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# Choking Under Pressure: Environmental and Personality Variables

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Choking Under Pressure:  
Environmental and Personality Variables

Danielle Ranney

A DEPARTMENT HONORS THESIS SUBMITTED TO THE  
DEPARTMENT OF PSYCHOLOGY AT TRINITY UNIVERSITY  
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR GRADUATION WITH  
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Choking Under Pressure:  
Environmental and Personality Variables

Danielle Ranney

A thesis submitted to the  
Department of Psychology at Trinity University

April 18, 2007

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Thesis Advisor

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Chair of Department

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## Abstract

This experiment manipulated the level of environmental demand in a pressured dart-throwing task in order to investigate the effects of individual difference variables on performance. After performing baseline trials alone, the participant was told additional trials would occur with an audience and that they would have the chance to win \$100 if they met 90%, 100%, or 110% of their baseline scores. This demand manipulation did not affect performances. However, across demand conditions, participants reported significant increases in ratings of pressure, motivation, and anxiety compared to their baseline trials. High adaptive narcissism scores predicted worse performance under pressure than low scores, and high maladaptive narcissism scores predicted lower anxiety ratings after the pressured trials than low scores. There was also an unexpected effect of sex differences on performance in the pressured trials. Men did better than women in the first trial, while women did better than men in the second trial. These results suggest that individual differences affect performance under pressure independent of environmental demand.

## Introduction

Two students have been study partners for an entire semester. Going into the final test, Student 1 needs to moderately improve her performance in comparison to the rest of the semester to make an 'A' in the class. In contrast, Student 2 can perform at a lower level when compared to the rest of the semester to maintain an 'A' in the class. The final exam is worth half of the overall grade, and unlike the previous tests, it is a standardized test written and graded by all professors teaching sections of the class. The students feel pressure to do well in order to get the preferred grade in a situation where success is uncertain. Both students prepare for the final exam equally; however, Student 2 fails to keep the 'A' while Student 1 successfully reaches the desired grade. What happened during the test to Student 2, who needed a lower performance to earn an 'A'?

There are two likely explanations for why the student with the better record going into the final test emerged with a lower overall grade in the course. First, Student 2 may have simply felt overconfident that an 'A' was guaranteed but faced a reality check at test time. The second and more interesting possibility may seem counterintuitive from an observer's perspective: Student 2 might have felt more pressure than Student 1 experienced. Student 2 has demonstrated ability and competence on the previous tests that Student 1 has not established, and as a result, others likely expect Student 2 to uphold that prior success by repeating it on the final test. Student 2 did well on the earlier tests when the stakes were low, but the final exam was worth a higher percentage of the total grade than the earlier tests. Almost everyone has personally experienced what it is like to perform below their capability when they felt a good performance mattered most. This common occurrence is known as choking under pressure (Baumeister & Steinhilber, 1984; for a review see Baumeister & Showers, 1986). Choking can happen in

virtually every environment, because various situations are stressful for different people, including those in which one has been successful before.

Prior success, as demonstrated by Student 2's superior scores going into the final test, did not necessarily decrease performance pressure. It is likely that both students felt less pressure about the earlier tests than they did about the final test, which affected their overall grades as much as all of the earlier tests combined. When the circumstances of a situation change, such as the importance of the final test, prior success is not necessarily comforting. One might expect past achievements to raise people's confidence in their abilities to repeat those achievements again, but sometimes confidence levels come up short. For people who are unsure that they can repeat a performance, a situation requiring them to perform at a previously achieved level could increase feelings of pressure. This is especially likely if a person finds the performance important to his or her self-esteem or public image (Rhodewalt, 1990). In the example, Student 2 may have lacked confidence in his or her ability to do well on the final test, despite having done well before. Teacher or parental expectations derived from good test performances in the past may have increased the Student 2's perception of pressure about the final test. In certain situations, prior success has the potential to increase pressure rather than confidence, and consequently, previous success can hinder future performances.

Prior success does not make a person immune to choking under pressure. In fact, having previously succeeded at a task constitutes performance pressure in and of itself, because failure to repeat that success is diagnostic of choking. If a person has not succeeded before and does not succeed again, then that the person may not have the ability required to do well on that particular task. However, once ability has been established, failure implies that the performer choked. Anyone concerned with the appearance of choking under pressure likely feels anxiety about

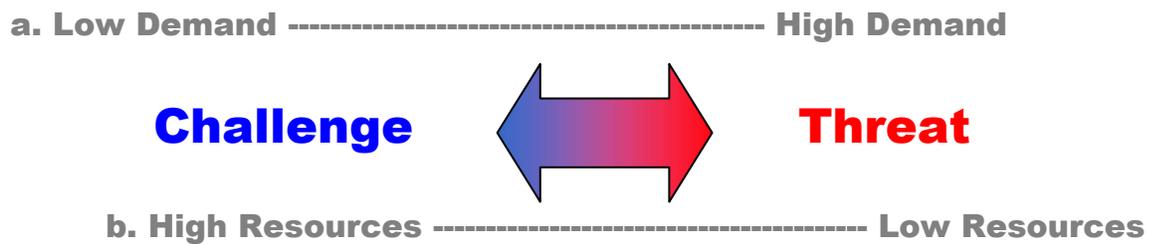
repeating a performance, especially if the stakes have increased. When the spotlight turns on, so does the pressure.

Whenever a person feels performance pressure, choking becomes a possible outcome. In order to feel performance pressure, people must find the situation personally meaningful or important and believe that their actions will affect the outcome (Folkman & Lazarus, 1985; Wallace et al., 2005). Interestingly, not everyone who feels pressure performs poorly; pressure is a necessary but not a sufficient condition of choking. Cognitive Appraisal Theory (CAT) explains how performance pressure can lead to both choking and successful outcomes. CAT proposes that people evaluate a situation with two appraisals that eventually lead to an overall response state that influences performance (Folkman & Lazarus, 1985). The first assessment, the demand appraisal, is made by a person about the environmental demands or the external stressors of a situation. Environmental demand involves key components such as physical and psychological danger, uncertainty, and required effort (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003). Demand is the appraisal of how good one has to be to get the job done. However, the degree and type of pressure depends not only on the environmental demand, but also what resources a person possesses to deal with it.

The resource appraisal in CAT assesses the internal resources available to cope with the perceived demands. Such resources consist of skills, knowledge, and abilities (Blascovich et al., 2003). Resources are anything that allows one to deal with environmental demand and can include practice or even social support. According to Folkman and Lazarus (1985), the greater the perceived environmental demand, the more resources and coping skills are needed for success. A challenge response occurs when a person believes he or she possesses adequate resources to meet the environmental demand (Tomaka et al., 1993). Alternatively, a threat

response emerges when a person feels that he or she does not possess the skills demanded by the situation (Tomaka et al., 1993).

In a challenge response, a person feels the potential for growth, gain, or mastery of a particular skill exists (Tomaka et al., 1993). A challenge response is associated with positive emotions and advantageous outcomes (Skinner & Brewer, 2002). In a threat response, a person feels the potential for injury or the loss of something one currently values (Tomaka et al., 1993). Threat responses are associated with negative emotions and can lower immediate performance as well as create burnout over time (Folkman & Lazarus, 1985; Skinner & Brewer, 2002). Figure 1 illustrates how a demand-resource ratio determines a challenge or threat response state. For example in this study, a challenge response will be identified by maintaining or improving upon one's previous performance and a threat response will be identified by lowered performances.



*Figure 1.* Cognitive Appraisal Theory continuum of stress responses. External stressors are evaluated during the demand appraisal (a), and coping resources are assessed during the resource appraisal (b). The challenge or threat response is determined by a demand-resource ratio. If demand is less than or equal to resource level, a challenge response occurs. Alternatively, if demand is greater than resource level, a threat response emerges.

This study proposes that the demand-resource continuum implied by CAT may be an oversimplification of the stress evaluation process. CAT predicts that the less demanding a situation, the more likely individuals will possess adequate resources and experience a challenge response. However, situations involving low demands and high resources can result in a threat response, especially after a person has previously demonstrated competence at a task.

Prior success demonstrates to others that one has the ability to succeed and often increases audience expectancies about the current situation. These audience expectations of success intensify the pressure a performer feels (Baumeister, Hamilton, & Tice, 1985). A person may not always feel confident in her ability to reproduce a performance. Unless the performer's private expectancies match those of the audience, the pressure from audience expectancies could hurt the actual performance (Baumeister et al., 1985). Failing to uphold competence on a task could result in changes in the performer's self-concept and public image. CAT predicts that situations in which people have previously demonstrated success will produce a challenge response when repeating one's previous score is likely. However, these situations have the potential to elicit a threat response instead and harm performances, especially when people lack confidence in their ability to repeat the original performance.

When others expect success but the performer remains uncertain, the performer might employ methods other than performance to escape potential mental distress. Self-handicapping is a strategy employed to protect one's self-concept and/or public image, thereby reducing the goal relevance to one's self (Rhodewalt, 1990; Seery, Blascovich, Weisbuch, & Vick, 2004). In self-handicapping, a person attributes performance outcomes to a specific situation rather than individual characteristics (Rhodewalt, 1990), which allows one to discount lack of ability or to augment success. For example, a tennis player may not practice for an upcoming match that he

is predicted to win. If he were to lose the match, he could claim it was due to not practicing instead of less ability than his opponent. However, if the tennis player were to win the match, he could point out his lack of practice, to make the win more impressive than it otherwise would have been. People tend to feel more comfortable in pressured situations if they have an excuse for failure, and self-handicapping strategies provide this excuse, which decreases performance pressure and could conceivably benefit performance.

Prior success often increases others' expectations of a person repeating the same level of performance, and as a result, self-handicappers in particular may feel pressure when attempting a task on which they have previously exhibited competence. This idea can be illustrated by a scenario in which a basketball player needs to shoot a free-throw to win a big game. The free-throw is a well-practiced shot and in itself presents relatively low demand for an average-skilled player; yet, the audience expects the player to make the shot and the outcome of the game rests in its execution. Even though the audience expectations and game importance do not increase the amount of skill required to shoot a free-throw, the player likely feels more pressure to make the basket than usual. The presence of an audience can increase perceptions of performance pressure. In situations where the desire to do well would be sufficient to motivate performance without an audience, the presence of an audience can result in choking from the added pressure (Wallace et al., 2005). Thus, even though the player possesses adequate resources to make the shot, choking under pressure and missing the basket is a plausible outcome.

Challenge and threat responses can be experimentally induced based solely on changes in the environmental demand (Blascovich et al., 2003), but according to the CAT, the demand appraisal contributes only half of the information that people assess in stressful situations. Challenge and threat responses are determined by the demand-to-resource ratio, so the resource

appraisal is just as important as demand in predicting cognitive stress responses. It has been found that in the presence of uncertainty regarding the task and/or personal abilities, people with comparable demand appraisals can experience different response states (Tomaka et al., 1993). Although less frequently studied than other aspects of the resource appraisal, individual differences have been shown to produce challenge or threat responses. For example, the belief in a just world can mediate threat responses, making a challenge response more likely (Tomaka & Blascovich, 1994). Because subjective evaluations differ between people, individual differences likely account for more variation in response states than environmental factors alone, particularly in situations with a high degree of uncertainty.

### *Individual Differences*

Several individual differences that have particular relevance to choking under pressure and the CAT are self-handicapping, narcissism, self-esteem, and self-consciousness. Because self-handicapping strategies are used to protect self-concepts and public images, self-handicappers care how they are viewed by both themselves and others (Rhodewalt, 1990). Prior success demonstrates ability and competence. Once established, competence at a task can become a defining characteristic of the person. Failing to uphold that competence could result in changes in one's self-concept as well as changes in how others view the person. Consequently, situations in which self-handicappers have previously demonstrated success have the potential to threaten their sense of worth, even when those situations involve low demand and the person in question possesses many resources. In general, self-handicappers should feel better with a disadvantage because that is what they seek to give themselves; however, there is little evidence that self-handicapping benefits performance (e.g., Ferrari & Tice, 2000), presumably because the

costs of self-imposed handicaps outweigh the benefits of reduced anxiety or performance pressure.

A second individual difference with direct relevance to choking under pressure and the CAT is narcissism. For this study, the term narcissist does not refer to those with narcissistic personality disorder. Instead the term refers to those in the general population with high narcissism tendencies that do not meet the criteria required for a formal diagnosis. Narcissists generally possess high confidence in their abilities and high perceptions of their performance (Wallace & Baumeister, 2002), but these self-images are vulnerable because they are not always based in reality (Rhodewalt, Tragakis, & Finnerty, 2006). Narcissists tend to perceive themselves as better than others and want other to know it, so they may thrive in highly demanding, public situations (Wallace & Baumeister, 2002). Contrarily, they may perform below average when a task is private and not diagnostic of special skills (Wallace & Baumeister, 2002).

Wallace and Baumeister (2002) speculated that this may occur because narcissists lack motivation in tasks where success is expected, but Rhodewalt et al. (2006) argued that this could be a form of choking. Rhodewalt et al. (2006) proposed that narcissists have nothing to lose in difficult situations but are easily threatened in others. Lack of success in a difficult situation does not hurt the public's opinion about a person as much as failure on a relatively easy task. Because narcissists seem to care immensely about appearing superior to others (Wallace & Baumeister, 2002), they likely feel pressure to avoid failure when success is expected. Unfortunately, failure avoidance, as opposed to success seeking, is predictive of lower performance outcomes (Elliot & McGregor, 2001). Rhodewalt et al. (2006) found that individuals with high narcissism scores use self-handicapping strategies to protect self-esteem

and public image more often than those with low narcissism scores (Rhodewalt et al., 2006). Narcissists may feel more comfortable in situations where success is expected if they have an excuse for failure. Self-handicapping allows them to maintain their sense of great self-worth and their inflated public images even in the case of an undesirable outcome. When combined, these findings indicate that narcissists may feel threatened more often than average and that choking under pressure is frequently a possible outcome, especially regarding easy tasks that offer little potential to shine.

Narcissists may experience CAT-inconsistent responses as well as the tendency to self-handicap: Narcissists perform well when opportunities for self-enhancement exist, but they do relatively poorly in their absence (Wallace & Baumeister, 2002). Consequently, those with high narcissism scores may perform better when success is gauged as unlikely. In other words, in situations with high demand and lower resources, narcissists may experience a challenge response and do well in contrast to the threat response predicted by CAT. Furthermore, these same individuals may be afraid of failure in situations where success is expected, and thus perform below what they are capable of producing due to choking. It is also possible that narcissists perform poorly because they are simply not motivated by these situations.

Two specific expressions of narcissism include adaptive and maladaptive styles. Adaptive narcissism positively correlates with optimism, self-esteem, and negatively with social anxiety (Sturman, 2000; Watson & Biderman, 1993). In contrast, maladaptive narcissism is linked to pessimism, depression, and anxiety (Sturman, 2000; Watson & Biderman, 1993). It is likely that those with adaptive narcissism are less likely to feel threatened than those with maladaptive narcissism.

Those with high narcissism scores tend to have high self-esteem as well, even if it is generally extreme and/or unstable. Although in most research self-esteem and narcissism are moderately correlated, self-esteem and narcissism are not the same. Self-esteem is a general and subjective sense of an individual's self-worth. Some aspects of narcissism are related to self-esteem, such as an inflated sense of importance and a preoccupation with one's own greatness (Raskin & Terry, 1988). However, other narcissism tendencies are less directly related to self-esteem, like a lack of empathy and a sense of entitlement (Raskin & Terry, 1988).

High self-esteem can be predictive of decreased choking, independent of narcissism characteristics (Wallace et al., 2005). High self-esteem may predict decreased failure avoidance as well (Wallace et al., 2005). Those with high self-esteem are more likely than those with low self-esteem to perceive a situation as controllable, which is associated with increased performance (Lane, Jones, & Stevens, 2002). It has been proposed that high self-esteem also influences cognitive appraisals by making memories of positive accomplishments more salient while low self-esteem increases the appraisal of high environmental demand (Lane et al., 2002). Based on these findings, it is likely that high self-esteem makes a person more likely to experience a challenge as opposed to a threat response in reaction to performance pressure.

Self-consciousness is another individual difference that may influence the cognitive appraisal process. Self-consciousness is of interest because of its association with performance and choking under pressure. Self-consciousness as an individual difference means awareness about the self or a tendency to self-analyze (Watson & Biderman, 1993). It has been found that individuals with high dispositional self-consciousness are less susceptible to choking under pressure on new tasks than those with low self-consciousness (Baumeister, 1984). It has also been found that people who are trained to perform with high attention to the self performed

better under pressure than those without self-consciousness training (Beilock & Carr, 2001).

This effect was viewed as a result of those with high self-consciousness being more acclimatized to self-focus than those with low self-consciousness. Consequently, in pressured situations, negative effects emerge in the performance of those with low but not high self-consciousness.

Self-consciousness can be broken down into public, private and social anxiety measures (Fenigstein, Scheier, & Buss, 1975). Public self-consciousness involves concern with performance and self-presentation while private self-consciousness encompasses both awareness about internal states and a tendency to self-reflect (Fenigstein et al., 1975). Low private self-consciousness has been associated with higher performance under pressure than high private self-consciousness (Baumeister, 1984). Because many pressured situations involve audiences, high public self-consciousness may be especially likely to affect cognitive appraisals.

Social anxiety is another dimension of self-consciousness in which the presence of an audience may influence cognitive appraisals. Those who have high social anxiety generally feel nervous or uneasy when others are around (Fenigstein et al., 1975). The presence of other people will likely decrease the performance of those with high social anxiety, similarly to those with high public self-consciousness.

### *The Current Study*

To assess environmental and personality variables in relation to performance under pressure, a dart task was selected because it has been used in previous studies of choking under pressure (e.g., Wallace & Baumeister, 2002) and is conceptually similar to golf putting, which has also been used in previous studies (e.g., Beilock & Carr, 2001). Additionally, most people in our participant sample have limited experience throwing darts. After demonstrating a baseline performance level on the dart task, participants were told to repeat the task with an audience for a

potential monetary reward. Participants were assigned to one of three conditions: low demand, control, and high demand. The low demand condition was intended to exemplify a CAT challenge situation where participants have demonstrated prior success and possess more than enough resources to succeed. The high demand condition was meant to mimic a CAT threat situation, where resources are possibly not enough to meet the environmental demand.

Cognitive responses were assessed by performance outcomes. Challenge responses were assumed to occur when participants perform equal to or better than their baseline scores, and performances worse than their previous scores will signify a threat response. According to CAT, those in the low demand condition should demonstrate a challenge-consistent performance, while those in the high demand condition should show a threat-consistent performance. In contrast to CAT, it is predicted that some people in the low demand condition will perform worse than their previous scores, while some people in the high demand will improve on performances.

Specifically, in the high demand condition, those with high narcissism scores may be more likely to exhibit a challenge-consistent performance than those with low narcissism, because those with high self-esteem may be more likely to perform well in general compared to those with low self-esteem. Furthermore, those with high social anxiety scores may demonstrate threat-consistent performances in the low demand condition. It is also predicted that in the low demand condition, people with high narcissism or self-consciousness may be more likely to choke than people with low scores on these scales.

## Method

### *Participants*

The participants were 90 Trinity University students between the ages of 18 and 22 years of age (59 female and 31 male participants). Students were recruited from introductory psychology classes and received course credit. A female experimenter conducted the study.

### *Informed Consent*

Participants were run individually. Upon arrival, participants filled out a consent form and were told the experiment consisted of personality questionnaires on the computer and throwing darts and that their involvement in the study was completely voluntary. They were then led to a small room with a computer station and a dart board attached to a wall. Here, the experimenter delivered the cover story and instructions.

### *Cover Story*

Participants were told that the purpose of the study was investigating timing mechanisms and how mental processes change according to timed intervals. The only mention of dart performance was to assure participants that it was not the primary interest. The participant then learned that the dart task would be done alone and that their scores would remain anonymous, because individuals often feel nervous when observed. Privacy was achieved by having the participants slide their score sheets into a private, sealed drop box in the room. This deception was used to minimize performance pressure felt by the participant, while also allowing the experimenter to establish an accurate baseline dart score prior to the manipulation.

### *Questionnaires*

After the initial instructions, the experimenter explained the first phase of the test, a series of self-report personality questionnaires administered on the computer through MediaLab

(Jarvis, 2004). The experimenter left the room before the participant began. The personality assessment consisted of 233 questions and was made up of forms that assessed qualities with potential relevance to performance pressure. These included 40 items about narcissism (NPI; Raskin & Terry, 1988), 22 questions assessing self-consciousness (revised SCS; Scheier & Carver, 1985), and the 10-item Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1989).<sup>1</sup> In addition to this trait measure of self-esteem, Heatherington and Polivy's (1990) state measure was included. Upon the participant's completion of the personality assessment, the experimenter returned to explain the dart task.

#### *Warm-up and Baseline Trials*

The dart target was an 8 ½ by 11 in paper attached horizontally to a cork board by tacks. The top of the target was 67 in from the floor, and the participant stood behind a wooden block that was nailed 88 in away from the base of the target. The target paper had 4 concentric rectangles printed in black. The space between the rectangles was assigned a point value of 1 through 5, with 5 being the space within the center rectangle. Thus, higher scores meant better performances. Since every trial consisted of 10 throws, the best possible score a participant could achieve per trial was 50 points. Misses were coded as 0 points.

The warm-up trial consisted of 20 un-timed practice throws performed alone. The warm-up was included to minimize potential practice effects. The experimenter then explained the timing intervals. Two trials of 10 throws made up the baseline pretest. Participants could only throw a dart after a signal, indicated by a whistle. The participant followed the pre-taped whistle signals for both trials, each of which lasted 1 min 21 s at which time the participant threw a dart

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<sup>1</sup> The self-handicapping scale (Jones & Rhodewalt, 1982) was intended to be used in the study but was not due to a programming error. In addition, the PANAS (Watson, Clark, & Tellegen, 1988), the subjective overachievement scale (SOS; Oleson, Poehlmann, Yost, Lynch, & Arkin, 2000), the BIS/BAS scale (Carver & White, 1994), and the achievement motivation style scale (Elliot & McGregor, 2001) were evaluated but excluded from the text for the sake of brevity.

after each whistle. The pause between each signal whistle was determined by a randomized block method using 8, 9, and 10 s. Each timing interval occurred 3 times per trial. Varying the length of time between throws was done to prevent participants from anticipating the whistle signal or developing a rhythm for throwing the darts. After completion but before the experimenter returned, the participant placed the paper targets into the privacy box. The experimenter then told the participant to respond to a set of questions and then he or she was free to leave. These post-baseline-trial questions addressed perceptions of pressure, anxiety, motivation during the baseline trials. These questions were answered with 7 or 9 point Likert-type scales. While leaving the room, the participant was intercepted by the experimenter and returned to the testing room for the induction of performance pressure.

#### *Induction of Performance Pressure*

The experimenter explained that the study's actual purpose was investigating performance under pressure, not timing mechanisms. The participant was told that the study sought to identify the characteristics of individuals who tend to perform poorly under pressure. The participant was also inaccurately informed that choking is a stable, individual characteristic, showing consistency regardless of the task. These statements served as part of the pressure induction by attempting to make the performance on the next two trials meaningful to the participant. They introduced the possibility that the participant could be negatively labeled a 'choker.'

The experimenter explained that the first two trials were the baseline for comparison against the performance on the next two trials. The participant learned that a camera would be set up to record his or her personal characteristics for later review and that the experimenter would be present to keep track of the order of each dart score. Both the presence of the camera

and the experimenter were additional attempts to increase performance pressure. Prior to the dart task but after hearing the explanation, the participant was directed toward the computer for a mood assessment.

### *Manipulation*

Just before beginning the questionnaire, the participant learned of a lottery. The participant was told that he or she would be automatically entered into a lottery for \$100 prize as long as he or she met a standard. The standard varied between three conditions: 90%, 100% or 110% of the baseline score. These are the traditional challenge, the control, and the traditional threat conditions respectively. Upon completion of the questionnaire, the participant performed the next two trials with same pre-taped, timing schedule as was used in the first two trials. After the second trial, the experimenter left the room and the participant filled out post-pressured-trial questions about the pressured trials. These questions were the same as the post-baseline-trial questions with additional hypothetical questions about the demand conditions included. These questions allowed for a manipulation check of the performance pressure induction.

### *Debriefing*

In the debriefing, the experimenter explained the CAT primary and secondary appraisals and their relations to performance, as well as the goals of the study. It was also stressed that choking is not a stable, personal characteristic, despite what was said during the study. Any questions were answered before the participant left.

## Results

In all analyses unless otherwise noted, performance on the pressured trials was measured by taking the mean score on the first pressured trial while controlling for the mean scores from both baseline trials. The second pressured trial was excluded from the analyses because pressure is likely to dissipate with time. Therefore, the first pressured trial provides a more precise measure in this regard.

### *Effects of Demand Conditions*

Overall achieved scores of participants per trial were in the middle of the possible range of 0 to 50 ( $M = 23.79$ ,  $SD = 7.03$ ). An analysis of covariance (ANCOVA) on the pressured trial controlling for the baseline scores revealed no effect of demand condition on performance,  $F(2, 86) = 0.19$ , *ns*. Additional analyses between demand condition and individual difference variables revealed no significant effects; hence, the remainder of the results will be collapsed across conditions. Despite the fact that no effect of demand condition was found, further analyses revealed important findings.

### *Assessment of Pressure*

Self-report questions were presented after the baseline trials and again after the pressured trials as a manipulation check of the pressure induction and meaningfulness of the situation. This allowed for the inclusion of participants' subjective evaluations about their inner states. Two questions addressing effort and motivation that were both asked after the baseline and after the pressured trials were combined to create a single motivation variable (Cronbach's  $\alpha$  post-baseline trials = .62 and Cronbach's  $\alpha$  post-pressured trials = .62). The effort and motivation questions were intended to address aspects of situational meaningfulness to the participant, so they were combined despite the relatively low Cronbach's Alphas. An anxiety variable was

created with three questions on tension, nervousness, and relaxation that were also asked twice during the study (Cronbach's  $\alpha$  baseline time = .91 and Cronbach's  $\alpha$  pressured time = .89). A repeated measures analysis of variance (ANOVA) assessing changes from post-baseline to post-pressured trials yielded significant increases in pressure,  $F(1, 89) = 22.77, p < .01$ , motivation,  $F(1, 89) = 4.65, p < .05$ , anxiety,  $F(1, 89) = 65.40, p < .01$ , and importance of doing well,  $F(1, 89) = 29.20, p < .01$ . There was also a significant decrease in boredom ratings,  $F(1, 89) = 10.06, p < .05$ , between the times. Means and standard deviations for responses at time one and two are reported in Table 2. In summary, the induction of performance pressure appeared to be successful.

Table 1

*Means and Standard Deviations for Self-Reported, State Ratings*

Question	Time			
	After Baseline Trials		After Pressured Trials	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Pressure	4.27	(2.16)	5.31	(2.12)
Motivation	10.61	(2.13)	11.10	(1.95)
Anxiety	9.03	(4.64)	12.17	(4.69)
Importance	4.53	(1.54)	5.29	(1.28)
Boredom	2.54	(1.25)	2.19	(1.17)

*Note.* All results are significant at the .05 level.

### *Narcissism*

Regression analyses were performed on narcissism scores to investigate their relation to performance on the first pressured trial with the combined baseline trials as a covariate. Self-esteem was controlled for as it has been correlated with the NPI scale in other studies and is very

closely linked to the concept of narcissism (Raskin & Terry, 1988). There were no significant differences in analyses of baseline performances for total narcissism score. Total narcissism scores did not predict performance on the first pressured trial either,  $\beta = -.11$ ,  $t = -1.09$ , *ns*. However, the NPI can be divided by seven factors which are separated into two subscales: adaptive and maladaptive (Watson & Biderman, 1993). Linear multiple regression analyses were performed to determine if a relationship existed between these narcissism subscales and performance. All the following narcissism analyses had the combined baseline performances as a covariate and included adaptive narcissism, maladaptive narcissism, and self-esteem. Other individual differences demonstrated no interactive effects with narcissism.

As was true for total narcissism scores, there were no significant effects of adaptive or maladaptive narcissism on baseline performances. Higher adaptive narcissism predicted significantly worse performance during the pressured trials than lower adaptive narcissism,  $\beta = -.27$ ,  $t = -2.08$ ,  $p < .05$ . This effect was not found when the self-esteem covariate was removed from the analysis. There was not a significant effect of maladaptive narcissism on performance, but the trend was toward better performance,  $\beta = .13$ ,  $t = 1.10$ , *ns*. There was a marginally significant effect of high self-esteem predicting better performance while controlling for adaptive and maladaptive narcissism,  $\beta = .28$ ,  $t = 1.94$ ,  $p = .06$ . No significant interactions were found between any of the personality variables. In fact, there were no significant interactions involving any of the personality variables of interest in any of the regression analyses described in the results.

*Narcissism and Anxiety.* Since anxiety was assumed *a priori* to influence performance, more regression analyses were run using anxiety as a dependent variable. There was no relationship between narcissism and baseline anxiety levels or self-esteem and baseline anxiety.

In another analysis, self-reported post-pressured-trial anxiety served as the dependent variable, and post-baseline-trial anxiety and self-esteem were included as covariates. This analysis yielded a marginally significant effect of higher total narcissism scores predicting higher post-pressured-trial anxiety than lower narcissism scores,  $\beta = -.14$ ,  $t = -1.65$ ,  $p = .10$ . To assess the influence of adaptive narcissism and maladaptive narcissism on post-pressured-trial anxiety, a new regression analysis was conducted with post-baseline-trial anxiety and self-esteem again included as covariates. High maladaptive narcissism scores predicted lower self-reported anxiety after the pressured trials than low scores,  $\beta = -.21$ ,  $t = -2.18$ ,  $p < .05$ . In contrast, adaptive narcissism had no significant effects on anxiety, but the trend was toward greater post-pressured anxiety for those with high adaptive narcissism scores compared to those with low scores,  $\beta = .05$ ,  $t = .48$ , *ns*. Although adaptive and maladaptive narcissism were differentially related to performance and anxiety, anxiety did not mediate performance because there was no correlation between it and performance scores.

*Narcissism and Self-Esteem.* Based on Sturman's (2000) description of adaptive and maladaptive narcissism and previous findings (Watson & Biderman, 1993), bivariate correlation analyses for self-esteem and narcissism were conducted. Higher total NPI scores predicted higher RSE scores,  $r(88) = .37$ ,  $p < .01$ , and Heatherton and Polivy's state self-esteem score,  $r(88) = .29$ ,  $p < .05$ . Adaptive narcissism scores were positively correlated with self-esteem for both the trait and state self-esteem scales,  $r(88) = .48$ ,  $p < .01$ , and,  $r(88) = .39$ ,  $p < .01$ , respectively. There were no correlations of maladaptive narcissism with either self-esteem scale.

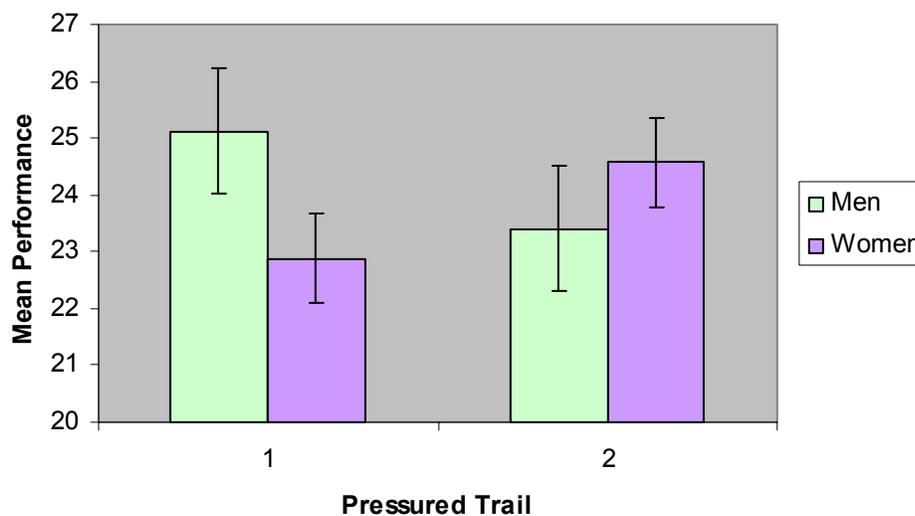
#### *Self-Consciousness*

Linear regression analyses revealed that neither public self-consciousness scores nor private self-consciousness scores were related to performance. High social anxiety scores

revealed marginal significance in predicting better performance than low social anxiety scores,  $\beta = .94, t = 1.67, p = .10$ .

### *Sex Differences*

Using combined baseline performances as a covariate, a 2 (Sex) x 2 (Pressured Trial) mixed design ANCOVA revealed a significant interaction between sex and the two pressured trials,  $F(1, 87) = 4.73, p < .05$ , as seen in Figure 2. Male participants did significantly better than female participants in the first pressured trial while females performed significantly better than males during the second pressured trial. Additionally, male participants performed significantly better in the first than second trial than they did in the second trial with the opposite effect for female participants. Means and standard errors for these groups are reported in Table 2 as are their respective baseline scores for comparison.



*Figure 2.* Differential performances on a dart task by male and female participants during two pressured trials. Mean performance scores represent estimates with a covariate of combined baseline scores.

Table 2

*Mean Performance Scores and Standard Errors by Pressured Trial and Sex*

Sex	Baseline Trail				Pressured Trial			
	One		Two		One		Two	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Male	23.71	(1.31)	26.03	(1.21)	25.51	(1.14)	23.40	(1.09)
Female	20.37	(0.95)	20.32	(0.88)	22.88	(0.81)	24.57	(0.78)

Because of this interaction between sex and performance on the pressured trials, repeated measures ANOVAs were run to examine difference in subjective measures after the baseline and pressured trials between male and female participants. There were no sex differences in self-reported pressure, motivation, or anxiety measures.

## Discussion

Manipulating low and high environmental demand did not influence performance on a pressured dart-throwing task when compared to baseline performance. These null effects are contrary to CAT predictions and the current hypothesis that performance can oppose CAT in certain situations. CAT claims that prior success should produce a challenge response for subsequent performances of that task and result in either an equal or better performance. This prediction was supported by the current findings because there was no change in performance from baseline to pressured trials in the low demand condition. CAT also predicts that in situations where demand is higher than resources, such as in the high demand condition, a threat response should result, which would in theory lead to lower performances. This prediction was not supported by the results of this study. The current hypotheses predicted that some people would increase their performance in the high demand condition and that others would decrease their performance in the low demand condition relative to baseline, implying challenge and threat responses respectively. Neither of these patterns occurred in this study.

### *Demand Manipulation*

Experimental manipulations of demand characteristics alone have been found to elicit challenge and threat responses in many studies (Blascovich et al., 2003); however, differences in demand did not influence performance in this study. Extending these results to the CAT model (Blascovich et al., 2003) may be inappropriate, because the demand manipulation may have failed. There are several reasons this may have occurred. First, the manipulation conditions may not have been distinct enough to elicit differing primary appraisals. It might have been better to make the conditions more conceptually different, such as 75% for low demand condition and 125% for the high demand condition. The self-report questions support that the demand

conditions were not perceived as different. Few people in the low demand condition reported recognizing much difference between the 100% and 110% performance standards. Similarly in the high demand condition, no differences were recognized between the 100% and 90% performance standards. Perhaps making the differences in demand more extreme would have encouraged the desired performance differences between conditions. However, if the demand conditions were made too extreme, this would risk eliminating participants' perceptions of uncertainty in the outcome. If the low demand condition is too easy and the high demand condition is too hard, the manipulation would likely be just as ineffective as if the conditions are too similar because of outcome invariability.

The second potential reason an effect of demand on performance was not found may involve the personal relevance of the demand manipulation. In the debriefing, participants reported not caring about or in some cases, not even remembering the lottery. Had the demand manipulation been more obvious or personally meaningful to the participants, it most likely would have exerted some influence on performance.

One way this might have been achieved could have been through competition with another person. Instead of meeting or improving upon one's previous scores for inclusion in the lottery, participants would have to beat another person who either had a better or worse record than the participant. Competition would add self-relevant motivation to the potential for winning money, since money is not adequate motivation for everyone. In addition, if the competition element increased overall pressure, more people across conditions would likely choke under pressure than did in the current study.

Third, it is also possible that presenting the demand manipulation after the pressure induction may have downplayed demand's potential influence. Pressure was induced prior to

delivering the lottery criteria. Had the lottery demand been presented first, before creating pressure, participants may have been more receptive and attentive to it. If the pressure induction was successful, it is possible that people were distracted when the terms of the lottery were presented. Reversing the order of the pressure induction and demand manipulation would likely make the salience of each more apparent as it seems less likely that demand would drown out pressure in the same way. Yet, it is possible that presenting the demand first may minimize the effectiveness of the pressure induction.

#### *Pressure Induction and Individual Differences*

Based on the self-report questions administered after the baseline trials and again after the pressured trials, pressure influenced participants' subjective emotional states. There was an increase in anxiety, pressure, motivation, and importance of doing well from after the baseline trials to after the pressured trials as well as a decrease in boredom ratings. Because pressure affected participants' mental states, the relationships between pressure and individual difference measures were investigated further.

There was no effect of overall narcissism scores on performance, which is consistent with most findings from previous studies (Gabriel, Critelli, & Ee, 1994; John & Robins, 1994). In contrast, Wallace and Baumeister (2002) found that narcissists improved more in a high-pressure dart task compared to a low-pressure dart task. Their finding was not replicated here; narcissists performed no better or worse than anyone else in the pressured trials compared to the baseline trials.

Separating the adaptive and maladaptive narcissism elements did produce some interesting results. Adaptive narcissism was related to lower performance on the pressured trials compared to the baseline trials, while maladaptive narcissism demonstrated a weak trend toward

better performance. This distinction is noteworthy because it hints at opposing influences of each subscale on performance. It appears that the characteristics that make narcissists not as off-putting during interpersonal relations may have hurt their abilities to perform under pressure.

When assessing anxiety rather than performance, high maladaptive narcissism scores predicted lower ratings of anxiety than did low maladaptive narcissism scores. At first glance, this result may be the reverse of what one would expect since anxiety is generally avoided. However, anxiety is not always undesirable, especially if it ignites a helpful response. For example, if a person were to step in front of a moving car and feel anxiety, perhaps that person could move out of its way safely. Anxiety may add the extra adrenaline rush needed to effectively respond to certain situations. It has been found that arousal of the sympathetic-adrenal-medullary (SAM) neuroendocrine system during stress is associated with decreased overall anxiety when compared to those who do not experience SAM arousal during stress (Dienstbier, 1989). This finding suggests that a lack of an appropriate response when a situation warrants it can be detrimental to an individual. The current finding that maladaptive narcissism was associated with lower ratings of anxiety, but maladaptive narcissism has often been associated with higher levels of anxiety than found in the general population (Sturman, 2000; Watson & Biderman, 1993). In combination, these findings may hint at a predisposition for those with high maladaptive narcissism to feel a constant level of anxiety in general, whether it is warranted or not.

The pressured trials in this study may not qualify as a situation in which anxiety is beneficial. After all, effects of high adaptive narcissism on anxiety were nonsignificant, even though the outcome hinted at an increase in anxiety. As with performance, the narcissism subscales appear to have different influences on anxiety ratings. It seems possible that

maladaptive narcissism characteristics prevented participants from feeling nervous or worried about the pressured trials in a way that adaptive narcissism traits did not. Despite these apparently opposing effects of the subscales on anxiety and performance, there was no correlation between anxiety increase and performance.

When controlling for adaptive and maladaptive narcissism, high self-esteem was associated with better performance than low self-esteem; however, the effect was not quite significant. There was a positive correlation between total narcissism score and self-esteem, and adaptive narcissism predicted higher self-esteem as well. These findings are consistent with Watson and Biderman's (1993) correlational results. According to Sturman's (2000) breakdown of adaptive and maladaptive narcissism, a relationship between low self-esteem and high maladaptive narcissism seemed likely but was not found. This finding is also consistent with previous findings (Watson & Biderman, 1993).

Since adaptive narcissism and total narcissism scores both correlated with increased self-esteem as one would expect, it is curious that maladaptive narcissism did not relate to low self-esteem. Narcissists are generally considered to have high self-esteem and confidence in their abilities, whether they are justified or not (Wallace & Baumeister, 2002; Watson & Biderman, 1993). Perhaps those with maladaptive narcissism have low self-esteem relative to other narcissists but not the general population.

In previous studies, high self-consciousness improves performances under pressure compared to low self-consciousness (Baumeister & Showers, 1986; Beilock & Carr, 2001). Although this finding seems counterintuitive, Beilock and Carr (2001) used it to support the idea that pressure harmfully redirects performers' focus toward themselves and away from the task. When people are accustomed to focusing on themselves, the attentional effects of pressure are

lessened. The findings from the current study showed no relation of private or public self-consciousness scores with performance. It is possible that an audience of one person did not induce enough pressure for those with low self-consciousness scores to direct their attention away from the task.

Social anxiety, another dimension of self-consciousness, correlated significantly with public self-consciousness. Yet, unlike public self-consciousness, high social anxiety tended to predict better performance than low social anxiety. Socially anxious participants are probably used to dealing with anxiety on a regular basis. It appears that those with high social anxiety may feel emotions similar to those evoked by the dart task more frequently than those with high public self-consciousness. In a sense, those with high social anxiety appear to have been slightly protected from the effects of pressure. It is also possible that those with high social anxiety scores experienced reasonable motivation to perform well while those with low social anxiety scores felt no motivation to try in the dart task.

The unexpected differences between male and female participants' performances on the two pressured trials are difficult to interpret. When taking the baseline performances into account, the male participants improved within the baseline scores and then maintained that same level of performance from the second baseline trial in the first pressured trial. In the second pressured trial male participants' performances dropped closer to but still higher than their original baseline score. Female participants showed no improvement between baseline trials, but they increased performance in the first pressured trial and again in the second pressured trial. It appears female participants performed better under pressure than male participants when compared to their previous performances. Perhaps male and female participants had differing responses because the audience in the pressured trials was a female experimenter. There might

have been a different pattern of results had there been a male experimenter or an audience with both a male and female person in it. This finding should be considered with caution since almost twice as many women than men participated in this study.

Moreover, the effect of sex differences on performance may have more to do with practice effects than performing well under pressure. Women might have less experience with darts going into the study and thus experience greater improvement during the trials than men, despite the fact that no improvement occurred from the first baseline trial to the second. Men might play darts more often and thus not improve as much during the study. It is also possible that their decreased performance on the second pressured trial had to do with boredom rather than choking under pressure.

In their dart experiment, Wallace and Baumeister (2002) found that women improved more than men in pressured trials, which is consistent with the current findings. Their results are intriguing, because unlike this study, the participants were mostly male. In another experiment conducted by Wallace and Baumeister (2002), they found that women with high narcissism scores responded stronger to pressured situations than men with high narcissism scores. The current findings revealed no relationship between narcissism and sex differences on performance.

Even though sex differences in the current study were restricted to performance under pressure, other individual differences have been linked to sex differences in the past. Rhodewalt et al. (2006) found that men self-handicap in a response non-contingent feedback situation more than women. Furthermore, in a response contingent feedback situation, men with high NPI scores self-handicapped more than men with low NPI scores. The tendency for women to self-handicap remained the same, regardless of contingency or NPI score. Like Wallace and

Baumeister's (2002) study, sex differences and narcissism were linked to performance under pressure. As supported by the current findings, men and women may have different responses to pressured situations. The role of individual differences in these responses is unclear at this point.

### *Future Directions*

Narcissism is related to high self-esteem, but different correlations exist between self-esteem and the adaptive and maladaptive narcissism subscales. Because of this, it would be useful to explore self-esteem in more depth. Using a self-esteem stability measure would address fluctuations in self-esteem in response to external feedback. Assessing both self-esteem level and self-esteem stability would likely elucidate a connection to narcissism and performance. Narcissism has been linked to high but unstable self-esteem (Morf & Rhodewalt, 1993), but everyone with high and unstable self-esteem does not have high narcissism characteristics. Future studies are needed to understand the intriguing relationships between adaptive narcissism, maladaptive narcissism, and performance under pressure. Self-esteem is presumably involved in this process, and a breakdown of self-esteem stability could help to explain the current findings as well as those of others.

The distinction between social anxiety and public self-consciousness in relation to performance on pressure should be investigated more closely. Public self-consciousness involves concern with performance and self-presentation, while social anxiety encompasses a sense of nervousness in the presence of others (Watson & Biderman, 1993). Even though the two constructs are strongly correlated and conceptually similar, this study showed that they had different effects on performance. Additionally, the finding that public self-consciousness was not associated with improved performance is inconsistent the findings of Beilock and Carr (2001).

The finding that sex differences affected performance under pressure is unexpected. Few studies have found sex differences in this context; however, two notable exceptions include Wallace and Baumeister (2002) and Rhodewalt et al. (2006). Wallace and Baumeister found comparable results as the current study on performance as well as a relationship between sex, narcissism, and performance under pressure. Rhodewalt et al. (2006) found that sex differences significantly interacted with narcissism and self-handicapping tendencies in their pilot study. Perhaps future researchers should investigate sex differences directly. At the least, closer attention should be paid to balancing sex across conditions in order to more accurately assess any relationships with performance under pressure, narcissism, and self-handicapping.

The findings in this study suggest that individual differences affect how people perform in pressured situations, but these differences should be explored further. Those with high adaptive narcissism tendencies, low self-esteem, and high social anxiety are not the only ones in danger of choking under pressure; they simply might be more likely than others to do so when a situation requires them to repeat an uncertain, public performance. Individual differences influenced people's subjective responses to pressure as well as their performances. These findings are particularly important because performance differences occurred despite apparently similar demand appraisals. Choking under pressure occurs to everyone at some point, and the results of this study suggest that personality characteristics play a role in that process independent of environmental demand.

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