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# Choking under Pressure and the Role of Fear of Negative Evaluation

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Choking under Pressure and the Role of Fear of Negative Evaluation

**Abstract**

*Objective:* Conceptual models and predictors of choking under pressure (i.e., choking) have been proposed, but the role of fear of negative evaluation remains largely unknown. The purpose of the current study was to determine the degree to which fear of negative evaluation (FNE) may predispose athletes to choking within a self-presentation model of choking.

*Method:* 138 experienced basketball players participated in a pre-selection stage, which involved completing a set of questionnaires that included the Brief Fear of Negative Evaluation-II (BFNE-II) questionnaire. Based on the scores from the BFNE-II, 34 athletes, categorized as either low or high FNE, were selected to perform basketball shots from five different areas of the court under low- and high-pressure phases, with shooting performance based on the total number of successful shots out of 50 attempts.

*Results:* Results indicated that the high FNE athletes displayed a significant increase in anxiety and also experienced a significant decrease in performance from low- to high-pressure phases. The low FNE group exhibited only minimal changes in anxiety throughout the study and was able to maintain performance under pressure. Further mediation analysis investigating significant difference in performance between FNE groups within the high-pressure phase indicated that that cognitive anxiety was a partial mediator between FNE group and performance, but somatic anxiety was not.

*Conclusions:* Findings extend the existing choking literature by providing empirical support for the role of FNE in the context of the self-presentation model of choking.

Keywords: Impression management, self-presentation, anxiety, emotion

Choking under Pressure and the Role of Fear of Negative Evaluation

Athletes who are unable to perform under stressful circumstances may experience increased social anxiety, diminished enjoyment, and increased dropout from sport. Elevated emotional stress results in behavioral and attentional changes whereby athletes experience "choking under pressure" (i.e., choking). Though a universally acceptable definition of choking remains elusive (see Hill, Hanton, Matthews, & Fleming, 2010a, for a review), the current project is founded on the notion that choking is "a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety under perceived pressure, leading to substandard performance" (Mesagno, Marchant, & Morris, 2008, p. 439).

**Predictors of Choking**

To date, researchers have suggested that self-consciousness, trait anxiety, and coping styles are dispositional characteristics that may identify an athlete as choking-susceptible (i.e., likely to experience choking). Over three decades ago, Fenigstein, Scheier, and Buss (1975) explained that self-consciousness is, "the consistent tendency of persons to direct attention either inward or outward" (p. 522). Public self-consciousness is the realization that others may be aware of oneself, resulting in uneasiness when the individual expects critical evaluation by others. In sport, differences in self-consciousness (i.e., high vs. low) may be represented in dissimilar responses to pressure. Initial investigations (e.g., Baumeister, 1984) indicated that athletes *low* in self-consciousness perform poorly under pressure because they are not accustomed to being self-conscious under pressure and decrease performance. More recently, however, researchers have found that athletes *high* in self-consciousness may have a higher likelihood of experiencing choking. For example, Wang, Marchant, Morris, and Gibbs (2004) used correlational and hierarchical multiple regression analysis to confirm that individuals high, rather than low, in self-consciousness performed worse under pressure when executing a basketball free throw shooting task. Wang et al. also found that trait anxiety was a significant predictor of choking, with somatic trait anxiety being correlated with poor performance under pressure. Thus, individuals *high in self-consciousness and trait anxiety* may be susceptible to choking.

When athletes are confronted with performance pressure, the effectiveness of their coping skills may determine success or failure. Two coping styles, approach and avoidance coping, have also been examined to determine whether they differentially predict choking. Wang, Marchant, and Morris (2004) asked 66 basketball players to complete the coping styles questionnaire one-week prior to performing 20 free throws under low- and high-pressure conditions. They found that athletes who are approach "copers" performed less accurately under high-pressure than avoidance copers, with approach coping accounting for 7% of the explained performance variance under pressure. Approach coping was theorized to influence perceived threat by leading approach copers to seek a reduction in anxiety, thereby diverting attention to irrelevant cues. Conversely, Jordet and colleagues (Jordet, 2009; Jordet & Hartman, 2008) analyzed the preparation time and self-regulatory behavior of soccer players taking penalty kicks in international competitions. They found that players who missed goals in the high-pressure situation had significantly faster preparation times and more escapist behavior (perhaps wanting to get the shot "over with") than those who successfully scored a goal. They advocated that inappropriate self-regulation techniques may lead the person to immediate behavioral withdrawal from the situation, which supports the contention that avoidance coping is linked to performance failure under pressure. This conflicting evidence between approach and avoidance coping may be explained by how they were operationalized. That is, Wang et al. measured coping styles through administration of a cognitive questionnaire to predict choking whereas Jordet and colleagues measured coping from a behavioral perspective. Perhaps the conflicting results are a product of "chokers" using approach coping to understand why anxiety is high and then employing avoidance coping to behaviorally "escape" the situation. Future research is needed to clarify this supposition.

It is worth noting that although there is general consensus on many aspects of choking, disparate views of an adequate choking definition still exist. Hill, Hanton, Fleming, and Matthews (2009) introduced a worthy conceptual debate about the magnitude of the performance decrease associated with choking (which is beyond the scope of this paper), however, extant research definitions (including the Mesagno et al., 2008) have yet to include suitable choking-specific (rather that under-performance) amounts of performance decrements. Nevertheless, the Mesagno et al. definition encapsulates three important requirements of a research-based choking definition: skilled performance, anxiety increase under pressure, and performance decrease below expectations (but see Gucciardi, Longbottom, Jackson, & Dimmock, 2010; Mesagno & Mullane-Grant, 2010 for other possible definitions that can be used for evaluation in similar quantitative research designs).

**A Self-Presentation Model of Choking**

Although researchers have provided descriptive accounts of choking, covert factors that precipitate the initial anxiety increase have been largely overlooked. While sources of stress have indeed been investigated by inferences to competitive anxiety, financial concerns, presence of audience and video camera, and potential embarrassment, self-presentation concerns have not been systematically (by separating commonly used pressure manipulations to identify which creates the most anxiety) studied with regard to choking. *Self-presentation* refers to behaviors aimed at conveying an image of self to others (Schlenker, 1980). Self-presentation objectives in a social evaluative context establish the background with which threat would increase anxiety. Self-presentation concerns, such as appearing incapable of performing well under pressure, likely play a significant role in explaining why anxiety increases among choking-susceptible athletes (Gucciardi et al., 2010; Hill, Hanton, Matthews, & Fleming, 2010b; Mesagno, 2009; Mesagno et al., 2009) because individuals attempt to create a public image that will support their preferred beliefs about themselves (Baumeister, 1982; Leary, 2001; Schlenker, 1980). In fact, researchers using qualitative approaches (e.g., Gucciardi et al., 2010; Hill et al., 2010b) found that purposely selected (i.e., who experienced choking in the past two years) participants identified self-presentation concerns and social evaluation as links to increased anxiety and choking in competitions.

Leary (1992) conceptualized competitive anxiety as a sport-specific class of social anxiety, maintaining that "Competitive anxiety, whether regarded as a state or a trait, revolves around the self-presentational implications of competition" (p. 347). Leary's suggestions have been recently resurrected and specified in a self-presentation model of choking based on qualitative evidence of self-presentation concerns among individuals who were likely to experience choking (Mesagno, 2009, in review). Fourteen choking-susceptible athletes were interviewed about their experience in single-case design research involving low- and high-pressure situations. Analysis of participants' interviews suggested a link between perceived self-presentation concerns and choking, which might be explained through public self-consciousness (i.e., tendency to focus on outwardly observable aspects of the self such as physical appearance or performance) and fear of negative evaluation (FNE). Watson and Friend (1969) defined FNE as "apprehension about others' evaluations, distress over their negative evaluations, avoidance of evaluative situations, and the expectations that others would evaluate oneself negatively" (p. 449). The predisposition of FNE exacerbates the possibility that individuals will become high in public self-awareness (the state form of self-consciousness) in a pressure situation.

Researchers have yet to establish clear distinctions between public self-consciousness and FNE in sport psychology research. In mainstream psychology studies (e.g., Monfries & Kafer, 1994; Schlenker & Weigold, 1990), positive correlations exists between public self-consciousness and FNE ($r$ = .41–.65). In fact, many inventory questions in Leary's (1983) Brief FNE questionnaire are similar to that used in the public self-consciousness component of the Self Consciousness Scale (Fenigstein et al., 1975) (or vice versa), emphasising the commonalities between FNE and public self-consciousness. Though these similarities exist, there still may be subtle differences between these constructs that researchers have not yet debated (or acknowledged), especially within sport psychology literature. For example, individuals high in public self-consciousness do not consider the public self from another person's perspective, but are concerned about themselves as social objects (Buss, 1980). FNE, however, predisposes people toward expectations that negative evaluation about public (e.g., physical appearance or style) and perceived private (e.g., competence, ability to deal with pressure) aspects of the self will occur. Furthermore, public self-consciousness may make people susceptible to negative experiences within social situations (Buss, 1980), however, it may not necessarily originate from fear. From this perspective, it is possible that those individuals high in FNE could also be high in public self-consciousness, however, not everyone who is high in public self-consciousness is necessarily high in FNE.

Two logical inferences could be made regarding the affects of FNE on anxiety and performance. As discussed briefly, Baumeister (1984) found that low self-conscious individuals are not accustomed to increased self-consciousness under pressure, and the uncharacteristic increase in self-consciousness may lead to decreased performance under pressure. Analogous to Baumeister's self-consciousness argument, high FNE individuals may be safeguarded against choking because they are acclimatized to experiencing FNE and also the anxiety that performance under pressure causes. Based on Mesagno's (2009, in review) findings, however, we would argue that in pressure situations, individuals high in FNE experience additional public self-consciousness, feel they are the object of others' attention, are more likely to become aware of being observed, and become more concerned about audience's judgments, than individuals low in FNE. Such reactions typically increase anxiety (Mor & Winquist, 2002). Athletes who have a predisposition toward FNE, therefore, may be more likely to experience increased anxiety levels due to self-presentation concerns. During pressure situations, public self-consciousness likely increases because the audience's attention focuses on the participant's "public self" (Mesagno, 2009). If the public self is discredited, negative self-presentation concerns will likely be elevated. Athletes who experience such anxiety and self-consciousness, unabated by coping skills, may be susceptible to choking. The increase in anxiety experienced by choking-susceptible athletes is, therefore, postulated to be a product of these self-presentation predispositions, which then lead the athlete into "self-monitoring" techniques identified in the self-focus (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) and distraction (Nideffer, 1992) models of choking.

### The Current Study

Systematic quantitative explorations of the associations between FNE and choking are lacking. Furthermore, no known studies have investigated the link between FNE and performance outcomes. The purpose of the current study, therefore, was to determine whether high and low levels of FNE differentiate susceptibility to choking and whether FNE is associated with anxiety and performance changes as performance pressure is increased. Based on scores from a FNE questionnaire, basketball players were selected to participate in an experiment that involved attempting basketball shots in low- and high-pressure phases. We predicted that low and high FNE athletes would increase anxiety during the high-pressure, compared to the low-pressure phase. We also hypothesized that successful performance would increase for the low FNE athletes, yet decrease (i.e., experience choking) for the high FNE athletes under high pressure performance situations. We also expected that cognitive anxiety would mediate the relationship between FNE group and performance.

## Method

### Participants

Initially, 138 basketball players (aged from 14 to 54; $M_{age}$ = 25.50, *SD* = 8.94) participated in the pre-selection stage, which involved completing a set of questionnaires. Participants were initially screened for required basketball experience (played in a competitive basketball league for a minimum of 5 years) and score on the Brief Fear of Negative Evaluation-II (BFNE-II) questionnaire. Of the pre-screened participants, scores on the BFNE-II questionnaire ranged from 12 to 52 ($M_{score}$ = 25.83, *SD* = 10.07). A total of 89 (37 high FNE and 52 low FNE) participants were eligible to participate in the experimental stage, however, only 36 experienced basketball players, categorized as either high FNE (having a FNE score located no less than 0.5 standard deviation above the mean) or low FNE (a FNE score located no more than 0.5 standard deviation below the mean), were selected. Eligible but unselected participants were eliminated because the most extreme sample of low and high FNE participants was needed. Two participants (one high- and one low-FNE) were excluded from further participation because they did not achieve the lower level of the shooting criterion; thus the final sample size was 34. The 17 high FNE participants scores ranged from 32 to 52 ($M_{score}$ = 42.56, *SD* = 6.30), whereas the 17 low FNE participants scores ranged from 12 to 17 ($M_{score}$ = 14.31, *SD* = 1.85).

**Equipment and experimental task**

Standard basketball equipment and facilities were used, with the participants attempting shots from five separate shooting areas on the court. Shooting distance was identical to the distance from the basket to the free-throw line, which is approximately 15.09 ft (5.80 m) away from the endline (International Basketball Federation, 2010). Shots were taken from behind the free-throw line, and at 30 and 60 degree angles equidistant (and on both sides) to the free-throw line in a semi-circular path relative to the endline (see Figure 1).

**Measures**

**Demographics questionnaire.** Demographics including questions about age, gender, basketball playing experience, and highest level of competitive basketball played were recorded.

**Brief Fear of Negative Evaluation-II (Carleton, McCreary, Norton, & Asmundson, 2006; Rodebaugh, Woods, Thissen, Heimberg, Chambless, & Rapee, 2004).** The Brief FNE questionnaire (Leary, 1983), a shortened version of the original FNE questionnaire (Watson & Friend, 1969), consists of 12 items (11 items that are verbatim from the original FNE questionnaire) with four "reverse-worded" questions and measures individuals' expectations of being negatively evaluated by others, looking foolish, and making a bad impression on others. Individuals respond to the questions by rating the extent to which the statements are characteristic of them, on a 5-point Likert scale ranging from 1 (*not at all characteristic of me*) to 5 (*extremely characteristic of me*). Total scores range from 12 to 60, with higher scores indicating greater FNE disposition. The straightforwardly worded BFNE-II (Carleton et al., 2006; Rodebaugh et al., 2004) was used in the current study because of criticisms about reverse-worded questions being confusing and potentially decreasing scale validity (e.g., Marsh, 1996; Rodebaugh et al., 2004). The BFNE-II has undergone psychometric testing and received acceptable psychometric properties (Carleton et al., 2006).

**Revised Competitive State Anxiety Inventory-2 (Cox, Martens, & Russell, 2003; Martens, Burton, Vealey, Bump, & Smith, 1990).** State anxiety was measured using the Revised Competitive State Anxiety Inventory-2 (CSAI-2R). Cox et al. systematically deleted a number of "weak" items from the original CSAI-2 (Martens et al., 1990), resulting in a total of 17 self-report statements measuring intensity components of somatic anxiety (seven items), cognitive anxiety (five items), and self-confidence (five items). Consistent with the purpose of the study, only the cognitive and somatic anxiety subscales were used. Morris, Davis, and Hutchings (1981) defined cognitive and somatic anxiety as "negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences" (p. 541) and "one's perception of the physiological-affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feeling states such as nervousness and tension" (p. 541), respectively. For each subscale, intensity level responses were scored on a Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). Total possible scores on each subscale range from 10 to

40, with higher scores indicating higher anxiety. Cox et al. reported Cronbach alpha reliability coefficients for both cognitive and somatic anxiety to be acceptable ($\alpha > .80$).

**Performance.** Each participant was instructed to be as accurate as possible with shot attempts. The mean total number of successful shots out of 50 attempts for each phase was the dependent variable.

**Preparation time.** Jordet (2009; Jordet & Hartman, 2008) provided evidence that “preparation time” prior to shot attempt may be an important component to anxiety interpretation. Thus, a comparison of each participant’s completion time and variability (in seconds) in each phase was assessed using a stopwatch. The time taken from when the participant received the basketball to when the ball was released defined the preparation time.

**Procedure**

During the pre-selection stage, participants were recruited from basketball teams and leagues, with the head coach’s permission, and were asked to complete a demographic information sheet, an informed consent form, and the BFNE-II. A plain language statement was given to participants, outlining the study objectives and indicating that the University Ethics committee also approved the project. Upon returning the questionnaires, we screened participants for acceptable experience level and FNE scores. Prior to the experimental stage, we contacted eligible participants to determine involvement in the next stage of testing. During the experimental stage, participants were tested independently and took part in three separate phases (hereafter known as familiarization, low-pressure, and high-pressure).

**Familiarization phase.** Prior to commencement of shot attempts, general information about the procedures was explained and testing began with each participant completing the CSAI-2R. After completing the CSAI-2R, 10 warm-up shots (two from each shooting area) and 50 regular shots in a “low-pressure” situation were performed, whereby the researcher was the only person present. The order of shooting areas (with 10 shots from each area) was randomized to minimize the likelihood of order effects.

**Low-pressure.** The low-pressure phase procedures were identical to the familiarization phase, and were differently named because participants are generally more nervous when they arrive for a research experiment, which is usually reflected in slightly higher anxiety scores, due to uncertainty of the procedures (Mesagno, 2006; Verdecchia, Schillaci, Borgioni, Ciucci, & Porcellati, 1996). With that said, we counterbalanced the order of the low- and high-pressure phases.

To ensure experienced skill level, it was important to set a criterion for continued participation, which has also been used in other research and sports, such as tenpin bowling (Mesagno et al., 2008), basketball (Mesagno, Marchant, & Morris, 2009), and Australian football (Mesagno & Mullane-Grant, 2010). Possible performance scores in each phase ranged from 0 to 50, but unknown to participants, a performance range from 15 to 35 successful shots was set in the phase prior to the high-pressure (depending on counterbalanced order) for continued participation. This range ensured that each participant was experienced, and also decreased the likelihood of ceiling effects.

**High-pressure.** Prior to commencement of the high-pressure phase, specific instructions designed to induce anxiety were explained that included a combination of pressure manipulations. Per our pressure manipulations, researchers (e.g., Beilock & Carr, 2001; Masters, 1992; Mesagno et al., 2008; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004) have used a combination of performance contingent monetary incentives, as well as video camera and audience presence to successfully increase pressure in experimental settings. With the performance-contingent monetary incentive, each participant received money for participating, depending on the number of successful shots made in the high-pressure, relative to performance in the phase prior to the high-pressure (depending on counterbalanced order). The participant received AU$10 for equaling the previous phase score with an additional AU$5 for each successful shot above the previous performance, to a maximum of AU$100. If an equal previous phase score was not achieved, the participant received no money. After these instructions were read, the participant was informed of the individual score during the previous phase.

A video camera was also used to heighten self-consciousness (Lewis & Linder, 1997), and was positioned directly under (and slightly behind) the basketball backboard. Each participant was informed that the video camera would be used to record their participation for later biomechanical analysis and to improve the basketball shooting technique. The video camera was turned on prior to the first shot attempt and remained on throughout the high-pressure phase. Finally, a small audience was used and consisted of four sport science students that were unknown to the participant. Audience members were positioned in front and to both sides about two meters away. A research assistant operated the video camera and also acted as an audience member.

Once the high-pressure instructions were read, each participant completed the CSAI-2R to determine differences in state anxiety. The high-pressure phase was identical to the familiarization phase with the exception of the pressure manipulation. After the high-pressure phase, each participant was informed of the amount of money received, with all participants receiving a minimum of AU$20 (i.e., if equal performance was not achieved). The participant was then debriefed and thanked for participating. To decrease fatigue effects, participation in the phases were completed on separate days.

## Results

Initially, it was important to ensure that FNE groups were dichotomous. An independent samples t-test was conducted to compare differences in the total FNE score. To validate that ability level was similar between groups, separate independent samples t-tests were conducted on the number of years played, performance scores in the familiarization phase, and performance scores in the low-pressure phase. Cohen's *d* provided an index of effect size for all t-tests. Separate 2 (Group: low-FNE, high-FNE) × 3 (Phase: familiarization, low-pressure, high-pressure) mixed-design Analysis of Variance (ANOVA) with repeated measures on the phase factor were also conducted for cognitive anxiety, somatic anxiety, successful shots, and preparation time. In all anxiety and preparation time analyses, Mauchly's test of sphericity was violated. Thus, results are interpreted using Huynh-Feldt Epsilon values. Partial eta squared (partial $\eta^2$) was used as an indicator of effect size for ANOVA calculations (Tabachnick & Fidell, 2007) and an alpha level of .05 was set for all statistical tests.

**Dichotomous FNE Groups**

It may be obvious from the selection criteria that FNE groups were uniquely dichotomous. Nevertheless, it was necessary to determine that the low and high FNE groups were significantly different. Results indicated that there was a significant difference, $t(32) = 18.10$, $p < .001$, Cohen's $d = 6.21$, between total FNE scores for the low ($M = 14.35$, $SD = 1.80$) and high FNE ($M = 42.88$, $SD = 6.24$) groups. As such, sample characteristics, and specifically, assignment to low and high FNE group membership, were consistent with conceptual notions of the construct and prior research (Carleton et al., 2006; Rodebaugh et al., 2004; Weiser, Pauli, Weyers, Alpers, & Mühlberger, 2009).

**Homogeneity of Ability**

It was important to ensure that the FNE groups were equal in basketball ability. Results for years experience indicated no significant differences, $t(32) = .324$, $p > .10$, Cohen's $d = .11$, between the low FNE ($M = 14.47$ years, $SD = 8.87$) and high FNE groups ($M = 15.82$, $SD = 14.75$). The familiarization phase performance analysis indicated no significant difference, $t(32) = .38$, $p > .10$, Cohen's $d = .13$, between the low FNE ($M = 24.35$, $SD = 3.62$) and high FNE ($M = 24.94$, $SD = 5.25$) groups. Finally, the low-pressure phase performance analysis also indicated no significant differences, $t(32) = .41$, $p > .10$, Cohen's $d = .14$, for the low FNE ($M = 26.00$, $SD = 3.64$) and high FNE ($M = 26.59$, $SD = 4.69$) groups. With these analyses complete, groups were concluded to be equivalent in experience and ability.

**Anxiety Differences**

By definition, choking must include an elevation in anxiety under perceived pressure, thus, verification of increases in anxiety during the high-pressure phase was necessary. For cognitive anxiety (Figure 2), results revealed that no significant interaction occurred, $F(1.098, 35.126) = 1.36$, $p > .10$, partial $\eta^2 = .04$, but the phase main effect was significant, $F(1.098, 35.126) = 4.19$, $p = .045$, partial $\eta^2 = .12$. Pairwise comparisons indicated that the cognitive anxiety scores in the low-pressure phase ($M = 19.06$, $SD = 1.03$) were significantly different from scores in the familiarization ($M = 19.94$, $SD = .91$) and high-pressure phases ($M = 21.53$, $SD = 1.07$), with a non-significant difference between the familiarization and high-pressure phases. A significant group main effect, $F(1, 32) = 28.29$, $p < .001$, partial $\eta^2 = .47$, was also evident, with the high FNE group ($M = 24.82$, $SD = 6.59$) experiencing more cognitive anxiety than the low FNE group ($M = 15.53$, $SD = 4.95$). For somatic anxiety, a significant phase main effect was evident, $F(1.11, 35.47) = 9.60$, $p = .003$, partial $\eta^2 = .23$, with somatic anxiety scores in the high-pressure phase ($M = 17.44$, $SD = .89$) being significantly different than those in the familiarization ($M = 14.83$, $SD = .57$) and low-pressure phases ($M = 14.62$, $SD = .67$). A significant group main effect, $F(1, 32) = 20.21$, $p < .001$, partial $\eta^2 = .39$, was also identified, with the high FNE group ($M = 18.29$, $SD = 5.08$) experiencing more somatic anxiety than the low FNE group ($M = 12.97$, $SD = 2.88$). Similarly, a Phase × Group interaction was also evident, $F(1.11, 35.47) = 5.19$, $p = .026$, partial $\eta^2 = .14$, indicating that the high FNE group increased, while the low FNE group maintained similarly low somatic anxiety levels during the high-pressure phase (see Figure 3). With the statistically significant increases in anxiety during the high-pressure phase, it was concluded that the pressure manipulation was effective.

**Group Performance Differences**

Performance results revealed no significant phase main effect, $F(2, 64) = 1.57$, $p > .10$, partial $\eta^2 = .05$, or group main effect, $F(1, 32) = 0.62$, $p > .10$, partial $\eta^2 = .02$. Importantly, however, there was a significant interaction, $F(2, 64) = 4.38$, $p = .017$, partial $\eta^2 = .12$. Analysis of simple effects of phase within groups revealed no significant change in performance between low- and high-pressure phases for the low FNE group, $F(1,32) = 1.037$, $p > .10$, partial $\eta^2 = .03$, and a significant decrease in performance between low- and high-pressure phases for the high FNE group, $F(1,32) = 6.83$, $p = .014$, partial $\eta^2 = .18$. Analysis of simple effects of groups within phases revealed no significant difference in performance between low-FNE ($M = 26.0$) and high-FNE ($M = 26.6$) groups within the low-pressure phase, $F(1,32) = 0.167$, $p > .10$, partial $\eta^2 = .005$, and a significant difference between low-FNE ($M = 27.4$) and high FNE ($M = 23.1$) groups within the high-pressure phase, $F(1,32) = 4.373$, $p = .045$, partial $\eta^2 = .12$ (Figure 4).

**Mediation Analysis**

To further investigate the significant difference in performance between high- and low-FNE groups within the high-pressure phase, a mediation analysis was conducted. To test the mediating effects of cognitive and somatic anxiety between FNE group and performance, the following sequence of regression models were evaluated (as outlined by Baron & Kenny, 1986): (i) performance was predicted from FNE group (coded low-FNE = 1, high-FNE = 2), (ii) cognitive and somatic anxiety were (separately) predicted from FNE group, and (iii) performance was predicted (in a three-predictor model) from cognitive anxiety, somatic anxiety, and FNE group. To establish mediation, FNE group must affect performance and either cognitive anxiety or somatic anxiety (or both), which in turn must affect performance, and the signs of all the relationships must be in the expected direction. Furthermore, the effect of FNE group on performance must be significantly reduced in the three-predictor model including cognitive anxiety and somatic anxiety, compared to the one-predictor model with FNE group alone.

The results of these regression analyses are summarized in Figure 5. Because FNE group is categorical, the regression coefficients for FNE group represents the mean difference in the dependent variable between low- and high-FNE groups (coded 1 and 2, respectively). FNE group was found to be a significant predictor of performance ($b$ = –4.23, $t$ = –2.09, $p$ = .045), cognitive anxiety ($b$ = 10.82, $t$ = 5.04, $p$ < .0001) and somatic anxiety ($b$ = 7.98, $t$ = 4.49, $p$ = .0001). Thus, the first criterion of Baron and Kenny (1986) was met, and the second criterion was met for both cognitive and somatic anxiety. In the three-predictor model, cognitive anxiety was found to be statistically significant as a predictor of performance ($b$ = -0.40, $t$ = -2.01, $p$ = .05), but somatic anxiety was not a significant predictor of performance ($b$ = 0.26, $t$ = 1.09, $p$ > 0.10); the magnitude of the effect of FNE group on performance was found to be less than in the first regression model and not statistically significant ($b$ = -2.01, $t$ = -0.74, $p$ = .465). Using bias-corrected and accelerated bootstrapping (Preacher & Hayes, 2008), the difference attributable to cognitive anxiety was found to be significant but the difference attributable to somatic anxiety was not significant (95% confidence intervals for indirect effects: cognitive anxiety [-8.99, -0.91], somatic anxiety [-1.87, 5.03], 1000 replications). Furthermore, the signs of all the relationships involving cognitive anxiety were in the expected direction. Results consistent with these were also obtained in single-mediator analyses for cognitive and somatic anxiety, respectively. Based on these results, it is concluded that cognitive anxiety is a partial mediator between FNE group and performance, but somatic anxiety is not a mediator.

The method of Fairchild, MacKinnon, Taborga, and Taylor (2009) was used to calculate an “$R^2$ type” effect size measure for cognitive anxiety (mediation $R^2$ = 0.114). Thus, 11.4% of the performance variation in the high-pressure phase was attributable to FNE group (high-FNE vs. low-FNE) mediated by cognitive anxiety.

**Preparation Time**

No significant main effects or interactions emerged ($p$'s > .10) for preparation time duration.

## Discussion

The purpose of this investigation was to determine whether fear of negative evaluation (FNE) might differentially predispose individuals to experience heightened anxiety and choking. Experienced basketball players were categorized as either low or high FNE, based on their responses to a FNE questionnaire, and selected to participate in an experiment that included low- and high-pressure phases. The high and low FNE groups were expected to increase anxiety during the high-pressure, compared to the low-pressure, phase. We also hypothesized that the low FNE group would increase performance during the high-pressure, compared to the low-pressure, phase, whereas the high FNE group would decrease performance. Results indicated that the high FNE group experienced choking whereas the low FNE group maintained performance (with non-significant performance differences) throughout the study. Similarly, as expected, cognitive anxiety mediated the relationship between FNE group and performance. These results extend the existing choking literature by providing empirical support for the role of FNE in the choking process. Findings are specified and discussed in the context of the self-presentation model of choking (Mesagno, 2009, in review).

**Pressure Manipulation**

The pressure manipulations included in the current study were implemented to maximize the combined pressure associated with a high-pressure phase, while remaining within ethical restrictions. Similar to other work (e.g., Behan & Wilson, 2008; Hardy, Mullen, & Jones, 1996; Masters, 1992; Mesagno et al., 2008, 2009; Mesagno & Mullane-Grant, 2010; Murray & Janelle, 2003; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004; Wilson, Wood, & Vine, 2009), the combined pressure manipulation was largely successful. The results supported our hypothesis in that both groups experienced increased anxiety in the high-pressure phase. Furthermore, the high FNE group experienced a significantly greater increase in somatic anxiety than the low FNE group. It is difficult to determine how these combined pressure manipulations exert their influence, however, Mesagno, Harvey, and Janelle (2011) have identified that self-presentation related pressure manipulations (e.g., the audience in this study) elicit choking effects more so than motivational incentives (e.g., money). It can therefore be logically inferred that the audience in the current study was a primary reason for the elevated anxiety in the high-pressure phase, due to the implications for self-presentation. That is, the high FNE group likely experienced more anxiety because they were apprehensive about others' evaluations, became distressed about negative evaluations, and expect that others would evaluate them negatively (Watson & Friend, 1969). A predisposition toward evaluation apprehension combined with a performance situation where apprehension is maximized (i.e., with the audience present) may have elevated the high FNE groups' anxiety levels.

We hypothesized that both groups would increase anxiety in the high-pressure phase. The high FNE group experienced more cognitive and somatic anxiety initially, and during the high-pressure phase, than the low FNE group. While not having been reported in the extant sport psychology database, the current findings are consistent with other non-sport related research whereby high FNE participants experienced greater anxiety than low FNE participants (e.g., Chen & Drummond, 2008). Likewise, personality characteristics associated with concern over others' impressions have been found to predict levels of social anxiety. For example, people who are attuned to and concerned with others' perceptions, score high on measures of social anxiety (Fenigstein, 1979; Hope & Heimberg, 1988; Leary & Kowalski, 1993; Watson & Friend, 1969).

Choking studies (e.g., Beilock & Carr, 2001; Gucciardi & Dimmock, 2008; Hardy, Mullen, & Martin, 2001) have often speculated how worry about the situation occupies working memory resources, but until recently (e.g., Gucciardi et al., 2010; Mesagno et al. 2008, 2009; Mesagno et al., 2011) choking studies have not identified the specific worries associated with a socially evaluative situation. Our findings aid in the identification of potential factors related to evaluation apprehension that may trigger the *initial* anxiety increase when choking-susceptible athletes' perform under pressure. Further quantitative and qualitative research, however, is needed to support this assumption.

**The Choking-Susceptible Athlete**

The current study is the first to confirm that high FNE athletes experience significantly higher levels of state anxiety than low FNE athletes in response to identical pressure manipulations. That is, the high FNE group experienced moderate anxiety levels throughout the experiment compared to the low absolute anxiety level of the low FNE group. Participants were tested in a laboratory-based environment, which would presumably be less anxiety inducing than "real-world" competitions. The anxiety levels experienced by the high FNE group, however, were similar to reported anxiety levels experienced by athletes leading into actual competitions, as measured using the original CSAI-2 (e.g., Hanton, Thomas, & Maynard, 2004; Thomas, Maynard, & Hanton, 2004). Although Hanton and colleagues did not examine the affects of FNE in real-world competitions, considering our results, it would seem logical that high FNE athletes may respond to real-world competition with more anxiety than low FNE athletes, which would make them more likely susceptible to choking. Caution should be used, however, when comparing studies that use the original CSAI-2 (such as Hanton and colleagues studies) and the modified CSAI-2R (such as the current study), because the measures are slightly different in the calculation of mean scores, which may increase the sensitivity of differences.

**Group Performance Differences**

Group performance differences indicated that the high FNE group suffered performance decrements, in part, as a result of heightened cognitive anxiety. Indeed, regardless of conceptual disagreement and ambiguities (e.g., Hill et al., 2009; Mesagno et al., 2008), the high FNE group clearly experienced an underperformance in the present study. Considering their success rate in the high-pressure phase was the lowest of all three phases (lower than the familiarization or low-pressure phases) and was a statistically significant difference from the low-pressure phases, we would also argue that choking occurred. Similarly, in accordance with our operational definition of choking (Mesagno et al., 2008), skilled performers exhibited elevated anxiety in the high-pressure phase, which can be inferred from the experimental design to have resulted in substandard performance. The role of anxiety interpretation on anxiety and subsequent performance is still being debated (e.g., Hill et al., 2010a), however, the anxiety intensity data supports our predictions, which was conceptualized on existing choking definitions and published literature. Regardless, the nature of the dichotomous FNE groups resulted in performance changes that were in opposite (and the expected) directions, which was unambiguously important to identify choking effects.

**Preparation Time**

Preparation time was measured during the phases because previous work has indicated that unsuccessful athletes take less time to prepare in pressure situations (e.g., soccer penalty shootouts) than successful athletes (e.g., Jordet, 2009; Jordet & Hartman, 2008). Jordet and colleagues have argued that shorter preparation time indicates a behavioral coping strategy to escape the anxiety inducing situation. Researchers (Mesagno & Mullane-Grant, 2010) have found support for Jordet’s supposition regarding preparation time, however, the current study indicated no significant difference in preparation time for group and phase, contradicting Jordet’s claims regarding preparation time.

A dose response explanation is viable for the difference in our preparation time results relative to Jordet and colleagues (Jordet, 2009; Jordet & Hartman, 2008) previous work. Most would agree that the pressure to perform in a real-world situation, like a penalty shootout in the World Cup final, would be extremely high (although no direct measure of pressure experienced was available in Jordet and colleagues studies) compared to the experimental pressure that researchers can induce in a laboratory setting. Within the current study and many other laboratory studies, the upper limit of anxiety experienced (a threshold, per se) may not be great enough for changes in preparation time to be experienced. Future research may attempt to uncover whether this explanation is applicable to preparation times.

**Theoretical Implications**

One central tenet of the original self-presentation theory is that people experience social anxiety when they are motivated to make a desired impression on others but doubt they will be successful (Schlenker & Leary, 1982). A number of elements in this description are applicable (or comparable) to choking. First, anxiety increases as motivation increases. Such a view is similar to Baumeister’s (1984) explanation that importance of the situation must be high for choking to occur. In the current study, importance of the situation may have taken a number of forms based on the combined pressure manipulation (e.g., winning money, making a good impression on the audience, or looking good for perceived biomechanics experts). Although it is difficult to decouple these explanations, the self-presentation model of choking (Mesagno, 2009, in review) suggests that the audience would have been the major factor that increased importance (and social anxiety) because high FNE participants would experience increased evaluation apprehension. Secondly, social anxiety would be experienced if self-doubt at making a good impression was present. While viable, these potential explanations cannot be directly assessed or disproven in the current study. Finally, these results indicate that while FNE may lead to differences in performance, the relationship between FNE and performance is mediated by cognitive anxiety (as shown from the mediation analysis).

The present study provides quantitative support for Mesagno’s (2009, in review) self-presentation model of choking with the added specification that FNE may be an antecedent to performance impairments under pressure. One self-presentation question (among many) that remains, is that concerning the relationship between self-presentation concerns and self-monitoring techniques (subsumed in the self-focus and distraction models)? The current design did not provide a direct measurement of how self-presentation concerns could have altered attentional focus, which limits our interpretability about the link between self-presentation and existing choking models. Thus, future research should investigate whether self-presentation concerns are a precursor that leads to self-monitoring techniques or whether self-presentation is another potential explanation of choking effects that should be included within the distraction model.

**Limitations and Future Directions**

We acknowledge limitations of the current project that should be remedied in future work. While the combined pressure manipulation was effective in increasing performance anxiety, we could not differentiate within the high-pressure phase what source of pressure (self-presentation or monetary rewards) exerted the most influence, and whether the high FNE participants were actually distracted by evaluation apprehension cognitions per se. While this is certainly a limitation of the current work, the design yielded important insights. More specifically, purposefully selecting high and low FNE participants and then evaluating their anxiety and performance differences under pressure added further evidence to the self-presentation model and use of FNE as a possible predictor of choking. Other manipulations are certainly viable and appropriate for testing the self-presentation model of choking. For example, a manipulation could include an audience that is known to the athlete and potentially supportive (Butler & Baumeister, 1998). Similarly, perhaps parents, coaches, or even elite sport recruitment officers could be used in future studies to promote the most anxiety, and to determine how these audiences affect choking behavior.

Another limitation was that we recruited participants that we expected to be choking-susceptible and choking-resistant based on a specific (self-presentation) model of choking

(Mesagno, 2009, in review). They were not, however, purposefully sampled as choking-susceptible participants, thereby potentially decreasing the ecological validity of the study. Nevertheless, we sought to determine *if* FNE is a potential predictor of choking and non-choking behavior, rather than use choking-susceptible athletes who would experience choking. Another limitation is that we measured performance differences at a superficial level without indices of what is the likely cause of the performance change (e.g., attention related or motor coordination). Future research could employ measurement tools (e.g., eye-tracking, EMG, or force production indices, c.f., Coombes, Gamble, Cauraugh, & Janelle, 2008; Coombes, Higgins, Gamble, Cauraugh, & Janelle, 2009; Janelle, 2002) that permit more direct inferences concerning the mechanisms that drive performance changes under pressure as a function of FNE. Further qualitative exploration of how FNE influences anxiety and performance during competition is needed to help identify additional factors associated with choking. Other avenues for future research include using the directional dimension of the CSAI-2R to determine if differences in interpretation of anxiety exist in high- and low-FNE participants, and using a sport-specific (rather than general) FNE questionnaire to potentially enhance differences in performance outcomes.

**Conclusions**

In conclusion, our evidence strongly suggests that fear of negative evaluation is an important psychological characteristic of the choking-susceptible athlete. Future research should be directed toward identification of other evaluative aspects of competition that may evoke competitive and social anxiety. Examining the relationship between evaluation apprehension, cognitive anxiety, and self-presentation issues should identify the critical origins of performance anxiety, which increase the likelihood of choking. By extending our knowledge of the precursors of anxiety, empirically based recommendations can be provided to improve interventions for performance under pressure.

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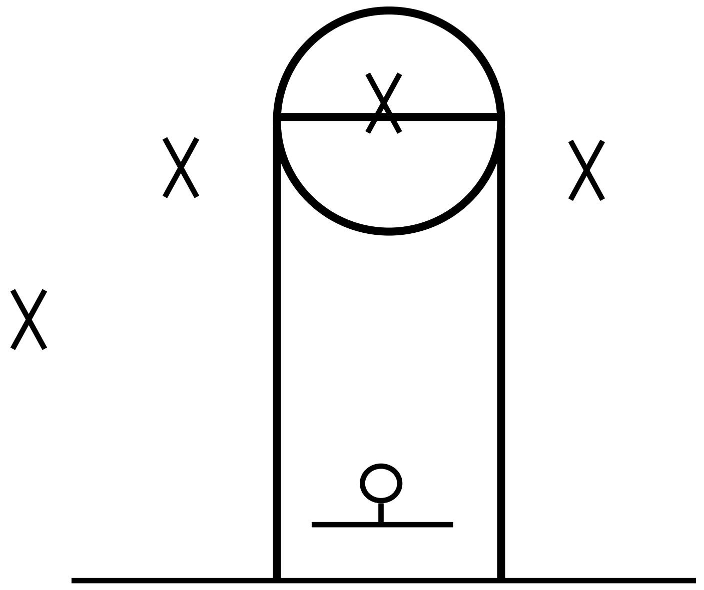


*Figure 1*. Diagram of shooting distance and areas (labeled by an X).

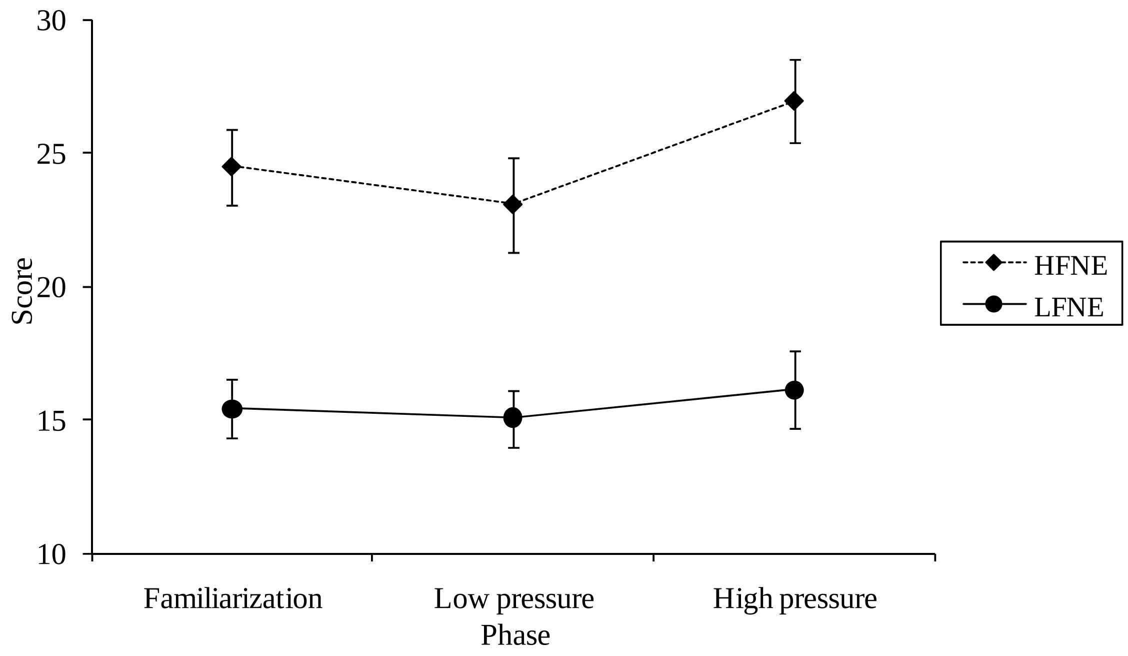


*Figure 2.* Mean cognitive anxiety scores (and standard error bars) for the LFNE and HFNE groups as a function of phase.

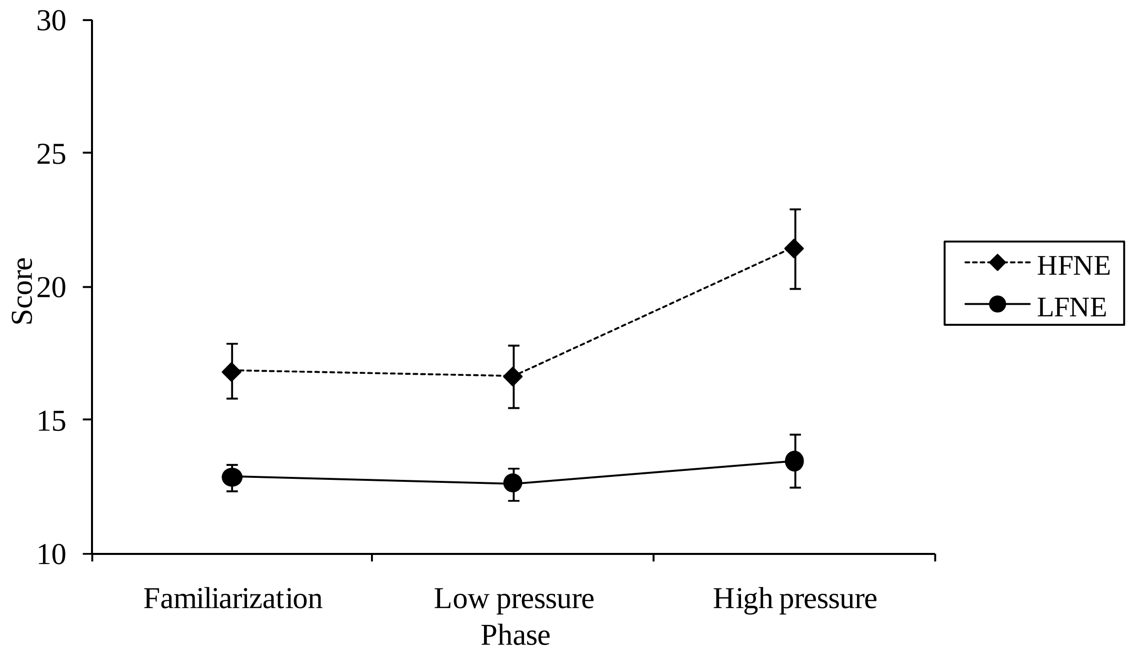


*Figure 3.* Mean somatic anxiety scores (and standard error bars) for the LFNE and HFNE groups as a function of phase.

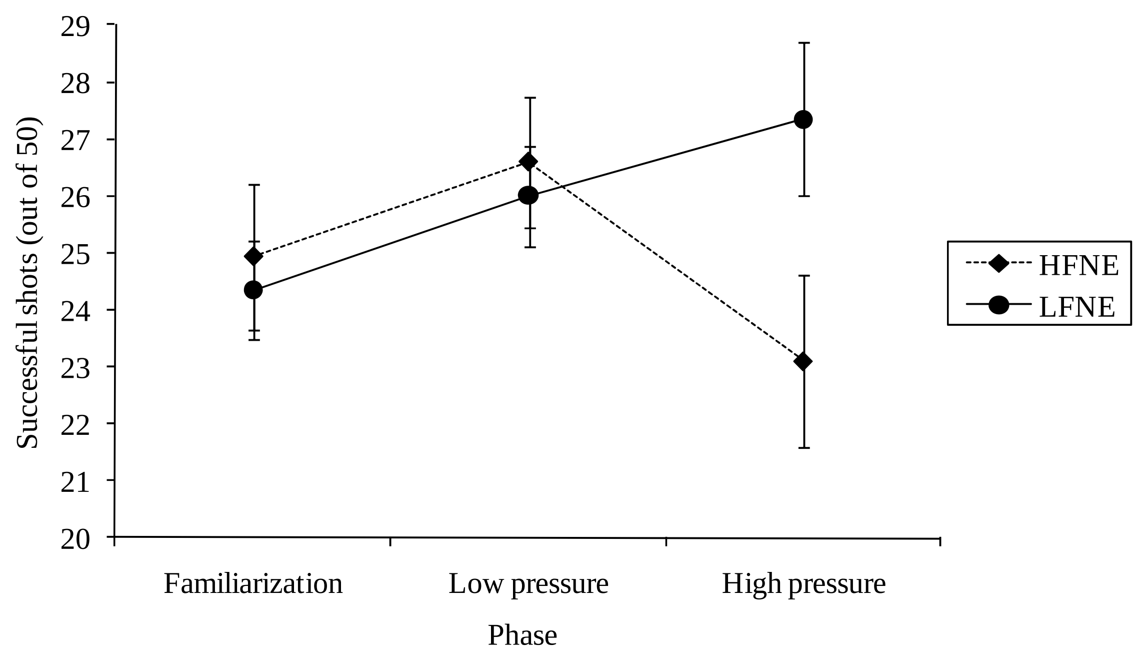


*Figure 4*. Mean performance scores (and standard error bars) for the LFNE and HFNE groups as a function of phase.

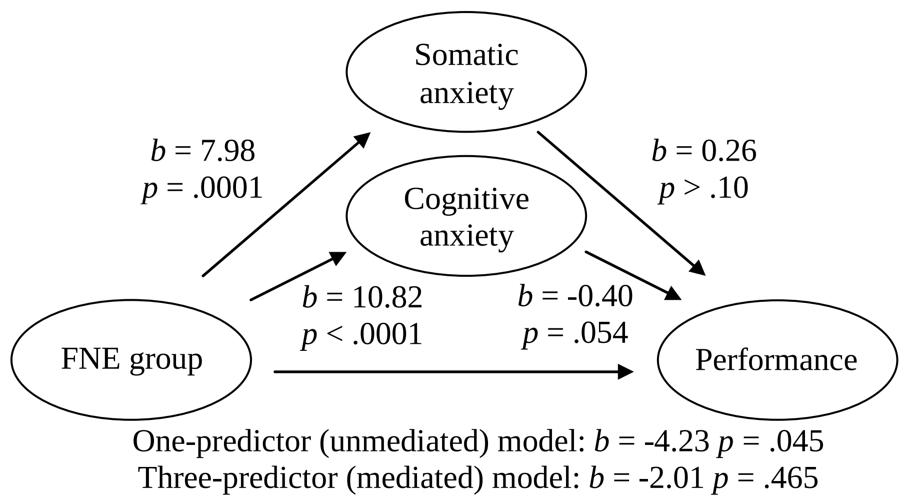


*Figure 5*. Mediational models. Somatic and cognitive anxiety as mediators between FNE group and performance during the high-pressure phase.