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Five NAIA intercollegiate men's basketball teams and 53 players served as subjects to determine the role pre-game anxiety played in basketball game performance. The study involved four games in which Western Oregon State College competed against other small colleges in Oregon during the 1980-81 season. Performance in basketball was ascertained by field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played.

Twelve hypotheses were established to determine the effect played on basketball performance, the impact of playing time, and the effect of being a game starter or non-starter.

A review of literature revealed little factual data to indicate that high levels of anxiety lead to poor performance in athletic competition. Spielberger (112) developed the State-Trait Anxiety Inventory which assessed both state and trait anxiety. Rainer Martens' (65-72) work served as the guiding and directing source of information.

Two inventories measuring trait and state anxiety were administered to the players one-half hour prior to the intercollegiate games.

The relationship between the anxiety level of NAIA basketball players and their performance in games indicated no significant levels. Players who possessed high levels of pre-game anxiety were apparently able to dissipate it once the game began, not reflecting the anxiety in their performance.

Turnovers per minute was the basketball performance indicator most consistently affected by anxiety, reaching significant levels in the following situations:

1. Players who participated over 20 minutes.
2. In the relationship between the length of time played, number of personal fouls and turnovers.
3. Game starters with anxiety represented by one test item and non-starters by seven test items.
4. All players with anxiety represented by five different test items.

It was suggested that further study of anxiety involve NCAA programs, other sports, other physical environments, other age groups, women's programs, the effect of the anxiety level of coaches, and determining what level of anxiety is optimal for player success in intercollegiate basketball.

Relationship of Anxiety Level and Performance in NAIA Intercollegiate Basketball Games

by

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RELATIONSHIP OF ANXIETY LEVEL AND PERFORMANCE IN NAIA INTERCOLLEGIATE BASKETBALL GAMES

CHAPTER I

Introduction

Basketball coaches have pondered the role of anxiety in the ability of players to perform in National Association of Intercollegiate Athletic (NAIA) basketball games. Coaches have often wondered why some athletes perform at their best under the most stressful game situations while others are not effective under the same circumstances. Ascertaining the relationship between the anxiety levels and error levels in intercollegiate basketball games could be beneficial in the selection of the best performers for each game situation. This determination could greatly enhance the difficult task of evaluating talent and making crucial decisions on the selection of players. More importantly, it would identify those players who possess varying levels of anxiety who could profit from different techniques to help stabilize these anxiety levels. This could improve players' ability to perform up to their maximum potential.

A review of literature revealed little factual data to indicate tnat high levels of anxiety lead to increased number of errors in athletic competition. This lack of factual data leaves open the question of the optimum level of anxiety needed for maximum performance. It would appear that certain anxiety levels are necessary for motivation but that extreme amounts could interfere with performance in athletic competiton. It was the purpose of this study to provide statistical information on the relationship between anxiety and performance in selected NAIA intercollegiate basketball games.

Statement of the Problem

The central purpose of this study was to investigate the relationship of pre-game anxiety to performance in selected NAIA intercollegiate basketball games. The study provided factual data on the role anxiety played in each individual's performance in field goal shooting, free throw shooting, turnovers per minute played and personal fouls per minute played.

HYPOTHESES

1. There is no relationship between the anxiety level of NAIA college men basketball players and their game performance as shown by:

   a. Field goal percentage
   b. Free throw percentage
   c. Turnovers per minute played
   d. Personal fouls per minute played

2. There is no difference between anxious and non-anxious NAIA men basketball players in intercollegiate NAIA games as shown by:

   a. Field goal percentage
   b. Free throw percentage
   c. Turnovers per minute played
   d. Personal fouls per minute played

3. For those men who played 20 minutes or more in intercollegiate NAIA basketball games, there is no relationship between their anxiety level and their basketball performance, as indicated by:

   a. Field goal percentage
   b. Free throw percentage
   c. Turnovers per minute played
   d. Personal fouls per minute played

4. For men who played one to 19 minutes in a NAIA basketball games and those who played 20 or more minutes, there is no difference between their:

   a. Anxiety level
   b. Field goal percentage
   c. Free throw percentage
   d. Turnovers per minute played
   e. Personal fouls per minute played

5. For those men who played one to 19 minutes in intercollegiate NAIA basketball games, there is no relationship between their anxiety level and their basketball performance, as indicated by:

   a. Field goal percentage
   b. Free throw percentage
   c. Turnovers per minute played
   d. Personal fouls per minute played

6. There is no relationship beween men players who committed zero or one turnover and players who committed two or more turnovers in NAIA intercollegiate basketball games as shown by:

   a. Anxiety level
   b. Field goal percentage
   c. Free throw percentage
   d. Turnovers per minute played
   d. Personal fouls per minute played

7. There is no relationship between men players who committed zero, one or two personal fouls and players who committed three, four or five personal fouls in NAIA intercollegiate basketball games as shown by:

   a. Anxiety level
   b. Field goal percentage
   c. Free throw percentage
   d. Turnovers per minute played
   e. Personal fouls per minute played

8. For men who started in each of the four intercollegiate NAIA basketball games and those men who did not start, there is no difference between their:

   a. Anxiety level
   b. Field goal percentage
   c. Free throw percentage
   d. Turnovers per minute played
   e. Personal fouls per minute played

9. For men who started in each of the four intercollegiate games and the men who did not start, there is no difference in the anxiety level as represented by test items of the two anxiety inventories.

10. There is no relationship between the anxiety level as represented by Anxiety Test I and II and the 20 test items of the two anxiety inventories of the men players who started in the NAIA intercollegiate games to their basketball performance as shown by:

    a. Field goal percentage
    b. Free throw percentage
    c. Turnovers per minute played
    d. Personal fouls per minute played

11. There is no relationship between the anxiety level as represented by the Anxiety Text inventories and the 20 test items of these inventories of men players who did not start in the NAIA intercollegiate basketball games to their basketball performance as shown by:

    a. Field goal percentage
    b. Free throw percentage
    c. Turnovers per minute played
    d. Personal fouls per minute played

12. There is no relationship between the anxiety level indicated by each anxiety test item for men NAIA intercollegiate basketball players and their game performance as shown by:

    a. Field goal percentage
    b. Free throw percentage
    c. Turnovers per minute played
    d. Personal fouls per minute played

Significance of Study

The acquisition of successful basketball coaching skills has become a sophisticated and complicated challenge. Evaluating talent and making intelligent judgments in selecting players throughout the duration of games are among the most difficult problems facing the coach. The selection process must consider which players can perform up to their maximum potential in crucial situations. If a predictable number of mistakes could be related to anxiety levels, then this information could be beneficial to the coach. If players who appear to

to possess high or low anxiety levels could be related to levels of basketball errors, it would provide the opportunity for the coach to utilize a variety of techniques to ease or heighten the anxiety level. If the anxiety levels could be positively altered, the basketball team would have a much better opportunity to win the game and play closer to their maximum potential.

All coaches must deal with athletes who possess unnecessary anxiety and stress in athletics. Some of the most tension-causing problems are created when the team plays a formidable opponent, when the game is hosted in an unfriendly environment or when there is a personal lack of confidence by individual players. Developing a strong relationship with players where trust and caring are evident is one good method a coach can utilize to ease tension on the team. If the players are bombarded with additional stress by their coach, anxiety levels will usually increase. The increased anxiety may cause a decrease in performance. Bonder (9) pointed out the disadvantages of overreacting to performances and causing undue anxiety: "When I started to coach . . . I was not only guilty of overcoaching but of transferring my anxiety and fears to the players. I would get all wound up and tight as a drum inside. My fear resulted in misplaced aggression".

Maintaining one's poise in relationship to the team is another important goal that must be accomplished by the coach to help eliminate possible stressful situations. Wooden (123) supported

this contention:

> Coaches must also be able to react in a philosophical manner to the unpredictable emotional reactions of players, fans, opponents and all others who have, or think they have, a very personal interest in the participants, the playing and the scores of the games.

One excellent method of lowering the amount of stress, tension and anxiety that athletes feel is to be absolutely prepared as a team. It involves developing the conditioning level to a high plateau, analyzing and assimilating scouting reports of opponents and teaching quality fundamentals. Being an outstanding teacher of fundamentals is a key quality. Fundamentals must be explained and demonstrated. The correct demonstration must be imitated by the players while being constructively analyzed and corrected. The players must repeat the execution of the proper method until the correct habit has been formed so that they will react instinctively in the correct manner. If the players realize they are in excellent condition, know their opponent and possess a high level of skill fundamentals, their degree of stress and anxiety should be lowered.

One of the major tension and anxiety provoking situations in basketball is caused by the fear of difficult competition. It becomes accentuated if the additional value of invitations to playoffs or championships depends upon the outcome. In addition to being thoroughly prepared, a squad meeting is essential to cover other important areas. Each player should be reminded that team work is the essential ingredient of team success and that unselfish team play and spirit are the keys to a successful performance. These

simple comments will often help make the players realize that it is everyone's responsibility to play well together. The coach should also encourage players to do their best and never be outfought. They should possess respect, but not fear, of their opponents and attain confidence in themselves and in the team.

Using positive reinforcement with players is an exceptionally good tool to eliminate anxious situations. When a performer executes a movement that is not totally correct, a good manner of handling the correction of his error is first to point out the good things that the player accomplished. Secondly, the coach should indicate that it would be an outstanding move if he would make one small correction. Being positive in dealing with practice sessions can help overall relationships with team players. Always pointing out and emphasizing the good things people are doing has a positive, lasting effect. A good coach must possess a lot of patience and control when teaching in a positive manner. Progress comes slowly in many respects. The formation of new habits and the breaking of old ones are no quick-change proposition.

Thus, if a coach is conscientious in conducting a good program, he can eliminate some of the anxiety-causing situations that occur in his profession. Determining the anxiety levels of players can provide valuable information necessary to make proper selection of players during a game. This information can help in the teaching, coaching and counseling techniques once the players are identified

who need extra help. Providing the avenue by which coaches can determine the competitive anxiety trait in relationship to errors in basketball games for team members could provide valuable assistance in the coaching profession.

Definitions

There are a variety of terms in this study which will have the following meanings:

1. Anxiety: a strong personally experienced feeling of distress and anguish. It is a state of being uneasy, apprehensive or worried about what may happen.
2. A-State Anxiety: existing or current emotional state characterized by feelings of apprehension and tension and associated with activation or the organism. A-State Anxiety is a negative affect (68).
3. Competitive A-Trait Anxiety: a tendency to perceive competitive situations as threatening and to respond to these situations with feelings of apprehension or tension (68).
4. Basketball Performance: a player's performance in an intercollegiate basketball game as indicated by field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played.

5. Measurement of Anxiety: Anxiety levels were measured by two separate inventories. The first inventory, which was identified as Anxiety Text I, was developed by Rainer Marten (68) as the Sport Competition Anxiety Test. The second inventory, Anxiety Text II, was the Competitive Short Form of the State Anxiety Iventory (68). The "low" and "high" anxiety levels were determined by taking the top and bottom 27 per cent of the scores of each respective inventory for the 53 subjects. Anxiety Test I had a range of 10-30 points and Anxiety Test II had a range of 10-40 points. High anxiousness was defined as a score of 22-30 on Anxiety Test I and 22-40 on Anxiety Test II. Low anxiousness was defined as 10-14 on Anxiety Test I and 10-15 on Anxiety Test II.

6. NAIA: The National Association of Intercollegiate Athletics governs 515 colleges across the United States and Canada. It is divided into 32 Districts and the headquarters are located in Kansas City, Missouri. Western Oregon State College, Southern Oregon State College, Eastern Oregon State College, Warner Pacific College and Western Baptist College are all members of NAIA District #2 composed of twenty teams from the states of Idaho, Hawaii and Oregon.

7. State Anxiety: An existing or immediate emotional state characterized by apprehension and tension (114).

8. Trait Anxiety: A predisposition to perceive certain situations as threatening and to respond to these situations with varying levels of state anxiety. It also included a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening and to respond to these with state anxiety reactions proportionate in intensity to the magnitude of the objective danger (114).
9. Turnovers: Any tabulated loss of possession of the basketball by one player during an intercollegiate NAIA game. This could include a bad pass, fumbled reception, violation or charging personal foul.

Limitations

1. The study involved male NAIA basketball players from selected teams in District #2 and the state of Oregon.
2. The basketball games were analyzed for the 1980-81 season. All four basketball games involved only that season.
3. The statistics kept for the four selected games involved:
   a. Number of minutes each player competed
   b. Number of turnovers
   c. Number of personal fouls
   d. Field goals attempts and completions
   e. Free throw attempts and completions

4. Each team utilized for this study played in programs with similar philosophies. Most of the scholarships in each of the respective schools are based upon the financial need of each player.
5. Both anxiety inventories were given approximately thirty minutes prior to the start of each of the four intercollegiate games. Western Oregon State College players were given both inventories only prior to the first game studied, which was against Southern Oregon State College.

CHAPTER II

REVIEW OF LITERATURE

Definition of Anxiety

Anxiety is a key construct in the conceptualization of many theorists considering personality. It usually designates a strong personally experienced feeling of distress and anguish. Anxiety is something a person feels and it feels bad. It even hurts, although it cannot be localized or easily identified. McReynolds (63) stated:

> Anxiety is found as a central explanatory concept in almost all contemporary theories of personality and it is regarded as a principle causative agent for such diverse consequences as insomnia, immoral and sinful acts, instances of creative self-expression, debilitating psychological and psychosomatic symptoms and idiosyncratic mannerisms of endless variety.

Freud (32) was one of the first psychologist to be identified with the field of anxiety. He believed that anxiety was recognizable by its "character of unpleasure (that) seems to possess a particular note of its own, definite physical sensations associated with specific organs and efferent discharge bound together along specific pathways". Thus, anxiety was first identified by its particularly unique and unitary characteristics as an affective physiological state. The exact nature of these unique and unitary characteristics was never spelled out by Freud and continues to remain nebulous.

Endler (26) utilized the theories of Freud and applied them to the field of psychodynamics and its relationship to anxiety:

> Personality dynamics focuses on the continuous interaction of conflict among the id, ego and superego. One of the consequences of this conflict is anxiety and the person develops defense mechanisms, which are motives, in order to defend the self-concept against this anxiety.

The mystic of anxiety has prompted much difference of emphasis in its definition. Epstein (29) emphasized the term "arousal" in his analysis of anxiety, defining it as a "state of undirected arousal following perception of danger." McReynolds (62) also indicated the close relationship of anxiety and arousal when he stated that the arousal system responds positively to increments in anxiety. The more sudden the increment of anxiety the greater the response, but once the level of anxiety has reached an equilibrium, even though it is still high, the levels of arousal tend to return to their normal baseline. Therefore, according to McReynolds, arousal is a crisis reaction to upsurges in anxiety but it is not a correlate of the level of anxiety.

Investigators have become frustrated in establishing labels for the multidimensional aspects of anxiety because so much of the research has indicated inconsistent findings. Crider (22) discussed this inconsistency:

> Individual differences in physiological arousal--do not appear to be correlated with indices of behavioral deficit nor with reports of emotional and subjective distress. Rather, the behavioral and the physiological reactions to conflict are independently organized systems.

There are a variety of ways in which life's experiences create anxiety for individuals. McReynolds (63) outlined four situations which can lead to anxiety:

1. Incongruence which occurs between one's values and feelings.
2. Discrepancy between one's own wishes or standards and those of important peers.
3. Discrepancy between one's own standards and those of parental or other authority figures.
4. Discrepancy between two self-concepts.

May (74) identified anxiety as a "vague fear stemming from a source that is unknown to the stricken individual, a diffused apprehension." For him, the central difference between fear and anxiety was that fear is a reaction to a specific danger, while anxiety is unspecific, vague and objectless.

Anxiety has a variety of autonomic and muscular consequences. These include such charactertistics as queasy feelings in the stomach, heart palpitations, feelings of tension and inclination to pace the floor. McReynolds (62) elaborated:

> Still, a further complexity in the experience of anxiety is provided by the existence and diversity of autonomic feedback and of the perception of other somatic effects of anxiety. The awareness of gastric disturbances, muscle tensions and the like, becomes a part of the whole experience of anxiety and adds immeasurably to its complexity. Further, such feedbacks themselves can be conditioned.

Sarason (97) specified in his synopsis of anxiety that the fear which individuals sense is related to self-evaluation and that the highly anxious individual is self-centered, focusing on self-worry and self-evaluation rather than on the situational task.

Selye (106) completed a thorough study of stress which included the physiological changes that occur in the body which accompany anxiety. He indicated that the widespread bodily changes are caused by the release of ACTH, which regulates the secretion of adrenalin. This reaction stimulates the heart and blood pressure, the muscles and lungs, improving blood flow, oxygen consumption and strength. Belyne (7) theorized that physiological arousal mediates postural, perceptual and cognitive responses. It was his contention that arousal leads to heightened vigilance and greater information processing, except at extremely high levels of arousal, where confusion, avoidance and defensiveness (blocking out of relevant stimuli) occur. Berlyne's theory is consistent with the older and more generally known Yerkes-Dodson Law (86) which stated that an increase in arousal results in improved performance up to a point and that further increases in arousal result in decrements in performance. Oxendine explained this further:

> The Yerkes-Dodson Law. . . points out the varying effect that a standard amount of drive might have on different tasks. According to this law, complex tasks are performed best when one's drive or motivation is relatively low, but optimum proficiency in simple tasks is attained when drive is high. The relationship between drive and performance is therefore not a simple one. As drive increases,

> so does performance to a point. Continued increases in drive lead to poorer performance, especially in complex skills. It appears that under a high level of tension, wrong habits are often activated which interfere with both learning and performance.

Physiological manifestations of anxiety are one method of analyzing its presence. A second common identification of anxiety is as a motivational term. An ordinary recognition of anxiety is revealed in the statement, "you look anxious" which is a reference for various publicly observable bodily characteristics.

Sarason (95) specifically listed five different traits which can cause the anxiety reaction:

1. The situation is seen as difficult, challenging and threatening.
2. The individual sees himself as ineffective, or inadequate, in handling the task at hand.
3. The individual focuses on undesirable consequences of personal inadequacy.
4. Self-deprecatory preoccupations are strong and interfere or compete with task-relevant cognitive activity.
5. The individual expects and anticipates failure and loss of regard by others.

The competition of intercollegiate basketball certainly provides a medium for individual players to experience anxiety. Players can perceive the challenge and threat of opposing players. They can imagine the threat of not being able to perform as adequately as their parents and peers would expect. The pressure of intercollegiate

games offers the environment where individual players must deal with all of these anxiety-provoking situations.

Early researchers who have studied psychology of sports were ambiguous in their definition of anxiety. There has been confusion in the determination of whether anxiety is a matter of a general tendency to be anxious or an immediate state of anxiety. It becomes even more ambiguous when both of these states have so many similarities. McReynolds (63) defined the general tendency as "primary anxiety", for it "inevitably occurs under certain limited and prescribed conditions, simply because the organism is made that way. Spielberger (110) was one of the first to define and differentiate between the two distinct types of anxiety, identifying them as "trait" and "state" anxiety. He categorized "trait" anxiety as similar to the general tendency or primary type, which is a predisposition to perceive certain situations with varying levels of state anxiety. Thus he maintained that trait anxiety is a stable and consistent feature of each individual. It is also a single, unitary characteristic of the organism that is based primarily on past experience and, like other personality traits, is firmly established in adulthood. "State" anxiety, on the other hand, is defined as an existing or immediate emotional state characterized by apprehension and tension. Speilberger (111) further elaborated in a later publication that the definition of state anxiety can be termed A-State and that it is an emotional reaction, "consisting of unpleasant, consciously perceived feelings of tension and apprehension with associated activation

or arousal of the autonomic nervous system." He further pointed out that high A-Trait anxiety individuals are concerned with a fear of failure and therefore more likely to perceive ego-involving situations as more threatening than would a person who possessed low A-Trait characteristics.

Sarson, Davidson, Lighthall, Waite and Ruebusch (98) provided some background information for Spielberger in the development of the state and trait anxiety theories. They stated that anxiety is conceived by a person's self perception. The person who is characterized as ego-centered and concerned about himself is usually found to possess high levels of anxiety.

McReynolds' (62) analysis of immediate anxiety was termed "secondary anxiety", a conditioned anxiety which arises from the pairing of neutral cues under the appropriate conditions with states of primary anxiety. It is conceivable that the phenomenal aspect of secondary anxiety involves a particular focus on a felt cause of the anxiety, due to its association with the conditional stimulus. McReynolds offered this definition of both primary and secondary anxiety:

> By primary anxiety I will mean anxiety which arises through the operation of processes in an organism which have the inherent power of causing anxiety, independent of the prior existence of anxiety; and by secondary anxiety, I will mean anxiety which arises through the advent association of previously neutral cues with states of primary anxiety.

Speilberger (113) proposed that trait anxiety reflects a predisposition to respond with heightened state anxiety to situations

involving the possibility of failure or loss of self-esteem and not to situations involving harm or the threat of harm. Therefore, trait anxiety is a summary of states and it can be defined generally by the average of a sample of measured states. It can be even more specifically defined within categories of situations. This indicates that personality might better be assessed as a summary of responses over time rather than in terms of hypothetical traits that are supposed to predict those responses. It appears that individuals high in trait anxiety either perceive more situations as threatening or respond to threatening situations with more intense levels of state anxiety or both. Therefore, it is Spielberger's contention that trait anxiety is the individual differences in the frequency with which state anxiety have been manifested in the past and will be in the future.

Newmark (77) did a comparison study of Spielberger's (115) trait and state anxiety and indicated that the real nature of state anxiety is transitory while trait anxiety is more stable. His results revealed that state anxiety was significantly changed by experimentally induced stress, while trait anxiety measures remained fixed. In addition, A-Trait measures seemed to reflect individual differences in anxiety-proneness that were impervious to the environmental stress of everyday living.

Despite the fact that state anxiety shows incongruity in anxiety characteristics, there are still patterns of these traits that can be identified. Levitt (57) indicated that state anxiety may express

itself in at least four different modes:

1. A verbal report, spoken or written, that conveys via ordinary language the message that the reporter is consciously experiencing fear;

2. Minor surface physical reactions such as pallor, sweating or trembling, which are ordinary manifests;

3. Internal physiological reactions such as elevated blood pressure and pulse rate, breathing, hormonal and gastrointestinal changes, and loss of consciousness;

4. Voluntary gross motor behavior or absence of behavior ("freezing") most often taking the form of withdrawl from, or avoidance of, a situational task.

Martens (68) developed a situational specific modification of the A-Trait definition that Spielberger originated. Martens named this A-Trait as Competitive Trait Anxiety and defined it as a "tendency to perceive competition situations as threatening and to respond to these situations with feelings of apprehension or tension."

The Relationship of Anxiety to other Nomenclature

Anxiety is a very complex psychological term and it has been compared and related to several similar words. The fact that anxiety is not a unitary phenomenon makes it necessary for a discussion of the relationship of these words similar to anxiety. Anxiety-proneness or predisposition has been linked closely to stress, motivation, worry, fear and arousal, but unfortunately the findings are ambiguous and conflicting.

Sarason (94) suggested that worry rather than emotionality produces performance decrement in test-anxious students. In his opinion, test anxiety may be conceptualized as a proneness to emit

self-centered interfering responses when confronted with evaluative conditions and these personalized self-centered responses (worry) interfere with the performance of high test-anxious persons. Sarason also noted that trait-state anxiety theory attributes the performance decrements of anxious people to the activation of strong error tendencies by the high drive levels that are associated with elevations in A-State. Spielberger (110), considering the worry component, speculated that the self-centered interfering responses of high test-anxious persons are cued off by the A-State reactions evoked in evaluative situations.

Stress has long been identified and associated with anxiety provoking forces. Brown (11) studied the effects of a stressor on a specific motor task. The motor task involved a hand-eye coordination task on a rotor pursuit apparatus. Subjects in the control group executed 15 ten-second trials on the rotor pursuit. The experimental group performed the same tasks, except during each trial noises from a tape recorder were played, which served as a stressor. The Cattell 16 Personality Factor evaluated the subjects and the results indicated that subjects with high confidence or emotional stability were not affected in their performance on the task by the loud noises.

Martens (67) reported a close relationship between arousal and anxiety. He indicated that when an individual reaches extremely high levels of arousal, both perceptual and motor processes become disrupted. However, it is likely that moderate increases in arousal will facilitate

performance on a well-learned task. Zajonc (124) concurred with Martens' analysis when his research revealed that increases in arousal tend to elicit the dominant response (the response more likely to occur). That is, when an aroused individual is confronted with a stimulus that elicits a potential family of responses, the response that is strongest in the repertoire of responses is more likely to occur. Zajonc's research supports the drive theory, which is one of the two main theories which explain the relationship between changing levels of arousal (anxiety) and performance. Authorities (85, 124) contend that the drive theory is a relationship of habit multiplied by drive. The basis of this theory is that increases in drive increase the probability of the dominant reponse being emitted. During the early stages of skill acquisition the dominant response is likely to be an incorrect response; but later with practice as the skill is mastered, the dominant response becomes the correct response. Thus, increases in drive (arousal or anxiety) early in the acquisition phase impair performance, but later in the well-learned phase, increase the performance. The second theory is the Yerkes-Dodson Law or the Inverted-U Hypothesis. In this theory performance improves with increasing levels of arousal to some optimum point. At this optimum point, further increases in arousal cause performance decrement. According to Oxendine (86) the Yerkes-Dodson Law implies that complex tasks are performed best when one's drive or motivation is relatively low, but optimum proficiency in simple tasks

is attained when drive is high. Thus, as the drive level is accelerated, performance will follow to a point. Continued increases in drive lead to a decline in performance, especially in complex skills.

A word closely associated with anxiety is fear. The existence of a strongly perceived fear will contribute greatly to the buildup of anxiety. Fear, as a goal-oriented motive, refers to the future, but this is not true of anxiety. It is understandable, however, that the two terms should frequently be used synonomously, since fear consistently leads to anxiety and is perhaps more easily identifiable than other factors leading to anxiety (62).

Levitt (57) also believed that fear should be distinguished from anxiety. He believed there are two types of fear. One deals with a factor of fear, the relative specificity of its stimulus. The other is concerned with the emotion's basis in reality. It is his contention that there is a difference between a specific, conscious fear and what is called "free anxiety", although it is difficult to separate these two forces distinctively. A specific fear, when it occurs, is usually easily identified. To be afraid is painful, but not to know why you are afraid can be catastrophic, because you are then deprived of any avenue of escape from the threatening danger.

Measurement of Anxiety

Anxiety can be measured by physiological, psychological or behavioral methods. Martens (68) indicated that "Physiological methods include analysis of brain potentials, skin resistance, cardiovascular activity, electromuscular potentials, body temperature and biochemical changes." The physiological component of the A-State anxiety reaction has been defined operationally as change in galvanic skin response (27), systolic blood pressure (87), heart rate (42) and other indicators of physiological arousal. Utilizing a physiological method to determine anxiety and A-Trait presents some limitations which make it unfeasible to apply. Hodges (43) did a review of psychological abstracts for approximately a three-year period and only 7 per cent of the 794 studies indexed under "anxiety" used any physiological variables as a major dependent variable. These types of analyses are rarely found to be related to each other and are so replete with contradiction that many investigators who have summarized research on anxiety have tended to deemphasize the physiological variables. In addition, the necessity of utilizing expensive equipment limits the feasibility of this type of experiment.

The psychological self-report inventory of anxiety has been employed the most frequently because of its ease of administration and its higher reliability as found in various studies (68, 109, 117, 125). The first trait anxiety measure to come into general use was developed by Taylor in 1951 and published two years later (116). His Manifest

Anxiety Scale is one of the larger number of various kinds of inventories developed from the 550 items of the Minnesota Multiphasic Personality Inventory. In its day, the MAS was an exceedingly popular instrument that was employed in more than 2000 experimental investigations (112). The Manifest Anxiety Scale is a measure of "reactive" anxiety. Thus, the MAS reflects the tendency to respond under stress with heightened state anxiety to each individual's high level of trait anxiety. This state anxiety could be experienced constantly or chronically.

In 1957 another important trait inventory was developed by the Institute for Personality and Ability Testing (IPAT) (12). IPAT has prepared a number of anxiety inventories but only the Anxiety Scale Questionnaire (ASQ) is in frequent use. Cattell and Scheier (12) defined trait anxiety as a second order factor emerging from factor analysis of their sixteen primary factors. This research led to the ASQ and state measures were developed from the P technique. The P technique was defined by Cattell and Scheier as:

> A factor analytic design which measures a single person on the same set of variables over a number of different occasions. Correlations between the variables are computed over these occasions as entries, then factor analyzed. P-techniques and incremental factor analysis (q.v.) are the two main methods for determining dimensions of personality change-over-time (or states).

Trait measures were determined with the use of the R technique, which was defined as: (12)

> A design which measures a group of persons on the same set of variables at one occasion, then factor

> analyzes the correlations between these variables to determine personality dimensions descriptive of inter-individual differences at any one time (or traits).

Zuckerman (126) developed an Affective Adjective Check List in 1960 which gained national attention as a viable anxiety inventory. His check list is one of the most widely used measures and his AACL is composed of eleven anxiety-positive adjectives and ten anxiety-negative adjectives. The check list was changed to differentiate state from trait anxiety simply by altering the instructions. The respondent is asked to indicate how he/she feels right now or today. Zuckerman utilized words used frequently by anxious parents and by normals in hypothetical suggested anxiety states to describe their current mood. Clyde (14) also employed anxiety-reflecting adjectives in the Clyde Mood Scale where the individual taking the scale rates his mood on a 1-4 point scale.

The Stimulus-Response (S-R) Inventory is the product of Endler and his colleagues at York University in Canada. It first appeared in 1962 (27) and was later revised by Endler and Okada in 1975 (28) before taking its present form. It is an omnibus measure, which means that its construction was guided by the theoretical concept of trait anxiety as being basically multidimensional.

Thayer (118) developed, through factor analysis, the Activation-Deactivation Adjective Check List in 1967 as an objective evaluation of arousal. He validated these adjectives against a physiological basis and obtained high correlations only with composite physiological measures.

One of the most popular general trait anxiety measures is the State-Trait Anxiety Inventory (STAI) developed by Spielberger in 1966 (112). Since that time it has undergone several revisions and was finalized in 1970 (115). The STAI was both a trait and a state anxiety inventory. Martens (68) concluded that the "STAI is the most sophisticated anxiety assessment instrument from both the theoretical and methodological standpoint." Spielberger believed that traits may be measured by questionnaires that will predict state responses to situations perceived as relevant. However, he also noted that prediction from anxiety measures is limited to certain types of stress situations such as ego or failure threat as opposed to impersonal threat of pain.

A number of investigators (43, 68, 128) suggested that situational specific trait anxiety measures are better predictors of elevation in state anxiety in relevant situations than are generalized measures of anxiety traits. These investigators also concurred that self-ratings of behavior probably exaggerate the degree of relationship between different kinds of responses. For example, most persons assume that when they feel emotionally aroused, all of their autonomic reactions are increased in direct proportion to their subjective feeling of arousal. Psychophysiological studies indicate that this assumption is highly oversimplified (43).

When comparing the relationship between trait and state anxiety inventories, Zuckerman and Lubin (127) reported moderate correlation

between the Taylor (116) Manifest Anxiety Scale (TMAS) and the MAACL (126) state anxiety scores. It was also reported that the STAI measure had a high correlation with Cattell's IPAT (12) and the TMAS, plus a moderate correlation with the MAACL (126).

Spielberger (115) reported that there was a moderate to high correlation between his STAI trait and state forms given on the same occasion to the same people. This might suggest that trait and state inventory forms may be somewhat confounded in the two forms. However, correlations between the trait and state forms given on different occasions were lower. As Spielberger noted, "Larger correlations are obtained under conditions which pose some threat to self-esteem or under circumstances in which personal adequacy is evaluated." He also indicated that "Changes in A-State evoked by physical danger are apparently unrelated to levels of A-Trait." Thus, both Zuckerman and Spielberger have found evidence that A-Trait measures have some predictive value for state measured during certain types of stress, such as examinations, but are poor predictors of anxiety states on other given days.

Distinguishing between trait and state evaluatory devices creates some confusion. Zuckerman (126) suggested a number of criteria by which trait and state tests can be differentiated:

1. Trait and state tests should have high internal consistency or item reliability, but trait tests should show high-retest reliability whereas state tests should have low-retest reliability. It is assumed that state fluctuates over time as a function of external events affecting the individual.

2. Trait and individual state tests that propose to measure the same construct should correlate to a low degree, but valid trait tests should correlate moderately with the mean of a number of state tests.

3. A valid trait test should correlate more highly with other trait measures of the same construct than they do with other state tests. In contrast, state tests should correlate more highly with other concurrent measures of state, such as automatic arousal or performance decrement, than with trait measures.

4. Trait tests should not change with transient changes in conditions while state tests should be sensitive to immediate conditions that are expected to affect the relevant construct.

Ogilvie and Tutko developed a personality instrument called the Athletic Motivation Inventory(AMI). Martens (67) pointed out that they have gained wide public acclaim through their assertion that they have been able to identify with the AMI unique personality profiles of very successful athletes. Based on their assertion, they offer for a fee to assess athletes' personalities. From this information they will predict success as well as suggest to the coach ways to handle an athlete in order that the athlete may maximize his potential.

The AMI assessed eleven different personality traits, of which several relate closely to anxiety. The construction procedures of the questionnaire have never been published, except that the questions were based on the Cattell-16-PF, The Edwards Personal Preference Schedule and the Jackson Personality Research Form (67).

It appears that differences existing in general A-Trait between athletes and non-athletes are only minimal (68). Ogilvie (81) provided the most persuasive evidence for the existence of a relationship between sport and competence and A-Trait. In his review of literature

for sport personality, he concluded that athletes, particularly superior athletes, have a unique and identifiable personality profile. Superior athletes are emotionally more stable, have lower levels of A-Trait and greater resistance to emotional stress. Other investigators (70, 75), however, found that there were no consistent differences in A-Trait among participants when compared with non-participants or among participants of different skill levels.

Measuring anxiety prior to competitive situations presents a difficult obstacle to researchers. Almost all sport personality research has used the trait approach. This system is based on the assumption that personality traits are relatively stable, consistent attributes that exert generalized causal effects on behavior. This original view of traits characterized them as having widespread influence on behavior with little or no concern for situational determinants, making them primary determinants of behavior. However, consideration for human behavior in terms of each situation must be taken into account. Martens (68) indicated that traits should be categorized as tendencies or predispositions to perceive or respond to certain classes of situations with certain behaviors. Traits are not necessarily the primary determinants of behavior.

The inconsistent findings of researchers in the relationship between general A-Trait and various behaviors have added further cause to seek a measuring tool that can evaluate specific competitive situations. Spielberger (109) explained in support of this contention: "In general, situation-specific trait anxiety measures are better

predictors of elevations in A-State for a particular class of stress situations than are general A-trait measures."

Martens' (68) Sport Competition Anxiety Test is a situation-specific construct, especially developed to identify A-Trait dispositions in competitive sport situations. According to Martens, the Sport Competition Anxiety Test (SCAT) for a competitive situation appeared to have a better ability to predict a A-Trait anxiety than Spielberger's State Anxiety Inventory. The development of the Sport Competition Anxiety Test evolved from an investigation by Mandler and Sarason (64) and later by Sarason, Davidson, Lighthall, Waite, and Ruebsuch (98). These investigators found that behavior in a particular situation can be predicted better if a person's A-Trait for the class of situations is known rather than just the general A-Trait. In essence, everyone's anxiousness depends upon the perception of each individual situation. Since it is an individual situation, the level of anxiety from different sources can vary greatly from person to person.

The SCAT inventory is a specific modification of the A-Trait construct developed by Speilberger (109). Martens (68) summarized his justification for developing the Competitive A-Trait as follows:

1. The recognition that the interaction paradigm for the study of personality is superior to the trait and situational paradigms.

2. The recognition that situation-specific A-Trait instruments have superior predictive power when compared to general A-Trait instruments.

3. The trait-state theory of anxiety which makes the distinction between A-Trait and A-State.

4. The development of a conceptual model for the study of competition as a social process.

Empirical Methods to Alleviate Anxiety

A great many behavioral approaches to reducing fear and anxiety in empirical studies have centered on systematic desensitization. These treatments are usually based upon Wolpe's (122) classical procedures. These involve relaxation training and visualization of situations that evoke anxiety. Several investigators (45, 54, 62, 63, 122) have shown scientific evidence that systematic desensitization can notably lower levels of anxiety. Kukla (54) investigated the effects of strictly progressive relaxation training upon athletic performance during stress. The results were primarily positive, as the relaxation treatment group had significantly lower STAI A-State scores than placebo or control groups. The study involved high school baseball players and statistical results revealed that batting performances were significantly enhanced by relaxation techniques. He indicated that progressive relaxation can be a useful technique in decreasing arousal for athletes under stress and that increased performance on a batting task may have resulted from an increased ability to concentrate, thus screening out anxiety-producing stimuli.

Blacksmith (10) completed a study of pre-match anxiety conditions among college wrestlers and the effect of systematic desensitization

on these states. The results indicated a disagreement with most studies done in this area in that the treatment of systematic desensitization failed to reduce state anxiety among collegiate wrestlers.

McReynolds (63) indicated that both the relaxation and exposure elements of desensitization have been found to be individually sufficient treatment procedures. Usually there appears to be two elements common to most treatment procedures. These elements are either some form of exposure to or confrontation with fear stimuli or instruction in coping or controlling fear responses. He mentioned that other systematic desensitization include modeling, shaping or reinforcing practice, somatic conditioning, exposure, self-instruction and rational emotive therapy, and training in relaxation or coping skills.

Johnson and Spielberger (45) dealt with the effect of relaxation, although their study centered on the passage of time on measures of state and trait anxiety. The results showed that A-State measures which involved systolic blood pressure, heart rate and Zuckerman's Affect Adjective Check List all declined due to the effects of relaxation. In contrast, the A-Trait measures which included the Manifest Anxiety Scale and the General Form of the Affect Adjective Check List were essentially unaffected by relaxation training. These findings supported Spielberger's contention that trait anxiety is a stable characteristic while state anxiety is a transient and fluxuating state.

Flood and Endler (30) stated that most individuals who become aware of the presence of anxiety or recognize an implied buildup of unassimilated material carry on a variety of mental procedures in an effort to cope with the manifestation. These procedures involve problem-solving, worrying, self-analysis, rumination, working through and mourning. These methods are different ways of looking at things which permit assimilation of the unassimilated. In some cases, unassimilated perceptions simply dissipate over a period of time. They summarized their findings on alleviation of anxiety by stating that "One can also reduce A-State by decreasing threat, or at least, altering the person's perception of the threat so that he or she perceives it as less threatening."

Relationship of Anxiety to Performance and Competition

It was the opinion of Ogilvie and Tutko (83) that the impact that anxiety plays in the ability to perform or to compete against other individuals is based upon each person's analysis and perception. Each situation, therefore, is individually evaluated according to the make-up of each person. The potential anxiety-producing situation become a reality if the person feels threatened, apprehensive, possesses a lack of confidence or senses fear. In dealing with the field of athletics, investigators are constantly concerned with how athletes perceive various situations, how this perception affects their anxiety level and finally how the anxiety might affect performance. Ogilvie and Tutko conducted studies on problem athletes which included those who possessed a high level of anxiety:

> What anxious athletes share in common is an elevated level of tension when compared to the non-anxious athletes. Instead of the gradual peaking experience, which leads to the ideal mental and physical harmony for performance near true potential, it becomes obvious that there is too much tension too soon. As a consequence, we can expect disharmony, which leaves the athlete with a depletion of this energy and a reduction in true athletic potential.

Ogilvie and Tutko (83, 84) strongly believed that athletics and competition place individuals into a great number of situations which can provoke fear and anxiety. Even though the nature of the threats is an individual matter, the potential among athletes is greater than among non-athletes. It was their contention that failure in athletics forces individuals to redirect their thinking or energy to eliminate further possibility of failure. Unfortunately, failure acts as a harsh reminder that we are not good, are unworthy, or not living up to what someone else expects of us.

Endler (26) delved extensively into the philosophical basis of anxiety in his discussion of the relationship between athletic personality traits and the ramification of stress situations. He stated that the key in this relationship is to determine how athletes perceive various athletic situations, how this perception affects their anxiety level and how the anxiety might affect performance. He contended that performance in athletics is primarily based upon motivation and social situational factors.

Provoking anxiety in individuals who are performing or competing is usually increased by the presence of others (3, 18, 20, 33, 64, 67,

88, 90, 124). Poteet and Weinberg (90) indicated that in the early stages of learning a complex skill the dominant response is most likely incorrect whereas in the later stages of learning a simple task, the dominant response is more likely correct. Therefore, performance would be inhibited by increases in arousal with the presence of others in the early stages and facilitated in the later stages. Cox (17) utilized second and third grade school boys in a study where mothers, teachers and strangers provided the audience. He found that low test-anxious subjects showed response increments whenever any of the people served as an audience in the experimental room. Conversely, the presence of mothers or teachers resulted in response decrements in high test-anxious boys. Cox (18), in a later study, found that high anxious children decreased their rate of performance when in the presence of others. He suggested that the presence of another person was interpreted as transforming the situation into an evaluative one for high anxious children, causing their anxiety to interfere with performance. On the other hand, low anxious children assumed that an observer represented incentive for more efficient performance. Ganzer (33) found the same results.

Cottrell (16) proposed that the mere presence of an audience is not sufficient to raise levels of arousal but instead suggested that the audience must have the potential to evaluate. This potential is the awareness by the audience of the criteria of excellence for the task.

Alderman (1) indicated that athletes who participate in competitive sports and who repeatedly expose themselves to these anxiety-provoking situations are more likely to be characterized by lower state anxiety than are non-athletes. In addition, the more successfully an athlete performs in a competitive situation, the lower should be the amount of anxiety during competition, which in turn would provide less interference with effective game performance. Individual sports competition is probably a more anxiety-provoking situation, since in individual sports everything depends upon the performer, whereas in team sports the responsibility for the outcome is shared.

Anxiety may be stimulated to a high degree by the thoughts of an examination. Mandler and Sarson (64) led early research in this area when they found that anxious college students performed more poorly on intelligence tests than students who were low in test anxiety. They also indicated that decrements in the performance of highly anxious students were most pronounced when tests were administered under stressful and ego-involving conditions. Wine (121) shared this same contention in that he concluded that text anxious persons react to evaluative threat with self-oriented, interefering responses. Under stress, high test anxious individuals divide their attention between "self-relevant" and "task-relevant" responses while low-anxious persons focus their attention more fully on the task.

Sarason (94) found that when achievement aspects of performance were emphasized, high test-anxiety individuals performed more poorly than did individuals who were low in test anxiety. On the basis of his research he concluded that high test-anxious individuals are more self-centered and self-critical than individuals low in test anxiety and more likely to emit personalized, self-centered, derogatory responses that interfere with task performances. Spielberger, Anton and Bedall (114) concurred as they described high and low test anxious individuals:

> High test anxious persons emit negative, self-centered responses to the inherent threat associated with evaluative situations. In contrast, they contend that persons who are low in test anxiety, when confronted with a threatening evaluative situation, react with increments on learned tasks drives and associated task-relevant responses that faciliate performance.

Spielberger, Anton and Bedall (114) applied Sarason's theory to both trait and state anxiety. They stated that high test-anxious persons respond to evaluation, with self-centered interferring worry. It appears that elevations in A-State and worry responses both seem to contribute to the performance decrements that have been observed for high anxious persons. In test situations, the high levels of A-State that are evoked in trait test anxious individuals are activated.

Investigators have found a variety of results when relating anxiety levels to performance in different sports. Basler, Fisher, Craig and Mumford (5) found no significant relationship for predicting gymnastic performance from arousal and anxiety measures.

Morgan (75) found the same results in his study where few relationships existed between pre-match anxiety levels and wrestling performance. Knapp (53) in contrast found that anxiety was detrimental to the performance of novice collegiate gymnasts. A study designed by De Caria (24) investigated the feasibility of cognitive rehearsal (progressive relaxation training and mental practice) as a technique to help athletes facilitate their motor performance in gymnastics. Cognitive rehearsal moderately decreased the self-report of performance anxiety and moderately enhanced gymnastic performance of the intermediate subjects.

It has been generally accepted among sport psychologists (19, 21, 86, 108) that well learned athletic performance, in essence, is action requiring varying degrees of emotional arousal for optimal performance. The need for arousal depends upon the nature of the task confronting the participants. Oxendine (85) indicated that a high level of arousal is essential for optimal performance in gross motor activities involving strength, endurance and speed, but it interferes with performances involving complex skills requiring fine muscular movements, coordination, steadiness and general concentration. Furthermore, a slightly above average level of arousal is preferable to a normal arousal state for all motor tasks. Spence and Spence (104) concurred with Oxendine when they found that high-anxious persons have many of the characteristics of individuals in a high drive state. This would include greater difficulty in learning complex tasks and greater facility in learning simple tasks.

Klavora (50) completed a study to determine the optimum level of anxiety necessary for performance in interscholastic football. His procedure was to analyze each specific position in relationship to possible differences in pre-competition emotional arousal levels. There were no significant differences between elevations in pre-game emotional arousal in subjects playing different positions in high school football competition.

Kauss (48) was also concerned with the psychological factors involved in producing positive motor performance in football. He made the assumption that there are certain psychoemotional readying procedures which can form the basis for the production of efficient performance in intercollegiate football. The study linked intercollegiate football performance and psychological factors which included activation (tension arousal and anxiety) and attentional factors (set and concentration). The study obtained measures in preseason: resting heart rate, player self-ratings of anxiety and activation levels, player self statements about focus of attention and coaches' ratings of player performance. The results indicated that there was not a simple, linear relationship between anxiety and activation or between these states and athletic performance. He also revealed that both state and trait (Spielberger's STAI) notions of anxiety and activation were relevant, contrary to the study of Kauss in which anxiety did differentially affect athletic performance based on the varying demands of the tasks involved.

When an individual has competed and gained success, investigators (34, 60, 113) have stated consistently that state anxiety decreases with success and increases with failure. The tremendous social pressure on today's youth is particularly visable in athletic competition. It appears that the competitive process involves considerable evaluation potential that could provide threatening information regarding one's competence and could result in negative social appraisal.

Scanlan (100) found that high-competitive, trait-anxious men perceived greater personal threat during competition than low-anxious men, but that both groups preferred performing in the competition situation and sought evaluative information by selecting opponents of equal or better ability. Levitt (57) concurred with this perception of greater threats and added:

> Anxiety-prone individuals tend to have chronically low self-esteem, to have a poor self-image, to regard themselves as less desirable people than the norm. The relationship between trait anxiety and self-esteem is probably circular, a phenomenon that occurs along with other dimensions of human personality. A high predisposition to experience anxiety leads to low- self-esteem, which in turn increases the predisposition to become anxious and so on.

Freischlag (31) researched the effects of winning and losing and the impact of being "cut" from an athletic team on the self-concept of chosen subjects. Players who made the team assigned themselves higher personal effort and lower luck attributes than those players who were cut. However, the contribution of self and team ability to the outcome of a contest did not vary between winning and losing teams. In both

cases, losses were attributed to causes external to the team. Little is known about the manner in which competitive trait anxiety influences perceived threat during actual competition with an opponent of equal ability. However, recent findings (6, 69, 103) have indicated that high A-Trait individuals manifest greater A-Trait just prior to engaging in competition than low A-Trait individuals.

Martens and Gill (69) reported that subjects' A-State levels on the Spielberger STAI increased as the number of games won on a motor maze task decreased. Both high and low A-Trait subjects increased in A-State after failing, but remained relatively low in A-State after experiencing success.

Tenenbaum and Milgram (117) correlated Spielberger's STAI to three groups of student athletes participating in individual competitive sports. It also involved team competitive sports and individuals performing in non-competitive situations. The scores on the STAI of each group were compared to a physiological measure of state anxiety that consisted of press metabolic rate. Press metabolic rate is the number of heart beats under stress minus a person's basic metabolic rate. The results of the study indicated that although the trait anxiety of both individual and group competitors was lower than that of non-competitors, the difference was not statistically significant. They also found that team sports appeared to evoke as much state anxiety as individual sports. This disagrees with the investigators discussed previously. When Tenenbaum and

Milgram increased the number of spectators, both groups increased in state anxiety but again the results did not reach significance.

Relationship of Anxiety to Basketball

Research that deals with the relationship of anxiety to team sport like basketball presents a complicated topic. Scanlan (99) pointed out that "The dynamics of a high-interactive sport group, such as a basketball team, add another dimension to success and failure attributions." She indicated that both self and team ability and effort are judged to be high following success while failure causes a drop in the performer's evaluation of team effort and ability, with self evaluation unaffected. Apparently, individuals are willing to share responsibility when they win but unwilling to accept personal responsibility for losing. Members of losing teams attribute a loss to the team's shortcoming. Scanlan's study referred to the effects of both trait and state anxiety on children in a summer basketball camp. Her findings were contrary to the bulk of research in that A-Trait anxiety was higher among candidates selected for an all-star team than among those who did not make that select team. It was predicted that successful candidates for the all-star team would have lower A-Trait scores than unsuccessful subjects and that tryouts would be more anxiety-provoking among those cut. The results revealed that both groups show non-significant decreases in anxiety for those who made the team. Team competition promoted lower levels of anxiety in subjects but was unrelated to the outcome of contests.

Gruber and Beauchamp (39) studied the relationship of state anxiety to winning and losing in three easy and three difficult basketball games. Their subjects were University of Kentucky female players and their anxiety-measuring tool was the short form of Spielberger's STAI. The researchers correlated the results on 16 different occasions by administering the tests before and after two baseline practices and the six intercollegiate basketball games. The results indicated that state anxiety was significantly reduced after all games that were won but remained high after all games that were lost. The players were significantly more anxious before the difficult or crucial games when compared to the easy games. This reduced state anxiety for victorious team players usually was credited with an individual's own ability and the team effort. Failure or losses tended to result in reduced internal team evaluations accompanied by the maintenance of higher evaluation for self (31).

A study completed by Bird and Brame (8) on female basketball players supported the fact that players are inclined to reject personal responsibility for failure by transferring the blame to the team concept. Their study revealed only moderate support for members of losing basketball teams. It tended to maintain positive self-evaluations regarding their external attributes while simultaneously de-evaluating those same elements in regard to their team. Their evaluation of themselves and their team's ability revealed no significant difference, and the players of losing teams saw luck as playing a greater role in their performance when compared to winners.

The winners demonstrated enhanced positive perceptions of their teams' ability as compared to their own, although they perceived their own assignment to be more difficult than that of the other members of their own team.

Greenfield (38) completed a study that compared anxiety levels as measured by the Institute for Personality and Ability Testing (IPAT) to each person's ability to shoot free throws. The study involved both high school and college male basketball players and data were analyzed three ways: a) during the games totally, b) during the closing minutes of the games, and c) during overtime periods if they were involved. Greenfield found that only a low, non-significant relationship existed between anxiety and free throw shooting performance in all three time periods.

Lewis (58) found similar results in investigating freshman and sophomore physical education college students. His research involved males who were divided into four separate groups who each trained with different types of free throw shooting techniques. In addition, he studied relationships of the Tennessee Self-Concept Scale and performance. The results revealed that there was no significant difference between training methods as well as no significant statistical interaction between self-concept and free throw shooting means. Thus, each individual's self-concept was not an influencial factor in performance of free throw shooting for unskilled college students.

Bash (6) studied the close association of self-concept and anxiety with its effect on performance in basketball. He evaluated the effect of male intercollegiate basketball participation upon the self-concept of each of the players. He utilized three methods of analysis which included a basketball evaluation instrument, a player subjective rank by each of their respective coaches and the Tennessee Self-Concept Scale. A pretest and posttest were given and the Pearson product moment correlation was applied to determine if any changes in self-concept had occurred. The results indicated that the basketball evaluative instrument was the most accurate tool in measuring the top five players on each team although it was not related significantly to changes in self-concept. There were no significant relationships between self-concept and the coaches' evaluation. Members of winning teams had higher pre and post test scores of self-concept than members of losing teams but they did not reach significance.

Klavora (50) investigated the effects of Speilberger's State anxiety in pre-competition situations of junior high and high school football and basketball players. The study involved the role of trait anxiety of these athletes and three experimental athletic environments characterized by both stressful and non-stressful conditions. State anxiety increased in all subjects prior to regular season games, practices and playoffs. High trait subjects exhibited significant higher elevations in state anxiety than low

trait subjects, which supports the Spielberger theory of trait-state anxiety. The state anxiety rose in stressful environments of playoffs. However, it did not elevate to a significant degree.

CHAPTER III

PROCEDURE

Selection of Teams

Five separate teams totalling 53 players from the state of Oregon were selected for the purposes of this study. Southern Oregon State College, Eastern Oregon State College, Warner Pacific College and Western Baptist College all played intercollegiate basketball games against Western Oregon State College. Western Oregon State College is a state institution which was chartered in 1856 as Monmouth University. It has an enrollment of approximately 2800 students and is located in Monmouth, Oregon. Two home games and two road games were selected to equalize the environment and audience. It was felt that by playing two opponents on their home court and two games in Monmouth the home court advantage would be equalized for the purposes of this study. To promote reliability by utilizing the same "statistics crew" and insuring equal and consistent basketball statistics for all four games, each of the four games selected was located in close vicinity to Western Oregon State College.

The selection process took into account equal representation from both public and private colleges. Since Western Oregon State

College was a public college, selection of Warner Pacific College and Western Baptist College provided representatives from the private sector. The public colleges selected were Southern Oregon State College and Eastern Oregon State College. Thus, the four games included two with public colleges and two games with a public school competing against a private school.

The philosophy of each of the five colleges was very similar. Each school was a viable member of NAIA District #2. All were categorized as independents with no official affiliation with a league membership. The two private colleges awarded scholarship assistance to basketball players strictly for their athletic ability while the three public colleges awarded scholarship money for each individual's personal financial need. The allocation of scholarship money for the private colleges was not a substantial amount but helped athletes defray the costs of paying tuition. Each of the five coaches were assigned approximately one third of their contract responsibilities for coaching duties. None of the five basketball programs had a full time assistant. The assistants were either graduate students, undergraduates or hired part-time coaches.

The final step in the selection process was authorization of each of the respective athletic departments to complete the study. The administration of two anxiety tests 30 minutes prior to an intercollegiate game can be a disrupting influence on a team that is trying to prepare itself mentally for a contest. Permission was initially requested from each coach and a follow-up letter was mailed

to verify the research procedure once consent was given by the basketball coach. Each athletic department was assured that the administration of the tests would involve only five to eight minutes and that nothing would be done other than the inventory examination. Each athletic department was sent a copy of the procedure with the follow-up letter (see Appendix A).

Selection of Anxiety Tests

Two anxiety tests were administered: The Sport Competition Anxiety Test and The Competitive Short Form of Spielberg's STAI (68). The Sport Competition Anxiety Test was developed by Rainer Martens and was utilized to measure individual differences in the tendency to perceive competitive situations as threatening and to respond to these situations with A-State reactions of varying anxiety intensities (see Appendix B). Selection of this inventory was based upon several factors which Martens summarized (68):

1. An objective rather than a projective scale.
2. A minimization of response bias.
3. An unambiguous procedure for taking the test.
4. A short time period to complete the scale.
5. An easy method for scoring the responses.

Each of the fifteen questions utilized a Likert-type scale of responses of three points which included 1) hardly ever, 2) sometimes, and 3) often. The pool of statements was compiled with two considerations: that they could be understood by the population

taking the inventory and that they had face validity for measuring competitive A-trait anxiety. Item analysis, tri-serial correlations and discriminant function analyses were calculated on the test results from trial runs to determine item discrimination. Five of the fifteen statements on the SCAT inventory had spurious statements that had been added to the ten counting items. These non-scoring items on Anxiety Test I include test items # 1, 4, 7, 10, and 14. These spurious statements were added to diminish response bias toward the actual test items and were not included in the scoring. The original inventory had a total of 21 statements and the item discrimination statistical procedures tapered the test down to the ten items. The mean triserial correlation coefficient across the ten items was .64 and the mean discriminant function coefficient was 1.01. These figures surpass the normal criteria for item discrimination. The scoring of Anxiety Test I was calculated by counting 1, 2 or 3 points for the Likert scale. A score of 3 indicated the highest level of anxiety. There were two test items which had reverse scoring. For example, test item #6 indicated: "Before I compete I am calm." If a player answers "often" which normally is a score of 3 points, in reverse scoring would compute at 1 point. Test item #11 was the other question which was scored reverse.

One test for reliability was given for the inventory utilized in this study. A reliability coefficient of .85 was obtained by

employing the analysis of variance method. Evidence of internal consistency was partially demonstrated by both the item analyses correlations and the triserial correlations which correlated each item with the total test score. Martens also utilized a more direct approach for determining the homogeneity of the test by examining the correlations between the test items. The Kuder-Richardson Formula 20 was applied and both tests revealed a .97 and .95 level.

Martens did validity evaluations for content, concurrent, predictive and construct validities. He solicited six expert judges who evaluated content validity and grammatical clarity. The original list of 75 items was assessed on a 1 - 7 point scale and ten selected items averaged a 6.5 from these judges. The concurrent validity was tested by correlating the SCAT to Spielberger, Gorusch and Lushene's STAI inventory (115). The correlation figure was .44 which showed good support between a general A-trait and a situation-specific competitive sport inventory. SCAT was also related to other selected personality dispositions to help understand how competitive A-trait aligns itself into personality dispositions. The results indicated that the SCAT was moderately related to general anxiety scales and had moderate success in relationship to personality scales.

The second inventory used in this study was devised by Martens (68) by shortening the Spielberger Anxiety Inventory for competitive

situations to provide a feasible indication of changes in A-state. This A-state inventory required the player to report how he feels at the moment of the examination, rather than how he generally feels about competitive situations. The SCAT inventory requested the general feelings that the players sense about competitive situations. Martens modified the original inventory because there appeared several items which were not pertinent in measuring changes in A-state as solicited by competitive sport situations (see Appendix C). Thus, by eliminating the long and redundant characteristics of the original scale, Martens was able to provide a convenient inventory that discriminated in competitive situations. Anxiety Test II had a similar Likert scale as Anxiety Test I but involved 4 points instead of 3 points. This indicated a point value of 1, 2, 3 or 4. There were five out of the ten statements that had reverse scoring, including test items #1, 3, 5, 7 and 9. The reverse questions were scored the same as Anxiety Test I. The options for each test item were: 1) not at all, 2) somewhat, 3) moderately so, and 4)very much so. A response of "very much so" on the even numbered questions would compute 4 points but would figure on only 1 point on the reverse questions. There were no spurious statements on Anxiety Test II.

Factor analyses of the STAI scale helped determine which factors could be identified that were more sensitive to variations in A-state among persons that vary in competitive A-trait. Martens also analyzed the relationship between SCAT and A-state and both activation

and deactivation were selected from the original STAI. Activation measures high levels of A-state and deactivation measures low levels of A-state. Martens (68) indicated the criteria by which each of the five deactivation and five activation items were selected:

1. The item had face validity for competitive sport situations.
2. The items had significant weight among the orthogonally rotated factors that related significantly with SCAT for the competitive A-state scored.
3. The item had concurrent validity with Thayer's AD-ACL inventory.

The validity of Spielberger's STAI may be transferred to the competitive short form because Spielberger (115) indicated that as few as five items from the STAI may be used as a subscale. Thus, the Competitive Short Form which is composed of ten items qualified as a subscale of STAI and possessed the tranferred validity.

Administration of Anxiety Tests

The anxiety inventories were both given consecutively to each of the respective teams one half hour prior to the start of the contests. The Competitive Short Form of Spielberger's STAI was given first and the players were requested to complete the survey on how they felt at that particular moment, not how they generally felt about competitive athletics. Each of the opposing teams met in a designated team room that was normally utilized for pre-game

strategy talks. The opposing coach was present when each inventory was administered. The author served as the administrator of the anxiety tests for each game. Questions were answered about the inventories only by reiterating or clarifying the instructions.

The SCAT inventory was given immediately after completion of the Competitive Short Form of Spielberger's STAI. The SCAT examination is a trait evaluation, so information was requested about how players felt about competition. The SCAT inventory was presented to each team as the Illinois Competition Questionnaire to help alleviate the possibility of bias responding. The pseudo name served to disguise the investigator's intent of studying anxiety.

These two anxiety tests were given to each of the respective teams approximately one half hour prior to the start of each intercollegiate basketball game. In each test the subjects were informed that these inventories were merely part of the researcher's graduate responsibilities and there was no mention of anxiety or tension. There was also no justification given for the purpose of the study. Each subject was requested to answer the questions as honestly as possible and that his name would never be associated with the results. Each player was assigned a number and did not place his name on the inventory answer sheets.

Tabulation of Basketball Statistics

Each of the four games had basketball statistics kept by the same group of four people. These people represented the "statistics crew" of Western Oregon State College. Their methods and procedures followed the national NAIA policies and each coach received a copy of the final statistics approximately 30 minutes after the completion of the intercollegiate basketball game. The person in charge of statistics for the Western Oregon basketball team was also responsible for statistics for the total District #2 (see Appendix D). The consistency and uniformity of the collecting and computation of statistics increased the reliability of the data for this study. The basketball computations utilized included field goal attempts and completions, free throw attempts and completions, turnovers, personal fouls and listing of starters.

Field goal and free throw percentages were directly utilized for the different comparisons and relationships studied. There was no special consideration or adjustment for the amount of time each player competed in relation to these percentages. However, to calculate accurately the turnovers and personal fouls it was ncessary to tabulate the amount of time each player accumulated. Then, each player's turnovers and personal fouls were converted to turnovers per minute played and personal fouls per minute played. This system created an equitable comparison for all players.

Statistical Procedures

The four basketball game statistics were combined to compute the relationship of pre-game anxiety to performance in basketball. The statistical data collected were analyzed in the following manner:

A. Computation of t-tests of significance

1. Comparison of the top 27 per cent to the lower 27 per cent of the two anxiety tests to each of the four basketball statistics: field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played.

2. Comparison of male players who had zero or one turnover to players who had two or more turnovers in the selected NAIA intercollegiate games.

3. Comparison of male anxious and non-anxious basketball players on Anxiety Test II to basketball performance in the intercollegiate games.

4. Significance of difference in basketball performance of players rated as "anxious" on both inventories to players who were rated as "non-anxious" in the intercollegiate games.

5. Comparisons of players who participated 20 or more minutes in intercollegiate games to players who participated one - nineteen minutes to Anxiety Test I, Anxiety Test II and basketball performance.

6. Comparison of players who committed zero, one and two personal fouls to players who committed three, four or five personal fouls in the intercollegiate games.

7. Significance of difference in basketball performance in the intercollegiate games for players who were starters to those who were non-starters.

B. Analysis of Variance

1. Comparison of the results from Anxiety Test I for male players who were starters with those who were non-starters in the NAIA intercollegiate games.

2. Comparison of the results from Anxiety Test II for players who were starters with those who were non-starters.

3. Comparison of starting players vs non-starters to results from Anxiety Test I, Anxiety Test II and each inventory test item.

4. Comparison of basketball performance of starting players vs non-starters.

C. Pearson product moment correlation

1. Relationships of scores from Anxiety Test I and and Anxiety Test II with basketball performance in the NAIA intercollegiate games.

2. Relationship of scores from a combination of anxious and non-anxious players for Anxiety Test I with basketball performance in the intercollegiate games.

3. Relationship of scores from a combination of anxious and non-anxious players for Anxiety Test II with their basketball performance.

4. Relationship of scores from Anxiety Test I and Anxiety Test II with basketball performance for players who competed 20 or more minutes.

5. Relationship of basketball performance with scores from Anxiety Test I and Anxiety Test II for players who competed one to nineteen minutes.

6. Relationship of basketball performance of players who committed two or more turnovers in the intercollegiate games to results from Anxiety Test I and Anxiety Test II.

7. Relationship of basketball performance of players who committed either zero or one turnover in the intercollegiate games to results from Anxiety Test I and Anxiety Test II.

8. Relationship of basketball performance of players who committed zero, one or two personal fouls in the intercollegiate games with scores from Anxiety Test I and Anxiety Test II.

9. Relationship of basketball performance and scores from Anxiety Test I and Anxiety Test II and each test item of both inventories of players who were starters in the intercollegiate games.

10. Relationship of basketball performance and scores from Anxiety Test I, Anxiety Test II and each test item of both inventories of players who were starters in the intercollegiate games.

11. Relationship of basketball performance and scores from Anxiety Test I, Anxiety Test II and each test item of both inventories of players who were non-starters.

12. Relationship of each inventory test item of all subjects to basketball performance in the intercollegiate games.

Data were analyzed through the Oregon State Computer Center. Statistics were computed through the Statistical Package for the Social Sciences (79). The level of significance was computed at .05 range for possible rejection of the null hypothesis.

CHAPTER IV

RESULTS

Data from 53 players from the five selected teams who competed in NAIA intercollegiate basketball games from Western Oregon State College, Eastern Oregon State College, Southern Oregon State College, Warner Pacific College and Western Baptist College were analyzed. Statistical relationships and comparisons were calculated according to the following procedures:

1. Relationships of the results of two anxiety inventories of 53 players to basketball performance (field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played). The scores were computed with Pearson product moment correlations.
2. For comparison, players were divided into two groups: "Anxious players" were categorized according to scores above 21 on each of the two inventories. "Non-anxious players" scored below 16 on Anxiety Test I and below 15 on Anxiety Test II. These figures represented the top and bottom 27 per cent of the 53 subjects tested. The different totals for each of the two anxiety inventories represents cut-off points of the 27 per cent. The data were analyzed by comparing each of the anxiety inventories to basketball performance.

T-tests were utilized to assess the significance of difference of the means of the top and bottom 27 per cent. Relationships were determined by use of the Pearson product moment correlation.

3. Players who scored either in the anxious or non-anxious category of each of the two anxiety inventories were combined. Scores from Anxiety Inventory I (Anxiety Test I) and Anxiety Inventory II (Anxiety Test II) were compared to basketball performance by use of Pearson product moment correlations.
4. Those players who scored in the anxious level of both anxiety inventories were compared in their performance in NAIA intercollegiate basketball games with t-tests.
5. Players were selected who participated in each of the respective games for twenty or more minutes. Their scores for each of the two anxiety inventories were compared to their basketball performance by utilization of the Pearson product moment correlation.
6. Players were selected who participated in each of the respective games for less than 20 minutes. Their scores for each of the two anxiety inventories were compared to their basketball performance by utilization of the Pearson product moment correlation.

7. Players who played 20 or more minutes were contrasted to players who participated for less than 20 minutes. The significance of differences of their scores in each of the two anxiety inventories and the data from their basketball performance was computed with t-tests.

8. Players were selected who committed two or more turnovers in each of the respective NAIA intercollegiate basketball games. Relationships of their scores from each of the two anxiety inventories to basketball performance were determined by Pearson product moment correlations.

9. Players were selected who committed either zero or one turnover in each of the respective intercollegiate NAIA basketball games. Pearson product moment correlation procedures were applied to determine the relationship to their scores on each anxiety inventory to their basketball performance.

10. Players who committed two or more turnovers and players who committed zero or one turnover were selected for analysis. Significance of the differences between their basketball performance and the data of these groups from each of the two anxiety inventories was computed by means of t-tests.

11. Players were selected who committed zero, one or two personal fouls in each of the NAIA intercollegiate basketball games. Relationships were established, utilizing Pearson product moment correlation, between scores from the two anxiety inventories with performance in basketball games.
12. Players were selected who committed three, four or five personal fouls in each of the NAIA intercollegiate basketball games. Relationships were established, utilizing Pearson product moment correlation, between scores from the two anxiety inventories with performance in basketball games.
13. Players were selected who committed zero, one or two personal fouls and players who committed three, four or five personal fouls in the NAIA intercollegiage basketball games. Differences were analzyed with t-tests between the scores of the two groups with each of the two anxiety inventories and basketball performance.
14. Players were selected who started each of the four NAIA intercollegiate basketball games. Scores from this group were analyzed with Pearson product moment correlations. The relationships involved each of the twenty anxiety test items of both inventories and the scores of each of the two inventories to performance in basketball games.

15. Players were selected who were identified as non-starters for each of the five teams. Scores from these groups were analyzed in relationship to each of the twenty anxiety test items and to both inventories to performance in basketball games by Pearson product moment correlations.
16. Players were classified into groups as either a starter or non-starter in the NAIA intercollegiate basketball games. Analysis of Variance served as the method to determine the significance of differences between Anxiety Test I and Anxiety Test II and the basketball performance of these two groups.
17. Comparisons of scores for starters to non-starters were analyzed for each of the 20 anxiety test items with performance in NAIA intercollegiate basketball games. Analysis of Variance served as the vehicle to compute these differences.
18. Comparison of scores of Anxiety Test I and Anxiety Test II for starters to non-starters were analyzed with basketball performance. Analysis of Variance was utilized to determine if there was significance of difference between these two groups.
19. Comparison of scores for starters to non-starters were determined for each of the two anxiety inventories to NAIA intercollegiate basketball game

performance. The differences were determined by t-tests.

20. The relationship of each of the twenty anxiety test items to performance in the NAIA intercollegiate basketball games was determined by use of Pearson product moment correlation procedure. This relationship involved all 53 subjects.

21. Basketball performance of starting players vs non-starters was analyzed. Analysis of Variance was used to determine if a significant difference occurred between these groups.

For the 53 players involved in the study, the mean for Anxiety Test I was 18.472 and the average for Anxiety Test 11 was 18.679. These figures were slightly below the norm established by Martens (68) of 19.74 for college age people (see Table 1). The range of both inventories ran from either 10-30 or 10-40 points, with ten test items on each anxiety examination with a three or four point Likert Scale for response. The standard deviations were 4.362 and 5.139 for the 53 subjects tested on each of the two inventories. The field goal percentage during the NAIA intercollegiate basketball games included in this study averaged .405, which was considerably lower than the 1981 national average of .465 (120). Free throw percentage for the 53 players averaged .671, which was higher than the national average of .645. Turnovers per actual minute played averaged .054 or 2.16 if each player tested had played a total of forty minutes. Personal fouls per minute played averaged .134, which calculated to 5.36 for

TABLE 1

SUMMATIONS, MEANS, STANDARD DEVIATIONS AND VARIANCES OF SCORES ON ANXIETY TEST I AND II AND BASKETBALL PERFORMANCE

	Sum	Mean	S.D.	Variance
Anxiety Test I	979.0000	18.4717	4.3616	19.0232
Anxiety Test II	990.0000	18.6792	5.1395	26.4144
Field Goal Percentage	21.0697	.4052	.2417	.0584
Free Throw Percentage	36.6201	.6909	.2696	.9727
Turnovers per minute played	2.8724	.0542	.0600	.0036
Personal Fouls per minute played	7.0933	.1338	.1570	.0247

a total game.

The basketball performance, as indicated by field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played, was not significantly related to test scores of Anxiety Test I or Anxiety Test II. Thus, hypothesis 1 was upheld. Turnovers per minute played committed by each player had a relationship that was the closest to reaching a significant level with a $p = .117$ for the Anxiety Test I and $p = .105$ for Anxiety Test II (see Table 2). The results for field goal percentage computed at $p = .295$ and .276 for each of the respective anxiety inventories. Free throw percentage computed at $p = .478$ and .160 while personal fouls to anxiety levels were $p = .276$ and .482.

Those scoring in the middle range of the anxiety test were, of course, very similar to each other in their anxiety level. To determine whether either high or low anxiety related to basketball performance, scores from players who were categorized as anxious (scored above 21) on Anxiety Test I and non-anxious (scored below 16 on Anxiety Test I) were combined (see Table 3). The relationships to basketball performance were determined by the Pearson product moment correlation and no significant relationships were found. The relationship of field goal percentage was $p = .412$ and .250 for the two respective inventories. Free throw percentage was $p = .470$ and .144, turnovers per minute played was $p = .146$ and .165 and personal fouls per minute played was $p = .288$ and .330 for the two inventories(see Table 3).

TABLE 2

RELATIONSHIPS OF ANXIETY TEST I AND ANXIETY TEST II
TO BASKETBALL PERFORMANCE,
USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goals	Free Throws	Turnovers	Personal Fouls
Anxiety Test I	.0764 N = (52) p = . 295	-.0077 (53) p = . 478	-.1665 (53) p = . 117	.0837 (53) p = . 276
Anxiety Test II	-.0842 N = (52) p = . 276	.1394 (53) p =. 160	-.1754 (53) p = . 105	-.0062 (53) p = . 482

TABLE 3

RELATIONSHIPS OF SCORES OF ANXIETY TEST I OF BOTH ANXIOUS AND NON-ANXIOUS PLAYERS TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION.

	Anx. I	Anx. II	FG %	FT %	TO/M	PF/M
Anxiety Test I	1.000 N= (0) p= ****	.8962 (27) p= .8562	.0449 (27) p= .412	.0151 (27) p=.470	.2103 (27) p=.146	.1126 (27) p= .288
Anxiety Test II	.8562 N= (27) p=.001	1.0000 (0) p= ****	.1354 (27) p= .230	.2125 (27) p=.144	.1948 (27) p=.165	.0885 (27) p= .330
Field Goal Percentage	.0449 N= (27) p-.412	.1354 (27) p= .250	1.0000 (0) p= ****	-.984 (27) p=.313	.1912 (27) p= .170	-.0744 (27) p= .356
Free Throw Percentage	.0151 N= (27) p=.470	.2125 (27) p= .144	- .0934 (27) p= .313	1.000 (0) p=*****	- .0592 (27) p= .385	.0758 (27) p= .353
Turnovers per Minute Played	-.2102 N= (27) p=.146	-.1948 (27) p= .165	.1912 (27) p= .170	-.0592 (27) p=.385	1.000 (0) p= ****	.2465 (27) p= .108
Personal Fouls per Minute Played	.1126 N= (27) p=.288	-.0885 (27) p= .330	-.0744 (27) p= .356	.0758 (27) p=.353	.2465 (27) p= .108	1.0000 (0) p= ****

Comparisons of basketball performance scores from the anxious players (scored above 22) and non-anxious players (scored below 14) as indicated by Anxiety test I resulted in no significance by the t-tests utilized (see Table 4). The t-values for field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played were of small value.

The same method was utilized in the comparison of anxious players to non-anxious player on Anxiety Test II (see Table 5). The range of anxiety scores for this test included below 15 and above 22. The second inventory results in a larger number of players (N = 31) evaluated. The results projected non-significance for the four basketball variables. The t-values computed at .80, -.38, 1.53, and -.57 which were not high enough to establish significance. Thus, Hypothesis 2 was substantiated.

However, when high and low scores on Anxiety Test II were analyzed by the Pearson product moment correlation technique, a few significant relationships were found (see Table 6). This test involved a range of below 15 and above 21 on Anxiety Test II. There was a $p = .040$ for the relationship between field goal percentage and free throw percentage. The high and low anxiety players thus showed a positive relationship between their success at free throw shooting and field goal shooting. A $p = .032$ result was found between turnovers per minute played and free throw percentage. This indicated that as turnovers per minute played increased there was an increase in free throw percentage.

TABLE 4

SIGNIFICANCE OF THE DIFFERENCE IN BASKETBALL PERFORMANCE BETWEEN ANXIOUS AND NON-ANXIOUS PLAYERS ON ANXIETY TEST I USING t-TESTS

Variable	N	S.D.	t Value	d.f.	Standard Error	Two-tailed Probability
Field Goal Percentage						
Non-Anxious	9	.299	-.11	20	.100	.917
Anxious	13	.281			.078	
Free Throw Percentage						
Non-Anxious	9	.270	-.42	20	.090	.675
Anxious	13	.418			.116	
Turnover per minute						
Non-Anxious	9	.161	1.29	20	.054	.212
Anxious	13	.143			.040	
Personal Fouls per Minute played						
Non-Anxious	9	.171	-.22	20	.057	.830
Anxious	13	.134			.037	

TABLE 5

SIGNIFICANCE OF THE DIFFERENCE IN BASKETBALL PERFORMANCE BETWEEN ANXIOUS AND NON-ANXIOUS PLAYERS ON ANXIETY TEST II USING t-TESTS

Variable	N	S.D.	t Value	d.f.	Standard Error	Two-tailed Probability
Field Goal Percentage						
Non-Anxious	17	.396	.80	29	.096	.428
Anxious	14	.319			.085	
Free Throw Percentage						
Non-Anxious	17	.381	-.38	29	.092	.705
Anxious	14	.436			.116	
Turnover per minute						
Non-Anxious	17	.158	1.53	29	.038	.137
	14	.152			.041	
Personal Fouls per Minute played						
Non-Anxious	17	.166	-.57	29	.040	.571
Anxious	14	.141			.038	

TABLE 6

RELATIONSHIP OF SCORES OF ANXIETY TEST II
OF BOTH ANXIOUS AND NON-ANXIOUS PLAYERS
TO BASKETBALL PERFORMANCE, USING PRODUCT MOMENT CORRELATION

	Anx. I	Anx. II	FG %	FT %	TO/Mp	PF/Mp
Anxiety Test I	1.000	.7649	.0050	.0559	.2044	.1033
	N= (0)	(27)	(27)	(27)	(27)	(27)
	p= ***	p= .001	p= .490	p= .391	p= .153	p= .304
Anxiety Test II	.7649	1.000	-.1007	.1607	-.2586	.0821
	N= (27)	(0)	(27)	(27)	(27)	(27)
	p =.001	p= ***	p= .309	p= .212	p= .096	p= .342
Field Goal Percentage	.0050	-.1007	1.0000	.3435	.1490	-.0335
	N= (27)	(27)	(0)	(27)	(27)	(27)
	p= .490	.309	p= ***	p= .040	p= .229	p= .434
Free Throw Percentage	.0559	.1607	.3435	1.000	.3610	.0793
	N= (27)	(27)	(27)	(0)	(27)	(27)
	p= .391	p= .212	p= .040	p= ***	p= .032	p= .347
Turnovers per Minute played	-.2044	-.2586	.1490	.3610	1.0000	.1467
	N= (27)	(27)	(27)	(27)	(0)	(27)
	p= .153	p= .096	p= .229	p= .032	p= ***	p= .233
Personal Fouls per Minute played	.1033	.0821	-.0336	.8793	.1467	1.0000
	N= (27)	(27)	(27)	(27)	(27)	(0)
	p= .304	p= .342	p= .434	p= .347	p= .233	p= ***

t-tests were computed to determine whether a signficant difference existed between players who scored in the low anxiety category on both tests (see Table 7). A total of seven players qualified with scores low enough on both anxiety inventories and ten players satisfied the high anxiety standards for both inventories. The t-values included .08, -1.04, .88 and .001 for the four basketball statistics that indicated basketball performance. These results show that Hypothesis 2 was again substantiated.

Players who participated twenty minutes or more in each of the respective games were grouped to analyze the comparisons of their anxiety scores and their four basketball indicators (see Table 8). The number of qualified candidates was 23 and the Pearson Product moment correlation was employed to analyze these relationships. Significance was reached on both Anxiety Test I and Anxiety Test II on the relationship to turnovers per minute played. The significant level for turnovers per minute played and Anxiety Test I was $p = .001$ and was .037 for Anxiety Test II. These results showed a negative relationship which indicated that as the anxiety level increased, turnovers per minute played decreased to significant degrees. The relationship of Anxiety Test I to personal fouls was close to the .05 level at $p = .06$ but Anxiety Test II related to personal fouls at only .255. Hypothesis 3C was thus rejected while 3A, B and D were accepted.

TABLE 7

SIGNIFICANCE OF DIFFERENCE ON BASKETBALL PERFORMANCE OF PLAYERS RATED AS "ANXIOUS ON BOTH ANXIETY INVENTORIES TO PLAYERS WHO WERE RATED AS "NON-ANXIOUS ON BOTH ANXIETY INVENTORIES USING t-TESTS

Variable	N	S.D.	t Value	d.f.	Standard Error	Two-tailed Probability
Field Goal Percentage						
Non-Anxious	7	.318	.08	15	.120	.941
Anxious	10	.261			.083	
Free Throw Percentage						
Non-Anxious	7	.308	-1.04	15	.116	.315
Anxious	10	.305			.096	
Turnovers per minute played						
Non-Anxious	7	.177	.88	15	.067	.395
Anxious	10	.162			.051	
Personal Fouls per minute played						
Non-Anxious	7	.154	.001	15	.058	.996
Anxious	10	.150			.047	

TABLE 8

RELATIONSHIPS OF ANXIETY TEST I AND ANXIETY TEST II RESULTS TO BASKETBALL PERFORMANCE FOR PLAYERS WHO COMPETED TWENTY OR MORE MINUTES, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I	.0912	.0207	-.6373	.3339
	N= (23)	(23)	(23)	(23)
	p= .339	p= .463	p= .001	p= .060
Anxiety Test II	.0776	.2669	-.3795	.1445
	N= (23)	(23)	(23)	(23)
	p= .363	p= .109	p= .037	p= .255

Players who participated in the intercollegiate basketball game for twenty or more minutes had high anxiety scores when compared to players who played 1-19 minutes (see Table 9). Anxiety Test I averages for players who participated twenty or more minutes was 19.304 compared to 17.833 for performers who competed for 1-19 minutes. This, however, was not a significant difference. In Anxiety Test II, the average compared 19.652 to 17.933 which also was not significant. The field goal percentage for the same comparison revealed means of .487 to .341 while the free throw percentage indicated average of .785 to .619. Both of these shooting variables reached significant levels with t-values of -2.43 and -2.32. The two-tailed probability resulted in .019 and .024 figures. Turnovers per minute played also reached significant heights with a t-value of -2.13 and a two-tailed probability of .038. These results indicate that the best shooters were attaining the most playing time.

The results of the comparsion of players who participated in over twenty minute periods refuted Hypothesis 3C as mentioned previously. Turnovers per minute played was significant for players who participated twenty or more minutes as determined by the Pearson product moment correlation (see Table 8). Field goal percentage, free throw percentage and turnovers per minute played were significantly higher on the two-tailed probability evaluation of the t-test (see Table 9). This refuted Hypotheses 4B, C and D. However, there was no significant difference in the players' anxiety level or their personal fouls per minute, so Hypotheses 4A and E were accepted.

TABLE 9

SIGNIFICANCE OF THE DIFFERENCES BETWEEN PLAYERS WHO PARTICIPATED 20 OR MORE MINUTES AND PLAYERS WHO PARTICIPATED 1-19 MINUTES FOR FOR ANXIETY TEST I, ANXIETY TEST II AND BASKETBALL PERFORMANCE, USING t-TESTS

	N	Mean	S.D.	S.E.	t Value	d.f.	Two-tailed Probability
Anxiety Test I							
≤19 min.	30	17.8333	3.779	.690	-1.22	51	.227
≥20 min.	23	19.3043	4.986	1.040			
Anxiety Test II							
≤19 min.	30	17.9333	4.849	.885	-1.21	51	.231
≥20 min.	23	19.6522	5.449	1.136			
Field Goal Percentage							
≤19 min.	29	.341	.419	.078	-2.43	50	.019*
≥20 min.	23	.487	.169	.035			
Free Throw Percentage							
≤19 min.	30	.619	.432	.079	-2.32	51	.024*
≥20 min.	23	.785	.325	.068			
Turnovers per Minute Played							
≤19 min.	30	.045	.170	.031	-2.13	51	.038*
≥20 min.	23	.067	.132	.028			
Personal Fouls Per Minute Played							
≤19 min.	30	.061	.314	.057	.89	51	.379
≥20 min.	23	.098	.130	.027			

*indicates significance reached

Players who participated for period of 1-19 minutes for each of the five teams in the intercollegiate basketball games were grouped to compare their anxiety scores to the four basketball statistics. There was a total of thirty players who qualified by this criterion and the Pearson product moment correlation served as the statistical tool in the analysis (see Table 10). The results indicated that no significant relationships existed between basketball performance and the results of either anxiety inventory for those players who participated in games between 1-19 minutes. The level for field goal percentage was $p = .353$ and $p = .096$ for the two respective anxiety inventories. Free throw percentage was $p = .243$ and .469, turnovers per minute played was $p = .339$ and .219, and personal fouls per minute played was $p = .428$ and .439. Thus, Hypotheses 5A, B, C, and D were accepted.

A group of players were selected who committed two or more turnovers in the intercollegiate games studied (see Table 11). Relationships were computed with the Pearson product moment correlation between each anxiety inventory and each of the four basketball performance indicators. The number of players who qualified was fifteen, and there was no significant level reached in the statistical relationships. The p values of Anxiety Test I was .455, .115, .484 and .319 for field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played. Anxiety Test II indicated a p of .231, .178, .375

TABLE 10

RELATIONSHIPS OF ANXIETY TEST I AND ANXIETY TEST II TO BASKETBALL PERFORMANCE FOR PLAYERS WHO COMPETED 1-19 MINUTES, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers Per Minute	Personal Fouls Per Minute
Anxiety Test I	.0730 N = (29) p = .353	-.1320 (30) p = .243	.0789 (30) p = .339	.0347 (30) p = .428
Anxiety Test II	-.2493 N = (29) p = .096	-.0147 (30) p = .469	-.1474 (30) p = .219	-.0290 (30) p = .439

TABLE 11

RELATIONSHIPS OF PLAYERS WHO COMMITTED TWO OR MORE TURNOVERS TO ANXIETY TEST I, ANXIETY TEST II AND BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers Per Minute	Personal Fouls Per Minute
Anxiety Test I	.0332 N = (15) p =.455	.3300 (15) p =.115	.0116 (15) p = .484	.1321 (15) p = .319
Anxiety Test II	.2053 N = (15) p =.231	.2564 (15) p =.178	.0896 (15) p = .375	.0896 (15) p = .380

and .380 for each of the basketball categories. Players who committed two or more turnovers sustained a field goal average of .433 and a free throw average of .778 (see Table 12). Both of these averages are below the averages for the total 53 players who participated in this study. The turnovers per minute played averaged .119 and the personal fouls per minute played was .134.

Players who committed either zero or one turnover were compared with both anxiety inventories to the four basketball statistics (see Table 13). Pearson product moment correlations served as the method of computing relationship. The Anxiety Test I p values were .225, .481, .347 and .303 and the Anxiety Test II were .232, .163, .285 and .447. Thirty-eight players committed zero or one turnover and their field goal percentage was .394, their free throw percentage was .656, their turnovers per minute played were .029 and their personal fouls per minute played were .134 (see Table 14).

The comparison of the two groups of players classified as making either zero or one turnover per minute or two or more turnovers per minute in each of the respective intercollegiate games was analyzed by the use of t-tests (see Table 15). Anxiety level as represented by Anxiety test I was significantly higher for players who committed either zero or one turnover. One other significant relationship was found for players who had zero or one turnover. These players possessed higher anxiety scores than players who had two or more turnovers. The t-value computed at -6.38 when the high and low turnover players was compared. The results indicated that there was a significant relationship between players who committed zero or one

TABLE 12

SUMMATIONS, MEANS, STANDARD DEVIATIONS OF SCORES ON ANXIETY TEST I AND ANXIETY TEST II AND BASKETBALL PERFORMANCE FOR PLAYERS WHO COMMITTED TWO OR MORE TURNOVERS

	Sum	Mean	S.D.	Variance
Anxiety Test I	245.000	15.333	3.599	12.952
Anxiety Test II	257.000	17.133	4.502	20.267
Field Goal Percentage	6.499	.433	.186	.035
Free Throw Percentage	11.675	.778	.195	.038
Turnovers per Minute Played	1.778	.119	.052	.003
Personal Fouls Per Minute Played	2.016	.134	.121	.015

TABLE 13

FOR PLAYERS WHO COMMITTED EITHER ZERO OR ONE TURNOVER, RELATIONSHIP AMONG ANXIETY TEST I, ANXIETY TEST II AND BASKETBALL PERFORMANCE INDICATORS, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers Per Minute	Personal Fouls Per Minute
Anxiety Test I	.1282	-.0081	.0660	.0864
	N = (37)	(38)	(38)	(38)
	p = .225	p = .481	p = .347	p = .303
Anxiety Test II	-.1242	.1638	-.0952	-.0224
	N = (37)	(38)	(38)	(38)
	p = .232	p = .163	p = .285	p = .447

TABLE 14

SUMMATIONS, MEANS, VARIANCES AND STANDARD DEVIATIONS OF PLAYERS WHO COMMITTED EITHER ZERO OR ONE TURNOVER IN NAIA INTERCOLLEGIATE BASKETBALL GAMES TO ANXIETY TEST I, ANXIETY TEST II AND BASKETBALL PERFORMANCE

	Summations	Means	Variances	S. D.
Anxiety Test I	734.008	19.316	19.249	4.387
Anxiety Test II	732.982	19.289	28.103	5.301
Field Goal Percentage	14.972	.394	.069	.262
Free Throw Percentage	24.928	.656	.083	.289
Turnovers per Minute Played	1.102	.029	.002	.041
Personal Fouls Per Minute Played	5.092	.134	.029	.171

TABLE 15

SIGNIFICANCE OF THE DIFFERENCES BETWEEN ANXIETY TEST I, ANXIETY TEST II AND BASKETBALL PERFORMANCE OF PLAYERS WHO COMMITTED ZERO OR ONE TURNOVER TO PLAYERS WHO COMMITTED TWO OR MORE TURNOVERS, USING t-TESTS

	N	S. D.	Standard Error	t Value	d.f.	Two-tailed Probability
Anxiety Test I						
Zero or one TO	38	4.387	.712	2.34	51	.023*
Two or more TO	15	3.599	.929			
Anxiety Test II						
Zero or one TO	38	5.301	.860	1.39	51	.171
Two or more TO	15	4.502	1.162			
Field Goal Percentage						
Zero or one TO	38	.385	.063	- .67	51	.504
Two or more TO	15	.243	.063			
Free Throw Percentage						
Zero or one TO	38	.434	.070	-1.31	51	.195
Two or more TO	15	.302	.078			
Turnovers per Minute Played						
Zero or one TO	38	.133	.022	-6.38	51	.0001*
Two or more TO	15	.076	.020			
Personal Fouls per Minute Played						
Zero or one TO	38	.273	.044	- .14	51	.892
Two or more TO	15	.190	.049			

*indicates significance reached

turnover to high anxiety scores. These players had less turnovers per minute than the players who committed two or more turnovers per minute. Hypotheses 6, which stated that there was no relationship between players who committed zero or one turnover to players who committed two or more turnovers in intercollegiate NAIA basketball games, was mostly upheld, with 6B and C accepted and 6A and D being rejected.

Players were selected who committed zero, one or two personal fouls with the results of Anxiety Test I and Anxiety Test II which was compared to the statistics which indicated basketball performance (see Table 16). This relationship was analyzed through the Pearson product moment correlation. The results indicated no significant findings although Anxiety Test II related to turnovers per minute played at $p = .100$. The basketball statistical means for the 34 subjects totalled .382, .656, .041, and .103 for field goal percentage, free throw percentage, turnovers per minute and personal fouls per minute (see Table 17). These results reflected a lower average when compared to the average of all 53 players.

Players who committed three, four or five personal fouls were related to both anxiety inventories and compared to basketball performance (see Table 18). There were nineteen subjects who qualified under this category and Pearson product moment correlations were applied to compute the relationships. Turnovers per minute played reached the significant level on only Anxiety Test I at $p = .020$.

TABLE 16

RELATIONSHIPS OF PLAYERS WHO COMMITTED ZERO, ONE OR TWO PERSONAL FOULS WITH ANXIETY TEST I AND ANXIETY TEST II COMPARED TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers per Minutes Played	Personal Fouls per Minutes Played
Anxiety Test I	.0692	-.1524	.0057	.0555
	N = (33)	(34)	(34)	(34)
	p = . 351	p = .195	p = .487	p = .378
Anxiety Test II	.1240	.0652	-.2254	-.0212
	N = (33)	(34)	(34)	(34)
	p = .246	p = .357	p = .100	p = .453

TABLE 17

SUMMATIONS, MEANS, VARIANCES AND
STANDARD DEVIATIONS OF PLAYERS
WHO COMMITTED ZERO, ONE OR TWO PERSONAL FOULS

	Summations	Means	Variances	S. D.
Anxiety Test I	619.000	18,206	17.865	4.227
Anxiety Test II	631.000	28.559	27.769	5.270
Field Goal Percentage	12.594	.382	.074	.271
Free Throw Percentage	22.293	.656	.070	.271
Turnovers per Minute Played	1.381	.041	.002	.047
Personal Fouls per Minute Played	3.519	.103	.030	.174

TABLE 18

RELATIONSHIP OF ANXIETY TESTS TO BASKETBALL PERFORMANCE FOR PLAYERS WHO COMMITTED THREE, FOUR OR FIVE PERSONAL FOULS, USING PEARSON PRODUCT MOMENT CORRELATION

	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I	.0616 N = (19) p =.401	.1728 (19) p =.240	- .4727 (19) p = .020*	.0997 (19) p = .342
Anxiety Test II	.0133 N = (19) p =.478	.2684 (19) p =.133	-.1370 (19) p = .288	-.0052 (19) p = .492

*indicates significance reached

This indicated that for the pool of players who committed three, four or five personal fouls, turnovers per minute decreased significantly at high anxiety levels. The basketball statistical averages were .446, .754, .078 and .188 respectively, which were much higher than the players who committed zero, one or two personal fouls (see Table 19).

Relationships of the players who committed zero, one or two personal fouls in the intercollegiate games were compared to the players who committed three, four or five personal fouls (see Table 20). t-tests results indicated that both turnovers per minute and personal fouls per minute reached significant plateaus. The t-values were -2.03 and -2.45 and the two-tailed probabilities were .047 and .018. The results indicated that players with three, four, or five personal fouls had significantly more turnovers per minute played and personal fouls per minute played than players with zero, one or two personal fouls.

Hypotheses 7A, B and C, stating that no relationship existed for male players who committed zero, one or two personal fouls versus players who committed three, four or five personal fouls in NAIA intercollegiate games were accepted. However, Hypotheses 7D and E were rejected because of the significant t-test level reached for players who committed three, four or five personal fouls in both turnovers per minute played and personal fouls per minute played.

TABLE 19

SUMMATIONS, MEANS, VARIANCES AND
STANDARD DEVIATIONS OF PLAYERS WHO COMMITTED
THREE, FOUR OR FIVE PERSONAL FOULS

	Summations	Means	Variances	S. D.
Anxiety Test I	359.993	18.947	21.830	4.672
Anxiety Test II	359.005	18.895	25.322	5.032
Field Goal Percentage	8.474	.446	.032	.178
Free Throw Percentage	14.326	.754	.075	.274
Turnover per Minute Played	1.482	.078	.005	.073
Personal Fouls per Minute Played	3.572	.188	.011	.103

TABLE 20

SIGNIFICANCE OF THE DIFFERENCES BETWEEN PLAYERS WHO COMMITTED ZERO, ONE OR TWO PERSONAL FOULS AND PLAYERS WHO COMMITTED THREE,FOUR OR FIVE PERSONAL FOULS CONCERNING THEIR ANXIETY AND BASKETBALL PERFORMANCE, USING t-TESTS

	N	Mean	S. D.	Standard Error	t Value	d.f.	Two-tailed Probability
Anxiety Test I							
Two or under PF	34	18.2059	4.227	.725	- .59	51	.588
Three or over PF	19	28.9474	4.672	1.072			
Anxiety Test II							
Two or under PF	34	18.5588	5.270	.904	- .23	51	.822
Three or over PF	19	18.8947	5.032	1.154			
Field Goal Percentage							
Two or under PF	34	.382	.401	.070	-1.08	51	.286
Three or over PF	19	.446	.228	.052			
Free Throw Percentage							
Two or under PF	34	.656	.394	.068	-1.74	51	.088
Three or over PF	19	.754	.404	.093			
Turnover per Minute Played							
Two or under PF	34	.041	.147	.025	-2.03	51	.047*
Three or over PF	19	.078	.170	.039			
Personal Fouls per Minute Played							
Two or under PF	34	.103	.283	.049	-2.45	51	.018*
Three or over PF	19	.188	.125	.029			

*indicates significance reached

Players were selected who started for each of the five teams involved in the study (N= 25). Several comparisons were made with non-starters (N = 28). The analysis of variance was employed to compare the two groups with Anxiety Test I (see Table 21). The starters had substantially higher anxiety scores, averaging 19.1600 compared to 17.8571 for the non-starters. The starters were also more variable, as shown by standard deviations of 5.0057 compared to 3.6789. The results indicated a non-significant level on the ANOVA Table of .2819 with the F value of 1.1826. The starters were analyzed with Anxiety Test II and the results denoted similar findings (see Table 22). The significant level approached the desired .05 level at a closer range of .2014, with the F value reaching 1.6751. These findings were not close enough to be termed significant results. Hypotheses 8A stated that starting players for NAIA men's intercollegiate basketball teams were as anxious in intercollegiate contests as non-starters. This hypothesis was upheld since analysis of scores for each anxiety inventory denoted non-significant differences. The starters projected higher anxiety scores and had a higher spread of scores from the mean as indicated by the higher standard deviation and variance scores but the differences were not great enough to reach significance.

The comparisons of starters to non-starters in basketball performance indicated some significant differences. Results of the t-tests revealed that starters shot a higher percentage in both field goals and free throws than non-starters to a significant

TABLE 21

SIGNIFICANT DIFFERENCES BETWEEN STARTING PLAYERS AND NON-STARTERS WITH ANXIETY TEST I, USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Standard Deviation	Sum of Squares	N
Starters	479.0000	19.1600	5.0057	601.3600	25
Non-starters	500.0000	17.8571	3.6789	365.4286	28
Total	979.0000	18.4717	4.3616	989.2075	53

* * * * * * * * * * ANOVA TABLE * * * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	22.4190	1	22.4190
WITHIN GROUPS	966.7886	51	18.9566
TOTAL	989.2075	52	

* *

F = 1.1826, significant at .2819.

* *

TABLE 22

SIGNIFICANT DIFFERENCE BETWEEN STARTING PLAYERS AND NON-STARTING PLAYERS WITH ANXIETY TEST II, USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Standard Deviation	Sum of Squares	N
Starters	491.0000	19.6400	5.4839	721.7600	25
Non-starters	499.0000	17.8214	4.7458	608.1071	28
Total	990.0000	18.6792	5.1395	1372.5472	53

* * * * * * * * * * ANOVA TABLE * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	43.6800	1	43.6800
WITHIN GROUPS	1329.8671	51	26.0758
TOTAL	1373.5472	52	

* *

F = 1.6751, significant at .2014

* *

degree (see Table 23). The t-values for field goal percentage was 2.20 with a two-tailed probability of .033. The free throw percentage had a t-value of 2.69 with a two-tailed probability of .010. These results indicated a rejection of Hypotheses 8B and C. Hypotheses 8D and E were retained because there was not significance reached with turnovers per minute played or personal fouls per minute played.

Although it is realized that reliability and validity of a total testing instrument does not transfer to the individual test items, it was felt that the content of the items allowed face validity to be assumed. Therefore, a Pearson product moment correlation between the various test items of the basketball performance indicators was calculated to determine relationships with the various subgroups of the anxiety study.

The starters from the five selected teams were analyzed in relationship to the twenty test items from both inventories and to each inventory. These representatives of anxiety were compared to basketball performance. Pearson product moment correlations were used to determine if significant relationships occured (see Table 24). Two test items from each inventory revealed noteworthy comparisons. Question #3 of Anxiety Test I, which stated: "Before I compete I worry about not performing well," was significantly related to personal fouls per minute played at $p = .001$. This indicated that high scores on Anxiety Test I, Item #3, related to significant number of personal fouls for the starting players. Question #6 of Anxiety Test I related to significant number of turnovers per minute played at $p = .035$. The negative coefficient indicated that low scores on Test Item #6 on

TABLE 23

SIGNIFICANCE OF THE DIFFERENCES BETWEEN GAME STARTERS AND NON-STARTERS IN BASKETBALL PERFORMANCE, WITH t-TESTS

	N	S.D.	Standard Error	t Value	d.f.	Two-tailed Probability
Field Goal Percentage						
Starters	25	.176	.035	2.20	50	.033*
Non-Starters	27	.435	.084			
Free Throw Percentage						
Starters	25	.294	.059	2.69	51	.010*
Non-Starters	28	.447	.085			
Turnovers per Minute Played						
Starters	25	.132	.026	1.04	51	.303
Non-Starters	28	.181	.034			
Personal Fouls per Minute Played						
Starters	25	.133	.027	- .84	51	.403
Non-Starters	28	.322	.061			

*indicates significance reached

TABLE 24

RELATIONSHIPS OF GAME STARTERS' SCORES FOR ANXIETY TESTS AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnover per Minute Played	Personal Fouls per Minute Played
Anxiety Test I	-.0361	-.0199	-.3147	.2509
	N= (25)	(25)	(25)	(25)
	p= .432	p= .462	p= .063	p= .113
Anxiety Test II	.0918	.2032	-.0411	.9787
	(25)	(25)	(25)	(25)
	p= .331	p= .165	p= .423	p= .354
Anxiety Test I Test Item #2	-.1029	.2669	-.1824	.1485
	(25)	(25)	(25)	(25)
	p= .312	p= .099	p= .191	p= .239
Anxiety Test I TestItem #3	-.0516	-.0151	-.1418	.6508*
	(25)	(25)	(25)	(25)
	p= .403	p= .471	p= .249	p= .001
Anxiety Test I Test Item #5	-.2001	.0087	-.2509	.2939
	(25)	(25)	(25)	(25)
	p= .169	p- .483	p= .113	p= .077
Anxiety Test I Test Item #6	.2326	-.0743	-.3685*	-.0703
	(25)	(25)	(25)	(25)
	p= .132	p= .362	p= .035	p= .369
Anxiety Test I Test Item #8	-.2034	.1251	-.2556	.3207
	(25)	(25)	(25)	(25)
	p= .165	p= .276	p= .109	p= .059
Anxiety Test I Test Item #9	.1309	.1130	-.2493	-.1836
	(25)	(25)	(25)	(25)
	p= .266	p= .295	p= .115	p = .190
Anxiety Test I Test Item #11	.0667	.1701	-.1433	.1723
	(25)	(25)	(25)	(25)
	p= .376	p= .208	p= .247	p= .205

*indicates significance reached

TABLE 24
(continued)

RELATIONSHIPS OF GAME STARTERS' SCORES FOR ANXIETY TESTS AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I Test Item #12	.1961 N= (25) p= .174	-.0425 (25) p= .420	-.1736 (25) p= .203	-.0696 (25) p= .370
Anxiety Test I Test Item #14	.1575 (25) p= .226	-.1248 (25) p= .276	.1451 (25) p= .244	-.1047 (25) p= .309
Anxiety Test I Test Item #15	-.0653 (25) p= .378	-.1524 (25) p= .234	-.0109 (25) p= .479	.1824 (25) p= .191
Anxiety Test II Test item #1	-.0331 (25) p= .438	.1798 (25) p= .088	.0805 (25) p= .351	-.0679 (25) p= .374
Anxiety Test II Test Item #2	-.2008 (25) p= .168	.2093 (25) p= .302	-.2410 (25) p= .123	.1455 (25) p= .414
Anxiety Test II Test Item #3	.0745 (25) p= .362	.2661 (25) p= .099	-.0766 (25) p= .358	.1118 (25) p= .297
Anxiety Test II Test Item #4	.3447* (25) p= .046	.0028 (25) p= .495	-.1090 (25) p= .302	-.2050 (25) p= .163
Anxiety Test II Test Item #5	.0337 (25) p= .436	-.2376 (25) p= .126	-.1231 (25) p= .279	.0624 (25) p= .383
Anxiety Test II Test Item #6	.0462 (25) p= .413	-.0659 (25) p= .377	-.0453 (25) p= .415	.5447* (25) p= .002

*indicates significance reached

TABLE 24
(continued)

RELATIONSHIPS OF GAME STARTERS' SCORES FOR ANXIETY TESTS AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test II Test Item #7	.0253 N= (25) p= .452	.1736 (25) p= .203	-.0816 (25) p= .349	-.0350 (25) p= .434
Anxiety Test II Test Item #8	-.0227 (25) p= .457	.1228 (25) p= .279	-.1562 (25) p= .228	.1752 (25) p= .201
Anxiety Test II Test Item #9	-.0677 (25) p= .374	.1516 (25) p= .235	-.1322 (25) p= .264	-.0061 (25) p= .488
Anxiety Test II Test Item #10	-.2142 (25) p= .152	-.1094 (25) p= .301	-.0561 (25) p= .395	.2684 (25) p= .087

Anxiety Test I related to significant number of turnovers per minute played for starting players. Anxiety Test II, Test Item #4, which stated: "I am tense" was significantly related to field goal percentage at p = .046. The results indicated that Anxiety Test II, Test Item #4, increased in a significant manner relative to the starter's ability to shoot field goals accurately. Test Item #6 of Anxiety Test 11 which stated: "I feel worried" was significant at p = .002 relative to personal fouls per minute. This indicated that Test Item #6 increased in a significant relationship to the starters' attainment of personal fouls per minute. Hypotheses 11 which indicated that no relationship occurred between the anxiety level, as represented by both inventories and each test item of the inventories of starting players of the NAIA intercollegiate basketball games, to basketball performance was rejected on 10 A, C. and D. Hypotheses 10B, however, was accepted.

The twenty-eight anxious and non-anxious players who did not start were compared on the relationships between each of the two inventories to the basketball performance indicators, using Pearson product moment correlations (see Table 25). The relationship of Anxiety Test II to turnovers per minute played computed at p - .030. This indicated that non-starters had a significantly lower rate of turnovers per minute in comparsion to higher scores on Anxiety Test II. The anxiety tests for these non-starters were also analyzed item by item. There were twelve separate test items that showed significant relationships. Seven of these items were related to turnovers per minute, three were related to free throw percentage, and one each to field goal percentage and personal fouls per minute.

TABLE 25

RELATIONSHIPS OF GAME NON-STARTERS' SCORES
FOR THE ANXIETY TESTS
AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS
TO BASKETBALL PERFORMANCE,
USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I	.0747	-.1100	-.1024	.0551
	N= (27)	(28)	(28)	(28)
	p= .356	p= .289	p= .302	p= .390
Anxiety Test II	-.2719	.0076	-.3395*	-.0094
	N= (27)	(28)	(28)	(28)
	p= .085	p= .485	p= .039	p= .481
Anxiety Test I Test Item #2	-.1400	-.0461	-.1177	-.1062
	(27)	(28)	(28)	(28)
	p= .243	p= .408	p= .275	p= .295
Anxiety Test I Test Item #3	.1080	-.1083	.4025*	.0028
	(27)	(28)	(28)	(28)
	p= .296	p= .292	p= .017	p= .494
Anxiety Test I Test Item #5	-.0104	.0629	-.4375*	.0917
	(27)	(28)	(28)	(28)
	p= .480	p= .083	p= .027	p= .321
Anxiety Test I Test Item #6	-.0416	.0629	-.4375*	-.2520
	(27)	(28)	(28)	(28)
	p= .418	p- .375	p= .010	p= .098
Anxiety Test I Test Item #8	.3023	.2284	-.2087	.1588
	(27)	(28)	(28)	(28)
	p= .063	p= .121	p= .143	p= .210
Anxiety Test I Test Item #9	.1619	-.3529*	-.3730*	-.1035
	(27)	(28)	(28)	(28)
	p= .210	p= .033	p= .025	p= .300
Anxiety Test I Test Item #11	-.4298*	.1680	.0211	-.2793
	(27)	(28)	(28)	(28)
	p= .013	p= .196	p= .457	p= .075

*indicates significance reached.

TABLE 25
(continued)

RELATIONSHIPS OF GAME NON-STARTERS' SCORES
FOR THE ANXIETY TESTS
AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS
TO BASKETBALL PERFORMANCE,
USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I Test Item #12	.1204 N= (27) p= .274	.0134 (28) p= .473	-.2058 (28) p= .147	.3330* (28) p= .042
Anxiety Test I Test Item #14	.1915 (27) p= .169	-.4074* (28) p= .016	.1402 (28) p= .238	.2025 (28) p= .059
Anxiety Test I Test item #15	.0331 (27) p= .435	.1250 (28) p= .262	-.1087 (28) p= .291	.0810 (28) p= .341
Anxiety Test II Test Item #1	-.2160 (27) p= .140	.1542 (28) p= .217	-2398 (28) p= .110	-.1617 (28) p= .198
Anxiety Test II Test Item #2	1.2314 (27) p= .123	.0753 (28) p= .352	-.3177* (28) p= .050	.1996 (28) p= .154
Anxiety Test II Test Item #3	-.3111 (27) p= .057	-.3619* (28) p= .029	-.0786 (28) p= .346	-.0262 (28) p= .447
Anxiety Test II Test Item #4	-.0336 (27) p= .434	-.0223 (28) p= .455	-.4446* (28) p= .009	-.0183 (28) p= .463
Anxiety Test II Test Item #5	.0223 (27) p= .456	.2985 (28) p= .061	-.2159 (28) p= .135	-.2265 (28) p= .123
Anxiety Test II Test Item #6	-.2591 (27) p= .096	-.0881 (28) p= .328	.0239 (28) p= .452	-.0057 (28) p= .489

*indicates significance reached

TABLE 25
(continued)

RELATIONSHIPS OF GAME NON-STARTERS' SCORES
FOR THE ANXIETY TESTS
AND EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS
TO BASKETBALL PERFORMANCE,
USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test II Test Item #7	-.3120 N= (27) p= .057	-.0855 (28) p= .333	-.0666 (28) p= .368	.0739 (28) p= .354
Anxiety Test II Test Item #8	-.0277 (27) p= .446	-.0361 (28) p= .428	-.1374 (28) p= .243	.2736 (28) p= .079
Anxiety Test II Test Item #9	-.2282 (27) p= .126	.2824 (28) p= .338	-.3400* (28) p= .038	-.1517 (28) p= .220
Anxiety Test II Test Item #10	-.0205 (27) p= .460	-.0396 (28) p= .421	-.3069 (28) p= .056	.0237 (28) p= .452

*indicates significance reached

As indicated, turnovers per minute played revealed the most significant relationships to the anxiety inventory test items of non-starters. It is interesting to note that five of the seven significant relationships had negative coefficients. The results, therefore, have indicated a mixed impact. Five test items resulted in higher anxiety scores to lower turnovers per minute, while two test items resulted in significant relationships of high anxiety scores to higher production of turnovers per minute. The two positive coefficients were Anxiety Test I, Questions #3 and #5. Question #3 was: "Before I compete I worry about not performing well," and this question indicated a $p = .017$. Questions #5 was: "When I compete I worry about making mistakes." This question reached a p value of .027. Both of these anxiety test items results indicated that non-starters may be more apprehensive about their own ability, which could have created a higher anxiety level.

The five anxiety test items which related significantly to turnovers per minute with negative coefficients indicated a relationship of high anxiety to low turnovers per minute played. Question #6 was: "Before I compete I am calm" indicated a p value of .010. Question #9 was: "Just before competing I notice my heart beats faster than usual" resulted in a p value of .025. Anxiety Test II, Item #2, stated: "I feel nervous" indicated a p value of .050. Question #4 which stated: "I am tense" resulted in a p value of .009. Anxiety Test II, Test Item #9, was: "I feel calm" resulted in a significant level of $p = .038$. The five significant test items resulted in the

fact that as their anxiety level increased, turnovers per minute played decreased. These results could be related to the role a non-starter possesses. Perhaps they do not sense the pressure and tension of starting a game and the more arousal that is indicated leads to less turnovers per minute.

Anxiety Test I had four other significant test items to variables other than turnovers per minute played. Test Item #9 reached significant relationship with free throw percentage. The p value of .033 indicated that as anxiety level decreased, free throw percentage increased. Question #11 reached a p value of .013 on field goal percentage. This revealed similar results of higher field goal shooting in relationship to lower anxiety level. Question #12 attained a positive coefficient and significant relationship with personal fouls per minute. The questions stated: "Before I compete I am nervous," and the results indicated that as anxiety increased, personal fouls increased significantly. Test Item #14 which stated: "I get nervous wanting to start the game," negatively indicated a p value of .016 with free throw percentage. Anxiety Test II, Item #3, which stated: "I feel comfortable," attained a p value of .029 on free throw percentage. The results indicated that as the anxiety level decreased, free throw percentage increased.

Hypotheses 11, which indicated that no relationship occurred between the anxiety level, as represented by both inventories and each test item of the inventories of non-starting players was

rejected on 10A, B, C, and D. There was significance shown on one test item for field goal percentage, three items for free throw percentage, seven items for turnovers per minute played, and one item for personal fouls per minute played.

Analysis of Variance served as the statistical tool that compared the anxiety level of starters and non-starters on each test item of both anxiety inventories. Thus, significance of difference between the two groups' response to each test item was analyzed. Two of the twenty test items showed significance. Anxiety Test I, Item #14, which stated: "I get nervous wanting to start the game" resulted in a F value of 4.2638 and a significant .0440 (see Table 26). This result indicated that starters attained a higher anxiety level than non-starters as represented by Anxiety Test I, Item #14. Anxiety Test II, Item #1, which stated: "I feel at ease" resulted in an F value of 4.2733 and a significance value of .0438 (see Table 27). Again, starters attained a higher anxiety level than non-starters as represented by Anxiety Test II, Item #1. The anxious level of this positive test item was determined by the reverse scoring.

One analysis of variance relationship was found significant for each of the basketball performance statistics in the comparison of starters to non-starters. Field goal percentage computed at a F value of 3.4074, which was significant at .0708 (see Table 28). This comparison approached the significant level. These values reflected the fact that the starters shot at a .4680 percentage

TABLE 26

GAME STARTERS VS NON-STARTERS
IN ANXIETY LEVEL AS REPRESENTED BY ANXIETY TEST I,
TEST ITEM #14, USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Deviation	Squares	N
Starters	60.0000	2.4000	.6455	10.0000	25
Non-Starters	57.0000	2.0357	.6372	10.9643	28
	117.0000	2.2075	.6610	22.7170	53

* * * * * * * * * ANOVA TABLE * * * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	1.7527	1	1.7527
WITHIN GROUPS	20.9643	51	.4111
TOTALS	22.7170	52	

* *

F = 4.2638, significant at .0440

* *

TABLE 27

GAME STARTERS VS NON-STARTERS
IN ANXIETY LEVEL AS REPRESENTED BY ANXIETY TEST II,
TEST ITEM #1, USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Deviation	Squares	N
Starters	57.0000	2.2800	.8907	19.0400	25
Non-Starters	51.0000	1.8214	.7228	14.1071	28
Total	108.0000	2.0377	.8312	35.9245	53

* * * * * * * * * ANOVA TABLE * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	2.7774	1	2.7774
WITHIN GROUPS	33.1471	52	.6499
TOTAL	35.9245	53	

* *

F = 4.2733, significant at .0438

* *

TABLE 28

GAME STARTERS VS NON-STARTERS
IN FIELD GOAL PERCENTAGE,
USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Standard Deviation	Sum of Squares	N
Starters	11.7006	.4680	.1657	.6589	25
Non-starters	9.3690	.3470	.2863	2.1310	27
Total	21.0697	.4052	.2417	2.9800	52

* * * * * * * * * * ANOVA TABLE * * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	.1901	1	.1901
WITHIN GROUPS	2.7898	50	.0558
TOTAL	2.9800	51	

* *

F = 3.4074, significant at .0708

* *

compared to non-starters at .3470 for field goal attempts. Free throw percentage indicated a highly significant difference for starters over non-starters. Starters attained a percentage of .7990 while non-starters were at .5944. This value approached the F value computed at 8.7411 and the p value was .0047 (see Table 29). There was little relationship found between starters and non-starters in turnovers or personal fouls per minute played.

Hypothesis 9 , which indicated that no difference in the anxiety level as represented by each test item of both inventories between starters and non-starters was rejected. Test Item #14 of Anxiety Test #1 indicated that the starters had significantly higher levels of anxiety when compared to non-starters. Anxiety Test II, Item #1 revealed the same significant level by using Analysis of Variance.

Pearson product moment correlations were utilized to analyze the relationship of each of the twenty test items to basketball performance for all the players involved in the study (see Table 30). The analysis of 53 players indicated that several test items related significantly to the basketball performance indicators. Anxiety Test I, Item #6, which stated: "Before I compete I am calm" attained a p value of .001 for turnovers per minute. The results indicated that as scores on Anxiety Test I, Item #6, decreased there was a significant increase in turnovers per minute played. Similar results occurred on test item #9 of Anxiety Test I and its relationship to turnovers per minute. The p value of .018 on the question: "Just before competing I notice my

TABLE 29

GAME STARTERS VS NON-STARTERS
IN FREE THROW PERCENTAGE,
USING ANALYSIS OF VARIANCE

Variable	Summation	Mean	Deviation	Squares	N
Starters	19.9761	.7990	.1752	.7371	25
Non-Starters	16.6440	.5944	.3036	2.4893	28
Total	36.6201	.6909	.2696	3.7793	53

* * * * * * * * * ANOVA TABLE * * * * * * * * * * * * * *

	Sum of Squares	Degrees of Freedom	Mean Square
BETWEEN GROUPS	.5530	1	.5530
WITHIN GROUPS	3.2264	51	.0633
TOTAL	3.7794	52	

* *

F = 8.8411, significant at .0047

* *

TABLE 30

RELATIONSHIP OF ALL TESTED PLAYERS' RESPONSES TO EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS TO BASKETBALL PERFORMANCE, USING PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I Test Item #2	-.0440 N= (52) p= .378	.1503 (53) p= .141	-.1028 (53) p= .232	-.0555 (53) p= .346
Anxiety Test I Test Item #3	.0472 (52) p= .370	-.0808 (53) p= .283	.1784 (53) p= .101	.1670 (53) p= .116
Anxiety Test I Test Item #5	-.0998 (52) p= .241	-.2354* (53) p= .045	.1350 (53) p- .168	.1497 (53) p= .142
Anxiety Test I Test Item #6	-.0167 (52) p= .453	-.0371 (53) p= .396	-.4164* (53) p= .001	-.1683 (53) p= .114
Anxiety Test I Test Item #8	.1681 (52) p= .117	.2075 (53) p= .068	-.2037 (53) p=. .072	.1707 (53) p= .111
Anxiety Test I Test Item #9	.1690 (52) p= .115	-.1035 (53) p= .230	-.2882* (53) p= .018	-.1281 (53) p= .180
Anxiety Test I Test Item #11	-.1639 (52) p= .123	.1988 (53) p= .077	-.0316 (53) p= .411	-.1212 (53) p= .194
Anxiety Test I Test Item #12	.1372 (52) p= .166	-.0004 (53) p= .499	-.1855 (53) p= .092	.2015 (53) p= .074
Anxiety Test I Test Item #14	.2424* (52) p= .042	-.1680 (53) p= .115	.1734 (53) p= .107	.1370 (53) p= .164

*indicates significance reached

TABLE 30
(continued)

RELATIONSHIP OF ALL TESTED PLAYERS' RESPONSES
TO EACH OF THE TWENTY ANXIETY INVENTORY TEST ITEMS
TO BASKETBALL PERFORMANCE,
WITH PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test I Test Item #15	.0457 N= (52) p= .374	.0629 (53) p= .327	-.0375 (53) p= .395	.0783 (53) p= .289
Anxiety Test II Test item #1	-.0458 (52) p= .374	.2753* (53) p= .023	-.0498 (53) p= .362	-.1473 (53) p= .146
Anxiety Test II Test Item #2	-.1328 (52) p= .174	.1297 (53) p= .177	-.2482* (53) p= .037	.1151 (53) p= .206
Anxiety Test II Test Item #3	-.1460 (52) p= .151	-.0772 (53) p= .291	-.0591 (53) p= .337	-.0033 (53) p= .491
Anxiety Test II Test Item #4	.1305 (52) p= .178	.0544 (53) p= .349	.2384* (53) p= .043	-.0889 (53) p= .263
Anxiety Test II Test Item #5	.0011 (52) p= .497	.0913 (53) p= .258	-.1881 (53) p= .089	-.1422 (53) p= .155
Anxiety Test II Test Item #6	-.0855 (52) p= .273	.0078 (53) p= .478	.0280 (53) p= .421	.1055 (53) p= .226
Anxiety Test II Test Item #7	-.1450 (52) p= .153	.0615 (53) p= .331	-0508 (53) p= .359	.0222 (53) p= .437
Anxiety Test II Test Item #8	.0123 (52) p= .465	.0615 (53) p= .350	-.1276 (53) p= .181	.2100 (53) p= .066
Anxiety Test II Test Item #9	-.1317 (52) p= .176	.1216 (53) p= .193	-.2280* (53) p= .050	-.1009 (53) p= .236

TABLE 30
(continued)

RELATIONSHIP OF ALL TESTED PLAYERS' RESPONSES
TO EACH OF THE TWENTYANXIETY INVENTORY TEST ITEMS
TO BASKETBALL PERFORMANCE,
WITH PEARSON PRODUCT MOMENT CORRELATION

Variable	Field Goal Percentage	Free Throw Percentage	Turnovers per Minute Played	Personal Fouls per Minute Played
Anxiety Test II Test Item #10	-.0655 N= (52) p= .322	-.0595 (53) p= .336	-.2107 (53) p= .065	.0796 (53) p= .285

* indicates significance reached

heart beats faster than usual," showed that the lower the anxiety response, the higher the number of turnovers. Field goal percentage relationship to Anxiety Test I, Item #14, computed at the significant level of .042. Test Item #14 stated: "I get nervous wanting to start the game." Results showed that the higher the score on this question, the better the field goal percentage.

Four test items on Anxiety Test II revealed significant results. Test Item #1 on Anxiety Test II stated: "I feel at ease" computed a p value of .023 when related to free throw percentage. The results indicated that there was a significant relationship between higher scores on Test Item #1 and higher percentage of shooting free throws. Anxiety Test II, Item #2, stated: "I feel nervous," revealed a negatively significant relationship of a p value of .037 to turnovers per minute. Test Item #4 which stated: "I am tense," indicated a negative relationship and a p value of .043 relative to turnovers per minute. This result was derived from test Item #9 from Anxiety Test II which stated: "I feel calm." The result indicated that high scores on test Item #9 significantly related to decreases in the number of turnovers per minute played.

Hypothesis 12 stated that the relationship of anxiety level as measured by each test item of both inventories to the basketball performance of all 53 subjects would show no difference was accepted on 12D. It was refuted on 12A, B and C because of significant relationships of test items to field goal percentage, free throw percentage and turnovers per minute played.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The research which investigated the relationship between anxiety and performance in NAIA men's basketball games provided information relevant to basketball coaches. It also has implications for various other settings, especially in physical education, psychology, sociology and other behavioral sciences.

Hypothesis 1 which stated that there was no relationship between the anxiety level of NAIA men's basketball players and their game performance was verified by the Pearson product moment correlation. No significant level was reached by either Anxiety Test I or Anxiety Test II to the four basketball game performance indicators of field goal percentage, free throw percentage, turnovers per minute played and personal fouls per minute played.

Hypothesis 2 indicating that no difference occurred between anxious and non-anxious players in intercollegiate games with the basketball performance indicators was substantiated. t-test were computed to determine if a significant relationship existed between these two groups of players and none were found. It was also found that there was no relationship between the more anxious and the less anxious players and their basketball performance. Eliminating the middle scores of the 53 players studied, there were still no significant relationships found in the study between high and low anxiety player and their performance.

Hypothesis 3 stated that no significant relationship existed between anxiety of players who competed twenty or more minutes in the intercollegiate games and their basketball performance. Turnovers per minute played reached significant levels in relationship to both anxiety inventories. These results showed a negative relationship which indicated a signficant increase of anxiety related to decreased number of turnovers per minute played.

A comparison of players who competed twenty or more minutes vs the players who participated one to nineteen minutes in intercollegiate games for basketball performance and anxiety level served as Hypothesis 4. It was found that no significant differences occurred with either group on either anxiety inventory or on personal fouls per minute played. There was, however, significance attained in field goal percentage, free throw percentage and turnovers per minute played. Players who accumulated the most playing time showed higher significant field goal shooting, free throw shooting and turnovers per minute played.

Hypothesis 5 stated that the anxiety level of players who competed one to nineteen minutes in intercollegiate games was not significantly related to basketball performance. The results indicated the acceptance of this hypothesis since none of the variables reached significant levels.

Hypothesis 6 indicated that there was no relationship between players who committed zero or one turnover and players who committed

two or more turnovers in intercollegiate basketball games in anxiety level and basketball performance. This hypothesis was accepted for Anxiety Test II, free throw percentage and personal fouls per minute played. It was refuted, however, on Anxiety Test I and turnovers per minute played which both exceeded significant levels.

The comparison of players who either committed zero, one or two personal fouls to the players that committed three, four or five personal fouls served as Hypothesis 7 in their relationship to anxiety level and basketball performance. The results indicated that the anxiety level, field goal percentage and free throw percentage did not reach significant levels. However, both turnovers and personal fouls per minute played reached significant levels.

Hypothesis 8 stated that the anxiety level and basketball performance of game starters did not exceed the non-starters in intercollegiate games. Starters shot better field goal and free throw percentages than non-starters at significant plateaus but the results revealed non-significant findings for anxiety levels, turnovers per minute played and personal fouls per minute played.

Hypothesis 9 stated that the anxiety level of game starters would be no different than non-starters in the NAIA intercollegiate basketball games. The anxiety level was represented by each of the ten test items of both anxiety inventories. There was one test item of each inventory that resulted in a rejection of this hypothesis. In each case, nine of the ten questions did not reach significant levels but one of the questions did attain the significant height which caused the rejection.

Hypothesis 10 indicated that the anxiety level of game starters would not be related to their ability to perform in intercollegiate basketball games. In this case, the anxiety level involved both inventories and each test item of these inventories. Two test items of each inventory concerning worry and tenseness or calmness reached significant levels and this created a rejection of Hypothesis 10. Only the relationship of free throw percentage to anxiety level did not reach significant levels.

The relationship of anxiety levels to game non-starters served as Hypothesis 11. Again, anxiety was represented by both inventories and each test item of these inventories in the analysis of intercollegiate games. There were twelve separate test items and Anxiety Test II that reached significant levels. Seven of these items related to turnovers per minute played, three were related to free throw percentage and one each to field goal percentage and personal fouls per minute. Hypothesis 11, therefore, was rejected.

Hypothesis 12 stated that the relationship of anxiety level as measured by each test item of both inventories to the basketball performance of all 53 subjects would show no difference. This hypothesis was accepted only in relationship to personal fouls per minute and rejected on the other three basketball performance variables, with turnovers per minute played again relating to the most items.

Conclusions

The similarities of test score results of Anxiety Test I and Anxiety Test II indicated the close relationship of both inventories. Anxiety Test I was the Sport Competition Anxiety Test and was an A-Trait scale designed for measuring a predisposition to respond with varying levels of A-State in competitive sport situations. Thus, it evaluated how athletes usually feel when competing in basketball games. It is their latent disposition for a reaction to occur if triggered by appropriate stimuli. Anxiety Test II is the competitive short form of the State Anxiety Inventory. This evaluative tool measures the actual level of a player's arousal at a particular specific time. It measures how the athlete feels at the moment of marking the inventory items prior to the athletic competition. It thus became an indicator of changes in A-State as a function of competing in intercollegiate basketball. The closeness of these two inventories verified Anxiety Test I's ability to predict accurately the predisposition of A-State, since Anxiety Test II measures the player's current arousal or A-State.

The basketball performance statistical averages revealed considerably lower field goal percentage than the national average. This could be related to the wide spread of scores in each of the games. Usually a wide discrepancy of scores in an intercollegiate game promotes more substituting and a freer game which could lead to more uninhibited shooting. The averages of turnovers per minute played and personal fouls per minute played support this aggressive

and free lance style of play that usually occurs as the result of games that are one-sided.

The relationship of anxiety to each player's ability to perform in intercollegiate basketball games did not result in any significant correlations. Apparently, those players who possessed high levels of pre-game anxiety were able to dissipate it once they began to play the game. Perhaps it was defensive assignments or offensive plays that required concentration so that their own individual tension and apprehension were temporarily forgotten. It also could be attributed to actions within the program such as excellent preparation for the specific game, good conditioning level or confidence expressed from the coaching staff.

The Pearson product moment correlation which combined anxious and non-anxious players to see relationship of Anxiety Test I to basketball performance indicated non-significant findings. Turnovers per minute played attained the closest scores to reaching the significant plateau which apparently indicated that anxiety was reflected more in player's ability to control the basketball.

The correlation that combined both anxious and non-anxious players for Anxiety test II revealed two signficant figures. Free throw percentage significantly increased as field goal percentage improved, reflecting that the better shooters are proportionately completing both field goal and free throw attempts. The significant increase in turnovers per minute played to free throw percentage indicated that players responsible for handling the basketball and leading offensive plays had a higher turnover per minute rate as well as a higher free

throw percentage. This would indicate that the best free throw shooters were apparently those players who were point guard players. t-tests for significance of the difference between these two anxiety level groups, however, supported the null hypothesis.

Specific relationships between anxious and non-anxious players revealed non-significant results on both anxiety inventories combined, when compared to basketball performance indicators. These results revealed that high or low levels of anxiety did not influence the players' ability to perform basketball fundamentals. Apparently, players must concentrate so intensely upon their own individual responsibilities of such areas as running offensive plays, defensing offensive players, rebounding or playmaking that anxiety levels dissipate once the game begins.

Players who participated twenty or more minutes were analyzed to determine if players who had the most playing time were affected by anxiety levels. Turnovers per minute played reach significant levels on both anxiety inventories. Players who accumulated the most playing time lost possession of the basketball the most times per minute. Perhaps the players who are playing the most time are competing against the most talented opponents which could lead to more errors in the basketball games. When the basketball game is led by one team by substantial margins and substitutes are involved, the game atmosphere tends to be freer and more loosely structured. This fact could conceivably lower the amount of anxiety by the participants. Higher mean anxiety scores of 19.304 compared to 17.3 for Anxiety Test I and

19.652 compared to 17.933 on Anxiety Test II for players who participated twenty or more minutes versus players who participated one to nineteen minutes led to the significant levels. Those participants who accumulated more playing time also obtained higher field goal percentage and free throw percentage. Evidently coaches were playing the better shooters more time per individual contest. Significant differences were attained on t-tests for these three basketball performance indicators.

In the study of players who competed one to nineteen minutes in the intercollegiate basketball games, the results indicated no significant findings between the four basketball variables and anxiety. Apparently, the players who participated in basketball games in less amounts or basically as a substitute were less affected by anxiety in their performance. Perhaps the role of a substitute in basketball games which were one-sided made participation a more loosely structured game than would face those players who received more playing time. Once a team is ahead by substantial margins, the pressure for players on either side had possibly been reduced with a consequential loss of individual tension.

The relationship which directly compared players who competed twenty or more minutes to players who competed one to nineteen minutes with anxiety and basketball performance indicated some significant results. The players who participated the most shot better field goal and free throw percentages even though they attained more turnovers

per minute played. This would substantiate the coaches' decisions on who should play the most time in intercollegiate basketball games.

When specifically investigating all players who committed two or more turnovers relating anxiety level to the four basketball performance indicators, there were no significant relationships revealed. Apparently, the players who committed the most turnovers per minute played did not attain significantly higher anxiety scores. In the direct comparisons of players who committed two or more turnovers to those that committed zero or one turnover, results indicated that the lower turnover players had significantly higher anxiety scores. These players also had less turnovers per minute played. Thus, players who handled the ball the most time possessed the highest level of anxiety.

Players who committed three, four or five personal fouls were pooled to determine if they possessed higher anxiety scores in relationship to basketball performance. Turnovers per minute played reached significant levels on Anxiety Test I which indicated that aggressiveness in personal fouling carried over into errors in handling the basketball. Players who committed zero, one or two personal fouls did not reach any significant levels, but this group shot higher field goal and free throw percentages while committing lower turnovers and personal fouls per minute played than those players who committed three, four or five personal fouls.

The direct comparison of players who committed three, four or five personal fouls to those players who committed zero, one or two personal fouls indicated that performers attaining higher personal fouls

had significantly more turnovers per minute played. This verified the fact that aggressive behavior as reflected in accumulating more personal fouls had similar effects upon the players' ability to handle the basketball.

Comparison of game starters to non-starters revealed that the starting player did have higher mean anxiety scores. Perhaps the reasons the difference in mean anxiety levels did not reach a significant level was because of the wide spread of scores from the mean, the standard deviation being almost twice as great for the starting players. A larger number of subjects might yield significance.

The starters' relationship to basketball performance was analyzed with each anxiety inventory and each test item of both inventories. There was no significance established by the starters in relationship to each of the two inventories. However, there were test items that reached significant plateaus. Two test items related to personal fouls per minute played and one each to turnovers per minute played and field goal percentage. It appeared that aggressive behavior which usually leads to turnovers and personal fouls per minute played were directly related to the four test items of the two anxiety inventories, all specifying worry, tension or calmness.

Starters were directly compared to non-starters in each of the four basketball performance indicators. As would be expected, starters attained higher field goal and free throw percentages than

non-starters. Both exceeded significant levels and would verify the coaches' decisions in selecting the best shooters to start in the intercollegiate games.

The non-starters' relationship to basketball performance with each anxiety inventory and each test item of the two anxiety inventories revealed more significant data. The scores from Anxiety Test II indicated a significant negative relationship to turnovers per minute played. Perhaps non-starters who had high anxiety scores sensed the tension and apprehension in intercollegiate games that led to carelessness in handling the basketball and were more conscientious in taking care of the ball when playing.

There were twelve separate test items that attained significant levels relating to anxiety to the basketball performance of non-starters. Each of the four basketball performance indicators were related significantly to at least one item, turnovers per minute played being found in seven of these relationships. It appears that performance in basketball in relationship to anxiety levels are found the most in turnovers. A player must maneuver with the basketball with correct footwork, must catch the ball with opponents close and be constantly aware of violation standards. These precise maneuvers lend themselves to errors by over-aggressive or apprehensive players.

Much of the high anxiety levels attained prior to intercollegiate basketball games seemed to dissipate quickly for the players as the game developed. Apparently, each player's concentration on

his own responsibility deterred the anxiety-causing problems.

Turnovers per minute played was the most consistent basketball performance indicator that was significantly or almost significantly related to anxiety level.

Suggestions for Further Study

One of the primary problems with any research study is that the design can only examine a limited number of factors. There is a need to expand the study of anxiety and the influences it can have on various other phases of athletics. Attaining research data on the influence of anxiety to live-game situations will improve the coaching profession. The following are suggestions for future studies:

1. Compare the relationship of anxiety levels to performance in NCAA intercollegiate basketball games.
2. Compare the relationship of anxiety levels to performance in national tournaments for either NAIA or NCAA caliber basketball teams.
3. Compare the relationship of anxiety levels to individual analysis of personality type, race, sex, family income, playing experience, career aspirations, player position, physical size, grade point average or IQ.
4. Compare the anxiety levels to playing arena size, number of spectators and closeness of spectators to playing surface in intercollegiate games.

5. Compare the anxiety level of each coach and the impact this has on the anxiety levels of team members. Relate these factors to performance in intercollegiate basketball games.
6. Compare what levels of anxiety relate to successful performance in intercollegiate games for larger numbers of players.
7. Study the effects of anxiety level on performance in other athletic events for both individual and team sports.
8. Study all of the above for women as well as for men.

Recommendations

Recommendations based upon this study primarily deal with those directed toward coaches. Dealing with anxiety situations in coaching intercollegiate basketball is a problem that all coaches must face. It is their responsibility to motivate when necessary and to ease the tension when appppropriate. There are several methods that coaches can utilize to help the confidence level of his players. Such items as total team preparation, conditioning of the team to a high level and being positive in player-coach relationships can help improve the level of confidence of players. If a player's confidence is improved then it appears that the level of anxiety is appropriate for the task.

It is imperative that basketball coaches expose their players to a variety of potential anxiety-causing situations. These situations should simulate a game-like environment so that the situations are

treated like any other game fundamental. For example, a coach might involve the game clock and simulate a tied score with only brief seconds to play. He could apply a variety of offenses, defenses and certain specific players who become involved. By rotating the players' responsibilities, all team members could become involved. Practicing anxiety-provoking situations enable players to better understand themselves and prepare them for similar conditions that occur in games. Therefore, when the real situations develop there should be less anxiety because players will understand their role and responsibilities. They have practiced specifically what is involved.

Another recommendation which can help to improve the anxiety level of players deals with coaches' conduct and attitude. Each coach should continually strive to lower anxiety levels by emphasizing team play, not individual talent, to promote success. He should be thoroughly prepared with scouting reports and solid preparations to train the team in the very best condition to play each opponent. Projecting this team play attitude and being thoroughly prepared should reduce fear, apprehension and anxiety. Each coaches' conduct on the practice floor and during games should reflect a high level of intensity without projecting his own anxiety and fears. He should exude confidence, poise and determination while projecting a controlled and calm attitude. Players can sense their feelings and it should help each player and team play up to their maximum potential.

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APPENDIX A

CONFIRMATION LETTER TO COLLEGES INVOLVED IN STUDY

Mr. Gary Bays
Basketball Coach
Warner Pacific College
2219 S. E. 68th
Portland, Oregon 97215

Dear Gary,

This letter serves as a confirmation of our recent phone conversation on your consent to utilize your basketball team in a study we are completing for Oregon State University.

Each player will complete two short inventories approximately one half hour prior to our game on February 6, 1981, in Portland. These inventories should take approximately 5 - 8 minutes to complete and none of your players' names will ever be associated with the results. Each player will use a number instead of his name on their respective answer sheet.

Thank you for your cooperation and best of luck during the rest of the season.

Sincerely,

Jim Boutin
Basketball Coach
Western Oregon State College

APPENDIX B

ANXIETY TEST I

(ILLINOIS COMPETITION QUESTIONNAIRE)

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 square labeled A; if your choice is SOMETIME, blacken the square labeled B, and if your choice is OFTEN, blacken the square 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.

		Hardly-ever	Some-times	Often	
1.	Competing against others is social enjoyable	A ___	B ___	C ___	(not scored)
2.	Before I compete I feel uneasy.	A ___	B ___	C ___	
3.	Before I compete I worry about not performing well.	A ___	B ___	C ___	
4.	I am a good sportsman when I compete.	A ___	B ___	C ___	(not scored)
5.	When I compete I worry about making mistakes.	A ___	B ___	C ___	
6.	Before I compete I am calm.	A ___	B ___	C ___	(reverse scoring)
7.	Setting a goal is important when competing.	A ___	B ___	C ___	(not scored)
8.	Before I compete I get a queasy feeling in my stomach.	A ___	B ___	C ___	
9.	Just before competing I notice my heart beats faster than usual.	A ___	B ___	C ___	
10.	I like to compete in games that demand considerable physical energy.	A ___	B ___	C ___	(not scored)

APPENDIX B
(continued)

		Hardly-ever	Some-times	Often	
11	Before I compete I feel relaxed.	A ____	B ____	C ____	(reverse scoring)
12.	Before I compete I am nervous.	A ____	B ____	C ____	
13.	Team sports are more exciting than individual sports.	A ____	B ____	C ____	(not scored)
14.	I get nervous wanting to start the game.	A ____	B ____	C ____	
15.	Before I compete I usually get up tight.	A ____	B ____	C ____	

APPENDIX C

ANXIETY TEST II

(Self-Evaluation Questionnaire)

Name _____ Date _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but the the answer which seems to describe your present feelings best.

1. I feel at ease	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	(reverse scoring)
2. I feel nervous	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	
3. I feel comfortable	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	(reverse scoring)
4. I am tense	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	
5. I feel secure	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	(reverse scoring)
6. I feel worried	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	
7. I am relaxed	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	(reverse scoring)
8. I am jittery	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	
9. I feel calm	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	(reverse scoring)
10. I feel over-excited and rattled	1 Not at all	2 Somewhat	3 Moderately so	4 Very much so	

APPENDIX D

BASKETBALL CONTESTS, DATES AND RESULTS

January 30, 1981	Western Oregon (16-3) 96 vs Southern Oregon (6-17) 69
February 6, 1981	Western Oregon (17-3) 98 vs Warner Pacific (6-16) 66
February 7, 1981	Western Oregon (18-3) 76 vs Eastern Oregon (10-16) 66
February 9, 1981	Western Oregon (19-3) 86 vs Western Baptist (13-12) 77

FINAL SEASON RECORDS AND DISTRICT STANDINGS

Western Oregon State College	26- 4	1st
Western Baptist College	14-14	8th
Eastern Oregon State College	11-21	14th
Warner Pacific College	8-21	16th
Southern Oregon State College	6-20	20th