did not provide participants with the buyer's payoff table, but participants understood that it differed from their own. We told participants that only those who reached an agreement would earn additional money. We told participants that the seller would make the first offer, the buyer would see the offer and make a counteroffer, and the negotiation would continue until they reached an agreement or until time ran out. We explained that there would be at least six rounds of offers and counteroffers, but that they would not know the exact length of the negotiation. In fact, every negotiation ended after the sixth round of offers (as in Van Kleef et al., 2004). After the instructions and a comprehension check, sellers made their first offer.

First offers capture negotiator behavior immediately following the emotion induction. We postulate (and demonstrate in Study 3) that the effects of our movie clip induction dissipate quickly. In this study, participants knew the full range of possible offers. Therefore, we conceptualize first offers as a form of concessionary behavior.

### *Results and Discussion*

Supporting our prediction, participants in the anxiety condition made significantly lower first offers ( $M = \$11.77$ ,  $SD = 2.55$ ) than did participants in the neutral condition ( $M = \$12.73$ ,  $SD = 2.20$ ),  $t(147) = 2.45$ ,  $p = .015$ . This result is depicted in Figure 4. We did not find significant differences across conditions in subsequent rounds of the negotiation.

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Insert Figure 4 about here

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Participants in the anxiety condition made steeper initial concessions (i.e., lower first offers) than did participants in the neutral condition. This finding supports our prediction, and suggests that anxious negotiators are more eager than non-anxious negotiators to escape negotiations. We test this hypothesis directly in Study 3.

### Study 3

In Study 3, we shift our focus from negotiation to bargaining situations. Bargaining situations are abstracted versions of negotiations, and behavior in bargaining situations enables scholars to study behaviors that have important implications for both bargaining and negotiations. In this study, we examine the influence of anxiety on deliberate exit decisions in a bargaining game. Consistent with our thesis, we expect anxious individuals to exit bargaining situations earlier than individuals who are not anxious.

We study exit decisions in a modified version of the shrinking pie game. A substantial literature has studied bargaining behavior with shrinking pie games (e.g., Rubinstein, 1982; Weg, Rapoport & Felsenthal, 1990), including the shortest version of the shrinking pie game, the ultimatum game (e.g., Bolton & Zwick, 1995; Solnick & Schweitzer, 1999). In this study, we introduce a new variation of the shrinking pie game to study exit decisions in a bargaining context.

#### *Method*

Participants. One hundred seventy-nine students at a Northeastern university participated in the study for a \$10 show-up fee and the opportunity to make up to an additional \$23 based upon their decisions and the decisions of others in the experiment (92 female, 87 male). On average, participants were 20.1 years old ( $SD = 1.89$ ).

Design/Procedure. In this study, there were two within-subjects conditions (Anxiety v. Neutral). Participants read instructions, completed a comprehension check, watched the first video clip, completed the first bargaining task, watched a second video clip, and then completed a second bargaining task with a new partner. The order in which the video clips were presented was counterbalanced between subjects.

*Bargaining Task.* We developed a continuous version of the shrinking pie game (Rubinstein, 1982; Weg, Rapoport & Felsenthal, 1990). The original version of the shrinking pie game involves two players who make sequential moves to decide how to divide a “pie” or sum of money. In the first round, the first player proposes a division of the pie. The second player can either accept or reject this proposed split. If the second player rejects the proposed division, the pie shrinks, and the second player proposes a division of the reduced pie. The first player can then either accept or reject the new proposal. If the first player rejects the proposed division, the pie shrinks again, and the first player proposes another division of the reduced pie. This procedure continues until one of the parties accepts a proposed division or the game ends with an imposed payoff (e.g., \$0, \$0). This bargaining game has been called the “shrinking pie” game because the size of the sum of money shrinks at each stage of the game (Rubinstein, 1982).

The shrinking-pie game is very similar to the ultimatum game, which has been extensively studied to investigate bargaining behavior. In fact, the one-round version of the shrinking-pie game is equivalent to the ultimatum game. In the ultimatum game, the first player proposes a division of the pie, the second player either accepts or rejects the proposed division, and the game ends. Studies involving the ultimatum game have examined a number of negotiation-relevant topics, including fairness, deception, emotion, and even physical attractiveness (Blount & Larrick, 2000; Fehr & Schmidt, 1999; Moran & Schweitzer, 2008; Solnick & Schweitzer, 1999).

Like the ultimatum game, the shrinking-pie game measures an important aspect of bargaining and negotiation behavior: the decision to exit. The shrinking pie game is particularly well-suited for our investigation because it involves a relatively short interaction that follows an emotion induction. In this study, we used a movie-clip induction that may dissipate before the end of a lengthy or involved negotiation.

We develop a modified version of the shrinking-pie game. In our version, two players make simultaneous decisions to stay or to exit the bargaining game as the pie shrinks continuously over time. In our experiment, the pie starts at \$30 and decreases by fifty cents every second (until the pie equals \$0 after 60 seconds). Participants can stop the clock by choosing to exit any time during the 60 seconds.

The first player to exit stops the clock and determines the size of the pie. The first player to exit earns 25% of the pie and the second player to exit earns 75% of the pie. In this game, players choose exit decisions to balance two competing concerns;

early exit ensures a large pie size, but increases the likelihood of claiming a small share of the pie.

In this experiment, participants learned that they would be matched with another participant in the session to complete a computer-mediated bargaining task. We presented each participant with the payoff information depicted in Figure 5, an animation of how the pie decreases over time. We informed participants that their counterpart would see the same figure. We also told participants that if both participants waited until the end to exit, they would both earn \$0.

We informed participants that they would make their decisions simultaneously and independently; participants would not know when their counterpart decided to exit until after they had made their own decision. We also informed participants that they would make two rounds of decisions with a different counterpart each time. Finally, we informed participants that we would pay them based on one randomly selected round's outcome.

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Insert Figure 5 about here  
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### *Results and Discussion*

Supporting our prediction, participants in the Anxiety condition exited the bargaining situation earlier ( $M = 19.20$  seconds,  $SD = 15.17$ ) than did participants in the Neutral condition ( $M = 24.79$  seconds,  $SD = 17.60$ ). In a one-way repeated-measures analysis of variance (ANOVA) within subjects, we found that this relationship was significant,  $F(1, 177) = 38.21, p < .0001$ . We depict this effect in Figure 6. We found no

order effects for the sequence in which we presented the video clips (anxiety clip first v. neutral clip first).

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Insert Figure 6 about here  
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Results from Study 3 demonstrate that anxiety causes individuals to exit early. We believe that the decision to exit in this bargaining context is indicative of exit tendencies more broadly.

#### Study 4

In Study 4, we consider an important moderator of the influence of anxiety on exit behavior. Prior research has found that people tend to believe that they are below average in performing difficult skill-based tasks, such as negotiating (Moore & Cain, 2007). Other work, however, has found that negotiators with high self-efficacy may feel confident in their negotiating ability and insulate themselves from the prospect of negative outcomes. Negotiator self-efficacy is the belief in one's ability to perform well in a negotiation (Bandura, 1993; Sullivan, O'Connor, & Burris, 2006).

We postulate that individuals with high negotiator self-efficacy are less affected by anxiety than are negotiators with average negotiator self-efficacy. Specifically, we expect negotiators with high self-efficacy to persist in difficult negotiations, and we predict that anxiety influences negotiators with high self-efficacy less than it influences negotiators with moderate self-efficacy. In Study 4, we consider the role of negotiator self-efficacy in moderating the relationship between anxiety and early exit.

### *Method*

Participants. One hundred fifty-nine students at a Northeastern university participated in the study for a \$10 show-up fee and the opportunity to earn up to an additional \$23. On average, participants were 20.3 years old ( $SD = 2.01$ ).

Design. We randomly assigned participants to one of four conditions in a 2 (Anxiety v. Neutral) x 2 (High self-efficacy v. Average self-efficacy) design. We manipulated emotion (Anxiety v. Neutral) as we did in Studies 2 and 3 with video clips.

We manipulated negotiator self-efficacy by providing false performance feedback (High self-efficacy v. Average self-efficacy) on a “Negotiation Aptitude Test.” For this study, we developed the Negotiation Aptitude Test by creating ten questions to purportedly assess negotiation ability. We include the full Negotiation Aptitude Test in the Appendix. We introduced the aptitude test with the following text:

*Negotiations often involve balance. For example, some people are too aggressive and some are too passive. Some people focus too much on relationships and some focus too much on their own interests. Though there are often no perfect answers, the Negotiation Aptitude Test (N.A.T.) has been validated on a large U.S. based sample. For example, N.A.T. scores have been linked to a number of real-world outcomes such as starting salaries, home sale prices, and auto purchases.*

Following the introduction, participants answered 10 questions, such as the following:

*Imagine that you want to purchase a house that has a list price of \$500,000, but comparable prices for homes range from \$350,000 to \$450,000. You can afford to pay \$400,000. The housing market is rising (house prices are increasing), and there are three other buyers interested in the same house. Of the following options, which is best?*

- a. Wait for another buyer to make an initial offer.*
- b. Offer \$400K before the other buyers make offers.*
- c. Offer \$350K before the other buyers make offers.*
- d. Look for a different house that has fewer interested buyers.*

After participants completed the Negotiation Aptitude Test, we provided them with false performance feedback. In the High self-efficacy condition, we informed participants that they had scored in the 96<sup>th</sup> percentile. In the Average self-efficacy condition, we informed participants that they had scored in the 47<sup>th</sup> percentile.

*Pilot Study.* To assess the effectiveness of the self-efficacy induction, we conducted a manipulation check with a non-overlapping sample of 107 participants who completed the Negotiation Aptitude Test as part of a series of studies they completed in exchange for a \$10 show-up fee.

We randomly assigned participants to one of two conditions (High self-efficacy v. Average self-efficacy). Participants completed the Negotiation Aptitude Test, received false performance feedback, and then completed a ten-item measure of negotiator self-efficacy (Sullivan, B., O'Connor, K., & Burris, E., 2005). The ten items included statements such as “I am certain that I can persuade the other negotiator to make most of the concessions” and “I feel confident in my ability to negotiate effectively” (rated on a 5-point scale).

We compared negotiator self-efficacy across conditions. After our manipulation, participants' mean level of negotiator self-efficacy was significantly higher in the High condition ( $M = 3.60$ ,  $SD = .53$ ) than in the Average condition ( $M = 3.18$ ,  $SD = .55$ ),  $t(105) = 4.02$ ,  $p < .001$ .

Procedure. First, participants completed the Negotiation Aptitude Test and received false performance feedback. Second, participants read the instructions for the continuous shrinking-pie bargaining task (as in Study 3) and completed a



comprehension check. Next, participants watched one of two emotion-inducing video clips, and then made exit decisions in the continuous shrinking-pie bargaining task.

### *Results and Discussion*

We found that self-efficacy moderates the influence of anxiety on exit decisions. We conducted a 2 (Anxiety v. Neutral) x 2 (High self-efficacy v. Average self-efficacy) analysis of variance (ANOVA) on exit decisions. We found two significant main effects and a significant interaction. As before, participants in the anxiety condition exited earlier than did participants in the neutral condition,  $F(1, 155) = 4.01, p = .047$ . In addition, participants in the low self-efficacy condition exited earlier than did participants in the high self-efficacy condition,  $F(1, 155) = 14.83, p = .0002$ . Interestingly, we found a significant interaction between anxiety and self-efficacy,  $F(1, 155) = 4.29, p = .04$ . Participants in the Average self-efficacy condition exhibit the same pattern of results we found in Study 3. However, participant in the High self-efficacy condition were not influenced by anxiety. We depict this pattern of results in Figure 7.

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Insert Figure 7 about here  
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### General Discussion

For many people, the prospect of negotiating induces anxiety. In fact, anxiety may be the most pervasive negotiator emotion. We demonstrate that anxiety significantly harms negotiator behavior. Compared to negotiators in a neutral emotional state, anxious negotiators lower their expectations, make lower first offers, respond to counteroffers more quickly, and exit negotiations earlier—behaviors that are not

explained by other negatively-valenced emotions. In our studies, these behaviors caused anxious negotiators to attain worse outcomes. We also found that negotiator self-efficacy moderates the effects of anxiety on exit behavior. Individuals with high negotiator self-efficacy are less affected by the harmful effects of anxiety.

In our studies, we induced incidental anxiety. This approach afforded us experimental control; every participant experienced the same stimuli, and there were no normative reasons for incidental anxiety to influence negotiation behavior. As a result, our studies offer a conservative test of the influence of anxiety on negotiations. In addition to experiencing incidental anxiety, negotiators are likely to experience directed anxiety. The prospect of a difficult negotiation, high stakes, or an abrasive counterpart can trigger anxiety. Future work should investigate different triggers and the effects of directed anxiety on negotiator behavior.

Our findings establish an important link between anxiety and self-efficacy. Future work remains, however, with respect to understanding negotiator self-efficacy itself. Prior research has measured negotiator self-efficacy and linked self-efficacy with tactics and outcomes (Sullivan, O'Connor, & Burris, 2005), but no prior work has induced negotiator self-efficacy. In this paper, we introduce a tool for inducing negotiator self-efficacy (see Appendix), and we find that negotiator self-efficacy is both labile and consequential. In Study 4, participants who received false performance feedback indicating that they were effective negotiators were more tenacious and made later exit decisions than did negotiators who received false performance feedback indicating that they were average negotiators.

Prescriptively, our findings suggest that negotiators may improve their performance by curtailing their experience of anxiety and by boosting their perceptions of negotiation self-efficacy. For example, negotiation courses as well as negotiation simulations and training more generally may reduce anxiety and improve negotiator performance by boosting negotiator self-efficacy and by making negotiation situations routine (i.e., less novel) and hence less anxiety provoking. Future work should study these relationships and even consider the broader implication that self-affirmation in general may boost generalized self-efficacy and improve negotiation performance.

Another possible prescription for curtailing the influence of anxiety is to heighten self-awareness of anxiety. Prior work has found that making people aware of their emotional state enables people to correct for the influence of emotions on their judgment (Schwartz, 1990). Perhaps acknowledging feelings of anxiety could serve as a coping mechanism.

Our findings demonstrate that anxiety promotes flight behavior in negotiation. Future work should consider different types of flight. For example, there may be qualitative differences between volitional exit (i.e., deciding to leave prematurely) and an accelerated process (i.e., faster response times). In negotiations, volitional exit may yield impasses, whereas an accelerated process may yield poor agreements. In some cases, incentives may counteract the detrimental effects of anxiety on exit behavior. Quite possibly, even anxious individuals may be persuaded to persist until they reach specific goals, and future work should explore the interplay between incentives and different types of exit. For example, in Study 1, the expected value of exit was much

lower than the expected value of reaching an agreement. In this case, few negotiators exited with an impasse. Instead, anxious negotiators accelerated their process by lowering expectations, responding more quickly to counteroffers, and making steeper concessions.

Quite possibly, a strategic negotiator could induce anxiety in a counterpart to extract concessions. Even non-strategic negotiators may induce anxiety in a counterpart, either accidentally or via contagion. Prior work has found that emotions are easily transmitted across individuals (e.g., Barsade, 2002; Hatfield, Cacioppo, Rapson, 1994), and we conjecture that anxiety is highly contagious. Future work should explore issues such as how people perceive anxiety in others and how anxiety spreads between team members and negotiators.

A number of individual differences may moderate the relationship between anxiety and negotiator behavior. For example, risk attitude impacts negotiator behavior (Bottom, 1998), and differences in risk attitudes may influence the amount of anxiety negotiators experience in uncertain environments. Neuroticism may also matter. Neuroticism is a personality trait associated with the tendency to arouse quickly, to inhibit slowly, and to appraise events as stressful (Costa & McCrae, 1992). Individuals high in neuroticism may be particularly susceptible to anxiety triggers and the influence of anxiety in negotiation.

We identify an important link between the anxiety individuals experience and negotiation behavior. The association between anxiety and negotiations we measured in our pilot survey, however, was expected anxiety. Though prior work has found that

people sometimes mispredict their affective experiences (Robinson & Clore, 2002), we postulate that the experience of anxiety is a fundamental aspect of many negotiations that merits additional research. For example, future work should study how different aspects of negotiations induce anxiety, how the magnitude of anxiety may change behavior, how anxiety influences information exchange, how anxiety influences negotiator satisfaction, how anxiety influences decisions to enter negotiations, and how anxiety influences patterns of concession.

In addition to describing the importance of anxiety as an anticipatory emotion, our findings highlight the importance of excitement in negotiations. Future work should focus on the influence of excitement in negotiations and explore the interplay between anxiety, excitement, and physiological arousal. Some individuals may conceptualize a negotiation as an anxiety-inducing threat, while others may conceptualize the same situation as an exciting challenge. Similarly, though we did not detect significant gender differences in our studies, it is possible that men and women may perceive the same opportunities to negotiate quite differently (see Small et al., 2007).

Our findings also relate to the literature on alcohol in negotiations. Many negotiators consume alcohol prior to or during negotiations (Schweitzer & Kerr, 2000). Alcohol consumption directly influences negotiator behavior (Schweitzer & Gomberg, 2001), and future work should explore the role of anxiety in both motivating negotiators to consume alcohol as well as alcohol moderating the relationship between anxiety and negotiator behavior.

Finally, although our studies focused on the harmful effects of anxiety, it is possible that mild amounts of anxiety might actually improve negotiator performance. The magnitude of anxiety may have profound effects on behavior. For example, the Yerkes-Dodson Effect suggests a curvilinear relationship between arousal (i.e., stress) and performance. Though very low or very high levels of arousal may be debilitating, a moderate level of arousal may improve performance on difficult tasks like attention, memory, and problem-solving (e.g., Anderson, Revelle, Lynch, 1989; Lupien et al., 2007; Yerkes & Dodson, 1908). Perhaps moderate amounts of anxiety can increase focus or trigger defensive pessimism (Norem & Chang, 2002). As a result, some anticipatory anxiety may cause negotiators to prepare more thoroughly. Ultimately, though we identify harmful effects of anxiety for negotiators, mild amounts of anxiety may actually help Nervous Nelly negotiate.

## References

- Adler, R., Rosen, B., & Silverstein, E. (1998) Emotions in negotiation: How to manage fear and anger. *Negotiation Journal*, April 1998, 161-179.
- Allred, K., Mallozzi, J., Matsui, F., & Raia, C. (1997). The influence of anger and compassion on negotiation performance. *Organizational Behavior and Human Decision Processes*, 70, 3, 175-187.
- Anderson, K., Revelle, W., Lynch, M. (1989). Caffeine, impulsivity, and memory scanning: A comparison of two explanations for the Yerkes-Dodson Effect, *Motivation and Emotion*, 13, 1-20.
- Babcock, L., Gelfand, M., Small, D., & Stayn, H. (2006). Gender differences in the propensity to initiate negotiations. In D. De Cremer, M. Zeelenberg, & J. K. Murnighan (Eds.), *Social psychology and economics* (pp. 239–262). Mahwah, NJ: Erlbaum.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28, 2, 117-148.
- Baron, R., Fortin, S., Frei, R., Hauver, L. & Shack, M. (1990). Reducing organizational conflict: The role of socially-induced positive affect. *International Journal of Conflict Management*, 1, 133-152.
- Barry, B. (2008). Negotiator affect: The state of the art (and the science). *Group Decision and Negotiation*, 17, 97-105.
- Barry, B. & Oliver, R. (1996). Affect in dyadic negotiation: A model and propositions. *Organizational Behavior and Human Decision Processes*, 67, 2, 127-143.

- Barsade, S. (2002). The ripple effect: Emotional contagion and its influence on group behavior. *Administrative Science Quarterly*, 47, 4, 644-675.
- Bazerman, M., Curhan, J., Moore, D., & Valley, K. (2000) Negotiation. *Annual Review of Psychology*, 51, 279-314.
- Blount, S. & Larrick, R. (2000). Framing the game: Examining frame choice in bargaining. *Organizational Behavior and Human Decision Processes*, 81, 43-71.
- Bolton, G. & Zwick, R. (1995). Anonymity versus punishment in ultimatum bargaining. *Games and Economic Behavior*, 10, 95-121.
- Bottom, W. (1998). Negotiator risk: Sources of uncertainty and the impact of reference points on negotiated settlements. *Organizational Behavior and Human Decision Process*, 76, 89-112.
- Brophy, J. (1986). Teachers' influences on student achievement. *American Psychologist*.
- Brown, S. & Volgsten, U. (2006). *Music and manipulation: On the social uses and social control of music*. Berghahn Books: New York.
- Costa, P. & McCrae, R. (1992). *Revised NEO Personality Inventory (NEOPI-R) and Neo Five-Factor Inventory (NEO-FFI)*. Psychological Assessment Resources, Florida.
- De Dreu, C. & Van Lange, P. (1995) The impact of social value orientation on negotiator behavior and cognition. *Personality and Social Psychology Bulletin*, 21, 1178-1188.
- Deutsch, M. & Krauss, R. (1962). Studies of interpersonal bargaining, *Journal of Conflict Resolution*, 6, 52-76.



- Dixit, A. & Nalebuff, B. (1991). *Thinking Strategically: The Competitive Edge in Business, Politics, and Everyday Life*. W.W. Norton, New York.
- Dunn, J. & Schweitzer, M. (2005). Feeling and believing: The influence of emotion on trust. *Journal of Personality and Social Psychology*, 88, 736-748.
- Endler, N. (1983). Interactionism: A personality model, but not yet a theory. In M. M. Page (Ed.), *Nebraska Symposium on Motivation 1982: Personality – Current theory and research*, Lincoln, NE: University of Nebraska Press.
- Fehr, E. & Schmidt, E. (1999). A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, 114, 817-868.
- Forgas, J. (1998). On feeling good and getting your way: Mood effects on negotiator cognition and bargaining strategies. *Journal of Personality and Social Psychology*, 74, 3, 565-577.
- Fredrickson, B. L. & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19 (3), 313-332.
- Galinsky, A., Seiden, V., Kim, P., & Medvec, V. (2002). The dissatisfaction of having your first offer accepted: The role of counterfactual thinking in negotiations. *Personality and Social Psychology Bulletin*, 28, 271-283.
- Giebels, E., De Dreu, C.K.W., & Van de Vliert, E. (2000). Interdependence in negotiation: Effects of exit options and social motive on distributive and integrative negotiation. *European Journal of Social Psychology*, 30, 255-272.

- Gray, J. (1991). Fear, panic, and anxiety: What's in a name? *Psychological Inquiry*, 2, 1, 77-78.
- Greenhalgh, L. (2002). Managing anxiety in negotiated decision-making. Working Paper, Dartmouth.
- Hatfield, E., Cacioppo, J., & Rapson, R. (1994). *Emotional Contagion*. Cambridge, MA: Cambridge University Press.
- 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.
- Lenta, R., Browna, S., & Larkina, K. (1984). Relation of self-efficacy expectations to academic achievement and persistence, *Journal of Counseling Psychology*, 31(3), 356-362.
- Lerner, J., Small, D., & Loewenstein, G. (2004). Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychological Science*, 15, 337-341.
- Liebert, R., Smith, W. Hill, J., & Keiffer, M. (1968). The effects of information and magnitude of initial offer on interpersonal negotiation. *Journal of Experimental Social Psychology*, 4, 431-441.
- Lupien, S., Maheu, F., Tu, M., Fiocco, Al, Schramek, T. (2007). The effects of stress and stress hormones on human cognition: Implications for the field of brain and cognition. *Brain and Cognition*, 65, 209-237.

- Marks, I. & Nesse, R. (1994). "Fear and fitness: An evolutionary analysis of anxiety" in *The Maladapted Mind*, New York, NY: Elsevier Science Inc., pp. 57-60.
- Moore, D. & Cain, D. (2007). Overconfidence and underconfidence: when and why people underestimate (and overestimate) the competition. *Organizational Behavior and Human Decision Processes*, 103, 197-213.
- Moran, S. & Schweitzer, M. (2008). When better is worse: Envy and the use of deception. *Negotiation and Conflict Management Research*, 1, 3-29.
- Neale, M. & Bazerman, M. (1991). *Cognition and rationality in negotiation*. New York: Free Press.
- Norem, J. K., & Chang, E. C. 2002. The positive psychology of negative thinking. *Journal of Clinical Psychology*, 58: 993-1001.
- O'Connor, K., Arnold, J., & Maurizio, A. (in press). The prospect of negotiating: Stress, cognitive appraisal, and performance. *Journal of Experimental Social Psychology*.
- Pham, M. (1998). Representativeness, relevance, and the use of feelings in decision making. *Journal of Consumer Behavior*. 25, 144-159.
- Pillutla, M. & Murnighan, J. (1996). Unfairness, anger, and spite: emotional rejections of ultimatum offers. *Organizational Behavior and Human Decision Processes*, 68, 208-224.
- Pruitt, D. & Carnevale, P. (1993). *Negotiation in Social Conflict*. Buckingham, England: Open University Press.

- 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.
- Rapoport, A., Budescu, D., Erev, I., & Zwick, R. (1998). *Games and Human Behavior*. Mahwah, NJ, USA: Lawrence Erlbaum Associates, Inc.
- Robinson, M. & Clore, G. (2002) Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, 128, 934-960.
- Rubinstein, A. (1982). Perfect equilibrium in a bargaining model. *Econometrica*, 50, 97-109.
- Russell, J. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 6, 1161-1178.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. Higgins & R. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior*. New York: Guilford Press.
- Schweitzer, M. & Gomberg, L. (2001). The impact of alcohol on negotiator behavior: Experimental evidence. *Journal of Applied Social Psychology*, 31(10), 2095-2126.
- Schweitzer, M., & Kerr, J. (2000). Bargaining under the influence: The role of alcohol in negotiations. *Academy of Management Executive*, 14(2), 47-57.

- Small, D., Gelfand, M., Babcock, L., & Gettman, H. (2007). Who goes to the bargaining table? The influence of gender and framing on the initiation of negotiation. *Journal of Personality and Social Psychology*, *93*(4), 600-613.
- Smith, C. & Ellsworth, P. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, *48*, 4, 813-838.
- Solnick, S. & Schweitzer, M. (1999). The influence of physical attractiveness and gender on ultimatum game decisions. *Organizational Behavior and Human Decision Processes*, *79*, 199-215.
- Spielberger, C. (1966). The effects of anxiety on complex learning and academic achievement. In Spielberger (Ed.), *Anxiety and Behavior* (pp. 361-398). New York: Academic Press.
- Steinel, W., Van Kleef, G., & Harinck, F. (2008). Are you talking to me?! Separating the people from the problem when expressing emotions in negotiations. *Journal of Experimental social Psychology*, *44*, 362-369.
- Sullivan, B., O'Connor, K., & Burris, E. (2005). Negotiator confidence: the impact of self-efficacy on tactics and outcomes. *Journal of Experimental Social Psychology*, *42*, 567-581.
- Van Beest, Van Kleef, & Van Dijk, (2008). Get angry, get out: The interpersonal effects of anger communication in multiparty negotiation. *Journal of Experimental Social Psychology*, *44*, 994-1002.

- Van Dijk, E., Van Kleef, G., Steinel, W. & Van Beest, I. (2008). A social functional approach to emotions in bargaining: when communicating anger pays and when it backfires. *Journal of Personality and social Psychology*, *94*, 600-614.
- Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004). The interpersonal effects of anger and happiness in negotiations. *Journal of Personality and Social Psychology*, *86*, 57-76.
- Van Kleef, G., 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*, 124-142.
- Weg, E., Rapoport, A., & Felsenthal, D. (1990). Two-person bargaining behavior in fixed discounting factors games with infinite horizon, *Games and Economic Behavior*, *2*, 76-95.
- Wheeler, M. (2004). Anxious moments: Openings in negotiations. *Negotiation Journal*, *April 2004*, 153-169.
- Yerkes, R. & Dodson, J. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of comparative Neurology and Psychology*, *18*, 459-482.
- Yukl, G. (1974). Effects of situational variables and opponent concessions on a bargainer's perception, aspirations, and concessions. *Journal of Personality and Social Psychology*, *29*, 227-236.

## Appendix

## Negotiation Aptitude Test (to manipulate negotiator self-efficacy)

1. Imagine that you want to purchase a house that has a list price of \$500,000, but comparable prices for homes range from \$350,000 to \$450,000. You can afford to pay \$400,000. The housing market is rising (house prices are increasing), and there are three other buyers interested in the same house. Of the following options, which is best?
  - a. Wait for another buyer to make an initial offer.
  - b. Offer \$400,000 before the other buyers make offers.
  - c. Offer \$350,000 before the other buyers make offers.
  - d. Look for a different house that has fewer interested buyers.
  
2. Imagine that you want to buy a house that has a list price of \$200,000, but comparable prices for homes range from \$150,000 to \$250,000. You can afford to pay \$300,000. The housing market is falling (house prices are decreasing), and there are three other buyers interested in the same house. Of the following options, which is best?
  - a. Wait for another buyer to make an initial offer.
  - b. Make a full-price offer of \$200,000 before the other buyers make offers.
  - c. Offer \$150,000 before the other buyers make offers.
  - d. Look for a different house that has fewer interested buyers.
  
3. Imagine you have been offered a new job. The company has offered you a salary of \$70,000/year. New hires with similar experience, education, and skills are paid \$75,000/year on average. If you do not take the new job, you will go back on the job market, and the unemployment rate is 10% (very high). You have no other outside options. Of the following choices, which is best?
  - a. Tell the company you will only accept the job for \$80,000/year.
  - b. Tell the company you will only accept the job for \$75,000/year.
  - c. Accept the offer at \$70,000/year.
  - d. Reject the offer and go back on the job market.
  
4. Imagine you have been offered a new job. The company has offered you a salary of \$70,000/year. New hires with similar experience, background, education, and skills are paid \$75,000/year on average. If you do not take the new job, you will go back on the job market, and the unemployment rate is 1% (very low). You have no other outside options. Of the following choices, which is best?
  - a. Tell the company you will only accept the job for \$80,000/year.
  - b. Tell the company you will only accept the job for \$75,000/year.
  - c. Accept the offer at \$70,000/year.
  - d. Reject the offer and go back on the job market.
  
5. Imagine that you are buying a new car. You have found the exact car that you want, and the dealer has it in stock. The list price is \$35,000, and from your research the dealer

invoice is \$28,000. You really like this car, and you would be willing to pay up to \$35,000 for it. You suspect that other buyers are interested in this same car and that the dealership is not very eager to sell this car. What amount would you make for your first offer?

- a. \$28K
- b. \$30K
- c. \$33K
- d. Make the dealership offer the next price.

6. Imagine that you are buying a new car. You have found the exact car that you want, and the dealer has it in stock. The list price is \$35,000, and from your research the dealer invoice is \$28,000. You really like this car, and you would be willing to pay up to \$35,000 for it. You suspect that other buyers are not interested in this same car and that the dealership is very eager to sell this car. What amount would you make for your first offer?

- a. \$28K
- b. \$30K
- c. \$33K
- d. Make the dealership offer the next price.

7. Imagine that you are organizing a large party. You are working with a caterer for a sit-down dinner for 200 people. The caterer is charging you \$100 per person and asks you to commit to the exact number of guests. This caterer is the best in town. You can pay \$20,000, but you would prefer to pay less. How would you respond to this caterer?

- a. Pay full price to ensure good service.
- b. Offer the caterer \$80 per person and commit to 200 people.
- c. Offer the caterer \$100 per person, but insist on paying for only the guests who show up.
- d. Shop for alternative caterers to use as competitive leverage.

8. Imagine that you are organizing a large party. You are working with a caterer for a sit-down dinner for 200 people. The caterer is charging you \$100 per person and asks you to commit to the exact number of guests. This caterer is NOT the best in town. You can pay \$20,000, but you would prefer to pay less. How would you respond to this caterer?

- a. Pay full price to ensure good service.
- b. Offer the caterer \$80 per person and commit to 200 people.
- c. Offer the caterer \$100 per person, but insist on paying for only the guests who show up.
- d. Shop for alternative caterers to use as competitive leverage.

9. Imagine you are getting married to the man or woman of your dreams. Your fiancé wants you to sign a prenuptial agreement before you wed because s/he is fairly wealthy. In the case of divorce, the prenuptial offer is to split your wealth and assets 80% for your



spouse, 20% for you because that is the ratio of your current wealth. What should you do?

- a. Agree to sign the prenuptial agreement with the 80/20 division.
- b. Agree to sign the prenuptial agreement only with a 50/50 division of wealth and assets to be equitable.
- c. Consult with a lawyer and then make a counter-offer.
- d. Refuse to sign the prenuptial agreement because marriage is about love, not material wealth.

10. To what extent are the following statements true?

- a. Almost always true
- b. Often true
- c. Rarely true

-In general, it is better to live with some conflict.

-Not all conflict needs to be managed.

-In reality, most things in life are negotiable.

-Many people are willing to provide the same goods or services for a lower price.

-If you offer someone a low price, they are likely to provide worse service or get insulted.

-When people say that a price is their absolute lowest price, they are telling the truth.

-Once people have their mind set on a certain deal, you cannot change their mind.

## Tables

Table 1.

*Mean emotion ratings during music manipulation check (Study 1).*

		Happy	Sad	Anxious	Neutral	Angry
Anxious Music	Mean	1.94	1.18	2.17	1.85	1.27
	SD	(0.37)	(0.46)	(0.81)	(1.07)	(1.12)
Neutral Music	Mean	2.02	1.24	1.16	3.47	1.07
	SD	(0.82)	(0.71)	(0.29)	(1.16)	(0.53)

*Note:* Ratings were on a 5-point scale

Table 2.

*Buyer Payoff Chart (Study 1).*

<u>Price of Phones</u>		<u>Warranty Period</u>		<u>Service Contract</u>	
<i>Price</i>	<i>Payoff</i>	<i>Warranty</i>	<i>Payoff</i>	<i>Service</i>	<i>Payoff</i>
\$150	\$0.00	1 month	\$0.00	1 month	\$0.00
\$145	\$1.00	2 months	\$0.60	2 months	\$0.30
\$140	\$2.00	3 months	\$1.20	3 months	\$0.60
\$135	\$3.00	4 months	\$1.80	4 months	\$0.90
\$130	\$4.00	5 months	\$2.40	5 months	\$1.20
\$125	\$5.00	6 months	\$3.00	6 months	\$1.50
\$120	\$6.00	7 months	\$3.60	7 months	\$1.80
\$115	\$7.00	8 months	\$4.20	8 months	\$2.10
\$110	\$8.00	9 months	\$4.80	9 months	\$2.40

*Seller Payoff Chart (Studies 1-4).*

<u>Price of Phones</u>		<u>Warranty Period</u>		<u>Service Contract</u>	
<i>Price</i>	<i>Payoff</i>	<i>Warranty</i>	<i>Payoff</i>	<i>Service</i>	<i>Payoff</i>
\$150	\$8.00	1 month	\$2.40	1 month	\$4.80
\$145	\$7.00	2 months	\$2.10	2 months	\$4.20
\$140	\$6.00	3 months	\$1.80	3 months	\$3.60
\$135	\$5.00	4 months	\$1.50	4 months	\$3.00
\$130	\$4.00	5 months	\$1.20	5 months	\$2.40
\$125	\$3.00	6 months	\$ .90	6 months	\$1.80
\$120	\$2.00	7 months	\$ .60	7 months	\$1.20
\$115	\$1.00	8 months	\$ .30	8 months	\$ .60
\$110	\$0.00	9 months	\$0.00	9 months	\$0.00

Table 3.

*Mean Negotiated Outcomes (Study 1).*

Buyer Emotion	Seller Emotion	Buyer Profit	Seller Profit	Dyadic Profit	# of Dyads
Anxious	Anxious	\$7.52 (\$1.56)	\$7.35 (\$1.88)	\$14.87	18
Neutral	Anxious	\$8.18 (\$1.47)	\$6.99 (\$2.04)	\$15.17	14
Anxious	Neutral	\$6.60 (\$2.09)	\$8.38 (\$2.23)	\$14.98	20
Neutral	Neutral	\$7.94 (\$1.67)	\$7.81 (\$1.06)	\$15.75	15

*Note:* Possible individual profit [\$0, \$15.20]. Possible dyadic profit [\$12.80, \$17.60].

Figures

Figure 1. *Emotion ratings before negotiating for a higher salary (Pilot Survey)*

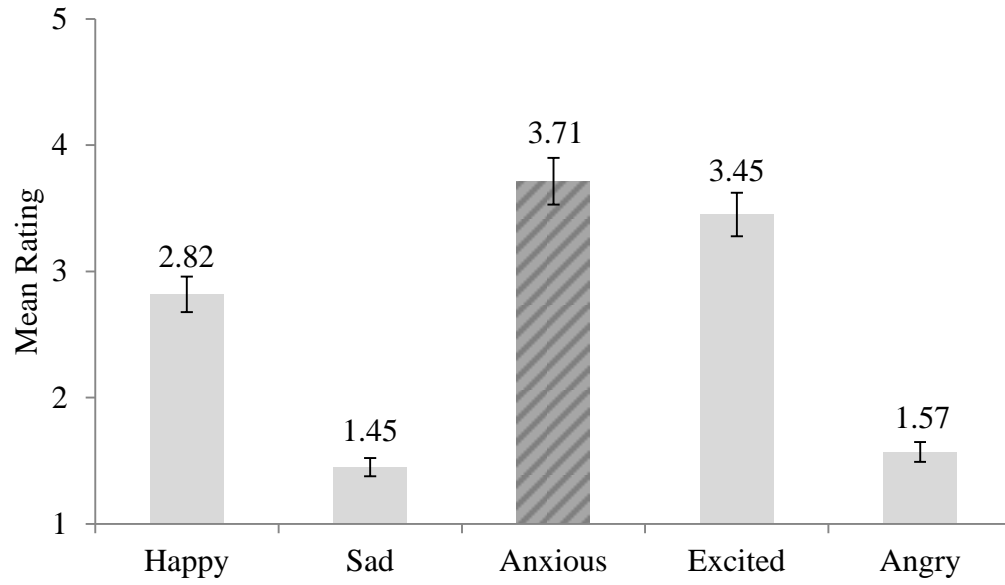


Figure 2. *Emotion ratings before negotiating over the price of a car (Pilot Survey)*

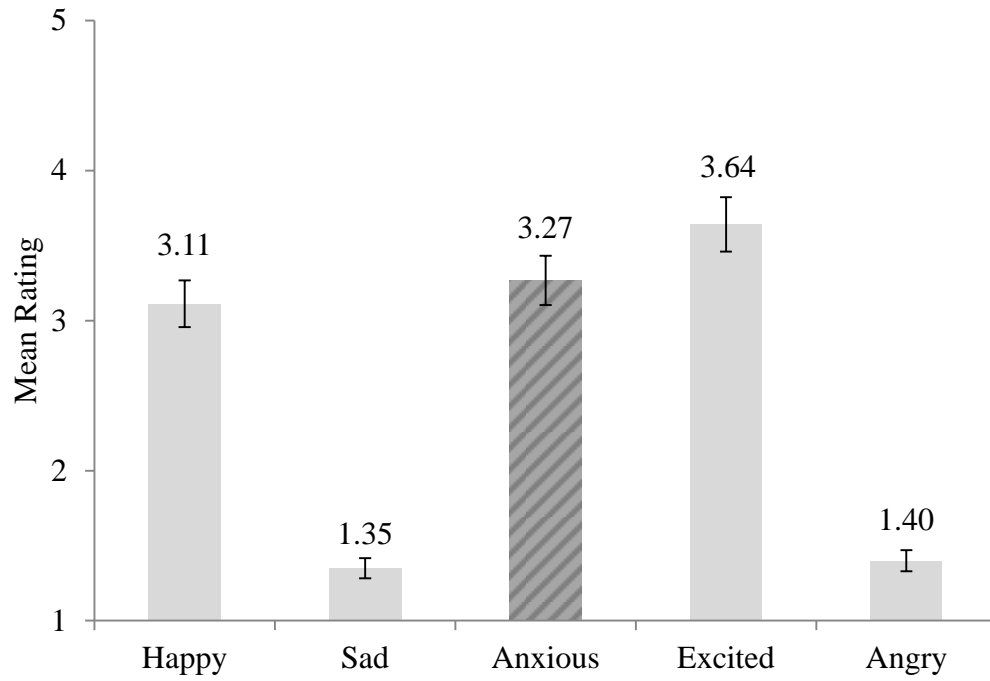


Figure 3. *The effect of anxiety on aspirations, expectations, and first offers (Study 1)*

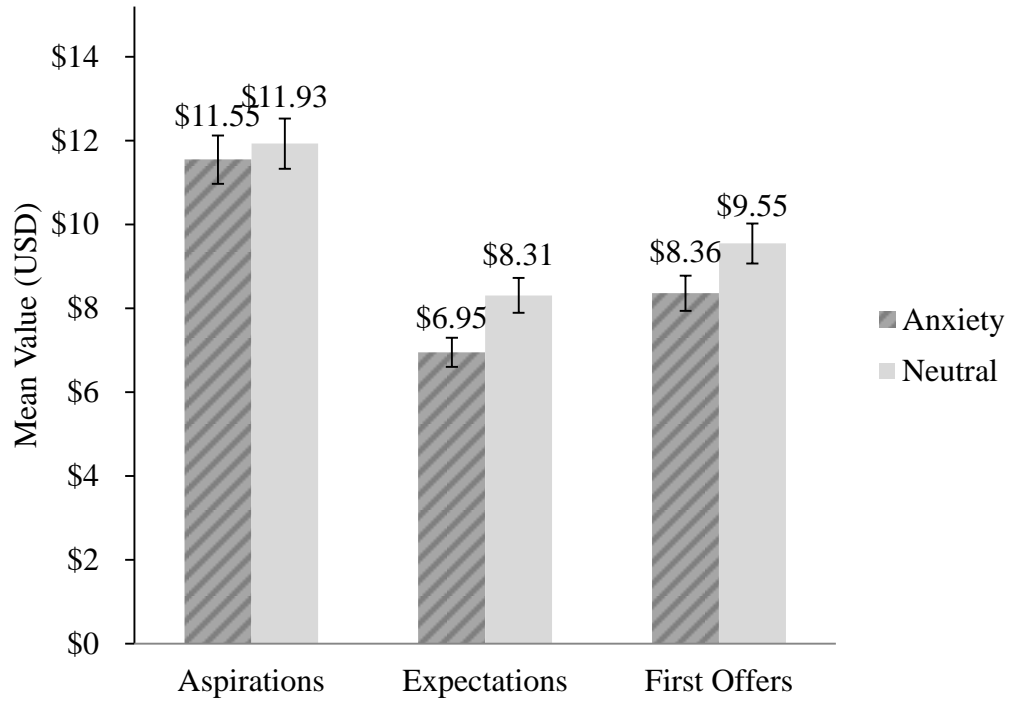


Figure 4. *The effect of anxiety on first offers (Study 2)*

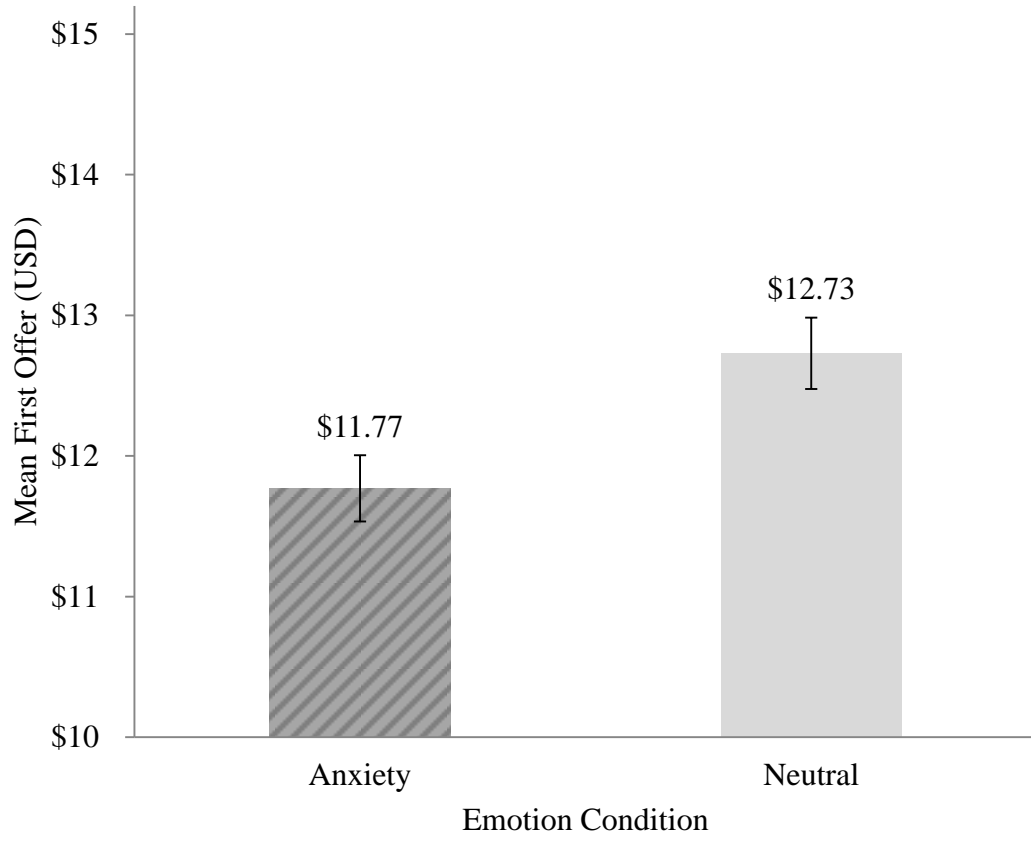
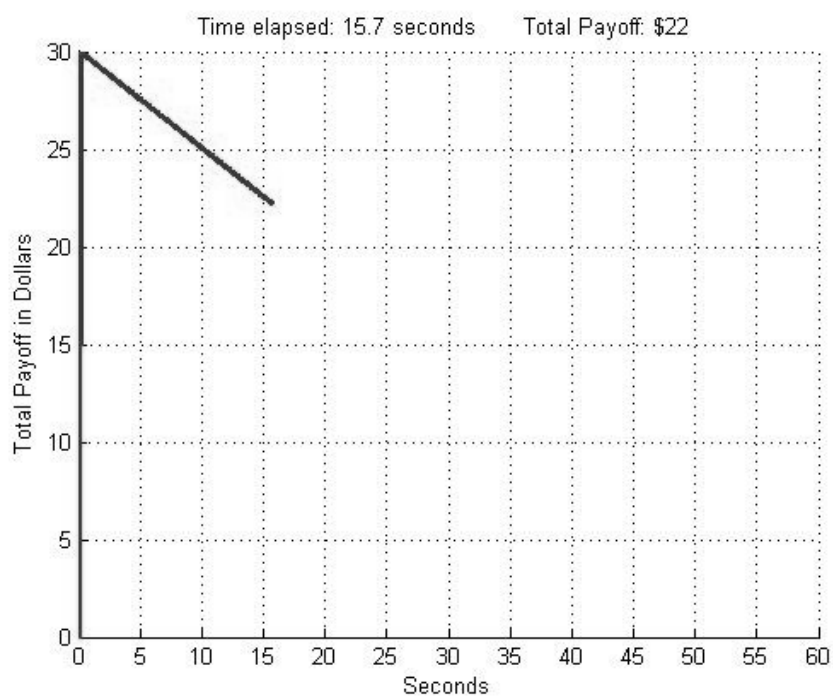




Figure 5. *Continuous shrinking-pie bargaining task payoff function (Studies 3-4)*



*Note:* This is a screen-shot of the payoff animation displayed to participants

Figure 6. *The effect of anxiety on exit decisions (Study 3)*

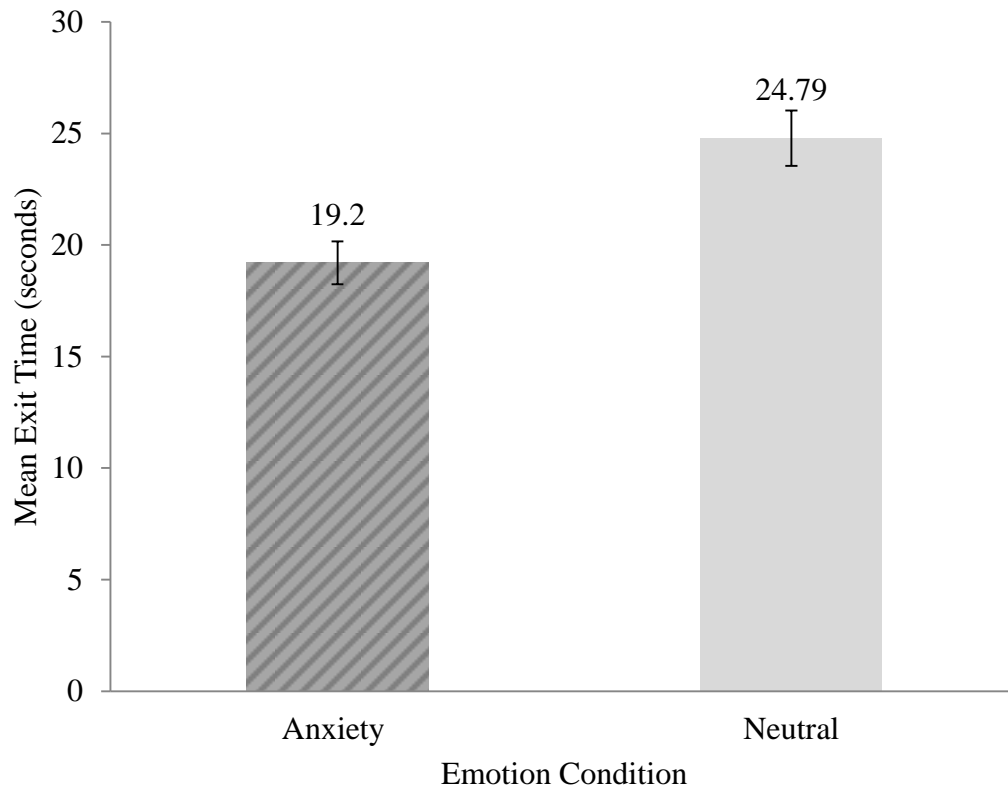
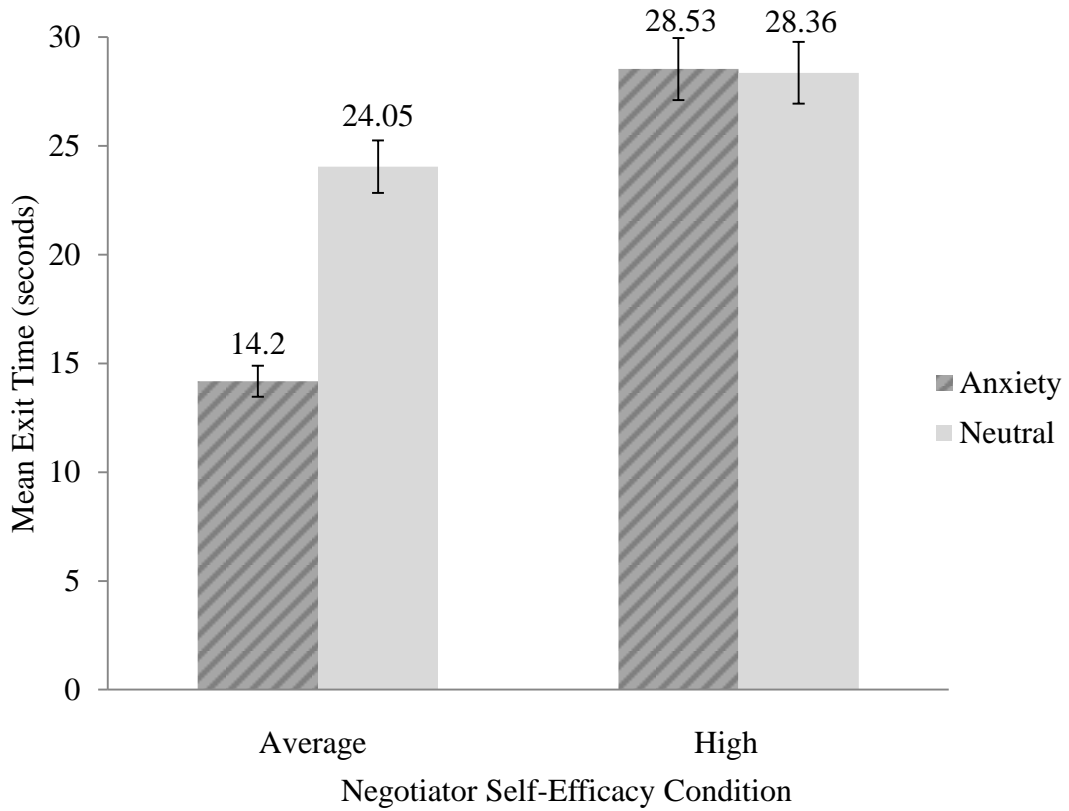


Figure 7. *The effects of anxiety and negotiator self-efficacy on exit decisions (Study 4)*



## CHAPTER 2.

ANXIETY, ADVICE, AND THE ABILITY TO DISCERN:  
FEELING ANXIOUS MOTIVATES INDIVIDUALS TO SEEK AND USE ADVICE

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## ABSTRACT

Across eight experiments, we describe the influence of anxiety on advice seeking and advice taking. We find that anxious individuals are more likely to seek and rely on advice than are those in a neutral emotional state (Experiment 1), but this pattern of results does not generalize to other negatively-valenced emotions (Experiment 2). The relationships between anxiety and advice seeking and anxiety and advice taking are mediated by self-confidence; anxiety lowers self-confidence, which increases advice seeking and reliance upon advice (Experiment 3). Though anxiety also impairs information processing, impaired information processing does not mediate the relationship between anxiety and advice taking (Experiment 4). Finally, we find that anxious individuals fail to discriminate between good and bad advice (Experiment 5a-c), and between advice from advisors with and without a conflict of interest (Experiment 6).

## ANXIETY, ADVICE, AND THE ABILITY TO DISCERN:

### FEELING ANXIOUS MOTIVATES INDIVIDUALS TO SEEK AND USE ADVICE

When individuals face important decisions, such as how to invest savings or how to choose a course of medical treatment, they often feel anxious and seek advice from colleagues, friends, and experts. Anxiety is “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). Prior research has documented harmful effects of anxiety on decision making. For example, anxiety impairs the ability to process information (e.g., Eysenck, 1992; Ganzer, 1968; Sengupta & Johar, 2001; Zatz & Chassin, 1985).

In addition to experiencing anxiety, when making important decisions, people frequently seek advice from colleagues, friends, and experts. Drawing on previous research on the role of anxiety in decision making, we investigate how anxiety influences advice seeking and advice taking. Departing from previous work, we propose that anxiety harms individuals’ confidence in their ability to make good decisions. As a result, individuals with impaired self-confidence are motivated to seek advice from others and rely on it, even when the advice they receive is bad. This line of research advances our understanding of how anxiety influences decision making by considering the *motivational*, in addition to the cognitive, consequences of experiencing anxiety.

#### Advice

We define advice as any relevant ideas and judgments that are offered to a decision maker. Our definition of advice includes contexts in which advisors are

disinterested in the advisee's decision and outcome as well as contexts in which advisors are invested in the advisee's decision and outcome, as in the case of helping behavior and persuasion.

In general, the process of seeking and receiving advice from others can expose an advisee to a conflict between their initial judgment and the advice they receive (Yaniv & Kleinberger, 2000). For example, a homebuyer may plan to make an offer of \$400,000 to a seller. Before the buyer makes an offer, however, she may consult her realtor, who may advise her to offer \$440,000 to avoid insulting the seller. Although little prior research has explored the advice-seeking process, a growing literature has investigated advice taking. This work identifies three factors that influence how receptive individuals are to advice.

First, characteristics of the advisor matter. Individuals weight advice more heavily when advisors are more experienced or more knowledgeable than the decision makers themselves (Goldsmith & Fitch, 1997; Feng & MacGeorge, 2006; Harvey & Fischer, 1997; Sniezek, Schrah, & Dalal, 2004; Yaniv, 2004; Yaniv & Kleinberger, 2000; Yaniv & Milyavsky, 2007). People are similarly more likely to weight advice when advisors express confidence in the quality of their advice (Sniezek & Buckley, 1995; Sniezek & Van Swol, 2001; Tost, Gino, & Larrick, in press; Van Swol & Sniezek, 2005; Yaniv, 1997).

Second, characteristics of the decision task moderate how receptive individuals are to advice. For example, individuals weigh advice more heavily when the task is

difficult than when it is easy (Gino & Moore, 2007) and when advice is costly to obtain than when it is free (Gino, 2008; Patt, Bowles, & Cash, 2006).

Third, aspects of the decision maker's internal state impact how receptive individuals are to advice, such as the decision maker's confidence (Cooper, 1991) and emotional state (e.g., Gino & Schweitzer, 2008).

The extant advice-taking literature has also identified a surprising regularity: in almost every domain, individuals discount the advice they receive (see Bonaccio & Dalal, 2006 for a review). In contrast to this finding, we identify an important aspect of a decision maker's internal state that causes individuals to be *very* receptive to advice: anxiety. We postulate that anxiety promotes feelings of low self-confidence. Compared to individuals in a neutral emotional state, we expect anxious individuals to lack confidence in their ability to make good judgments. As a result, we predict that anxious individuals will become more likely to seek advice and to rely on the advice they receive, even when the advice is bad.

### Anxiety

Anxiety is triggered by uncertain and novel situations that have the potential for adverse consequences (Brooks & Schweitzer, 2011). For example, an inexperienced homebuyer who is concerned about losing the opportunity to buy a desirable home may feel anxious when making an offer. Anxiety is a common emotion that signals the presence of a potential threat, promotes pessimistic appraisals of future events, and triggers psychological responses that help individuals reduce their vulnerability (Barlow, 1988; Butler & Mathews, 1983, 1987; Raghunathan & Pham, 1999; Savitsky, Medvec,

Charlton, & Gilovich, 1998; Shepperd, Grace, Cole, & Klein, 2005; Young, Klap, Shoai, & Wells, 2008). Extant anxiety research has largely focused on *trait* anxiety (e.g., Endler, 1980; Eysenck, 1982, 1992, 1997; Kantor, Endler, Heslegrave, & Kocovski, 2001; Stober, 1997), a personality characteristic similar to neuroticism that reflects an individual's susceptibility to anxious feelings (Spielberger, 1985). Individuals with high trait anxiety and those with anxiety disorders experience anxious feelings frequently.

In this paper we focus on *state* anxiety, a transient emotion that anyone can experience. Unlike trait anxiety, state anxiety is relatively short-lived, often occurring for mere seconds or minutes. Consistent with prior research (see Brooks & Schweitzer, 2011; Gray, 1991), we conceptualize anxiety to subsume fear, tension, worry, nervousness, stress, and apprehension. Anxiety is an unpleasant and aversive emotion (Marks & Nesse, 1994) that is characterized by high activation (within Russell's [1980] affective circumplex model), high uncertainty, and low control (within Smith and Ellsworth's [1985] appraisal framework).

State anxiety can be directed or incidental. In contrast to directed emotions that are triggered by an aspect of the decision context itself (e.g., by the nature of the decision or the people involved), incidental emotions are triggered by a prior stimulus that is unrelated to the current decision (e.g., Lerner & Keltner, 2001). For example, an individual who plans to invest in the stock market might experience directed anxiety because he is worried about losing money in the market, incidental anxiety because he watched an anxiety-inducing movie before making an investment decision, or both. In this paper, we study incidental anxiety because it offers a conservative test of the



influence of anxiety on advice taking. There are no normative reasons for why incidental anxiety should influence behavior.

### Anxiety, Advice Seeking, and Advice Taking

Schwartz and Clore's (1983) affect-as-information model suggests that individuals rely on the characteristics of their feelings to inform their judgments and decisions (1988; Pham, 1998; Clore, Gasper, & Garvin, 1998; Frijda, 1986; Raghunathan & Pham, 1999; Schwartz, 1990). When feeling anxious, individuals feel both high uncertainty and low control. These feelings erode self-confidence (Maddux, 1995; Schunk, 1995), harm self-efficacy, the belief that one is capable of attaining a specific, desirable goal (Bandura, 1977, 1997; Gould, Petlichkoff, & Weinberg, 1984; Martens, Burton, Vealey, Bump, & Smith, 1990; Martin & Gil, 1991), and consequently promote advice seeking and advice taking.

When individuals feel high uncertainty, they are likely to adopt an implicit goal of reducing uncertainty (e.g., Fridja, Kuipers, & ter Schure, 1989; Izard, 1977; Raghunathan & Pham, 1999; Raghunathan, Pham, & Corfman, 2006). We expect individuals to seek and rely upon the advice of others as a direct consequence of feeling uncertain.

In prior work, feelings of confidence moderate how receptive individuals are to advice. As individuals become more confident, they become less receptive to advice (e.g., Gino & Moore, 2007; Harvey & Fischer, 1997; Yaniv & Kleinberger, 2000; Yaniv, 2004). By eroding self-confidence, we expect that anxiety promotes advice

seeking and advice taking. Specifically, we predict that self-confidence will mediate the relationships between anxiety and advice seeking and anxiety and advice taking.

Anxiety may also promote advice taking by increasing the need for social affiliation. A healthy social network can improve an individual's physical and mental ability to cope with anxiety (Schachter, 1959; Taylor, 2006; Taylor, 2000; Zadro, Williams, & Richardson, 2004). As a result, we expect anxious individuals to be particularly likely to seek and rely upon the advice of others.

#### Anxiety and the Ability to Discriminate Between Good and Bad Advice

Individuals are generally sensitive to the quality of the advice they receive. Yaniv and Kleinberger (2000) found that individuals are more receptive to good advice than they are to bad advice. We expect anxious individuals, however, to be less discerning than neutral individuals. Anxiety harms self-confidence. Low confidence causes individuals to place low weight on their own estimates and to create a wide confidence interval around their own judgments. With a wide confidence interval, individuals will consider a large set of values or ideas to be reasonable. As a result, anxious individuals are more likely than neutral individuals to consider bad advice to be reasonable or acceptable.

For similar reasons, we expect anxious individuals, compared to non-anxious individuals, to rely more heavily on advice from advisors with a conflict of interest. Conflicted advisors often allow their personal preferences to influence the advice they offer others (Cain, Loewenstein, & Moore, 2005). In general, advisees, even when they are aware of the conflict of interest, rely heavily on the advice they receive (Cain,

Loewenstein, & Moore, 2005). By eroding confidence, we expect anxiety to exacerbate this problem. Specifically, by eroding self-confidence, we expect anxiety to cause individuals to consider a wide range of advice values as reasonable. As a result, anxious individuals are likely to consider even biased advice from a conflicted advisor as reasonable. Low confidence also causes anxious advisees to place low weight on their own estimates relative to the weight they place on the advice of others. Taken together, we predict that anxious individuals will rely more heavily on advice from an advisor with a conflict of interest than non-anxious individuals.

Importantly, we do not develop specific hypotheses with respect to anxiety and accuracy. The influence of anxiety on accuracy is likely to be moderated by a number of factors, such as the accuracy of an individual's initial judgments, the accuracy of advice, and an individual's initial receptivity to advice. For example, if an anxious individual makes an accurate initial judgment and receives bad advice, his final judgment may be less accurate than his initial judgment. On the other hand, if his initial judgment was inaccurate and he receives very good advice, his final judgment is likely to become more accurate.

### **Overview of the Present Research**

Compared to individuals in a neutral state, we expect anxious individuals to be more likely to seek advice and to use advice, even if the advice is of low quality. We expect the relationship between anxiety and receptivity to advice to be mediated by low self-confidence. We depict our theoretical model in Figure 1.

We test our hypotheses in eight experiments. In Experiment 1, we induce incidental anxiety and measure how likely participants are to seek and take advice from others. In Experiment 2, we compare the effects of incidental anger to those of incidental anxiety and demonstrate that these two emotions, though both negatively valenced, affect advice taking differently. Compared to a control condition, anger decreases advice taking and anxiety increases it. In Experiment 3, we show that anxiety lowers self-confidence, which, in turn, promotes advice taking. In Experiment 4, we disentangle cognitive from motivational mechanisms to explain the link between anxiety and advice taking. We show that low self-confidence mediates the relationship between anxiety and advice taking, but impaired information processing does not. In Experiments 5a-c, we examine whether anxiety harms the ability to discriminate between good and bad advice. In Experiment 6, we examine whether anxiety harms the ability to discriminate between advice from advisors with or without a conflict of interest. Across our studies, we use different emotion inductions to trigger anxiety (e.g., movie clips, audio clips, and writing tasks) and different decision tasks.

Our work makes several theoretical contributions. First, we extend our understanding of the influence of state anxiety on self-confidence and subsequent decision making. Previous research has examined the cognitive consequences of experiencing anxiety; here, we investigate its motivational consequences. Second, we expand our understanding of the advice taking process (e.g., Bonaccio & Dalal 2006; Larrick & Soll, 2006). In particular, we identify the importance of self-confidence and the ability to discern between good and bad advice. Third, though a growing literature

has examined advice taking, our work examines the relatively understudied process of advice *seeking*. Fourth, our work extends our understanding of how specific emotions influence decision making in interpersonal settings (e.g., Ashfort & Humphrey, 1995; Brief & Weiss, 2002).

### **Experiment 1: The Effect of Anxiety on Advice Seeking and Advice Taking**

In Experiment 1, we examine how anxiety influences advice seeking and advice taking. We also explore the role of self-confidence as a mediator.

#### Method

##### Participants

One hundred and two college students (56 female,  $M_{age}=21$ ,  $SD=1.34$ ) at a university in the Southern United States participated in the study for pay. Participants received a \$2 show-up fee and had the opportunity to earn an additional \$6 during the study.

##### Design and Procedure

Participants sat in private computer cubicles and were randomly assigned to one of two emotion conditions (anxiety vs. neutral). To mitigate potential demand effects, we informed participants that the experiment included two unrelated studies, a “Weight Estimation Study” (two parts) and a “Vivid Recall Study.” All of the study materials were presented on the computer screen.

Initial estimates. In the experiment, we referred to this segment of the study as the “Weight Estimation Study (Part 1).” Participants completed a repeated judgment task. In each of three rounds, we showed participants a photo of a stranger and asked them to estimate the person’s weight. As an incentive to be accurate, we gave

participants a \$1 bonus if their estimate fell within ten pounds of the actual weight of the person in the photo.

Emotion induction. We referred to this segment of the experiment as the “Vivid Recall Study.” Participants were told that they would be watching a video clip and that they would be asked to recall details from the video clip later in the study. In this segment of the experiment, we randomly assigned participants to watch either an anxiety-inducing clip from the movie *Vertical Limit* about a mountain-climbing accident or a neutral clip from a *National Geographic* documentary about fish in the Great Barrier Reef. Both video clips have been used in prior emotion research to induce anxiety and neutral feelings (e.g., Brooks & Schweitzer, 2011; Frederickson & Branigan, 2005; Gino & Schweitzer, 2008; Gross & Levenson, 1995).

Measure of self-confidence. In the segment of the experiment after the emotion induction, participants completed a four-item self-confidence measure (adapted from Schwarzer & Jerusalem, 1995). This measure included items such as “I feel capable” and “I usually make good judgments” ( $\alpha=.96$ ).

Revised estimates. After viewing the video clip and answering questions related to self-confidence, participants made a second round of estimates. We referred to this part of the experiment as the “Weight Estimation Study, Part 2.” We asked participants to re-estimate the weight of the same three people they saw in Part 1, and told them they would receive a \$1 bonus every time their estimate fell within ten pounds of the actual weight of the person in the photograph. Before showing participants the three photographs, we asked them to indicate whether they wanted to receive advice from

another participant. Participants answered this question only once prior to making their estimates. If they chose to receive advice, we showed them the estimates that another participant had purportedly made for the same set of photos in addition to their own initial estimates. If they did not choose to receive advice, participants only saw their own initial estimates. For experimental control, we kept the three advice values constant across conditions. We explained that these values had been randomly chosen from estimates participants in a previous study had made when they were assigned to the role of advisor and were paid based upon the accuracy of their estimates. In each round, the advice was of good quality since it fell within 5% of the true weight of the person in each photo.

Emotion measures. Next, we asked participants to think back to the video clip and to indicate the extent to which they felt various emotions (Lerner & Keltner, 2001; Lerner et al., 2004).

#### Dependent Measures

Advice seeking. To assess advice seeking, we examined whether or not participants chose to receive advice before making their second set of estimates (1=yes, 0=no).

Advice taking. Consistent with prior advice taking research, we used the “weight of advice” (WOA) measure to assess participants’ receptivity to advice. This measure gauges the extent to which participants revise their estimates in the direction of the advisor’s estimate (Harvey & Fischer, 1997; Yaniv & Foster, 1997). The WOA measure ranges from zero, which indicates that the advice has no impact on an individual’s final

estimate, to one, which indicates that the final estimate is equal to the advice. The WOA measure is computed as follows:

$$WOA = \frac{|final\ estimate - initial\ estimate|}{|advice - initial\ estimate|}.$$

If participants believe that they and their advisors are equally well informed, they should weight their own and another person's estimate equally, and the WOA score would equal 0.5 (Larrick & Soll, 2006).

Pilot study. We pilot-tested the emotion induction clips with a non-overlapping sample of participants ( $N=42$ ). In the pilot study, we asked participants to watch one of the two video clips and rate the emotions they experienced immediately after watching the clip. To measure anxiety, we averaged responses for *anxious*, *tense*, and *distressed* ( $\alpha=.92$ ). To measure neutral feelings, we averaged responses for *neutral*, *indifferent*, and *unemotional* ( $\alpha=.84$ ). The results of the pilot study confirmed that these video clips effectively induce anxiety and neutral feelings. Participants reported higher feelings of anxiety when they watched the anxiety-inducing video clip ( $M=4.27$ ,  $SD=2.37$ ) than when they watched the neutral clip ( $M=1.79$ ,  $SD=1.41$ ),  $t(40)=4.12$ ,  $p<.001$ . In addition, participants reported higher neutral feelings when they watched the neutral clip ( $M=5.44$ ,  $SD=2.05$ ) than when they watched the anxiety-inducing one ( $M=2.54$ ,  $SD=1.91$ ),  $t(40)=4.76$ ,  $p<.001$ .

## Results

Across all of our studies, we first conducted analyses that included gender and age as independent variables. We found no main effects or interaction effects for these



demographic variables, and we report all of our findings collapsed across demographic groups.

Emotion Manipulation Check. Feelings of anxiety were higher in the anxiety condition ( $M=6.83$ ,  $SD=1.45$ ) than in the neutral condition ( $M=1.75$ ,  $SD=1.06$ ),  $t(100)=20.04$ ,  $p<.001$ , and neutral feelings were higher in the neutral condition ( $M=4.37$ ,  $SD=1.70$ ) than in the anxiety condition ( $M=2.44$ ,  $SD=1.67$ ),  $t(100)=5.80$ ,  $p<.001$ . These results suggest that our emotion induction was effective.

Advice Seeking. Consistent with our prediction that anxious individuals would be more likely to seek advice than would individuals in a neutral state, 90% (47/52) of participants in the anxiety condition sought advice, compared to 72% (36/50) in the neutral condition,  $\chi^2(1, N=102)=5.68$ ,  $p<.02$ .

Self-confidence. Consistent with our prediction, participants reported significantly lower self-confidence in the anxiety condition ( $M=4.87$ ,  $SD=1.84$ ) than in the neutral condition ( $M=6.21$ ,  $SD=0.63$ ),  $t(100)=-4.86$ ,  $p<.001$ .

We then examined whether self-confidence mediated the relationship between incidental anxiety and advice seeking (Baron & Kenny, 1986). As summarized in Table 1, by including self-confidence in our model, the influence of anxiety on advice seeking was reduced to non-significance (from  $\beta=.24$ ,  $p<.02$  to  $\beta=.13$ ,  $p=.24$ ; 95% bias-corrected CI, [.04, .15]), and self-confidence predicted advice seeking ( $\beta=-.26$ ,  $p<.02$ ).<sup>1</sup>

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<sup>1</sup> In this study, because our dependent variable was binary, we reran the mediation analyses using MacKinnon and Dwyer's (1993) logistic regression method and found the same pattern of results. We report the more traditional approach in the interest of parsimony.

These findings demonstrate that self-confidence mediates the relationship between anxiety and advice seeking.

Advice Taking. We next examined whether incidental anxiety influenced advice taking by using data only from participants who chose to seek advice before making their revised estimates. As predicted, results from a repeated-measures ANOVA demonstrate that advice taking was high in the anxiety condition ( $M=0.55$ ,  $SD=0.26$ ) than in the neutral condition ( $M=0.39$ ,  $SD=0.11$ ),  $F(1,81)=11.55$ ,  $p=.001$ ,  $\eta_p^2=.13$ .

### Discussion

Results from Experiment 1 demonstrate that incidental anxiety increases both advice seeking and advice taking. Furthermore, our results indicate that incidental anxiety harms self-confidence, and that self-confidence mediates the relationship between incidental anxiety and advice seeking.

### **Experiment 2: The Influence of Anxiety and Anger on Advice Taking**

In Experiment 2, we extend our investigation of the relationship between anxiety and advice taking by contrasting the influence of two negatively valenced emotions: anxiety and anger. Although a substantial literature documents the misattribution of the valence of emotions (e.g., Dunn & Schweitzer, 2005), we postulate that it is the *certainty* dimension of anxiety, not valence, that causes individuals to be more receptive to advice. Smith and Ellsworth's (1985) appraisal theory of emotions characterizes emotions across several dimensions. Anxiety and anger, though both negatively valenced, differ along the dimension of certainty. Anxiety is characterized by a sense of uncertainty, whereas anger is characterized by a sense of certainty.

Consistent with our theoretical framework, we expect anxious feelings to increase feelings of uncertainty, lower self-confidence, and increase advice taking.

Conversely, we expect anger to increase feelings of certainty, increase confidence, and decrease advice taking. Compared to individuals in a neutral state, we expect anxious individuals to be more receptive to advice, and we expect angry individuals to be less receptive to advice. We expect self-confidence to mediate these relationships.

## Method

### Participants

One hundred twenty-seven students (74 female,  $M_{age}=21.10$ ,  $SD=2.56$ ) at a university in the Southern United States participated in the study for pay.

Participants received a \$2 show-up fee and had the opportunity to earn an additional \$6 during the study.

### Design and Procedure

Participants were randomly assigned to one of three emotion-induction conditions: anxiety, anger, or neutral. We used the same procedure as in Experiment 1, with three important differences. First, in Experiment 2, in addition to an anxiety and a neutral condition, we included an anger condition. In the anger condition, participants watched a video clip from the movie *My Bodyguard* that portrays a man being treated unfairly. This video clip has been effectively used in prior research to induce incidental anger (Gino & Schweitzer, 2008). Consistent with this design change, we added three

additional emotions to assess anger (i.e., *angry*, *mad*, and *furious*,  $\alpha=.84$ ) in the measure of subjective feelings participants completed at the end of the study.

Second, we developed a different measure to assess participants' self-confidence. We developed this measure to capture certainty and perceived accuracy of one's own estimates. This measure of self-confidence included five items ( $\alpha=.76$ ): "I think my initial estimates are accurate," "I think my initial estimates are close to the true value," "I am very certain about the accuracy of my judgments," "I am sure I am performing well on this task," and "I have no doubt my estimates are close to the true values." Participants indicated their agreement with each item and other filler ones using a seven-point scale (1=strongly disagree, 7=strongly agree). Half the participants answered these questions after the emotion induction, and half answered these questions after they made revised estimates.

Third, we did not ask participants whether or not they wanted to receive advice. Instead, across all three conditions, every participant received advice prior to making their revised estimate.

## Results

We found no order effects for whether participants answered the self-confidence questions after the emotion induction or after providing their revised estimates. We report our findings collapsed across order conditions. In Table 2, we report descriptive statistics for all of the variables we measured in this study.

Emotion Manipulation Check. Consistent with our emotion induction, feelings of anxiety varied across conditions,  $F(2,124)=36.88$ ,  $p<.001$ ,  $\eta_p^2=.37$ . Participants reported

greater anxiety in the anxiety condition than they did in both the neutral condition and the anger condition (both  $ps < .001$ ); anxiety ratings did not differ in the latter two conditions ( $p = .41$ ). Neutral feelings also varied across conditions,  $F(2,124) = 4.92$ ,  $p < .01$ ,  $\eta_p^2 = .07$ : they were higher in the neutral condition than they were in both the anxiety condition and the anger condition (both  $ps < .05$ ), and these ratings did not differ in the latter two conditions ( $p = .30$ ). Finally, anger ratings differed by condition,  $F(2,124) = 22.96$ ,  $p < .001$ ,  $\eta_p^2 = .27$ : they were higher in the anger condition than in both the anxiety condition and the neutral condition (both  $ps < .001$ ), and anger ratings did not differ in the latter two conditions ( $p = .44$ ).

Advice Taking. A repeated-measures ANOVA revealed that advice use varied across conditions,  $F(2,124) = 20.06$ ,  $p < .001$ ,  $\eta_p^2 = .24$ . Participants were more receptive to advice when they experienced incidental anxiety than when they experienced incidental anger or neutral feelings (both  $ps < .01$ ). Furthermore, participants were less receptive to advice when they experienced incidental anger than when they experienced neutral feelings ( $p < .01$ ).

Self-confidence. Participants' self-confidence also varied across conditions,  $F(2,124) = 35.17$ ,  $p < .001$ ,  $\eta_p^2 = .36$ ; self-confidence was lower in the anxiety condition than in either the anger or the neutral condition (both  $p$ 's  $< .001$ ), and self-confidence was higher in the anger than in the neutral condition ( $p < .001$ ).

We next examined whether self-confidence mediated the effect of incidental anxiety on advice taking (see Table 1).<sup>2</sup> When we included self-confidence in the

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<sup>2</sup> In our regressions, we used the average WOA across the three rounds as the dependent variable and included a dummy variable for the anger condition.

regression, the effect of anxiety was reduced to non-significance (from  $\beta=.29, p=.001$ , to  $\beta=.10, p=.27$ ; 95% bias-corrected CI, [0.05, 0.18]), and self-confidence predicted advice use ( $\beta=-.53, p<.001$ ).

### Discussion

In Experiment 2, we extended our investigation of the link between anxiety and receptivity to advice by contrasting two negatively-valenced emotions, anger and anxiety. We find that negative valence cannot account for our findings in Experiment 1. Angry participants were *less* receptive to advice than were those in both the neutral and the anxiety conditions. We find that incidental anxiety reduces self-confidence and that this lowered self-confidence mediates the relationship between anxiety and advice taking.

### **Experiment 3: Anxiety and Perceptions of Advice Quality**

In Experiment 3, we further test our theoretical model by using a different method for inducing anxiety and by using a different measure of advice taking. We also include a measure of advice quality to assess how anxiety influences perceptions of advice quality.

### Method

#### Participants

Seventy-nine students (44 female,  $M_{age}=23, SD=2.77$ ) at a university in the Southern United States participated in the study in exchange for a \$2 show-up fee and the opportunity to earn an additional \$5.

#### Design and Procedure

We randomly assigned participants to one of two experimental conditions: neutral vs. anxiety. In each condition, participants listened to a music clip that induces either anxiety or neutral feelings (see Brooks & Schweitzer, 2011). As a cover story, we informed participants that they would participate in several unrelated studies. We informed participants that in one study we would ask them to evaluate music. We then asked participants to wear headphones and listen to an audio clip while performing other tasks. In the anxiety condition, participants listened to the theme music from the movie *Psycho*. In the neutral condition, participants listened to Handel's *Water Music: Air*. Neither audio clip included vocal parts, and each clip was played on a continuous loop.

After reading general instructions about the audio clips, we informed participants about another, ostensibly unrelated study titled "Individual Performance Under Time Pressure." We told participants they had three minutes to work on a math problem and that they would receive a \$5 bonus for identifying the correct solution out of the five solutions provided. Furthermore, we told participants that they would receive information from another participant who previously completed the same task but had the opportunity to work on the problem for five minutes. Before working on the problem, participants received an envelope with a handwritten note, supposedly from this person, which read, "Choose Solution A [B, C, D, or E]." In this way, participants received advice from this person before they had the chance to work on the problem on their own. After reading the note, participants answered a series of questionnaires that included our measure of self-confidence (the same measure employed in Experiment 2,  $\alpha=.79$ ). Then, they spent three minutes working on the problem.

Once the three minutes were over, participants indicated which solution they thought was correct among the five possible solutions. Thus, participants provided their answer after having the opportunity to work on the problem and after reporting their self-confidence. After choosing a solution, participants answered a series of questions that included target questions interspersed with distracter questions. Our target questions asked participants to assess the quality of the advice. Specifically, we asked participants to indicate the extent to which the advice was likely to be accurate, was likely to be of good quality, probably represented the right answer, and was likely to indicate the correct answer ( $\alpha=.90$ ) on seven-point scales (1=very unlikely, 7=very likely). We also asked participants to indicate the extent to which the music made them feel various emotions.

### Pilot Study

We conducted a pilot study with a non-overlapping sample of participants. Thirty-five students from local universities in the Southern United States (52% male;  $M_{age}=21$ ,  $SD=2.69$ ) participated in the pilot study in exchange for \$3. In this pilot study, we gave participants five minutes to solve a math problem. After three minutes, we checked to see whether any of the participants had solved the problem. The problem (previously used by Dunn, Ruedy & Schweitzer, 2011) read:

Two people are running around a square track. Each side of the track has a length of 11 meters. Person A and person B begin at opposite corners of the track, facing the same corner. If person A runs 3 meters per second and person B runs 5 meters per second, how many meters will person B have run when they pass each other for the fourth time?



The correct solution is 96.25 meters. No participant solved the math problem correctly in three minutes, and only two participants out of 35 were able to solve the problem in the allotted five minutes. Consistent with Dunn et al. (2011), we found that this math problem appears tractable to participants, but is in fact quite difficult to solve.

### Results

Emotion Manipulation Check. Consistent with our induction, feelings of anxiety were higher in the anxiety condition ( $M=5.73$ ,  $SD=1.44$ ) than in the neutral condition ( $M=2.00$ ,  $SD=1.36$ ),  $t(77)=11.84$ ,  $p<.001$ . In addition, neutral feelings were higher in the neutral condition ( $M=4.62$ ,  $SD=1.78$ ) than in the anxiety condition ( $M=2.79$ ,  $SD=1.77$ ),  $t(77)=4.59$ ,  $p<.001$ .

Advice Taking. To measure advice taking, we coded the correspondence between advisors' recommendations and participants' choices. If a participant's choice matched the advice, we coded the response as 1, and 0 otherwise. Sixty-eight percent of the participants (27/40) took the advice in the anxiety condition, while only 41% of participants (16/39) took the advice in the neutral condition,  $\chi^2(1, N=79)=5.58$ ,  $p<.05$ .

Advice Quality. Similarly, perceived advice quality was higher in the anxiety condition ( $M=5.07$ ,  $SD=1.43$ ) than in the neutral condition ( $M=4.27$ ,  $SD=1.38$ ),  $t(77)=2.53$ ,  $p<.05$ .

Self-confidence. As we predicted, participants who experienced anxiety reported lower self-confidence ( $M=3.62$ ,  $SD=1.06$ ) than did participants in the neutral condition ( $M=3.00$ ,  $SD=0.79$ ,  $t(77)=2.92$ ,  $p=.005$ ).

We also conducted mediation analyses (see Table 1) and found that self-confidence mediated the relationship between our emotion manipulation and participants' perceptions of advice quality (95% bias-corrected CI, [0.19, 1.11]) as well as the relationship between anxiety and advice taking (95% bias-corrected CI, [0.24, 2.04]).

### Discussion

In Experiment 3, we again demonstrate that anxiety decreases confidence in one's own estimates, increases perceptions of advice quality, and increases receptivity to advice. This experiment extends our investigation by replicating these relationships with a different emotion induction and a very different advice-taking task.

#### **Experiment 4: Self-Confidence and Information Processing as Potential**

#### **Mediators**

In Experiments 1-3, we identify lower confidence as the mechanism that mediates the relationships between anxiety and advice seeking and anxiety and advice taking. In Experiment 4, we consider an alternative mediator for the relationship between anxiety and advice taking: impaired information processing.

In addition to lowering self-confidence, anxiety impairs the ability to process information (Eysenck, 1982; Sengutpa & Johar, 2001). As a result, anxious individuals perform poorly on tasks that demand cognitive resources (Chen, 1996; Deffenbacher, 1977; Hamilton, 1975; Ganzer, 1968; Mueller, 1976). When individuals feel anxious, they divert cognitive resources to activities such as worrying and retain fewer cognitive

resources for the task at hand (Eysenck, 1979, 1982) and take longer to draw inferences (e.g., Darke, 1988).

In Experiment 4, we use the Stroop task (Stroop, 1935) to assess information processing. In this study, we consider both self-confidence and information processing as potential mediators of the relationship between anxiety and advice taking.

### Method

#### Participants

One hundred twenty-two students and adults (58 male,  $M_{age}=32$ ,  $SD=9.06$ ) from a city in the Northeastern United States participated in the study in exchange for a \$4 show-up fee and the opportunity to earn an additional \$12.

#### Design and Procedure

We used a between-subjects design, and randomly assigned participants to one of two emotion conditions: anxiety vs. neutral. At the beginning of the experiment, we informed participants that they would complete three unrelated studies that had been combined for the sake of convenience: the “Estimation Study” (which included two parts), the “Vivid Recall Study” (where we introduced our emotion manipulation) and the “Word Recognition Task” (which we used to assess information processing).

Estimation Study, Part 1: Initial estimates. We told participants that they would be randomly assigned to the role of either adviser or advice recipient, and that another person taking the study would be assigned to the other role. All participants were actually assigned to the role of advice recipient. Across three rounds, participants viewed a photograph of a jar filled with coins and estimated the amount of money in

each jar. In both Part 1 (initial estimates) and Part 2 (revised estimates), participants received an additional \$2 if their estimate fell within 25 cents of the true amount of money in the jar.

Emotion induction. After providing three initial estimates, participants completed a (purportedly unrelated) study, the “Vivid Recall Study,” which was actually our emotion manipulation (anxiety vs. neutral). In this study, we used a writing induction. We asked participants to write a short essay. In the neutral condition, the instructions read:

Please take a few minutes to answer the following question as truthfully as possible. Once you’ve finished, then go on to the next task. Please describe, as best you can, how you typically spend your evenings. You might begin by writing down a detailed description of your activities, and then figure out how much time you devote to each activity. Please write in complete sentences. And, if you can, please write your description so that someone reading this might be able to understand how you typically spend your evenings.

In the anxiety condition, the instructions read:

Please take a few minutes to answer the following question as truthfully as possible. Once you’ve finished, then go on to the next task. Please describe, as best you can, a situation you experienced in the past that made you feel very anxious. You might begin by writing down a description of your feelings toward someone or something that caused you to feel high levels of anxiety. Then write about the details of such situation/moment. Please write in complete sentences. And, if you can, please write your description so that someone reading this might be able to understand the feelings you had.

Information processing task. After the emotion induction, participants completed a “Word Recognition Task” (i.e., Stroop task to measure information processing) and answered a short questionnaire that assessed self-confidence. We counterbalanced the order in which the Stroop task and the questionnaire were presented to participants.

In the Stroop task, we presented participants with the names of different colors. For ten rounds, the color names matched the word (e.g., “RED” was printed in red). For a second set of ten rounds, the color names appeared in colors that did not match the word (e.g., “RED” was printed in yellow). In each round, as soon as the word appeared on the screen, participants were asked to type the color of the text as fast as they could. We recorded the time it took them to type the color of the text in each round. We computed the difference in time between the incongruent and congruent trials and used this difference as an assessment of information processing (DeWall, Baumeister, & Vohs, 2008; Richeson & Trawalter, 2005).

Estimation Study, Part 2: Revised estimates. After completing the Stroop task and the questionnaire, we asked participants to re-estimate the amount of money in each of the jars they had seen in Part 1 of the estimation study. This time, however, participants received an estimate from another participant in addition to seeing their own initial estimates from Part 1.

Final questionnaire. Participants completed a final questionnaire with demographic information and a manipulation check. Specifically, we asked participants to think back to the writing task and to indicate the extent to which they felt various emotions.

## Results

Emotion Manipulation Check. Feelings of anxiety were higher in the anxiety condition ( $M=5.64$ ,  $SD=2.11$ ) than they were in the neutral condition ( $M=1.85$ ,  $SD=1.46$ ),  $t(120)=11.68$ ,  $p<.001$ . Neutral feelings were higher in the neutral condition

than they were in the anxiety condition ( $M=3.73$ ,  $SD=1.96$  vs.  $M=2.53$ ,  $SD=1.94$ ,  $t[120]=3.36$ ,  $p=.001$ ).

Advice Taking. As predicted, results from a repeated-measures ANOVA demonstrated that advice use in the anxiety condition was significantly higher ( $M=0.61$ ,  $SD=0.37$ ) than in the neutral condition ( $M=0.36$ ,  $SD=0.41$ ),  $F(1,120)=15.66$ ,  $p<.001$ ,  $\eta_p^2=.12$ .

Information Processing. We assessed information processing by computing the difference in response time for each participant between the congruent and incongruent words in the Stroop task. Lower scores reflect faster response times and indicate better information processing. Consistent with prior research (e.g., Eysenck et al., 2007), we found that information processing was lower (changes in the response times were higher) for participants in the anxiety condition than for those in the neutral condition (8.33 sec on average vs. 3.85 sec),  $t(120)=3.77$ ,  $p<.001$ .

Self-confidence. In addition, and consistent with our previous findings, self-confidence was lower for participants in the anxiety condition ( $M=5.23$ ,  $SD=1.10$ ) than it was for those in the neutral condition ( $M=5.95$ ,  $SD=0.92$ ),  $t(120)=3.95$ ,  $p<.001$ .

Mediation Analysis. We conducted mediation analyses to test whether self-confidence and impaired information processing mediated the effect of anxiety on advice taking. We first considered self-confidence alone as a mediator (see Table 1). When emotion condition and self-confidence were both entered into a regression model predicting advice taking, the effect of condition was significantly reduced (from  $\beta=.34$ ,

$p < .001$ , to  $\beta = .18$ ,  $p < .05$ ; 95% bias-corrected CI, [.05, .21]), and self-confidence significantly predicted advice taking ( $\beta = -.47$ ,  $p < .001$ ).

Next, we considered impaired information processing as a mediator. Although emotion condition predicted information processing ( $\beta = .33$ ,  $p < .001$ ), when we included both emotion condition and information processing in a regression model predicting advice taking, information processing did not significantly predict advice taking ( $\beta = -.10$ ,  $p = .29$ ). Therefore, the effect of information processing did not mediate the relationship between anxiety and advice taking.<sup>3</sup>

### Discussion

In Experiment 4, we considered both impaired information processing and lower self-confidence as potential mediators of the relationship between anxiety and advice taking. We found that anxiety does impair information processing, but that only diminished self-confidence, not impaired information processing, mediates the link between anxiety and advice taking.

### **Experiment 5: Anxiety and the Ability to Discern**

In Experiments 5a-c, we extend our investigation of the influence of anxiety on advice taking by exploring the consequences of experiencing low confidence. By harming self-confidence, anxiety widens an individual's confidence interval around an estimate and expands the range of ideas an individual is likely to consider to be reasonable. As a result, anxious individuals are likely to be more receptive to bad advice

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<sup>3</sup> We note that when both self-confidence and information-processing were entered into the regression model simultaneously, self-confidence predicted advice taking ( $\beta = -.47$ ,  $p < .001$ ) but information processing did not ( $\beta = -.10$ ,  $p = .21$ ).

than individuals in a neutral emotional state. Therefore, the relationship we identify linking anxiety and advice taking may present a particularly important problem when advice is bad.

### **Experiment 5a: Anxiety and the Ability to Perceive Advice Quality**

In Experiment 5a, we examine how anxiety influences perceptions of advice quality.

#### Method

##### Participants

We recruited 103 adults from a U.S. representative sample (52 male,  $M_{age}=45$ ,  $SD=15.95$ ) to participate in an online study in exchange for \$6.

##### Design and Procedure

We randomly assigned respondents to one of four experimental conditions using a 2 (Emotion: neutral vs. anxiety) x 2 (Advice quality: reasonable vs. unreasonable) between-subjects design.

We manipulated emotions by asking participants to engage in the same writing task we used in Experiment 4. After the emotion induction, we showed participants three photos of jars filled with coins, one photo at a time. Along with the photo, we showed participants an estimate of the value of the jar provided by another participant. We informed participants that the other participant had previously participated in the study in the role of advisor. For each jar, we asked participants to evaluate both how accurate and how reasonable the advisor's estimate was using a 7-point scale (ranging from 1 =



not at all, to 7 = very much). Responses to the two questions were highly correlated ( $r=.86$ ,  $p<.001$ ), and we report averaged responses to these questions.

After the three rounds, we asked participants to think back to the writing task and to indicate the extent to which they felt different emotions.

### Pilot Study

Prior to conducting the main study, we conducted a pilot study with a non-overlapping sample of participants ( $N=79$ ). We asked these participants to view the same three photographs of jars filled with coins and to make estimates that they would offer as advice to future participants. We informed participants that we would pay them for accuracy. We used these data to create two types of advice; we used the mean estimate from the pilot study as the value for “reasonable” advice, and we used the value two standard deviations above the mean as “unreasonable” advice. On average, the reasonable advice was \$2.30 lower than the true value of the jar, and the unreasonable advice as \$5.29 higher than the true value of the jar.

## Results and Discussion

Emotion Manipulation Check. Consistent with our manipulation, self-reported neutral feelings were higher in the neutral condition ( $M=4.24$ ,  $SD=2.20$ ) than in the anxiety condition ( $M=2.61$ ,  $SD=1.74$ ),  $F(1,99)=16.55$ ,  $p<.001$ ,  $\eta_p^2=.14$ , and self-reported feelings of anxiety were higher in the anxiety condition ( $M=4.66$ ,  $SD=2.21$ ) than in the neutral condition ( $M=2.15$ ,  $SD=1.60$ ),  $F(1,99)=43.62$ ,  $p<.001$ ,  $\eta_p^2=.31$ .

Perceived Advice Quality. In each round, we averaged participants’ responses to the accuracy and reasonableness questions and used these ratings as a measure of

perceived advice quality. A 2 (anxiety vs. neutral) x 2 (reasonable vs. unreasonable advice) repeated-measures between-subjects ANOVA (repeated on round) revealed that participants rated the advice higher on quality in the reasonable-advice condition ( $M=5.49$ ,  $SD=1.27$ ) than in the unreasonable-advice condition ( $M=4.52$ ,  $SD=1.34$ ),  $F(1,99)=21.88$ ,  $p<.001$ ,  $\eta_p^2=.18$ .

More interestingly, we found that perceived advice quality was higher in the anxiety condition ( $M=5.42$ ,  $SD=1.28$ ) than in the neutral condition ( $M=4.66$ ,  $SD=1.38$ ),  $F(1,99)=15.55$ ,  $p<.001$ ,  $\eta_p^2=.14$ . We also found a significant interaction between advice quality and emotion condition,  $F(1,99)=11.01$ ,  $p=.001$ ,  $\eta_p^2=.10$ . When participants experienced incidental anxiety, we found no significant difference in ratings of perceived advice quality between the reasonable and unreasonable advice ( $M=5.56$ ,  $SD=1.37$  vs.  $M=5.29$ ,  $SD=1.19$ ),  $F(1,44)<1$ ,  $p=.40$ ,  $\eta_p^2=.02$ . When participants were in a neutral state, however, ratings of perceived advice quality were higher in the reasonable-advice condition ( $M=5.44$ ,  $SD=1.21$ ) than they were in the unreasonable-advice condition ( $M=3.86$ ,  $SD=1.05$ ),  $F(1,55)=41.69$ ,  $p<.001$ ,  $\eta_p^2=.43$  (see Figure 2).

Overall, these results suggest that, compared to participants in a neutral emotional state, participants in the anxiety condition were less discerning between good and bad advice.

### **Experiment 5b: Anxiety and Receptivity to Bad Advice**

In Experiment 5a, we focused on the relationship between anxiety and perceived advice quality. In Experiment 5b, we explore how anxiety influences advice taking when advice is poor.

## Method

### Participants

One hundred eighty-nine students (118 female,  $M_{age}=21$ ,  $SD=2.29$ ) at a university in the Southern United States participated in the study in exchange for a \$2 show-up fee and the opportunity to earn an additional \$6.

### Design and Procedure

We randomly assigned participants to one of six experimental conditions using a 2 (Emotion: neutral vs. anxiety) x 3 (Advice quality: reasonable vs. unreasonably high vs. unreasonably low) between-subjects design.

As in Experiment 4, we manipulated emotions with a writing task and we asked participants to estimate the value of jars filled with coins. In Part 1 and Part 2 of the estimation task, participants received an additional \$1 if their estimate fell within 25 cents of the true amount in the jar.

To manipulate advice quality, we used the same “reasonable” advice values as those we used in Experiment 5a. In this study, we included both “unreasonably high” advice, the value two standard deviations above the reasonable value in the pilot study (on average, \$5.29 above the true value of the jar), and “unreasonably low” advice, the value two standard deviations below the reasonable value in the pilot study (on average, \$9.90 below the true value of the jar). Our primary dependent measure was weight of advice. As in our other studies, we measured emotion, self-confidence, and demographics.

## Results and Discussion

Emotion Manipulation Check. Neutral feelings ( $\alpha=.84$ ) were higher in the neutral condition than they were in the anxiety condition ( $M=4.66$ ,  $SD=2.20$  vs.  $M=3.09$ ,  $SD=2.03$ ),  $F(1,183)=25.74$ ,  $p<.001$ ,  $\eta_p^2=.12$ , and feelings of anxiety ( $\alpha=.92$ ) were higher in the anxiety condition than they were in the neutral condition ( $M=4.45$ ,  $SD=2.23$  vs.  $M=1.92$ ,  $SD=1.49$ ),  $F(1,183)=79.61$ ,  $p<.001$ ,  $\eta_p^2=.30$ .

Advice-taking. We conducted a 2 (anxiety vs. neutral) x 3 (reasonable vs. unreasonably high vs. unreasonably low advice) repeated-measures between-subjects ANOVA (repeated measure on round). We found that anxiety significantly influenced advice-taking,  $F(1,183)=58.41$ ,  $p<.001$ ,  $\eta_p^2=.24$ . The effect of advice quality was not significant,  $F(2,183)=1.85$ ,  $p=.16$ ,  $\eta_p^2=.02$ , but the interaction term was marginally significant,  $F(2,183)=2.56$ ,  $p=.08$ ,  $\eta_p^2=.03$ .

In the neutral condition, advice use differed across advice quality ( $F[2,85]=4.70$ ,  $p<.02$ ,  $\eta_p^2=.10$ ). Participants in the neutral condition were less receptive to unreasonably high and unreasonably low advice than they were to reasonable advice. Participants in the anxiety condition, however, were not less receptive to unreasonable advice than they were to reasonable advice ( $F[2,98]<1$ ,  $p=.93$ ,  $\eta_p^2=.001$ ). We depict these results in Figure 3.

Self-confidence. Participants in the anxiety condition reported lower self-confidence than did participants in the neutral condition ( $M=4.75$ ,  $SD=1.76$  vs.  $M=5.95$ ,  $SD=1.44$ ;  $F[1,183]=27.29$ ,  $p<.001$ ,  $\eta_p^2=.13$ ). Advice quality did not influence self-confidence.

We next tested for self-confidence as a mediator (see Table 1). The effect of anxiety on advice use was significantly reduced when we included self-confidence in the equation (95% bias-corrected CI, [.13, .27]), and self-confidence significantly predicted advice taking. These results further demonstrate that self-confidence mediates the effect of incidental anxiety on advice taking.

Although participants in the neutral condition were able to discriminate between good and bad advice, discounting both unreasonably high and low advice, participants in the anxiety condition did not.

### **Experiment 5c: Anxiety and an Advisor's Accuracy**

In Experiments 5a-5b, we found that anxiety impairs the ability to discriminate between good and bad advice. In Experiment 5c, we explore this relationship in a different way by explicitly manipulating the historical accuracy of the advisor.

#### Method

##### Participants

One hundred eighteen students (48 male,  $M_{age}=20.89$ ,  $SD=2.18$ ) at a university in the northeastern United States participated in the study in exchange for a \$2 show-up fee and the opportunity to earn an additional \$6.

##### Design and Procedure

We randomly assigned participants to one of four experimental conditions using a 2 (Emotion: neutral vs. anxiety) x 2 (Advisor accuracy: accurate vs. less accurate) between-subjects design. We used the same estimation task (jar of coins) and the same emotion induction (writing task) as we did in Experiment 5b.

For the second part of the estimation task, we informed participants that they would receive advice from an individual who had made estimates in a prior study and was paid based on accuracy. In the accurate-advisor condition, we told participants that the advisor's prior estimates were accurate 80% of the time. That is, the advisor had given an estimate within \$0.25 of the true value 80% of the time. In the less-accurate advisor condition, we told participants that the advisor's prior estimates were accurate 50% of the time. In reality, the advice values did not differ across conditions.

When participants received the advisor's estimates, they evaluated how accurate and reasonable they perceived the estimates to be (from 1=not at all, to 7=very much). We combined these two items to measure perceived advice quality (average  $\alpha$  across rounds =.91).

### Results

Emotion Manipulation Check. Consistent with our manipulation, neutral feelings were higher in the neutral than in the anxiety condition ( $M=4.69$ ,  $SD=2.09$  vs.  $M=3.02$ ,  $SD=2.03$ ),  $F(1,114)=19.54$ ,  $p<.001$ ,  $\eta_p^2=.15$ , and feelings of anxiety were higher in the anxiety than in the neutral condition ( $M=4.33$ ,  $SD=2.37$  vs.  $M=2.02$ ,  $SD=1.67$ ),  $F(1,114)=36.78$ ,  $p<.001$ ,  $\eta_p^2=.24$ .

Advice taking. We conducted a 2 (emotion) x 2 (advisor accuracy) repeated-measures between-subjects ANOVA (repeated measure on round) with advice use as the dependent variable. We found that anxiety significantly increased advice taking,  $F(1,114)=30.25$ ,  $p<.001$ ,  $\eta_p^2=.21$ . The effect of advisor accuracy was not significant,  $F(1,114)=2.39$ ,  $p=.13$ ,  $\eta_p^2=.02$ , but the interaction was,  $F(1,114)=4.38$ ,  $p<.05$ ,  $\eta_p^2=.04$ .

In the neutral condition, participants were less receptive to advice in the less-accurate advisor condition than they were in the accurate-advisor condition ( $M_{WOA}=0.11$ ,  $SD=0.24$  and  $M_{WOA}=0.34$ ,  $SD=0.38$ , respectively),  $F(1,56)=8.36$ ,  $p<.01$ ,  $\eta_p^2=.13$ .

Participants in the anxiety condition, however, were not less receptive to advice based on advisor accuracy ( $M_{WOA}=0.60$ ,  $SD=0.42$  and  $M_{WOA}=0.56$ ,  $SD=0.38$ , respectively).

Perceived Advice Quality. We conducted the same analysis using perceived advice quality as the dependent variable. As expected, participants rated advice quality higher in the accurate-advisor condition ( $M=5.49$ ,  $SD=1.19$ ) than they did in the less-accurate advisor condition ( $M=4.66$ ,  $SD=1.34$ ),  $F(1,114)=23.68$ ,  $p<.001$ ,  $\eta_p^2=.17$ . On average, participants rated the estimates as more accurate and reasonable in the anxiety condition ( $M=5.47$ ,  $SD=1.13$ ) than they did in the neutral condition ( $M=4.62$ ,  $SD=1.39$ ),  $F(1,114)=22.74$ ,  $p<.001$ ,  $\eta_p^2=.17$ .

Interestingly, we found a significant interaction between advisor accuracy and the emotion condition,  $F(1,114)=17.75$ ,  $p<.001$ ,  $\eta_p^2=.14$ . When participants experienced neutral feelings, they perceived the advice to be more accurate in the accurate-advisor condition ( $M=5.44$ ,  $SD=1.15$ ) than in the less-accurate advisor condition ( $M=3.80$ ,  $SD=1.09$ ),  $F(1,56)=42.22$ ,  $p<.001$ ,  $\eta_p^2=.43$ . However, when participants felt anxious, they perceived the advice to be similarly accurate across the two conditions ( $M=5.54$ ,  $SD=1.24$  vs.  $M=5.42$ ,  $SD=1.05$ ),  $F(1,58)<1$ ,  $p=.65$ ,  $\eta_p^2=.004$ .

Self-confidence. A 2 (emotions) x 2 (advisor accuracy) between-subjects ANOVA with self-confidence as the dependent variable revealed that participants in the anxiety condition reported lower self-confidence than did participants in the neutral

condition ( $M=4.65$ ,  $SD=1.84$  vs.  $M=5.78$ ,  $SD=1.57$ ),  $F(1,114)=13.08$ ,  $p<.001$ ,  $\eta_p^2=.10$ .

We found no other significant effect (both  $p$ 's  $>.16$ ). Importantly, self-confidence mediated the relationship between anxiety and advice taking (95% bias-corrected CI, [.07, .25]), as well as the relationship between anxiety and perceived advice quality (95% bias-corrected CI, [.03, .31]), as summarized in Table 1.

### Discussion

In Experiment 5c, we manipulated the purported accuracy of the advisor and found that anxiety increased reliance upon advice from both very accurate and less accurate advisors. Consistent with our findings in Experiments 5a and 5b, anxious participants were less discerning than participants in a neutral state. Participants in the neutral condition relied more heavily on advice when the advisor was purportedly very accurate than when the advisor was purportedly less accurate. Anxious participants, however, relied heavily on advice from both types of advisors.

### **Experiment 6: Anxiety and Biased Advisors**

In Experiment 6, we examine the influence of anxiety on advice taking when advisees know that advisors have a conflict of interest. Since anxious individuals are less discerning than those in a neutral emotional state, they may be particularly susceptible to biased advice from advisors with a disclosed conflict of interest.

### Method

#### Participants



One hundred thirty-nine college students (81 male,  $M_{age}=20$ ,  $SD=0.66$ ) at a university in the southeastern United States participated in the study in exchange for a \$2 show-up fee and the opportunity to earn an additional \$6.

### Design and Procedure

We randomly assigned participants to one of four experimental conditions using a 2 (Emotion: neutral vs. anxiety) x 2 (Advisor conflict: conflict of interest vs. no conflict of interest) between-subjects design. We used a procedure very similar to the one we used in Experiments 4-5.

For the estimation task, we told participants, “You will be randomly assigned to the role of either advisor or advice recipient. Another person in the room will be assigned to the other role.” In reality, every participant was assigned to the role of advice recipient. We also informed participants that they would receive a bonus for the accuracy of their estimates; specifically, we told participants that they would earn a \$1 bonus every time their estimate was within 25 cents of the true amount.

For the revised estimates, we used the same values as in the reasonable advice condition in Experiments 5a and 5b. Before receiving advice, we told participants that their advisor had an informational advantage. Specifically, we informed participants that the advisor had been given additional information about the range of values for each jar. In addition, we adapted Cain et al.’s (2005) conflict of interest disclosure for our manipulation. Each participant read one of two conflict of interest disclosures. In the conflict of interest condition, the instructions read:

Your advisor's payment depends on how much your estimate exceeds the value of the coins in the jar. In particular, in each round, the advisor will receive \$1 for every 25 cents your estimate exceeds the actual value of the jar of coins.

In the no conflict of interest condition, the instructions read:

Your advisor's payment depends on how accurate you are in estimating the value of the coins in the jar. In particular, in each round, the advisor will receive \$1 every time your estimate is within 25 cents of the actual value of the jar of coins.

### Results

Emotion Manipulation Check. Consistent with our manipulation, participants reported higher neutral feelings in the neutral condition ( $M=5.72$ ,  $SD=2.06$ ) than they did in the anxiety condition ( $M=3.62$ ,  $SD=2.20$ ),  $F(1,135)=34.42$ ,  $p<.001$ ,  $\eta_p^2=.20$ , and they reported higher anxiety in the anxiety condition ( $M=4.46$ ,  $SD=2.42$ ) than they did in the neutral condition ( $M=2.06$ ,  $SD=1.55$ ),  $F(1,135)=48.29$ ,  $p<.001$ ,  $\eta_p^2=.26$ .

Advice Taking. We conducted a 2 (emotion) x 2 (advisor conflict) repeated-measures between-subjects ANOVA (repeated measure on round) with advice use as the dependent variable. Advice taking was higher in the anxiety condition than in the neutral condition ( $M_{WOA}=0.60$  vs.  $0.24$ ),  $F(1,135)=35.19$ ,  $p<.001$ ,  $\eta_p^2=.21$ . The main effect of conflict of interest was not significant,  $F(1,135)=1.62$ ,  $p=.21$ ,  $\eta_p^2=.01$ , and the interaction was marginally significant,  $F(1,135)=3.38$ ,  $p<.07$ ,  $\eta_p^2=.02$ .

We hypothesized that, compared to individuals in a neutral emotional state, individuals experiencing anxiety would fail to discount advice from advisors with a conflict of interest. The results are directionally consistent with this hypothesis. Participants who felt anxious weighed advice similarly when their advisor did and did not have a conflict of interest ( $M_{WOA}=0.61$  vs.  $0.58$ ),  $F(1,68)<1$ ,  $p=.70$ ,  $\eta_p^2=.002$ . In

contrast, participants in the neutral condition discounted the advice significantly more from an advisor with a conflict of interest than from an advisor without a conflict of interest ( $M_{WOA}=0.15$  vs.  $0.34$ ),  $F(1,67)=5.06$ ,  $p<.03$ ,  $\eta_p^2=.07$ . We depict this pattern of results in Figure 4.

In this experiment, participants knew that advisors with a conflict of interest earned money when their revised estimates were higher than the true value of the jar. Thus, we examine weight of advice measures for participants whose initial estimates were lower than the advice value. We find that anxiety significantly increased advice taking,  $F(1,72)=12.35$ ,  $p=.001$ ,  $\eta_p^2=.15$ . The main effect of conflict of interest was not significant,  $F(1,72)=1.77$ ,  $p=.19$ ,  $\eta_p^2=.02$ , but the interaction was,  $F(1,72)=4.16$ ,  $p<.05$ ,  $\eta_p^2=.06$ . The presence of a conflict of interest did not affect the extent to which anxious participants were receptive to the advice ( $M_{WOA}=0.52$  with a conflict of interest vs.  $0.47$  without a conflict of interest;  $p=.62$ ), but it did influence the extent to which participants in the neutral condition discounted the advice. Specifically, participants in the neutral condition discounted advice more from an advisor with a conflict of interest than they did from an advisor without a conflict of interest ( $M_{WOA}=0.10$  vs.  $0.36$ ),  $F(1,29)=6.75$ ,  $p<.02$ ,  $\eta_p^2=.19$ .

Self-confidence. Self-confidence ( $\alpha=.81$ ) varied by condition ( $F[1,135]=14.06$ ,  $p<.001$ ,  $\eta_p^2=.09$ ). Participants in the anxiety condition reported lower self-confidence than did those in the neutral condition ( $M=5.48$ ,  $SD=0.79$  vs.  $M=5.96$ ,  $SD=0.68$ ). The conflict of interest manipulation did not influence self-confidence, and we found no

interaction between the conflict of interest manipulation and the emotion condition on self-confidence.

We also tested whether self-confidence mediated the relationship between anxiety and advice taking and found evidence for mediation (see Table 1).

### Discussion

As we found in Experiments 1-5, compared to individuals in a neutral emotional state, anxious individuals are more receptive to advice and self-confidence mediates this relationship. In this final experiment, we examined a particular case of bad advice: when advisors have a conflict of interest. We found that anxious individuals remained very receptive to advice, even when their advisor had a disclosed conflict of interest.

### **General Discussion**

Across eight experiments, we document a robust relationship between anxiety and receptivity to advice. Compared to people in a neutral emotional state, people who feel anxious are more likely to seek advice and are more likely to rely on the advice they receive. This pattern of results does not generalize to other negatively-valenced emotions, such as anger.

Consistent with prior research (e.g., Eysenck, 1992), we find that anxiety impairs information processing. The relationship between anxiety and advice taking, however, is not mediated by impaired information processing; rather, it is mediated by reduced self-confidence. Anxiety lowers self-confidence, which, in turn, increases advice seeking and reliance upon advice (see Figure 1). Our results also demonstrate that anxiety impairs the ability to discriminate between reasonable and unreasonable advice. Anxious

individuals rely heavily on advice, even when the advice is bad and advisors have a conflict of interest.

Across our studies, we employed different emotion inductions and different decision tasks. We examined both advice taking and the relatively understudied decision to *seek* advice. In our studies, we manipulated incidental anxiety, which offered a conservative test of the relationship between anxiety and advice taking. In practice, decision makers are likely to be influenced not only by incidental anxiety from an unrelated and irrelevant source, but also by directed anxiety triggered by the decision domain itself (e.g., choosing a surgery option in a hospital setting) and by other people (e.g., a realtor who may induce anxiety while recommending a purchase price for a house).

Prescriptively, our findings highlight the importance of assessing advice quality, especially when individuals are anxious. Though individuals in a neutral emotional state were able to discern good advice from bad advice, anxious individuals were less discerning and very receptive to extreme values and bad advice. Our findings underscore the importance of assessing advice quality in general, but when individuals are anxious in particular.

### Theoretical Implications

Our findings extend our understanding of the influence of anxiety on cognition and motivation. Prior work has found that anxiety impairs cognitive performance (e.g., Eysenck, 1982; Sengupta & Johar, 2001). Our work demonstrates that anxiety also influences motivation. By eroding self-confidence, anxiety motivates individuals to

reduce uncertainty and both to seek and to rely on advice from others. Future research should extend our investigation to study both cognitive and motivational consequences of experiencing incidental and directed emotions.

Our findings also deepen our understanding of the advice process. We document the influence of anxiety, we consider the influence of bad and biased advice, and we investigate the decision to seek advice as well as the decision to take advice. Rather than making decisions in isolation, individuals often make decisions after receiving input from others. This is especially true for exactly the types of decisions that are likely to trigger anxiety—important and novel domains that have the potential for adverse consequences.

In our investigation, we devoted particular attention to conditions under which advice taking may harm decision making. By considering contexts in which advice is bad and advisors have a conflict of interest, we identified systematic ways in which advice taking may harm individuals.

Further, we studied both the decision to take advice and the decision to seek advice. A growing literature has begun to study how people integrate the information they receive from others (Bonaccio & Dalal, 2006; Larrick & Soll, 2006). Very little work, however, has investigated the critical precursor to that process: the decision to seek advice.

Finally, our work contributes to extant research highlighting the importance of emotions in interpersonal and organizational settings (e.g., Ashforth & Humphrey, 1995; Ashkanasy, Härtel, & Zerbe, 2000; Brief & Weiss, 2002; Fineman, 1993; Fisher &

Ashkanasy, 2000; Judge & Ilies, 2004). Many organizational settings induce stress (e.g., Cannon-Bowers & Salas, 1998; Driskell & Salas, 1996) and anxiety (D'Aveni, 1995; Hartley et al., 1991; Jordan, Ashkanasy, & Härtel, 2002), but little prior research has studied how anxiety might influence organizationally relevant decision making, such as reliance upon advice from peers and managers.

### Limitations and Future Directions

The contribution of our work is qualified by limitations of our investigation. We identify these as both limitations and opportunities for future research. Across our studies, advisors and decision makers never met face-to-face. Although this approach afforded us experimental control, future work could examine the influence of anxiety on the advice process in face-to-face encounters.

In our studies, we considered contexts in which advice is poor and when advisors have a conflict of interest. Future work should explore these domains to develop our understanding of when advice systematically harms decision making. Specifically, this work should identify strategies for curtailing the effects of harmful advice. For example, anxious individuals who are particularly prone to bad advice may become less receptive to poor advice if they recognize and regulate their emotions.

Another limitation of the present work is the use of tasks that required a judgment or a solution to a problem that may not have been highly self-relevant to participants. Often, we consult others for their opinion when facing decisions that are important to us such as choosing a career or a medical treatment. Future research could extend our investigation by employing tasks that are high in self-relevance. Quite

possibly, self-relevance may exacerbate the influence of anxiety on advice seeking and advice taking.

Future work should also examine the interpersonal consequences of feeling anxious. For example, in addition to influencing decision processes, expressions of anxiety may influence relational outcomes. Little is known about how anxiety is communicated or may spread via contagion between individuals.

Many open questions remain with respect to the broader influence of anxiety on behavior. For example, small amounts of anxiety may be very constructive. Norem and Chang (2002) found that a small amount of anxiety causes people to prepare more thoroughly in advance of anxiety-inducing events. In other work, Alter et al. (2010) found that reappraising feelings of anxiety as excitement (i.e., reframing threats as challenges) can both improve motivation and diminish stereotype threat. Quite possibly, both the magnitude and timing of anxious feelings moderate the influence of anxiety on behavior.

Overall, our findings describe robust relationships between anxiety and advice seeking and anxiety and advice taking. Anxiety erodes self-confidence and causes individuals to seek advice from others and to be less discriminating between good and bad advice. Informed by these findings, we conclude by offering our own advice to anyone who might be anxious: be wary of an advisor's conflict of interest and be particularly vigilant about the quality of advice you receive.



## 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.
- Ashforth, B. E., & Humphrey, R. H. (1995). Emotion in the workplace: A reappraisal. *Human Relations*, 48, 97-125.
- Ashkanasy, N. M., Härtel, C. E. J., & Zerbe, W. J. (2000). Emotions in the workplace: Research, theory, and practice - Introduction. In N. M. Ashkanasy, W. Zerbe, & C.E.J. Härtel (Eds.) *Emotions in the workplace: Research, theory, and practice* (pp. 3-18). Westport, CT: Quorum Books.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barlow, D. H. (1988). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. New York: Guilford Press.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.

- Beal, D. J., Weiss, H. M., Barros, E., & MacDermid, S. M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology, 90*, 1054-1068.
- Bonaccio, S., & Dalal, R. S. (2006). Advice taking and advice giving in decision making: an integrative literature review, and implications for the organizational sciences. *Organizational Behavior and Human Decision Processes, 101*, 127-151.
- Brief, A. P. & Weiss, H. M. (2002). Organizational behavior: Affect in the workplace. *Annual Review of Psychology, 53*, 279-307.
- Brooks, A. W., & Schweitzer, M. (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.
- Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research & Therapy, 5*, 51-62.
- Butler, G., & Mathews, A. (1987). Anticipatory anxiety and risk prediction. *Cognitive Therapy and Research, 11*, 551-565.
- Cain, D. M., Loewenstein, G., & Moore, D. A. (2005). The dirt on coming clean: Perverse effects of disclosing conflicts of interest. *Journal of Legal Studies, 34*, 1-25.
- Cannon-Bowers, J.A., & Salas, E. (1998). *Making decisions under stress*. Washington, D.C.: American Psychological Association.

- Chen, E. (1996). Effects of state anxiety on selective processing of threatening information. *Cognition & Emotion*, 10(3), 225–240.
- Clore, G.L., Gasper, K., & Garvin, E. (1998). *Affect as Information*. In J.P. Forgas (Ed.), *Handbook of affect and social cognition*, pp. 121-144. Mahwah, NJ: Erlbaum.
- Cooper, R.S. (1991). Information processing in the judge-advisor system of group decision-making. Unpublished master's thesis, University of Illinois, Urbana-Champaign.
- Darke, S. (1988). Effects of anxiety on inferential reasoning task performance. *Journal of Personality and Social Psychology*, 55(3), 499-505.
- Deffenbacher, J. L. (1977). Relationship of worry and emotionality to performance on the Miller analogies test. *Journal of Educational Psychology*, 69, 191-195.
- DeWall, C. N., Baumeister, R. F., & Vohs, K. D. (2008). Satiated with belongingness? Effects of acceptance, rejection, and task framing on self-regulatory performance. *Journal of Personality and Social Psychology*, 95(6), 1367-1382.
- D'Aveni, R. A. (1995). *Hypercompetition*. New York: Free Press.
- Driskell, J. E., & Salas, E. (1996). *Stress and human performance*. Mahwah, NJ: L. Erlbaum.
- Dunn, J., Ruedy, N. & Schweitzer, M. (2011). Too good to be trusted? The effect of performance comparisons on affective and cognitive trust. *Organizational Behavior and Human Decision Processes*.
- Dunn, J. & Schweitzer, M. (2005). Feeling and believing: The influence of emotion on trust. *Journal of Personality and Social Psychology*, 88(6), 736-748.

- 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.
- Eysenck, M.W., Derakshan, N., Santos, R., & Calvo, M. (2007). Anxiety and cognitive performance: The Attentional Control Theory. *Emotion*, 7 (2), 336 - 353.
- Feng, B., & MacGeorge, E. L. (2006). Predicting receptiveness to advice: Characteristics of the problem, the advice-giver, and the recipient. *Southern Journal of Communication*, 71(1), 67-85.
- Fineman, S. (1993). Organizations as emotional arenas. In S. Fineman, (Ed.), *Emotion in organizations* (pp. 9-35). London, UK: Sage Publications.
- Fisher, C. D., & Ashkanasy, N. M. (2000). The emerging role of emotions in working life: An introduction. *Journal of Organizational Behavior*, 21, 123-129.
- Forgas, J. P. (1995). Mood and judgment: The Affect Infusion Model (AIM). *Psychological Bulletin*, 11, 39-66.

- Fredrickson, B. L. & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19(3), 313-332.
- Frijda, N. H. (1986). *The emotions*. Cambridge: Cambridge Univ. Press.
- Frijda, N. H., Kuipers, P., & ter Shure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, 57, 212-228.
- Gallagher, D., & Clore, G. (1985). Effects of fear and anger on judgments of risk and evaluations of blame. Paper presented at the meeting of the Midwestern Psychological Association, Chicago.
- Ganzer, V. J. (1968). Effects of audience presence and test anxiety on learning and retention in a serial learning situation. *Journal of Personality and Social Psychology*, 8, 194-199.
- George, J. M., Jones, G. R., & Gonzalez, J. A. (1998). The role of affect in cross-cultural negotiations. *Journal of International Business Studies*, 29, 749-772.
- Gino, F. (2008). Do we listen to advice just because we paid for it? The impact of cost of advice on its use. *Organizational Behavior and Human Decision Processes*, 107(2), 234-245.
- Gino, F., & Moore, D. A. (2007). Effects of task difficulty on use of advice. *Journal of Behavioral Decision Making*, 20(1), 21-35.
- Gino, F., & Schweitzer, M. (2008). Blinded by anger or feeling the love: How emotions influence advice taking. *Journal of Applied Psychology*, 93(5), 1165-1173.

- Goldsmith, D.J., & Fitch, K. (1997). The normative context of advice as social support. *Human Communication Research, 23*, 454-476.
- Gould, D., Petlichkoff, L., & Weinberg, R.S. (1984). Antecedents of, temporal changes in, and relationships between CSAI-2 subcomponents. *Journal of Sport Psychology, 6*, 289-304.
- 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.
- Gray, J. (1991). Fear, panic, and anxiety: What's in a name? *Psychological Inquiry, 2*(1), 77-78.
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition & Emotion, 9*, 87-108.
- Hamilton, V. (1975). Socialization anxiety and information processing: A capacity model of anxiety-induced deficits. In I. Sarason & C. D. Spielberger (Eds.), *Stress and Anxiety*, Vol. 2. London: Academic Press.
- Hartley, J., Jacobson, D., Klandermans, P. G., & Van Vuuren, C.V. (1991). *Job insecurity: Coping with jobs at risk*. London, UK: Sage Publications.
- Harvey, N., & Fischer, I. (1997). Taking advice: Accepting help, improving judgment, and sharing responsibility. *Organizational Behavior and Human Decision Processes, 70*, 117-133.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum.

- Jordan, P. J., Ashkanasy, N. M., & Härtel, C. E. J. (2002). Emotional intelligence as a moderator of emotional and behavioral reactions to job insecurity. *Academy of Management Review, 27*, 361-372.
- Judge, T. A., & Ilies, R. (2004). Affect and job satisfaction: A study of their relationship at work and at home. *Journal of Applied Psychology, 89*(4), 661-673.
- 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.
- Larrick, R. P., & Soll, J. B. (2006). Intuitions about combining opinions: Misappreciation of the averaging principle. *Management Science, 52*, 111-127.
- Lerner J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology, 81*(1), 146-159.
- Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgment and choice. *Cognition and Emotion, 14*, 473-493.
- Lerner, J. S., Small, D. A., Loewenstein, G. (2004). Heart strings and purse strings: Carryover effects of emotions on economic decisions. *Psychological Science, 15*(5), 337-340.
- MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediated effects in prevention studies. *Evaluation Review, 17*, 144-158.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593-614.

- Maddux, J. E. (1995). Self-efficacy theory: An introduction. In J.E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 3-33). New York: Plenum.
- Marks, I. & Nesse, R. (1994). Fear and fitness: An evolutionary analysis of anxiety. in *The Maladapted Mind*, New York, NY: Elsevier Science Inc., pp. 57-60.
- Martens, R., Burton, D., Vealey, R.S., Bump, L.A., & Smith, D.E. (1990). Development and validation of the Competitive State Anxiety Inventory-2. In R. Martens, R.S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117-190). Champaign, IL: Human Kinetics.
- Martin, J. J., & Gill, D. L. (1991). The relationship among competitive orientation, sport-confidence, self-efficacy, anxiety, and performance. *Journal of Sport and Exercise Psychology*, 13, 149-159.
- Moran, S. & Schweitzer, M. (2008). When better is worse: Envy and the use of deception in negotiations. *Negotiation and Conflict Management Research*, 1(1), 3-29.
- Mueller, J. H. (1976). Anxiety and cue utilization in human learning and memory. In Zuckerman, M. & Spielberger, C.D. (Eds.) *Emotions and Anxiety: New Concepts, Methods and Applications*, Potomac, Md: Erlbaum Associates.
- Norem, J. & Chang, E. (2002) The positive psychology of negative thinking, *Journal of Clinical Psychology*, 58(9), 993-1001.



- Patt, A., Bowles, H. R., & Cash, D. (2006). Mechanisms for enhancing the credibility of an advisor: Prepayment and aligned incentives. *Journal of Behavioral Decision Making, 19*, 347–359.
- Pham, M. T. (1998). Representativeness, relevance, and the use of feelings in decision-making. *Journal of Consumer Research, 25*, 144–159.
- Pham, M. T. (2004). The logic of feeling. *Journal of Consumer Psychology, 14*(4), 360–69.
- 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.
- Raghunathan, R., Pham, M. T., & Corfman, K. P. (2006). Informational properties of anxiety and sadness, and displaced coping. *Journal of Consumer Research, 32*(4), 596-601.
- Richeson, J.A. & Trawalter, S. (2005). Why do interracial interactions impair executive function? A resource depletion account. *Journal of Personality and Social Psychology, 88*, 934-947.
- Russell, J. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39, 6*, 1161-1178.
- Savitsky, K., Medvec, V. H., Charlton, A. E., & Gilovich, T. (1998). “What, me worry?”: Arousal, misattribution, and the effect of temporal distance on confidence. *Personality and Social Psychology Bulletin, 24*, 529–536.

- Schunk, D. H. (1995). Self-efficacy and education and instruction. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application*, (pp. 281-303). New York: Plenum.
- Schwarz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. Higgins & R. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behavior*. New York: Guilford Press.
- Schwarz, N., & Clore, G. L. (1988). How do I feel about it? Informative functions of affective states. In K. Fiedler & J. Forgas (Eds.), *Affect, cognition, and social behavior* (pp. 44–62). Toronto, Ontario, Canada: Hogrefe.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45, 513–523.
- Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: Nelson.
- Sengupta, J., & Johar, G. V. (2001). Contingent effects of anxiety on message elaboration and persuasion. *Personality and Social Psychology Bulletin*, 27(February), 139-150.
- Shepperd, J., Grace, J., Cole, L., & Klein, C. (2005). Anxiety and outcome predictions. *Personality and Social Psychology Bulletin*, 31(2), 267-275.
- Smith, C. & Ellsworth, P. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, 48(4), 813-838.

- Sniezek, J. A., & Buckley, T. (1995). Cueing and cognitive conflict in judge-advisor decision making. *Organizational Behavior and Human Decision Processes*, 62, 159–174.
- Sniezek, J. A., & Van Swol, L. M. (2001). Trust, confidence, and expertise in a judge-advisor system. *Organizational Behavior and Human Decision Processes*, 84, 288–307.
- Sniezek, J.A., Schrah, G.E., & Dalal, R.S. (2004). Improving judgment with prepaid expert advice. *Journal of Behavioral Decision Making*, 17, 173-190.
- 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.
- Stöber, J. (1997). Trait anxiety and pessimistic appraisal of risk and chance. *Personality and Individual Differences*, 22, 465–476.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18, 643–662.
- Tost, L. P., Gino, F., & Larrick, R. (2012). Power, competitiveness, and advice taking: Why the powerful don't listen. *Organizational Behavior and Human Decision Processes*. In press.
- Van Swol, L. M. & Sniezek, J.A. (2005). Factors affecting the acceptance of expert advice. *British Journal of Social Psychology*, 44, 443-461.
- Yaniv, I. (2004). Receiving other people's advice: Influence and benefit. *Organizational Behavior and Human Decision Processes*, 93, 1-13.

- Yaniv, I. (1997). Weighting and trimming: Heuristics for aggregating judgments under uncertainty. *Organizational Behavior and Human Decision Processes*, 69, 237-249.
- Yaniv, I., & Foster, D. P. (1997). Precision and accuracy of judgmental estimation. *Journal of Behavioral Decision Making*, 10, 21-32.
- Yaniv, I., & Kleinberger, E. (2000). Advice taking in decision making: Egocentric discounting and reputation formation. *Organizational Behavior and Human Decision Processes*, 83(2), 260–281.
- Yaniv, I., & Milyavsky, M. (2007). Using advice from multiple sources to revise and improve judgment. *Organizational Behavior and Human Decision Processes*, 103, 104–120.
- Young, A. S., Klap, R., Shoai, R., & Wells, K. B. (2008). Persistent depression and anxiety in the United States: Prevalence and quality of care. *Psychiatric Services*, 59, 1391-1398.
- Zatz, S., & Chassin, L. (1985). Cognitions of test anxious children under naturalistic test-taking conditions. *Journal of Counseling and Clinical Psychology*, 53, 393-401.

## Tables

Table 1

*Mediation analyses, Experiment 1-6. The table reports standardized coefficients for each regression. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$*

## (a) Experiment 1

	Self- confidence $X \rightarrow M$	Advice seeking $X \rightarrow Y$	Advice seeking $X, M \rightarrow Y$
Anxiety	-.44***	.24*	.13
Self-confidence			-.26*
$R^2$	.19***	.06*	.11**
95% bias-corrected CI			[1.05, 5.80]

## (b) Experiment 2

	Self- confidence $X \rightarrow M$	Advice taking $X \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.37***	.29**	.10
Anger	.32***	-.28**	-.11
Self-confidence			-.53***
$R^2$	.36***	.24***	.42***
95% bias-corrected CI			[.05, .18]

## (c) Experiment 3

	Self- confidence $X \rightarrow M$	Advice quality $X \rightarrow Y$	Advice quality $X, M \rightarrow Y$	Advice taking $X, M \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.32**	.28*	.07	.27*	.12
Self- confidence			-.67***		-.46***
$R^2$	.10**	.08*	.48***	.07*	.26***
95% bias- corrected CI			[.19, 1.11]		[.24, 2.04]

## (d) Experiment 4

	Self- confidence $X \rightarrow M$	Advice taking $X \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.72***	.34***	.18*
Self-confidence			-.47***
$R^2$	.12***	.12***	.31***
95% bias-corrected CI			[.05, .21]

## (e) Experiment 5b

	Self- confidence $X \rightarrow M$	Advice taking $X \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.36***	.49**	.22***
Unreasonably high	.13	-.15*	-.06
Unreasonably low	.15	-.14	-.03
Self-confidence			-.74***
$R^2$	.14***	.25***	.72***
95% bias-corrected CI			[.13, .27]

## (f) Experiment 5c

	Self- confidence $X \rightarrow M$	Advice quality $X \rightarrow Y$	Advice quality $X, M \rightarrow Y$	Advice taking $X, M \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.32***	.37***	.32***	.46***	.25***
Advice accuracy	-.12	.36***	.34***	.12	.05
Self- confidence			-.18*		-.63***
$R^2$	.12**	.26***	.29***	.22***	.57***
95% bias- corrected CI			[.03, .31]		[.07, .25]

## (g) Experiment 6

	Self- confidence $X \rightarrow M$	Advice taking $X \rightarrow Y$	Advice taking $X, M \rightarrow Y$
Anxiety	-.32***	.47***	.32***
Advisor conflict	.07	-.10	-.06
Self-confidence			-.47***
$R^2$	.10**	.22***	.42***
95% bias-corrected CI			[.06, .19]



Table 2

*Means and standard deviations by condition, Experiment 2.*

	Feelings of anxiety	Neutral feelings	Feelings of anger	Advice taking (DV)	Self- confidence (mediator)
Anxiety	4.46 (1.39)	2.45 (1.57)	1.75 (1.02)	0.51 (0.30)	3.21 (1.14)
Neutral condition	1.97 (1.51)	3.50 (1.68)	1.55 (1.12)	0.36 (0.16)	4.09 (0.74)
Anger condition	2.23 (1.49)	2.81 (1.45)	3.09 (1.24)	0.21 (0.14)	4.84 (0.72)

## Figure Captions

*Figure 1.* Theoretical Model.

*Figure 2.* Interaction of Emotion and Advice Quality on Perceived Quality (Experiment 5a)

*Figure 3.* Interaction of Emotion and Advice Quality on Advice Taking (Experiment 5b)

*Figure 4.* Interaction of Emotion and Conflict of Interest on Advice Taking (Experiment 6)

Figure 1

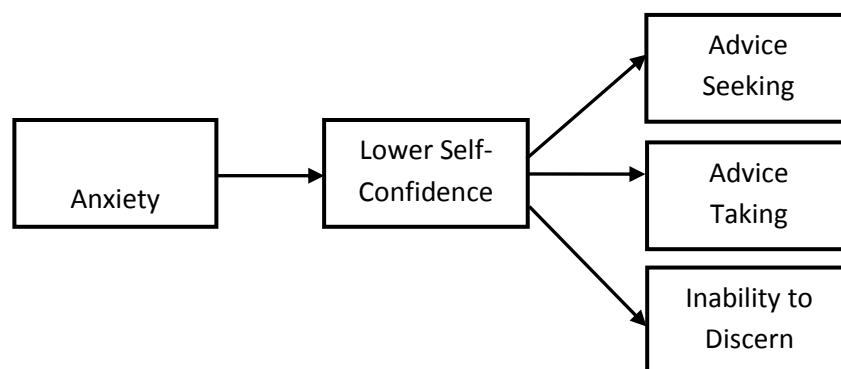


Figure 2

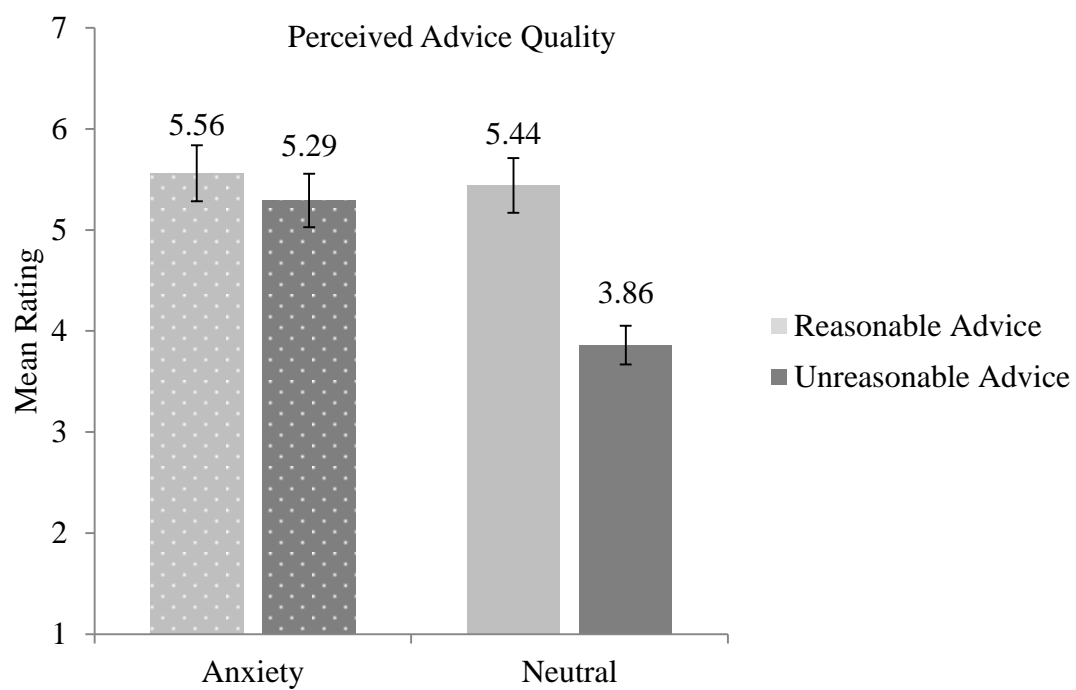


Figure 3

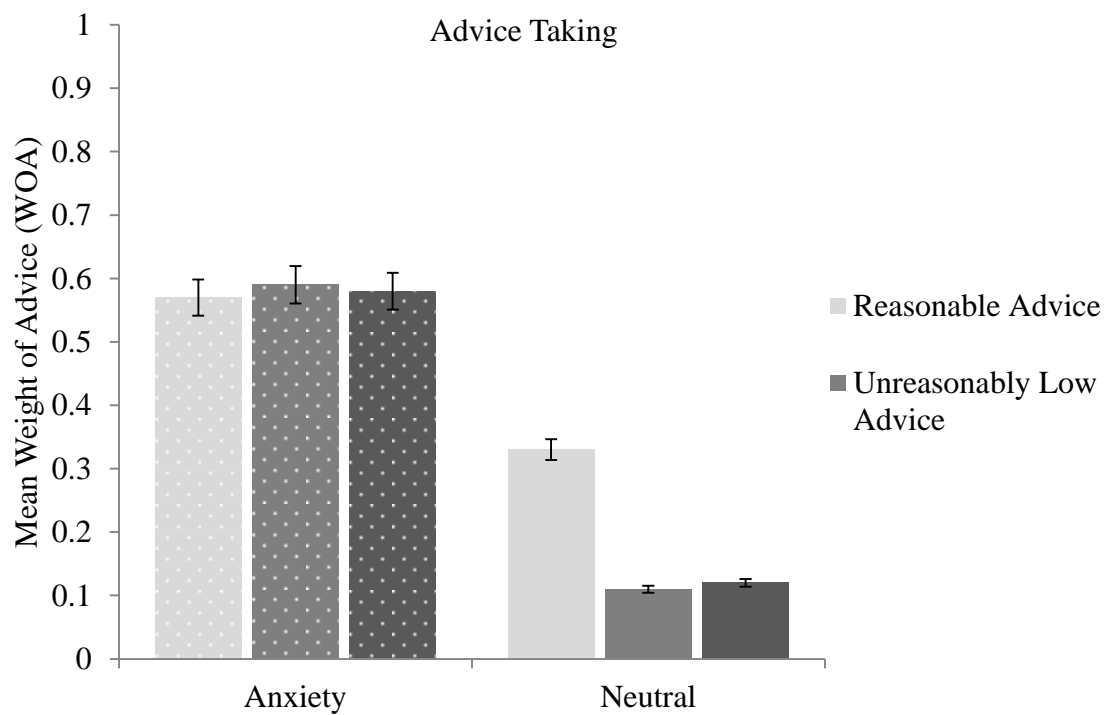
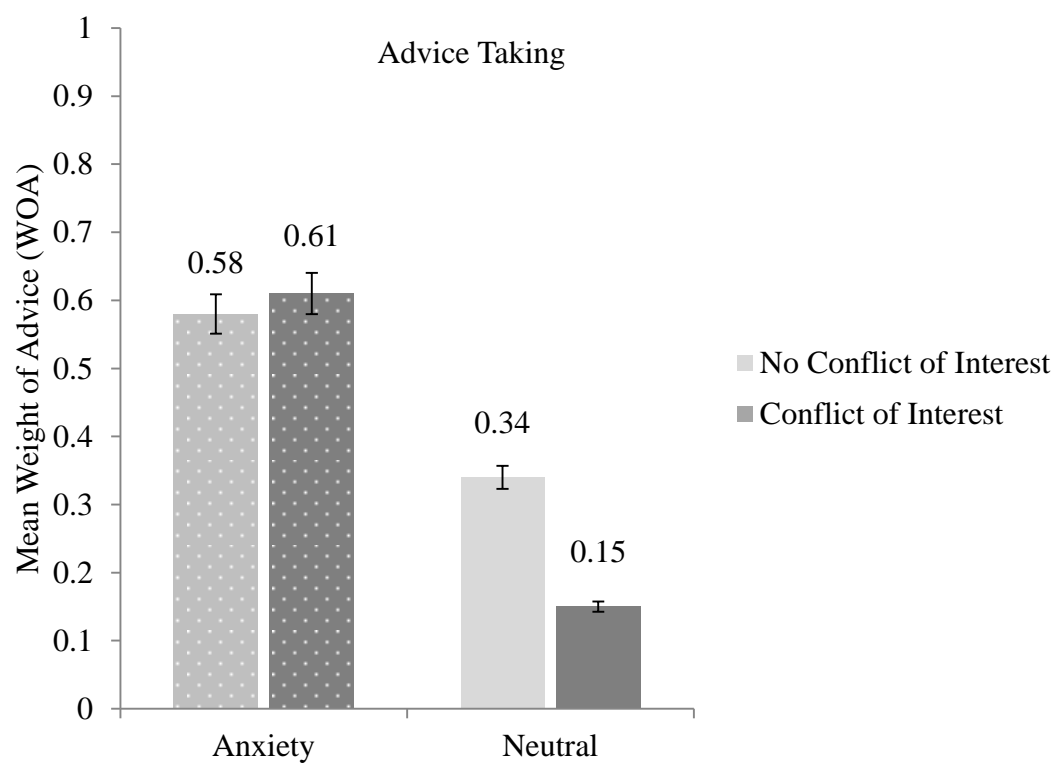


Figure 4



CHAPTER 3.  
GET EXCITED:  
REAPPRAISING PRE-PERFORMANCE ANXIETY AS EXCITEMENT

Alison Wood Brooks

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 adopt an opportunity mindset (as opposed to a threat mindset) and improve their subsequent performance.

## GET EXCITED:

## REAPPRAISING PRE-PERFORMANCE ANXIETY AS EXCITEMENT

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 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 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 *arousal congruent*, and minimal interventions may be sufficient to shift valence and produce genuine feelings of excitement. This notion builds on seminal work on the misattribution of arousal (e.g., Schacter & Singer, 1962). We know that when the source of arousal is ambiguous, people often misunderstand the true source of their arousal. In contrast, we 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, we suggest a minimal, deliberate intervention to shift the experience of high arousal from negative to positive valence (i.e., from anxiety to excitement).

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 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 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).

#### 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”

(e.g., Gross & Levenson, 1993; Hofmann et al., 2009). For example, imagine an individual who loses a loved one. He may initially appraise this event as tragic and feel sad. But appraisal is not a one-shot process (Lazarus, 1966; Lazarus, Averill, & Opton, 1970; Monat et al., 1972; Scherer, 2001). After initially appraising the event as tragic, he may search for new aspects about the situation, environment, or his own internal state, leading him to re-evaluate the loss as symbolic rather than tragic, and reappraising his 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) suggests 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 shifting anxiety toward emotional states other than calmness.

### Reappraising Anxiety as Excitement

We break new ground by examining the reappraisal process with respect to pre-performance anxiety and *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 experiences of anxiety and excitement are remarkably similar. Both anxiety and excitement are characterized by high arousal, signaled by increased heart rate (e.g., Smith & Bradley, 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 shift from negative to positive valence because anxiety and excitement are *arousal congruent*.

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

### Overview of Current Research

We test our predictions across several experimental studies. In a pilot study, we investigate people's intuitions about managing pre-performance anxiety. We 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, we test the effectiveness of reappraising pre-performance anxiety as excitement before singing in front of a stranger. In Studies 2 and 3, 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 4, we explore the psychological mechanism underlying this phenomenon: opportunity versus threat mindset. We expect that reappraising anxiety as excitement primes an *opportunity* mindset, which in turn improves performance.

### **Pilot Study: Lay beliefs**

To motivate our main series of experiments, we conducted a pilot study to investigate people's lay beliefs related to anxiety regulation. We 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. We do not expect individuals to anticipate the benefits of reappraising anxiety as excitement.

### 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 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 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* ( $\kappa = .54$ ),  $\chi^2(1, N = 300) = 37.89, p < 0.001$ . 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,"  $\chi^2(2, N = 153) = 150.11, p < 0.001$ . 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 "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, 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 and improve subsequent singing performance.

In this study, we use randomly-assigned self-statements of emotion to induce reappraisal (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), 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.

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Insert Figure 1 about here  
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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.

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Insert Figure 2 about here

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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>4</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 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

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<sup>4</sup> Information provided by Konami in May 2012.



gender as control variables<sup>5</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.

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 Insert Figure 3 about here  
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### 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 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 ( $M = 2.19, SD = 1.72$ ),  $t = -1.62, p < .02$ .

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<sup>5</sup> For analytical consistency and transparency, we include participant age and gender as control variables across all of our studies (Simmons, Nelson, & Simonsohn, 2011).

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. 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, we 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). 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.” 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 2-3 minute speech on camera. The experimenter was blind to condition and 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*,  $\alpha = .79$ ), and persistence (*The speaker was persistent*). 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, and persistence 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.

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Insert Figure 4 about here

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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.

### Speech Duration

Participants were required to speak for at least two minutes and no longer than three minutes. As an additional measure of speaker persistence, we conducted a t-test on speech duration (in seconds) across reappraisal conditions. Participants in the "I am excited" condition spoke longer during their speeches ( $M = 167$  sec,  $SD = 26$  sec) than did participants in the "I am calm" condition ( $M = 132$  sec,  $SD = 21$  sec),  $t = 8.69$ ,  $p < .001$ . Speech duration (in seconds) and the coders' subjective ratings of "persistence" were positively correlated,  $r = .87$ ,  $p < .02$ .

### 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, to speak longer, and to be perceived as more persuasive, competent, confident, and persistent.

### **Study 3: Math Performance**

In Studies 1-2, 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 3, 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” (calmness 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.

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 Insert Figure 5 about here  
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### 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, 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 4: Psychological Mechanism**

In Studies 1-3, 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 4, 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, even with very subtle interventions, 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 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 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.”

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 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 ( $M = 2.80, SD = 1.44$ ),  $F(1,213) = 8.09, p < .005$ . 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 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 an opportunity mindset ( $M = 3.75, SD = 0.72$  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 positive evidence. The results of Study 4 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 contend with pre-performance anxiety (Pilot Study). However, across several experimental studies, we find that reappraising anxiety as excitement is easier and 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 important performance domains: singing, public speaking, and math. This phenomenon was mediated by threat versus opportunity mindset. Reappraising anxiety as excitement primed an opportunity mindset, 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., 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 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., Ekman, 1992; Gross & Levenson, 1993; Grandey, 2000, 2003; Cote, 2005; Morris & Feldman, 1996). In contrast, our findings identify anxiety and excitement as a boundary condition. 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 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 discrete emotions. A brief, simple statement (“I am excited”) or simple words of advice (“Get excited”) were sufficient to shift individuals from experiencing a negatively-valenced emotion (anxiety) to a positively-valenced 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 calmness), but we find that shifting valence and maintaining high arousal may be easier and 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 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 should test how *arousal congruency* applies to other discrete 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. 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,” individuals’ heart rates remained high leading up to and throughout those tasks. Future work could employ 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, 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? It is possible that emotional reappraisal can operate 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.

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 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 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., Laraus, 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. Schoor, & 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 released by Konami in 2009.

Figure 2.



Figure 3.

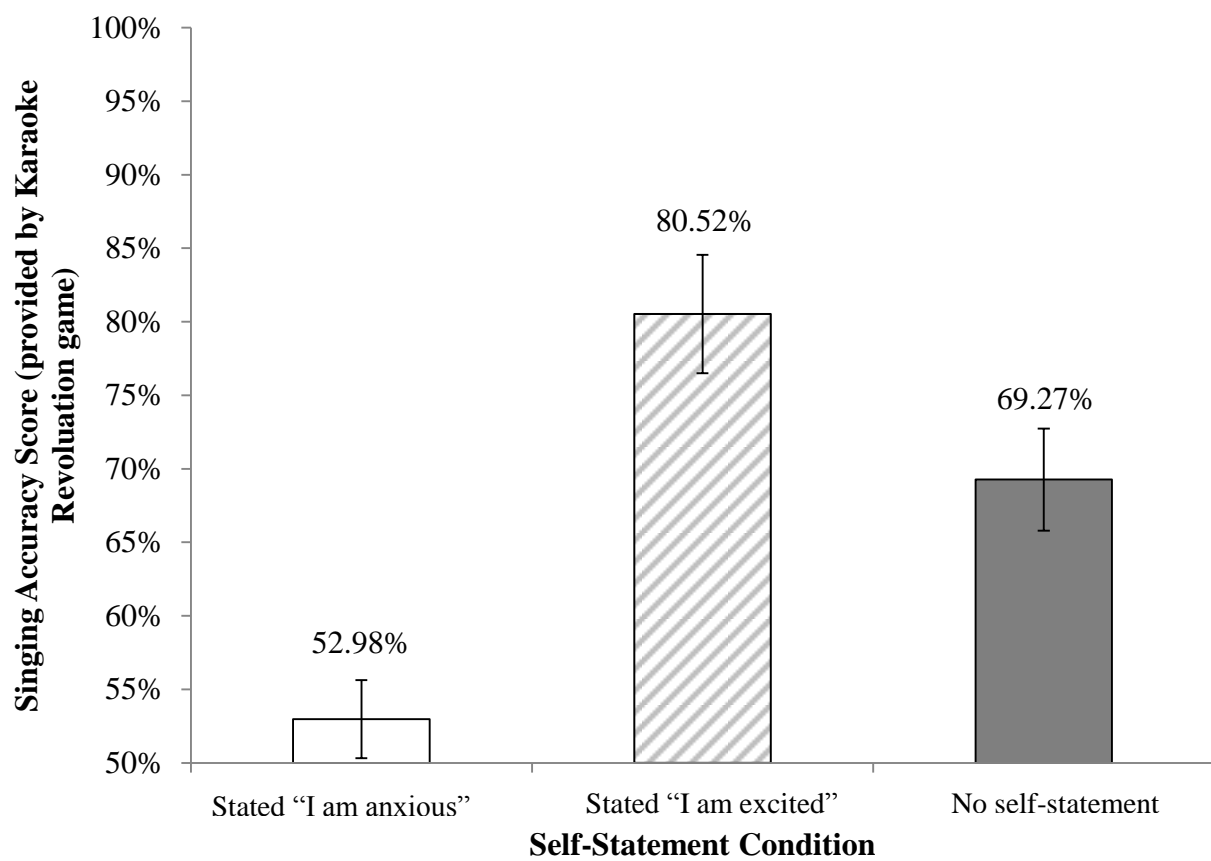




Figure 4.

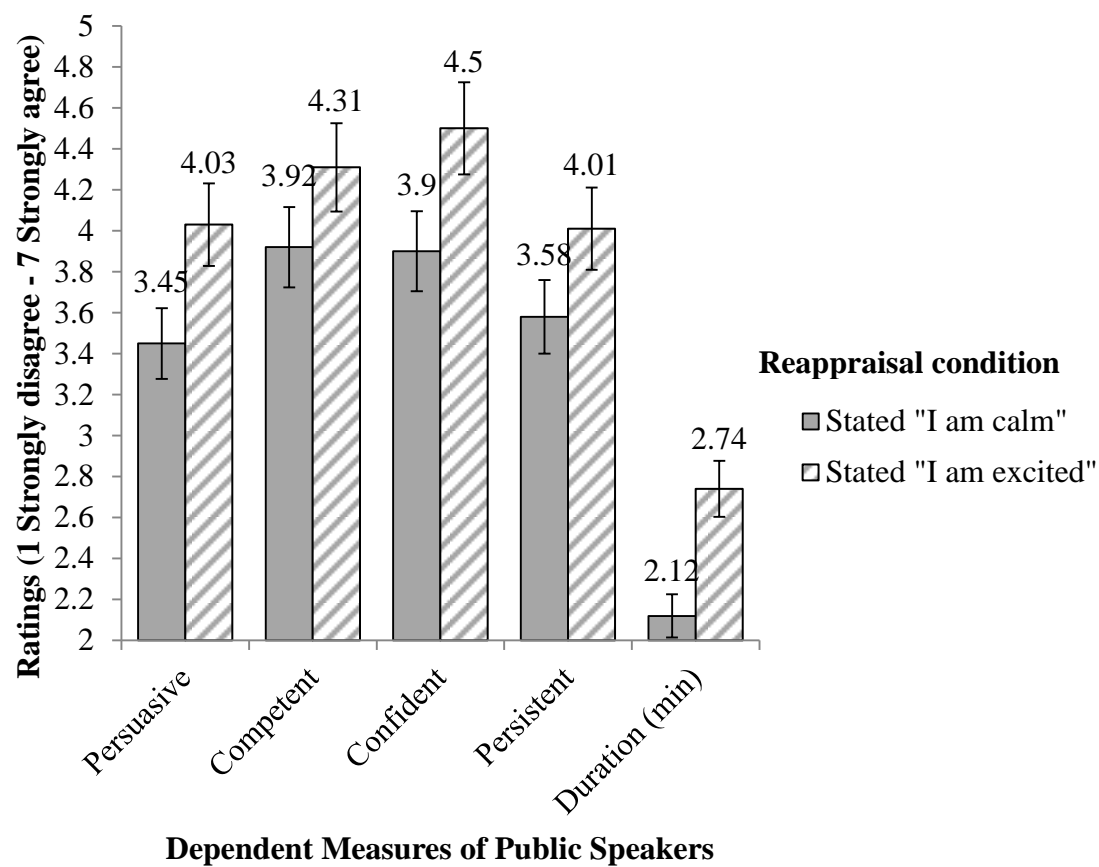


Figure 5.

