7-1-1977

The effects of anxiety on competitive achievement among college students

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THE EFFECTS OF ANXIETY ON COMPETITIVE ACHIEVEMENT AMONG COLLEGE STUDENTS

A Thesis
Presented to the
School of Health, Physical Education and Recreation
and the
Faculty of the Graduate College
University of Nebraska

In Partial Fulfillment of the Requirements for the Degree
Master of Arts
University of Nebraska at Omaha

by
Anne Bothe
July, 1977
THESIS ACCEPTANCE

Accepted for the faculty of the Graduate College, University of Nebraska, in partial fulfillment of the requirements for the degree Master of Arts, University of Nebraska at Omaha.

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Chairman

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CHAPTER I
INTRODUCTION

In modern day living, the phenomenon of competition has a striking influence on many areas of society. The nature of the competitive process implicates evaluation, which in turn elicits feelings of anxiety. Because of the demands of these forces on human nature, there is a need for systematic evaluation and theoretical integration of competition and anxiety. A series of investigations (Martens and Landers, 1970; Martens, 1971; Martens and Landers, 1971; Martens, et al., 1975; Martens and Simon, 1976; Martens and Gill, 1976) indicate a pervasive relationship between anxiety and competition. Burton (1976) emphasizes that personal adequacy is often judged by motor performance while, in fact, the attitude toward personal competency is affected by situational anxiety. It would, therefore, be useful to have a workable definition of the competitive phenomenon and the anxiety manifest therein.

Investigation in this area has been diverse in terms of performance variables and methodologies. A common practice relating competition and anxiety in the area of sport utilizes coaches as accurate judges of the manifestation of anxiety in players. This is based on the extensive amounts of time coaches spend with their players and the
ability of coaches to "psych up" a team. However, in a study by Martens and Simon (1976) a surprisingly low correlation was found between the coaches' rating of player anxiety and two other self-report scales of competition and anxiety. The confusion left by this practice supports further investigation for accurate measurement and integration of competition and anxiety.

Changes in physiological state due to feelings of tension, apprehension and nervousness are due to activation of the autonomic nervous system. Some of the physiological methods for measuring changes in this state include heart rate, blood pressure, palmar sweating, galvanic skin response, and muscle action potential. These methods in practice, however, have not been found to distinguish between levels of anxiety (Malmo, 1959; Martens and Landers, 1970; Spielberger and Sarason, 1975). Duffy (1962) has reported low correlations for intersubject physiological measures as well as problems arising from the use of single measures and combinations of measurements. These findings are due to several factors. Physiological responses are specific to each individual. In order to maintain homeostasis, some physiological systems must balance others. Not all physiological systems react at the same time while some systems are more representative than others. In addition, the expense of the equipment required to make such measurements limits their use.

Self-report scales have been utilized as direct methods
of assessment. The rationale behind psychological measures is that they are administered and scored quickly and easily to any size of group and they are more reliable than physiological measures (Martens, 1977). With psychological inventories, the subjects simply indicate how they feel at a given moment in time or while performing a specific task. The use of these measures rose from a belief that in a given situation a better prediction can be made as to how a person will perceive a competitive situation in terms of being threatening or nonthreatening (Martens and Simon, 1976). This theory depends upon the delineation of components of competition and anxiety which has not existed in previous research (Martens, et al., 1975).

Empirical observation reveals the rigor of competition in many areas of society. Further analysis is necessary to determine the effects of anxiety on competitive performance. This could indicate elements such as what is just enough anxiety to accomplish a task and yet not too much to hinder. It might also serve to indicate individual adversity to competition as well as to predict the success/failure component. It is theoretically and practically important to determine the influence of anxiety on competitive performance. This study is designed to clarify competition and anxiety and to determine their interrelationship for optimal performance.
CHAPTER II

THE PROBLEM

The Purpose

The purpose of this investigation was to determine if anxiety during competition affected golf performance. In addition, sex and years of previous experience were studied to determine their relationship to anxiety and golf performance.

Assumptions

The major assumptions of the study were that:

1. Anxiety and competition are important forces which exist in modern day living.
2. Within a competitive situation, differing levels of anxiety become manifest.
3. There is an interaction between anxiety and performance which influences competitive outcome.

Definition of Terms

With reference to this study, the following terms are defined as follows:

1. Trait Anxiety (A-Trait): is the tendency to perceive situations as threatening.
2. State Anxiety (A-State): is a transitional emotional state which responds according to the perceived A-Trait.
3. Inverted-U Curve: is the concomitant increase in anxiety and performance up to a certain optimal level, after which continued increases in anxiety cause increasingly inferior performance.

4. Competitive situation: is one in which golf skill is tested and the score recorded to constitute twenty-five per cent of the final grade.

The Hypothesis

In competitive situations, subjects with high and low anxiety levels will tend to score at an inferior level when compared to subjects with moderate anxiety levels. Males and females will show similar levels of anxiety, and previous golfing experience will not be a factor.

Delimitations

The study involved sixty-six college students from the University of Nebraska at Omaha, Omaha, Nebraska. The students were enrolled in beginning golf classes during the 1976-77 school year.

Significance of the Study

The significance of this study relates to the emphasis teachers and coaches place on success in relationship to varying levels of anxiety. Greater knowledge of anxiety levels prior to competition could feasibly modify classroom procedures and competitive strategies toward success rather than responding to consequence.
CHAPTER III
THE REVIEW OF RELATED LITERATURE

In view of a systematic evaluation and theoretical integration of competition and anxiety, special consideration will be given in reviewing the related literature. Organizationally, the related literature will define and evaluate the framework of both competition and anxiety, measure the relationship between competition and anxiety, and provide evidence of behavioral efficiency as it relates to anxiety.

Competition has never been subject to rigorous definition. In terms of research, competition has varied among studies. Martens (1975) has proposed a theory of competition which integrates several existing theories including the social evaluation theory of Festinger (1954) and recent research of Martens and Landers (1972). Competition as a social-psychological process according to Martens is represented in a four-stage model consisting of 1) the objective competitive situation, 2) the subjective competitive situation, 3) responses, and 4) consequences.

The objective competitive situation is the first stage of the process of competition. This is the actual physical and social environment which contains the stimulus properties for competition. A more complete definition is supported by social evaluation theory (Festinger, 1954) and research
(Martens and Landers, 1972), and is defined as a situation "in which the comparison of an individual's performance is made with some standard in the presence of at least one other person who is aware of the criterion for comparison and can evaluate the comparison process." (Martens, 1975, p. 71.)

Once involved in the objective competitive situation, the process by which an individual evaluates the circumstances is termed the subjective competitive situation. Appraisal is based on whether or not the competitive situation involved was voluntarily engaged, importance of the competition, criterion for performance, personal competency level and the possible positive or negative outcome. At this stage the individual must decide to either participate or avoid the competition.

Provided the individual enters the competitive situation, the third stage of the model or the response is reached. Response is dependent upon physiological and behavioral levels. The major response of interest here is a combination of psychological and behavioral levels which are largely determined by the subjective competitive situation.

The final stage of the competitive process is the consequence arising from the individual's response compared to the standard. The consequential feedback is then held for future use.

The competitive process occurs whenever an objective
situation is presented. Competitive behavior involves actually seeking an objective competitive situation which is determined by predisposition of competitiveness. Competitive behavior is also the decision to subject oneself to the comparison of another in terms of performance.

Competition as presented in this framework is viewed as a form of social evaluation. The delineation of the components of competition makes the model valuable in studying variables which affect competition. Knowledge of this phenomenon may explain why individuals compete, what influences their competitive behavior, and why situations which are perceived as competitive to one individual may be a threat to another.

Because the competitive process implicates evaluation, it can be postulated that competition elicits feelings of anxiety. It is human nature to react to a stressful or competitive situation with anxiety. The level of anxiety is dependent upon individual perception of the competitive outcome. In a competitive setting an individual who perceives a satisfactory outcome will have little anxiety while an individual who perceives negative evaluation will have increased levels of anxiety.

In order to identify characteristics of stressful situations which evoke differing levels of anxiety, Spielberger (1971) defined the concept of anxiety. Based on the State/Trait Theory of Anxiety and situation-specific approach to
the study of anxiety, differentiation is made between competitive anxiety and trait anxiety. Competitive state anxiety (A-State) is an emotional state which is characterized by subjective, consciously perceived feelings of tension and nervousness. A-State is transitional in that it may fluctuate and vary in intensity. Competitive trait anxiety (A-Trait) is a relatively stable personality state with the tendency to perceive a wide range of situations as threatening and to respond with varying levels of A-State.

By integrating Martens' (1971) model of the competitive process and Spielberger's (1971) state-trait theory of anxiety, a theory of competitive stress results. The objective of the theory is to predict levels of state anxiety. A-State is regulated by the value or importance of a competitive situation. When the value or importance is great, the probability of a threatening situation exists. As threat is perceived, competitive A-State increases.

From a series of investigations, Morgan (1973) reported that performance and anxiety are interrelated. In one study, wrestlers from the University of California completed alternate forms of the IPAT 8-Parallel Form Anxiety Battery during 1) early season, 2) four hours prior to competition, 3) one hour prior to competition, and 4) fifteen to thirty minutes following competition. Results revealed a significant increase in anxiety before competition, and in post-competition,
anxiety levels were significantly lower than the pre-competition level.

In another study, Morgan administered the State Trait Anxiety Inventory to forty adult males at intervals of 1) rest, 2) immediately following forty-five minutes of exercise, and 3) twenty to thirty minutes following exercise. The subjects who had worked at levels of cardiac frequency high enough to evoke aerobic or anaerobic mechanisms reported a sense of "well-being." Morgan's conclusion was that muscular exertion was associated with a significant reduction in A-State in normal and highly anxious subjects.

In testing the construct validity of the Sport Competition Anxiety Test (SCAT), Martens, et al. (1975) proposed competitive A-Trait to be a predictor of A-State prior to, during, and after competition. In two experiments the investigators tested ten to twelve year old boys and girls with SCAT, Spielberger's State Anxiety Inventory for children, palmar sweating, and a linear slide device. In both experiments, the subjects were tested prior to, during, and after stressful competition in which the outcome was manipulated. The experimenters concluded that subjects with high SCAT scores elicited higher levels of A-State than low scoring SCAT subjects in stressful competition, and, the interaction of SCAT and competitive outcome (success/failure) influenced subjects with high A-Trait to experience a more pronounced reduction in A-State when accompanied by success than those subjects
with low A-Trait. Conversely, high A-Trait subjects developed higher levels of A-State in the presence of failure than low A-Trait subjects.

Another study which related trait and state anxiety, movement satisfaction, and participation in physical education activities was done by Burton (1976). She contended that personal adequacy was often judged by one's ability to move, therefore, one's attitude toward personal competency could affect the level of state anxiety. Participants were 262 male and female college students involved in golf-archery, figure improvement, ballet, modern dance, and elementary physical education methods. Pre- and post-test measurements utilized the State-Trait Anxiety Inventory and Movement Satisfaction Scale. Results indicated a significant relationship between the ability to move and A-Trait and A-State in the physical education learning situations. Subjects rating high in A-Trait scored even higher in A-State and lower in movement satisfaction than the subjects rating low in A-Trait.

The relationship between performance and arousal is pervasive and yet not clearly understood. For many performances there seems to be an optimal level of arousal at which performance reaches excellence. There also seem to be levels of arousal which are too high or too low to produce excellence in performance. Yerkes and Dodson (1908) were the first to describe a nonmonotonic relationship between quality of performance and arousal. The purpose of this experiment
related the strength of stimulus to the rate of learning or acquisition of habit in a maze. There were fewer errors in learning when the electrical stimulus was at a medium intensity rather than extremely high or low. This experimental evidence explained the relationship in the construct on an inverted-U curve. In these terms, increases in arousal are associated with increases in performance up to a certain optimal level, thereafter, continued increases in arousal cause increasingly inferior performance. Optimal performance lays midway in the arousal continuum. This arousal-performance relationship is depicted in Figure 1.

Figure 1. The Inverted-U Hypothesis
Reviewing studies involving muscle tension, Courts (1942) found an increase in tension during mental activity as compared to rest. He noted an optimal level at which tension facilitated performance. The relationship between tension and performance was represented by the inverted-U curve or the Yerkes-Dodson law. Courts concluded, however, that the optimal level of tension is not the same for all performers and hence the results cannot be generalized beyond the original situation.

In another general review of the effects of psychological stress on performance, Lazarus, Deese, and Osler (1952) related a number of perceptual motor studies demonstrating impairment under stress. However, like Courts, they recognized inconsistent results and difficulty of comparing studies due to the different methods of inducing stress, different tasks, and individual differences in sampling.

An inverted-U curve was reported in an investigation in which the degree of anxiety of 101 college students was measured by the Manifest Anxiety Scale, which demonstrated a significant curvilinear relationship to the time required to learn a human stylus maze (Matarazzo, Ulett, and Saslow, 1955). Subjects in the middle range learned significantly faster than those at either the high or low levels of anxiety. Anxiety facilitated learning up to a point and beyond this performance in a learning situation was inhibited by increased anxiety.

Shaw (1956) tested thirty college students in an attempt
to facilitate performance under optimal tension in relation to task difficulty and individual ability. Subjects repeated aloud a series of digits displayed by a tachistoscope as tension was induced by zero, one-fourth, one-half, three-fourths and maximum dynamometric pull. The optimal tension varied as a function of task difficulty. One-fourth of the maximum pull facilitated performance on all digit series. Even greater pull improved performance on the longer, more difficult series, however, inhibited performance on the easier tasks. There was an inverted-U curve representing the effect of induced muscle tension on all series for good and poor performers. The better performers were facilitated by a moderate pull.

To confirm previous reports of a significant curvilinear relationship between performance and anxiety, Matarazzo and Phillips (1955) tested 119 medical students with a sixty-seven item digit symbol task and the Taylor Scale of Manifest Anxiety. A significant curvilinear relationship between performance and anxiety was not found; however, performance by the group in the moderate range of anxiety was superior to the group in the low range.

Stennett (1957) conducted a study to provide additional data to validate the inverted-U curve. In the study involving thirty-one right handed college males, he recorded electromyograms from four muscle groups and palmar conductance during an auditory tracking task. The results upheld the
inverted-U curve between performance and level of arousal whether conductance or any of the four muscle groups were used as a criterion for arousal.

Another view of the inverted-U curve was explained through activation theory (Malmo, 1959). Activation, a term used interchangeably with arousal, is primarily a psychological problem of study with emphasis of the importance of neurophysiological techniques. Malmo described this dimension as a continuum from a deep sleep or low activation to highly excited or highly activated states. Activation is a function of the amount of cortical bombardment by the ascending reticular activation system. The relationship between activation and behavior is demonstrated by the inverted-U. To support the inverted-U curve, Malmo cited a study done by Belanger and Feldman relating the performance of rats with the Skinner box to the number of hours of water deprivation. Bar pressing and heart rate increased linearly up to forty-eight hours of water deprivation. After that point, continued increase in heart rate was accompanied by a decrease in bar pressing.

A study suggesting that the effects of induced muscle tension on performance may be represented by the inverted-U curve was done by Stauffacher (1937) and later repeated by Woods and Hokanson (1965). They had one hundred college students perform a digit symbol task under five different degrees of muscle tension: 1) no induced tension, 2) one-fourth maximal pull, 3) one-half maximal pull, 4) three-fourths
maximal pull, and 5) maximum pull. The other dependent variable measured was heart rate. The investigators found that performance was facilitated as a function of the degree of induced muscular tension up to an optimal point and then tapered off with further increases in tension. On the other hand, heart rate increased in a linear fashion throughout the range of induced tension. These results were similar to those of Stauffacher (1937) in that the relationship between induced muscular tension and performance took the general shape of the inverted-U.

In order to leave the laboratory setting and test a real-life experience, Fenz and Epstein (1967) measured the conflict and stress associated with sport parachuting. The ten novice and ten experienced parachutists rated their intensity of feelings of fear at given intervals before and after jumping. In addition, their skin resistance, heart rate, and respiration rate were monitored. While anxiety took the shape of a positively accelerated curve for the novice jumpers, the experienced jumpers experienced an increase in arousal associated with a decline to normal levels before reaching the final altitude for jumping. This supports the inverted-U hypothesis reporting moderate levels of anxiety superior to high levels of anxiety for good jumps in sport parachuting.

Martens and Landers (1970) proposed support for the inverted-U curve when the relationship was that between performance of a novel motor task and arousal. One thousand
junior high aged boys represented three levels of trait anxiety (high, medium, and low) as measured by the Manifest Anxiety Scale. Each group was exposed to three levels of arousal as manipulated by three levels of psychological stress or threat of shock. Optimal performance on the tracking task was found in the moderately anxious group at any of the three levels of stress while both high and low anxious groups performed with equal difficulty. Each anxiety group was also noted to perform optimally under moderate stress as opposed to high or low levels of psychological stress. There were inverted-U curves representing both the three levels of anxiety and psychological stress.

Summary

Literature emphasizes the concomitant roles of anxiety and motor performance. While performing a task, differing levels of anxiety are manifest. Of interest is the integration of anxiety and behavior for optimal performance. In reviewing the literature, the most logical explanation for this was found in the Yerkes-Dodson law or the inverted-U curve. This predicts that as anxiety increases, the efficiency of performance increases simultaneously up to an optimal level. However, continued increases in anxiety result in increasingly inferior performance. Numerous studies provide evidence for the inverted-U curve in a variety of circumstances.

A basic difference between this study and a number of
those cited is that much of the previous research used varying levels of stress or exertion concomitant to performance; whereas, this study involved the use of social evaluation concomitant to performance. In line with the hypothesis of this study, anxiety should have an effect on golf performance, and this effect should assume an inverted-U curve. At the same time, sex and experience should not be influential. Based on research included in this review, the hypothesis of this study appears reasonable.
CHAPTER IV

PROCEDURES

Design

In this study the author examined the relationship between anxiety and performance in a competitive situation among college students. By categorizing anxiety levels, sex, and previous golfing experience and recording the performance outcome in the competitive setting, the relationship between performance and anxiety, sex, and experience was determined.

The design was proposed to satisfy the following hypothesized outcome: In competitive situations, subjects with high and low anxiety levels will tend to score at an inferior level when compared to subjects with moderate anxiety levels. Males and females will show similar levels of anxiety, and previous golfing experience will not be a factor.

Subjects

The subjects involved in this investigation consisted of sixty-six college students (thirty-five males and thirty-one females) enrolled in beginning golf classes at the University of Nebraska at Omaha, Omaha, Nebraska. The classes met twice a week throughout the second semester of the 1976-77 school year.
**Variables**

The independent variables measured were anxiety, sex, and experience. Performance, or scores from a modified version of the Nelson Pitching Test (Johnson and Nelson, 1974), was treated as the dependent variable.

**Description of Measuring Tools**

The instrument used for categorizing anxiety was the Sport Competition Anxiety Test, SCAT (Martens, 1977). SCAT was primarily designed for research purposes in order to identify individuals differing in A-Trait. It is an A-Trait scale which measures the predisposition to respond with varying levels of A-State in competitive situations. Martens (1975, 1976, 1977) has reported high reliability and good face validity for the fifteen-item questionnaire.

The indicator used for golfing performance was the total score achieved on a modified version of the Nelson Pitching Test. This test was designed for college students to measure the ability to use short irons. The validity of the test is .86. Using odd-even trials and the Spearman-Brown Prophecy Formula, a coefficient of reliability of .93 was obtained on this modified version of the Nelson Pitching Test. Modifications were made in order to use the test indoors. The total target area was reduced to one-half the recommended size, the distance from the center of the target to the hitting line was reduced by two-thirds, and whiffle balls were substituted for
real golf balls. Points were awarded for the area of the target where the ball initially struck. Golfers alternated hitting during the thirteen trials, the last ten of which were recorded to comprise the total score for each individual.

**Method of Gathering Data**

The methods employed in the collection of data to support the proposed hypothesis are discussed in this section. On the day of skill testing, the experimenter lectured to the subjects on the importance of the test and evaluation procedures. Emphasis was placed on individual concentration and accuracy to determine scores which in turn would be used to place the students in rank order and assign a skill grade or one quarter of the final semester grade. Following this discussion, the adult form of SCAT was administered to the subjects.

The inventory was presented as the Illinois Competition Questionnaire. The experimenter read aloud the instructions printed on the test while the subjects followed silently. The main point of the instruction was to emphasize that the respondents should report how they generally feel in competitive situations. The experimenter believed that instructions were clearly understood. The experimenter restated or clarified questions rather than providing any information regarding the purpose of the study. The subjects were instructed to answer all of the test items on which there was no time limit.
The inventory is reproduced in Appendix A.

The pitching test immediately followed the completion of the anxiety questionnaire. Subjects, paired by the experimenter for similar skill level, alternated hits from a distance of forty feet. The target had a diameter of twenty-four feet and was divided into equal quadrants. Each sector of the target had a designated value as can be noted in the reproduction in Appendix B. The total number of points accumulated in ten trials was recorded. The point value of the target was such that a high score was superior to a low score with a total of one hundred points possible.

**Treatment of Data**

In order to examine the effects of anxiety, sex, and experience on golf performance, a 3 x 2 x 3 factorial was employed. The first factor was anxiety (high, medium, and low). Subjects were selected for one of these three groups based on their SCAT scores. Those subjects whose total scores were in the upper one-third of the group were assigned to the high anxiety level. Those scoring in the middle one-third were assigned to the moderate level and those scoring in the lower one-third were assigned to the low anxiety level. The second factor was sex. Sex was recorded by each subject on the questionnaire as was the third factor, previous experience. Experience was categorized into levels of less than one year, one to two years, or three or more years. The data were
statistically treated at the University of Nebraska at Omaha Computer Center. Anxiety, sex, experience and golf score data were analyzed in a three-way analysis of variance and separate one-way analyses. Post hoc comparisons were made using the Scheffé method.
CHAPTER V
RESULTS

This chapter presents and describes the results of the analysis of data. A 3 x 2 x 3 factorial was the statistical design used to check for significant differences in golf scores according to anxiety, sex, and previous golfing experience. In addition to the three-way analysis, three one-way analyses were performed. The Scheffé method was used to determine significant differences between mean scores.

In the following discussion, the dependent variable is golf scores and the three independent variables are anxiety, sex, and experience; A, B, C, respectively. Factor A represents three levels of anxiety: A1 = low anxiety, A2 = moderate anxiety, and A3 = high anxiety. Factor B represents sex: B1 = female and B2 = male. Factor C represents years of previous golfing experience: C1 = less than one year, C2 = one to two years, and C3 = three or more years. The factorial design is depicted in Figure 2.
Figure 2. 3 x 2 x 3 Factorial Design, A x B x C
The analysis of variance is summarized in Table I. The F ratios of two of the three main effects were statistically significant at the .001 level of confidence. Golf scores did vary significantly with sex (B) and experience (C). There was no significant difference between anxiety levels (A). Thus, the hypothesis of this study was not supported.
### TABLE I

**SUMMARY OF ANALYSIS OF VARIANCE FOR ANXIETY, SEX, AND EXPERIENCE WITH GOLF SCORES**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
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<tr>
<td><strong>Main Effects</strong></td>
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</tr>
<tr>
<td>Anxiety</td>
<td>614.596</td>
<td>2</td>
<td>307.298</td>
<td>1.104</td>
</tr>
<tr>
<td>Sex</td>
<td>3936.791</td>
<td>1</td>
<td>3936.791</td>
<td>14.141**</td>
</tr>
<tr>
<td>Experience</td>
<td>4664.211</td>
<td>2</td>
<td>2332.105</td>
<td>8.377**</td>
</tr>
<tr>
<td><strong>Two-Way Interactions</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety x Sex</td>
<td>1237.052</td>
<td>2</td>
<td>618.526</td>
<td>2.222</td>
</tr>
<tr>
<td>Anxiety x Experience</td>
<td>3479.813</td>
<td>4</td>
<td>869.953</td>
<td>3.125*</td>
</tr>
<tr>
<td>Sex x Experience</td>
<td>2132.232</td>
<td>2</td>
<td>1066.116</td>
<td>3.830*</td>
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<tr>
<td><strong>Three-Way Interactions</strong></td>
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<tr>
<td>Anxiety x Sex x Experience</td>
<td>996.066</td>
<td>3</td>
<td>332.022</td>
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<td><strong>Explained</strong></td>
<td>20948.504</td>
<td>16</td>
<td>1309.281</td>
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<td><strong>Residual</strong></td>
<td>13362.836</td>
<td>48</td>
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<td><strong>Total</strong></td>
<td>34311.340</td>
<td>64</td>
<td>536.115</td>
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* significant at .05 level of confidence  
** significant at .001 level of confidence
Table II contains the mean golf scores and standard deviations for each level of Factors, A, B, and C. Inspection of mean scores for sex indicated that males scored better than females. Mean scores for experience indicated that golf scores improved with golfing experience. And although no significant difference was found, mean anxiety scores indicated that golf scores appeared to improve as anxiety decreased. The mean scores are also represented in Figure 3.
<table>
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<th>x</th>
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<tr>
<td>A3</td>
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<tr>
<td>Golf Scores with Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>34</td>
<td>19</td>
</tr>
<tr>
<td>B2</td>
<td>59</td>
<td>20</td>
</tr>
<tr>
<td>Golf Scores with Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>C2</td>
<td>55</td>
<td>18</td>
</tr>
<tr>
<td>C3</td>
<td>65</td>
<td>23</td>
</tr>
</tbody>
</table>
Figure 3. Mean Golf Scores for Anxiety, Sex, and Experience
The interactions between anxiety level and experience (AC) and sex and experience (BC) were also statistically significant at the .05 level of confidence. The mean scores corresponding to cell totals are contained in Tables III and IV and are plotted in Figures 4 and 5. As indicated in Table III, moderate anxiety has a facilitating effect while high anxiety is weakening among experienced golfers. For the less experienced golfers, anxiety has a mildly debilitating effect upon performance.

Table IV indicates that golf scores do improve with experience for both men and women. It also appears that men have better golf scores in the initial stages of learning; however, women's scores progress rapidly with experience.
TABLE III

MEAN GOLF SCORES FOR EACH ANXIETY LEVEL
AT EACH LEVEL OF EXPERIENCE

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>37</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>C2</td>
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<td>45</td>
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</tr>
<tr>
<td>C3</td>
<td>56</td>
<td>75</td>
<td>69</td>
</tr>
</tbody>
</table>

TABLE IV

MEAN GOLF SCORES FOR EACH SEX
AT EACH LEVEL OF EXPERIENCE

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>29</td>
<td>57</td>
</tr>
<tr>
<td>C2</td>
<td>38</td>
<td>61</td>
</tr>
<tr>
<td>C3</td>
<td>73</td>
<td>62</td>
</tr>
</tbody>
</table>
Figure 4. Mean Golf Scores for each Anxiety Level at each Level of Experience

- ○ less than one year of experience
- * one to two years of experience
- ■ three or more years of experience
Figure 5. Mean Golf Scores for Each Sex at Each Level of Experience

* female
○ male
CHAPTER VI
DISCUSSION

The hypothesis of this study failed to support previous research of activation theorists relating arousal and performance.

In competitive situations, subjects with high and low anxiety levels will tend to score at an inferior level when compared to subjects with moderate anxiety levels. Males and females will show similar levels of anxiety, and previous golfing experience will not be a factor.

The expectations expressed in the hypothesis were not confirmed. Statistical analysis of the data did not indicate significant differences between golf scores at any of the three levels of anxiety. Hence, it cannot be said that anxiety had a significant effect of golf scores. Contrary to the hypothesized inverted-U curve, Figure 6 reflects that the best golf scores corresponded with low anxiety, average scores with moderate anxiety, and poor scores with high anxiety. Scores, however, were not significantly different at any level. Significant differences were noted, however, between golf scores of men and women as well as between the three levels of previous golfing experience. Mean scores derived from these differences indicated an advantage for men and for golfers with three or more years of experience.
Figure 6. Relationship between the Inverted-U and the Actual Findings
The results of this study failed to provide evidence that anxiety has an effect on golf performance among college students. Empirical evidence, however, would seem to indicate that while a high level of anxiety might be a distinct advantage in one situation, in another situation it might be totally debilitating. According to Oxendine (1970) and Gutin (1973), optimal levels of arousal vary among motor tasks as well as from person to person. Oxendine suggested a continuum for optimal arousal in a variety of sports activities. Interestingly and in line with the findings of this study, golf was optimally placed at the low end of the anxiety continuum.

The present study hypothesized that sex would not be a factor in competitive achievement. Sex was significant, however, as a main effect and also in an interaction with experience. The greater amount of experience among males may have contributed to their lower anxiety level and better performance. However, it is noteworthy that there is a trend for females to average higher in competitive A-Trait than males (Martens, 1977).

Experience, another independent variable hypothesized not to be a factor in competitive achievement, was significant as a main effect and also in interactions with anxiety and sex. Fenz and Epstein (1967) and Fenz and Joncs (1972) studied sport parachutists and measured arousal as it related to the jumps of both novice and experienced jumpers. They found
that heart rate and respiration rate increased steadily as the time-to-jump neared. However, several minutes before the actual jump, the arousal level of experienced jumpers decreased to a moderate level as the arousal of novice jumpers continued to rise. Comparison of the jumps revealed that the experienced parachutists made the superior jumps. These findings relate closely to the high quality performance of experienced golfers. Performance was facilitated for males and the experienced golfers at a moderate level of anxiety.

The significant interactions between sex and experience (BC) and anxiety and experience (AC) were of interest. For each interaction, the main effects of one factor were examined at each level of the interacting factor. For sex and experience the interaction was readily apparent. The male-female dichotomy favored males and the profile of mean scores according to experience favored three or more years of participation. Their interaction reflected an advantage for males with three or more years of experience.

The hypothesis was strengthened by the significant interaction of anxiety and experience (AC). The main effects of anxiety at each level of experience were examined. The inverted-U curve was illustrated among experienced golfers, Figure 7. There was a concomitant increase in golf scores and anxiety up to the moderate level, after which continued increases in anxiety caused increasingly inferior golf performance. Increases in anxiety for the less experienced
golfers, however, acted as a decrement to their performance.

Figure 7. The Relationship between Experienced Golfers and Anxiety

Contrary to the findings of this study, many studies have supported the inverted-U relationship for motor behavior. The inability to reproduce these results is complicated by the inability to manipulate arousal or to verify levels of
anxiety common to all (Courts, 1942; Lazarus, Deese, and Osler, 1952; Martens, 1977). In addition, individual differences have an effect in the arousal-performance relationship. According to Duffy (1962), some individuals have the ability to control or inhibit high levels of arousal which would alter the quality of performance. Despite the equivocal circumstances, the inverted-U relationship has persisted through a number of motor behavior studies. That is, a positive relationship occurs between arousal and performance to an optimal level after which a decrement in performance occurs as arousal continues to rise.
Summary

The purpose of this study was to investigate the effects of anxiety on golf performance among college students with varying amounts of previous golfing experience. The study attempted to answer the following questions:

1. At what level of anxiety does one perform optimally on a test of golf skill?
2. Does one's sex affect performance at various levels of anxiety?
3. Does one's previous golfing experience affect performance at various levels of anxiety?

Subjects used in this study were sixty-six college students enrolled in beginning golf classes at the University of Nebraska at Omaha. In order to assign a skill grade or twenty-five per cent of a final grade and to rank order class members, the students were required to compete in a modified version of the Nelson Pitching Test. Before competing, the subjects completed the Sport Competition Anxiety Test so as to identify individual levels of A-Trait and also record sex and previous golfing experience. Each subject was then tested and a performance score was recorded which reflected the total points accumulated in ten trials.
The results of the testing were as follows:

1. There was no significant difference in anxiety levels among subjects.
2. There were significant differences in golf scores between males and females.
3. There were significant differences in golf scores between experience groups: less than one year, one to two years, and three or more years. Each group was identified by the Scheffe method to be significantly different.
4. A significant interaction was found between experience and anxiety.
5. A significant interaction was found between experience and sex.

Conclusions

The following conclusions are based on the findings of this investigation:

1. Anxiety level does not make a significant difference in golf performance among college students.
2. There are significant differences between golf performance of males and females.
3. Golf performance significantly increased with experience.
4. Golf performance is significantly related to the interaction of anxiety and experience.
5. Golf performance is significantly related to the interaction of sex and experience.
Recommendations

As a result of this investigation, the following recommendations warrant mention:

1. Further research should be designed to investigate performance as it is affected by social evaluation.

2. Research should expand to utilize field studies and experiments in order to determine the limits of environmental stimuli.

3. Changes in anxiety throughout competition need to be investigated further.

4. Investigations should continue in a variety of sports activities.
REFERENCES


APPENDIX A

SPORT COMPETITION ANXIETY TEST
DIRECTIONS: Below are some statements about how persons feel when they compete in sports and games. Read each statement and decide if you HARDLY-EVER, or SOMETIMES, or OFTEN feel this way when you compete in sports and games. If your choice is HARDLY-EVER, blacken the appropriate space on the answer sheet labeled A, if your choice is SOMETIMES, blacken the space labeled B, and if your choice is OFTEN, blacken the space labeled C. There are no right or wrong answers. Do not spend too much time on any one statement. Remember to choose the word that describes how you usually feel when competing in sports and games.

1. Competing against others is socially enjoyable.  
2. Before I compete I feel uneasy.  
3. Before I compete I worry about not performing well.  
4. I am a good sportsman when I compete.  
5. When I compete I worry about making mistakes.  
6. Before I compete I am calm.  
7. Setting a goal is important when competing.  
8. Before I compete I get a queasy feeling in my stomach.  
9. Just before competing I notice my heart beats faster than usual.  
10. I like to compete in games that demand considerable physical energy.  
12. Before I compete I am nervous.  
13. Team sports are more exciting than individual sports.  
14. I get nervous waiting to start the game.  
15. Before I compete I usually get up tight.  
16. Indicate your sex: A. Male B. Female  
17. Indicate your previous golfing experience:  
   A. I have played golf for less than one year  
   B. I have played golf for one-two years  
   C. I have played golf for three or more years
APPENDIX B

TARGET FOR THE NELSON PITCHING TEST