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Prediction of basketball field goal shooting success

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PREDICTION OF BASKETBALL FIELD
GOAL SHOOTING SUCCESS

by

Barbara Hebel

An Abstract

of a thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in the Division
of Health, Physical Education,
and Recreation at
Ithaca College

May 1989

Thesis Advisor: Dr. A. Craig Fisher

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ABSTRACT

Seventy-eight female basketball players from NCAA Division I to Division III, junior college, and high school varsity teams in the Northeast served as subjects. Subjects were administered the Test of Basketball Shooting Attentional Style (BBAS) and the Personal Assessment Questionnaire (PAQ) in an attempt to predict basketball field goal shooting success. Internal consistency of the BBAS was calculated using Cronbach's (1951) coefficient alpha analysis. Corrected alpha reliabilities for the seven attentional scales ranged from .52 (NET) to .75 (OIT). Pearson product-moment correlation was utilized to assess the degree of discreteness of the predictor variables. Pearson r values were in the direction expected, although some were slightly higher than expected. Field goal shooting percentage, hence shooting success, was predicted from stepwise multiple regression analysis. The analysis revealed that the predictor variables accounted for 24% of the variance in field goal shooting success, a significant amount. Perceived ability alone explained 20% of field goal shooting variance. This supports the idea that athletes' perceptions of ability often mediate many achievement behaviors. Inspection of the data revealed that effective performance during the course of a basketball game is predicted on remaining external (both broad and narrow) to select and act upon proper environmental cues.

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GOAL SHOOTING SUCCESS

A Thesis Presented to the Faculty of
the Division of Health, Physical
Education, and Recreation
Ithaca College

In Partial Fulfillment of the
Requirements for the Degree
Master of Science

by
Barbara Hebel

May 1989

Ithaca College
Division of Health, Physical Education, and Recreation
Ithaca, New York

CERTIFICATE OF APPROVAL

MASTER OF SCIENCE THESIS

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Barbara Hebel

Submitted in partial fulfillment of the requirements
for the degree of Master of Science in the Division of
Health, Physical Education, and Recreation at Ithaca
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Chapter 1

INTRODUCTION

Late in 1890, a young instructor at the Young Men's Christian Association School in Springfield, Massachusetts was given an assignment by his dean. James Naismith was to devise an indoor activity to sustain athletic interest at the school during the long New England months between the football and baseball seasons and to restore order in an unruly gym class of hyperactive, competitive types who were bored with gymnastics (Isaacs, 1975). His solution to this twofold problem was basketball.

The game of basketball has changed tremendously since Naismith hung two peach baskets from opposite walls of the gym in Springfield. Today it is a fast moving game wherein all of the players have an opportunity to score and are expected to do so. The very nature of the game indicates that accurate shooting is essential to the final outcome (Dahl, 1972). But, accurate shooting is a difficult task. Add to that the need for consistency and the difficulty is magnified.

Sharman (1965) stated that accurate shooting is the backbone of the game of basketball. This idea is supported by Benington and Newell (1962) who claimed that the skill of shooting has probably developed more than any other aspect of the game of basketball. Indeed, Inglis (1980) found field goal shooting

ability to be one of three factors identified as significantly discriminating between successful and unsuccessful basketball players. Given that field goal shooting is important to the outcome of the game, it would be of value to coaches to be able to predict success in scoring from the field.

It seems legitimate to suppose that a basketball field goal shooter must locate, select, and focus on relevant cues in order to be successful. Perception, particularly attention, is important in human athletic performance (Zaichkowsky, 1984). If an athlete focuses on irrelevant cues, the performance will be less than optimal.

Nideffer (1976) developed a self-report, pencil and paper inventory, the Test of Attentional and Interpersonal Style (TAIS), which measures individual attentional and interpersonal characteristics hypothesized to be important for predicting performance across a wide variety of life situations. The TAIS assesses the general attentional style of an individual from the situations presented on the test. According to Nideffer (1976), two dimensions of attention are important, width and direction. The width dimension consists of attentional focus and varies from broad to narrow. The directional dimension refers to internal (thoughts and feelings) and external (environmental) focus. In a particular situation, an individual's attentional focus may be described as broad external, broad internal, narrow external, or narrow internal. An individual's attentional focus may be specific to the situation. That is, a certain attentional style

may be effective in one situation but ineffective in another. Attentional styles should be congruent with specific task demands.

An individual's attentional style may change depending upon the situation he/she finds him/herself in. Therefore, Nideffer (1976) recommended that assessment of attentional behavior should be situation specific. It would seem, then, important to construct an assessment tool capable of examining the attentional style of basketball field goal shooters in situations specific to shooting. Because no measures of basketball shooting attentional style currently exist but are needed, a Test of Basketball Shooting Attentional Style (BBAS) was constructed (See Appendix A).

The BBAS contains 64 items and consists of basketball field goal shooting situations relating to four effective and three ineffective attentional scales. The effective scales include broad external focus (BET), broad internal focus (BIT), narrow external focus (NET), and narrow internal focus (NIT). The ineffective scales include overloaded external focus (OET), overloaded internal focus (OIT), and underinclusive focus (RED). Scores on each of the seven attentional scales are used to form a composite picture of the relative strengths and weaknesses of an individual's attentional functioning.

Another variable of basketball field goal shooting success that may be considered is self-perception. In fact, several researchers have investigated the relationship between individual

personality dimensions such as self-perception and their possible contributions to successful performance in athletics. Black (1976) found that winners generally had higher levels of self-confidence than losers. One might suspect that winners are most often more highly skilled than losers. Ray Meyer (1967) and Margaret Wade (1980), regarded as two of the greatest basketball coaches of all time, and certainly two of the most successful, maintained that confidence in one's ability is an asset of a good shooter. These assertions make self-confidence an important part of field goal shooting success.

The BBAS, a test to measure attention, and a Personal Assessment Questionnaire (PAQ) (See Appendix C), a test to measure perceived ability and success, were administered to assess the relationship between these variables and basketball field goal shooting success.

Scope of Problem

Two tests were administered to 78 female basketball athletes ranging from NCAA Division I to NCAA Division III, junior college, and high school varsity levels during the 1986-1987 basketball season, in an attempt to predict basketball field goal shooting success. The BBAS was constructed, based in part on Nideffer's Test of Attentional and Interpersonal Style (TAIS) and previous sport specific attentional tests (Dunphy, 1983; Ford, 1981; Taylor, 1979). The BBAS was administered to discover athletes' attentional styles in situations specific to basketball field goal shooting. Self-perception was assessed by the PAQ,

administered in an effort to assess self-report measures of ability and success.

Data were collected on the two tests and statistical analyses were performed to investigate possible correlations between basketball field goal shooting success, derived from seasonal game statistics, and the personality variables attention and self-perception. Internal consistency of the BBAS was derived from Cronbach's (1951) coefficient alpha analysis. Pearson product-moment correlation was utilized to assess the degree of individuality of the predictor variables. The data were subjected to multiple regression analysis in order to assess the various relationships that existed within the data.

Statement of Problem

The relationship between basketball field goal shooting success and attentional style and self-perception was investigated.

Hypotheses

1. There will be a significant relationship between the basketball players' scores on the BBAS attentional scales and their field goal shooting percentages.
2. There will be a significant relationship between the basketball players' perceived ability (PA) as measured by the PAQ and their field goal shooting percentages.
3. There will be a significant relationship between the basketball players' perceived success (PS) as measured by the PAQ and their field goal shooting percentages.

4. Basketball field goal shooting percentage can be predicted from attention and self-perception.

Assumptions of Study

1. The athletes were able to relate to the situations and modes of response for each test.

2. All subjects were equally motivated in basketball shooting situations.

3. Basketball field goal shooting-specific attention is measured effectively by the BBAS.

4. Self-perception is measured effectively by the PAQ.

Definition of Terms

1. Attention: the mental process of selectively or broadly focusing on internal (thoughts and feelings) or external (environmental) stimuli.

2. Attentional style: the attentional strengths and weaknesses of an individual along the attentional dimensions of width (broad or narrow) and direction (internal or external).

3. Basketball athlete: a female member of a college, junior college, or high school varsity basketball team.

4. Broad external focus of attention (BET): an effective attentional style in which the focus is on a range of environmental cues.

5. Broad internal focus of attention (BIT): an effective attentional style in which the focus is on a range of cognitive and proprioceptive stimuli.

6. Directional dimension of attention: this refers to the

internal or external focus of attention.

7. Effective attention: when the individual's attentional focus is appropriate for a particular situation.

8. Ineffective attention: when the individual's attentional focus is inappropriate for a particular situation.

9. Narrow external focus of attention (NET): an effective attentional style in which the focus is directed toward selected environmental cues.

10. Narrow internal focus of attention (NIT): an effective attentional style in which the focus is directed toward selected cognitive and proprioceptive stimuli.

11. Overloaded external focus of attention (OET): an ineffective type of attention in which the focus is on too wide a range of environmental cues.

12. Overloaded internal focus of attention (OIT): an ineffective type of attentional style in which the focus is on too wide a range of cognitive and proprioceptive stimuli.

13. Self-perception: how an individual perceives her/himself.

14. Underinclusive focus of attention (RED): an ineffective attentional style in which the focus is reduced and directed toward selected internal or external cues.

15. Width dimension of attention: this refers to the amount of information and the breadth of perceptual field an individual controls.

Delimitations of Study

1. Seventy-eight volunteer NCAA Division I to Division III, junior college, and high school varsity female basketball players served as subjects.
2. The psychological variables assessed in this study were limited to attention and self-perception.
3. Attentional styles were assessed only by the investigator's BBAS.
4. Perception of ability and success were measured only by the PAQ.

Limitations of Study

1. The results of this study can only be generalized to basketball athletes who are considered similar to the athletes in this study.
2. Other tests of attentional style may yield different results.
3. Other tests of perceived ability and success may yield different results.

Chapter 2

REVIEW OF LITERATURE

Intercollegiate basketball appears to be the most popular competitive sport for females in America. The growing acceptance of females competing in basketball has called for well organized programs and highly skilled athletes (Evans & Quarterman, 1983).

The recruitment of athletes is essential in establishing a stable, successful college basketball program (Inglis, 1980; Meyer, 1967). Coaches usually recruit players in direct relation to their inherited or acquired traits (e.g., body proportions, mechanical skills, endurance, speed, and strength). While coaches are in agreement that such physical and mechanical skills are important, they are also beginning to realize that personality traits and states are important as well (Evans & Quarterman, 1983). Coaches now realize that an athlete may possess all the necessary physical and mechanical skills, but may not perform at his/her maximum potential in given situations. It is believed that a possible explanation for this discrepancy lies within the realm of personality differences (Evans & Quarterman, 1983; Kane, 1978; Kirschenbaum & Wittrock, 1984; MacGillivray, 1980).

It seems as if some psychological edge exists among players or teams who constantly win. Research studies have attempted to relate performance to personality characteristics (Carlisle, 1985; Dunphy, 1983; Ford, 1981; Taylor, 1979). In the athletic

environment, certain psychological variables are thought to be highly related to athletic performance. If this is true, then it should be possible to discriminate among athletes of differing skill levels based on these psychological characteristics (Lidstone, 1982). Some sport psychologists have taken a credulous or skeptical view on this issue, however (Morgan, 1978; Silva, 1984). The fact remains, though, that if the variables that constitute athletic performance are known, and if such variables can be accurately and reliably measured, then these variables should be effective predictors of human athletic performance (Lidstone, 1982).

This chapter consists of related literature concerning personal and situational variables hypothesized to account for basketball field goal shooting success. Specifically, interactionism, attention, specificity of attention, and self-perception will be discussed. A summary will conclude this chapter.

Interactionism

Early sport personality research employed the trait perspective as a means of understanding personality and performance relationships. The key assumption was that personality traits, as relatively enduring characteristics, predicted an individual's behavior in a variety of situations. It was believed that traits were generalizable and allowed one to predict behavior even in normal situations (Silva, 1984). This perspective was quite popular as some sport

psychologists (Carron, 1975; Ogilvie & Tutko, 1972) suggested that researchers adopt the trait perspective. More recently, many sport psychologists (Fisher, 1977; Kroll, 1970; Martens, 1977) have documented the methodological limitations of the trait model. This approach is not adequate enough to fully explain behavior because it is concerned only with the person variable and does not consider the situation as a variable. Indeed, experience tells us that we behave differently in different situations. For example, a talented and aggressive basketball player may seem meek and inadequate in social situations. In order to better understand individual behavior, it is necessary to consider the personality traits of an individual as well as the specific situation she/he may be in.

Most recently, the interactionist approach has been recognized and advocated as a promising research approach (Bandura, 1978; Fisher, 1977, 1984; Fisher, Horsfall, & Morris, 1977; Fisher, Ryan, & Martens, 1976). To seriously begin to understand athletes' behavior, and to improve or predict performance outcomes, the reciprocal interaction between the athlete as a person and the specific sport environment must be considered (Bandura, 1978).

Attention

The importance of attention for understanding and predicting behavior has long been emphasized in psychology, and recently is being recognized in athletics (Nideffer, 1976; Zaichkowsky, 1984). Perception, particularly attention, is important in human

athletic performance (Zaichkowsky, 1984). Attention, according to Nideffer (1978), is defined as the ability to direct senses and thought processes to particular objects, thoughts, or feelings. He viewed attention as being crucial to effective human performance and offered an analysis of its role in the regulation of human behavior in general and sport performance in particular (Nideffer, 1976).

Nideffer's (1976) definition of attention is incorporated into the attentional aspect of the TAIS. The TAIS measures attentional and interpersonal characteristics related to performance across a wide variety of life situations.

Attentional processes can be conceptualized on at least two dimensions: breadth of focus (broad and narrow) and direction (internal and external) (Nideffer, 1976). The breadth of focus dimension of attention is the amount of information that individuals allow to penetrate their consciousness. This amount may be conceptualized as being on a continuum ranging from very narrow (filtering out a great deal) to very broad (Easterbrook, 1959; Wachtel, 1967). The direction dimension of attention extends itself on a continuum ranging from internal to external. Focus may be directed within the individual or at the external environment (Nideffer, 1976).

Within the TAIS are six scales that relate to the ability of individuals to control breadth and direction of attentional focus (Nideffer, 1976). A broad external focus (BET) refers to an individual's ability to integrate many external stimuli at one

time. An overloaded external focus (OET) assesses the amount of confusion that results from processing external stimuli. A broad internal focus (BIT) refers to an individual's capacity to attend to and integrate a variety of information from internal stimuli (e.g., thoughts, feelings, plans of action). An overloaded internal focus (OIT) assesses the degree of confusion that results from thinking of too many things at once. A narrow attentional focus (NAR) is the ability to narrow attention to concentrate effectively. The underinclusive attentional focus (RED), or reduced attention, encompasses the error-prone attentional style. Here, attention is excessively narrow and, therefore, very restricted.

It is important to know, in advance, the demands a particular sport makes on the participant with respect to attentional variables (Landers, 1978). Attentional demands not only differ across sports but differ from position to position within a given sport (Nideffer, 1979). The ability to change styles (i.e., flip-flop) in response to these demands is an important determinant of any successful performance.

Specificity of Attention

According to the interactionist approach, attentional style may, in fact, be partly dependent upon specific situations. If this is true, then how well can general tests that do not consider specific situations accurately explain attention? In order to get accurate answers about an individual's behavior in a specific situation, it is necessary to ask specific questions.

As defined and used by Nideffer (1976), the concept of attentional style has the characteristics of a relatively stable trait. A trait describes, predicts, or explains behavior across a variety of life situations. Because Nideffer incorporated this definition into his TAIS, it would seem that he assumed that attentional style is constant across competitive situations. As stated earlier, sport psychologists have criticized the use of the trait model to describe, predict, or explain behavior (Fisher, 1977; Martens, 1977). In this case, it would seem that attention may not generalize across situations.

It is true that some sports, such as golf and diving, demand focused concentration in apparently singular directions. A constant internal focus of attention might be sufficient to perform adequately. But many sports, such as football and basketball, demand a variety of attentional foci.

Assuming the importance of situational specificity, it is questionable that the TAIS could accurately or adequately predict performance across a variety of life situations, including sport. The TAIS does not capture situational demands and, therefore, may not be an appropriate means to assess attentional style in specific sport environments. To measure attention effectively in sport, it would seem necessary to construct specific assessment devices that capture specific sport situational demands. Sport-specific assessment devices have been developed, and based, in part, on Nideffer's TAIS. For example, sport-specific tests have been developed for baseball (Ford, 1981), soccer (Taylor,

1979), tennis (Van Schoyck & Grasha, 1981), and field hockey (Dunphy, 1983). In studies where the sport-specific inventory was compared to Nideffer's TAIS, the sport-specific inventory was found to be a better predictor of success (Ford, 1981; Taylor, 1979; Van Schoyck & Grasha, 1981).

Ford (1981) compared the effectiveness of his baseball-specific inventory (TBAS) with Nideffer's TAIS to discriminate the batting success of high school and college baseball athletes in the Central New York area. The TBAS had higher internal consistency than the TAIS. In addition, the TBAS was able to differentiate between athletes exhibiting high and low batting averages, whereas the TAIS was not.

Taylor (1979) compared the effectiveness of his soccer-specific inventory (TSAS) with Nideffer's TAIS to discriminate levels of ability and success of college soccer players. The TSAS had higher test-retest reliability than the TAIS, as well as higher internal consistency. Six TSAS attentional scales differentiated soccer athletes of high and low ability and success, whereas only two TAIS scales did.

Van Schoyck and Grasha (1981) compared the effectiveness of their tennis-specific inventory (T-TAIS) with Nideffer's TAIS to discriminate levels of tennis skill. The T-TAIS had higher test-retest reliability than the TAIS, as well as higher internal consistency for beginner, intermediate, and advanced tennis athletes. The T-TAIS also differentiated among tennis skill levels better than the TAIS.

Although Nideffer developed the TAIS for a variety of competitive situations, it seems that sport-specific inventories are more effective in assessing attentional style in certain situations and predicting success in those situations. This may cause one to wonder whether or not the TAIS would be equally effective in any situation, including basketball field goal shooting. Researchers embracing the interactionist perspective would seem to have a solid argument.

Self-perception

Personal success may largely be a matter of believing in one's capabilities. However, a capability is only as good as its execution, and a factor that appears to be crucial in achieving personal success is an individual's level of self-perception (Yukelson, 1984). Black (1976) supported this idea and maintained that research relating motor ability, physical skill, and physical fitness to self-perception and personality has shown that success in these activities is related to a more positive personality or self-perception.

There are many definitions of self. Terms describing the self, such as self-concept, self-confidence, self-esteem, self-worth, and self-efficacy, have been used interchangeably. Lipka, Beane, and Ludewig (1980) suggested that self-perception is an umbrella term encompassing two other terms, self-esteem and self-concept. Coopersmith (1967) perceived self-esteem as a personal judgment of worth expressed from attitudes individuals hold true of themselves. Self-esteem has been referred to as the

valuative assessment regarding personal satisfaction with one's role and quality of performance (Beane & Lipka, 1980).

While self-esteem is a valuative assessment, self-concept is a descriptive perception of self in various roles. It is defined as the perceptions one has of oneself; how one sees oneself in terms of personal attributes and various roles fulfilled (Lipka et al., 1980). Within each role, individuals develop perceptions of self and may assign some assessment of their performance.

Recently, the concept of self-efficacy has been addressed considerably in the literature. Bandura (1977) defined self-efficacy as the strength of one's conviction that he/she can successfully execute a behavior required to produce a certain outcome. Assuming that an individual is capable of a response and that appropriate incentives are available for optimal performance, Bandura (1977) asserted that an individual's actual performance will be predicted by her/his feelings of competence or expectation of personal effectiveness. Perceived levels of self-efficacy may be important determinants of success.

This idea was introduced earlier by Maltz (1960), who stated that, when an individual feels successful and self-confident, he/she will act successfully and the outcome will be desirable. Recently, Gauron (1984) related two incidents, implying that believing in oneself is enabling. He concluded that a confident athlete is a high level performer.

In sport, a growing body of evidence supports the contention that the athlete's perception of ability is the essential

mediating construct of achievement behaviors (Roberts, 1984). It seems reasonable that those individuals with high PA would also perceive themselves to be competent and would be less likely to experience behavioral disruptions (Harter, 1978; Kroll & Petersen, 1965). In keeping with the interactionist perspective, it also seems reasonable to assume that an individual will perceive him/herself as more competent in some domains than in others (Harter, 1978). Lipka et al. (1980) reiterated that an individual's perception of self may be altered, depending upon the role one finds him/herself in.

The self is a relatively unstable entity. This lack of inherent stability has caused a problem for researchers in the self field. Research focusing on the interactional model has been hampered by a lack of assessment instruments. Recently, however, this deficiency has been addressed. Several researchers (Dunphy, 1983; Massey, 1981; Taylor, 1979) have utilized a modification of Coulson and Cobb's (1979) Generalized Expectancy of Sport Success Scale, which measures perceived ability and success, and has been shown to be reliable (internal consistency, $r = .96$; test-retest reliability, $r = .90$). Taylor (1979), who created his soccer-specific Personal Assessment Questionnaire (PAQ) from Coulson and Cobb's (1979) scale, reported test-retest reliability coefficients of .72 for ability and .86 for success. These coefficients are somewhat similar to Dunphy's field hockey-specific PAQ coefficients of .58 for ability and .78 for success, yet lower than those reported by Massey (1981) for his

volleyball-specific PAQ.

Summary

In the athletic environment, certain psychological variables are thought to be highly related to athletic performance. If these variables are known, and if they can be accurately and reliably measured, then they should be effective predictors of human athletic performance (Lidstone, 1982).

Early sport personality research employed the trait perspective as a means of understanding person and performance relationships. This approach has been criticized, however, because it is concerned only with the person variable and does not consider the situation as a variable (Fisher, 1977; Kroll, 1970; Martens, 1977). Recently, it has been recognized that the reciprocal interaction between the athlete as a person and the specific sport environment must be considered (Bandura, 1978; Fisher, 1977, 1984; Fisher et al. 1976, 1977).

The importance of several variables for understanding and predicting behavior has been emphasized. Attention is an individual's style for directing his/her senses and thought processes to particular stimuli (Nideffer, 1978). Attention may be conceptualized on two dimensions: breadth of focus (broad and narrow) and direction (internal and external). Attentional style can be assessed by the TAIS. This is a general test designed to predict attentional and interpersonal behavior across a range of situations. The test has been criticized by those who advocate the interactionist approach on the basis that attention is not a

stable trait, implying a lack of constancy across competitive situations (Van Schoyck & Grasha, 1981).

Sport-specific assessment devices have been developed partly based on Nideffer's (1976) TAIS. Inventories were created for baseball (Ford, 1981), soccer (Taylor, 1979), tennis (Van Schoyck & Grasha, 1981), and field hockey (Dunphy, 1983). When researchers compared their sport-specific inventories with Nideffer's TAIS, the sport-specific tests were found to be better predictors of success (Ford, 1981; Taylor, 1979; Van Schoyck & Grasha, 1981).

Self-perception may be crucial to personal success. Success in motor activities, physical skill, and physical fitness is related to a more positive personality (Black, 1976). Self-perception is an umbrella term encompassing self-esteem and self-concept.

In sport, evidence supports the contention that athletes' perceptions of ability and success may be essential mediating constructs of achievement behaviors (Roberts, 1984). These perceptions of ability and success may change, though, depending on the situation one finds oneself in (Harter, 1978; Lipka et al., 1980).

Researchers have tried to assess these changing perceptions of ability and success by modifying Coulson and Cobb's (1979) Generalized Expectancy of Sport Success Scale. Reported test-retest reliability coefficients for sport-specific PAQs adapted from this scale appear to be within the range of

acceptability. In general, researchers have had some success in assessing perceived ability and success for specific sports.

Chapter 3

METHODS AND PROCEDURES

The following chapter will examine the methods and procedures used in this investigation. Selection of subjects, testing instruments, methods of data collection, scoring of data, treatment of data, and summary will be described.

Selection of Subjects

The subjects involved in this investigation were female basketball players ($N = 78$) from NCAA Division I to Division III, junior college, and high school varsity teams in the Northeast. Two Division I, two Division II, four Division III, one junior college, and two high school basketball teams participated. Fifteen basketball coaches were initially contacted. Fourteen agreed to allow the investigator to approach the members of his/her team about the possibility of participating in the study. Each athlete was asked to read and sign an informed consent form (Appendix D) if she was willing to participate. Of the 14 teams, only basketball players on 11 teams actually completed the two tests. Eleven potential subjects were eliminated because they did not attempt a single field goal.

Testing Instruments

The following tests were administered to the subjects: the Test of Basketball Shooting Attentional Style (BBAS) and the Personal Assessment Questionnaire (PAQ).

Because no measures of basketball shooting attentional style

currently exist but are needed, the BBAS was constructed. The BBAS consists of 64 statements that represent attentional demands specific to basketball field goal shooting. Prior to constructing the BBAS, the investigator familiarized herself with Nideffer's TAIS, a Test of Soccer Attentional Style (TSAS) (Taylor, 1979), and a Test of Batting Attentional Style (TBAS) (Ford, 1981). Two coaches and two players were consulted to assess the task demands of basketball field goal shooting and the various situations that occur frequently while athletes execute these tasks. The basketball field goal shooting situations were chosen on the basis that they would be relevant and easily understood by basketball athletes. The situations were also chosen in an attempt to cover a wide range of field goal shooting situations. Upon review of the situation statements, if a statement pertained to more than one scale (e.g., contained elements of both internal and external demands), it was revised so that it only applied to one scale or it was eliminated.

Seven types of attentional foci are each represented by a separate scale. The effective scales are broad external focus (BET), broad internal focus (BIT), narrow external focus (NET), and narrow internal focus (NIT). The ineffective scales are overloaded external focus (OET), overloaded internal focus (OIT), and underinclusive focus (RED). Eight situations comprise the BET focus, 9 the OET, 8 the BIT, 12 the OIT, 8 the NET, 8 the NIT, and 11 the RED focus of attention (Appendix B). The athletes responded to each statement of the BBAS on a 5-point

Likert scale ranging from "never" to "always," representing the degree to which the behavior in the situation described the athlete's attention. Scores on each of the seven attentional scales were used to form a composite picture of the relative strengths and weaknesses of an individual's attentional functioning.

The PAQ is a measure of perceived ability and success in basketball field goal shooting. The athletes responded to a "As a shooter I have been generally" statement on five bipolar adjective scales. Adjective pairs were listed in both positive and negative directions. Subjects were instructed to place an "X" along the 5-point scale in the space that best represented their perceived ability or success. The PAQ was adapted from Coulson and Cobb's (1979) Generalized Expectancy of Sport Success Scale and has been shown to be reliable (internal consistency, $r = .96$; test-retest reliability, $r = .90$).

Methods of Data Collection

Fifteen basketball coaches in the Northeast were initially contacted by telephone to assess their interest in participating in the study. A copy of the telephone recruitment message to head coaches can be found in Appendix E. Fourteen coaches allowed the investigator to approach the members of their teams about the possibility of participating in the study. If a coach agreed, 12 packets and a set of instructions (Appendix F) were sent by mail or delivered by the investigator to each coach between March and June, 1987.

Data were collected at the subjects' convenience in small groups. Upon assembling the members of her/his team, each coach read a short text to team members. Those athletes who did not wish to participate in the study were excused from the room, and one packet was administered to each of those individuals remaining. Each packet contained the following items: informed consent form, BBAS, PAQ, and an optical mark read sheet. Each athlete was asked to read and sign the informed consent form and then to complete the tests at her own rate. Responses on the BBAS were recorded on the optical mark read sheet, whereas the answers on the PAQ were recorded on the inventory. Approximate testing time was 45 min. Upon completion of the tests, the packets were collected and returned directly or by mail to the investigator.

After the completion of the 1986-1987 basketball season, each coach from participating institutions was asked to submit to the investigator a copy of the official NCAA statistical sheet for the team. Field goal shooting success was measured according to official NCAA percentages.

Scoring of Data

The data from the BBAS were submitted to the computer on optical mark read sheets. The "A" to "E" scores on the sheets were substituted with Likert-type values ranging from 1 to 5. The computer read the scores and assigned an appropriate value for each response.

The PAQ was hand scored. A number value ranging from 1 to 5

was made for each adjective pair, with 1 representing the most negative judgment and 5 representing the most positive judgment. Subtotals were obtained for both PA and PS.

Treatment of Data

Internal consistency of the BBAS was calculated using Cronbach's (1951) coefficient alpha. To maximize internal consistency, a decision was made to delete items that correlated with the entire scale (e.g., BET) less than .10. Pearson product-moment correlation was utilized to assess the degree of individuality of the nine predictor variables. Field goal percentages, hence degree of success, were predicted from stepwise multiple regression analysis of measures of attention and self-perception.

Summary

Seventy-eight female basketball players from NCAA Division I to Division III, junior college, and high school varsity teams in the Northeast served as subjects in this investigation. Subjects were administered the BBAS and the PAQ in an attempt to predict basketball field goal shooting success.

The BBAS was constructed, based in part on Nideffer's (1976) TAIS, to assess athletes' attentional styles as they shoot a basketball from the floor. The BBAS consists of statements representing a wide range of attentional demands.

Seven types of attentional foci are each represented by a separate scale within the BBAS. There are four effective scales (BET, BIT, NET, NIT) and three ineffective scales (OET, OIT,

RED). Scores on each of the attentional scales were used to form a composite picture of an individual's attentional functioning.

The PAQ is a measure of PA and PS in basketball field goal shooting. Scores were used to assess the relative strength or weakness of an individual's PA and PS in this realm.

The tests were administered and data were collected at the subjects' convenience in small groups. After the completion of the 1986-1987 basketball season, each coach from participating institutions submitted an official NCAA statistical sheet for his/her team so that field goal shooting success could be measured.

The data from the BBAS were submitted to the computer on optical mark read sheets. The PAQ was hand scored.

Internal consistency of the BBAS was calculated using Cronbach's (1951) coefficient alpha analysis. Pearson product-moment correlation was utilized to assess the degree of discreteness of the nine predictor variables. Field goal shooting percentage, hence shooting success, was predicted from stepwise multiple regression analysis.

Chapter 4

ANALYSIS OF DATA

The results of the investigation are presented in this chapter. The chapter is divided into the following sections: (a) internal consistency of the BBAS; (b) intercorrelations of attention, PA, PS, and field goal shooting percentage; (c) multiple regression analysis of the predictor variables (attention, PA, PS) with field goal shooting percentage; and (d) summary.

Internal Consistency of the BBAS

Internal consistency of the BBAS was calculated by Cronbach's (1951) coefficient alpha analysis. Alpha reliabilities for each of the attentional scales of the BBAS are reported in Table 1. Coefficients with superscripts are values adjusted to improve internal consistency by deleting items correlating negatively or below .10 with the scale as a whole. Adjusted reliability coefficients for the attentional scales of the BBAS varied from a low of .52 (NET) to a high of .75 (OIT).

Intercorrelations of Attention, PA, PS, and

Field Goal Shooting Percentage

Pearson product-moment correlation assessed the relationships among all variables. Pearson r values among variables are reported in Table 2. Pearson r values ranged from a low of $-.23$ (BET and RED) to a high of $.81$ (PA and PS).

Results from Table 2 indicate high commonality between some

Table 1

Alpha Reliabilities for the BBAS

BET	.56 ^a
OET	.69
BIT	.67
OIT	.75 ^a
NET	.52
NIT	.65 ^a
RED	.64 ^a

^aAdjusted reliability coefficient to improve internal consistency by deleting items correlating negatively or below .10 with the scale as a whole.

Table 2

Intercorrelation Values Among Variables

	OET	BIT	OIT	NET	NIT	RED	PS	PA	FG%
BET	-.30	.57	-.24	.43	.43	-.23	.39	.41	.25
OET		-.43	.69	-.40	-.57	.51	-.50	-.51	-.21
BIT			-.53	.62	.64	-.48	.39	.35	.13
OIT				-.45	-.66	.61	-.50	-.49	-.19
NET					.65	-.42	.41	.35	.25
NIT						-.53	.60	.59	.25
RED							-.25	-.34	-.10
PS								.81	.34
PA									.45

FG% = Field Goal Percentage.

of the BBAS scales, particularly BET and BIT ($r = .57$), NET and NIT ($r = .65$), and OET and OIT ($r = .64$). The higher the Pearson r value (magnitude of the relationship), the less discrete the scales. It would appear, then, that some attentional scales share significant variance with other scales. These scales (broad, narrow, overload) are perhaps too similar. There may not, therefore, be seven separate attentional scales but actually three or four discrete scales.

All seven attentional scales of the BBAS were moderately correlated with one another. The highest correlation was found between NIT and OIT, $r = -.66$. The lowest correlation was found between BET and RED, $r = -.23$.

Correlations among all effective attentional scales (BET, BIT, NET, NIT) yielded positive Pearson r values. Correlations among all ineffective attentional scales (OET, OIT, RED) also yielded positive Pearson r values. In addition, correlations between all effective and all ineffective attentional scales yielded negative Pearson r values.

All scales of the BBAS were moderately related to PA (r ranged from $-.34$ to $.59$). Slightly lower r values ($-.25$ to $.60$) were found between the attentional scales of the BBAS and PS. The effective scales correlated positively with both PA and PS, while the ineffective scales correlated negatively with PA and PS.

PA was most highly correlated with field goal shooting percentage, $r = .45$. A slightly lower r value ($.34$) was found

between PS and field goal shooting percentage. The effective attentional scales of the BBAS correlated positively with field goal shooting percentage, while the ineffective scales correlated negatively with field goal shooting percentage. Of the seven attentional scales of the BBAS, BET was most highly correlated with field goal shooting percentage, $r = .25$.

Multiple Regression Analyses of the Predictor Variables

To assess the overall degree of relationship between a set of predictor variables (attention, PA, PS) and a single criterion measure (field goal shooting percentage), the stepwise procedure of multiple regression was utilized. For the interval data collected, regression analysis is a more powerful tool than difference analysis.

Results of the stepwise multiple regression analysis are reported in Table 3. The nine predictor variables in sum explained 24% of the variance in field goal shooting percentages, a statistically significant amount. Therefore, Hypothesis 4 was accepted. PA, which was most highly correlated with field goal shooting percentage, accounted for most of the variance in the dependent variable, $R^2 = .20$. This relationship is statistically significant beyond the .05 level of probability. Therefore, Hypothesis 2 can be accepted. Respectively, NET, BIT, BET, RED, PS, NIT, OIT, and OET accounted for the remainder of the variance. PS, which was the second highest correlated predictor variable with field goal shooting percentage after PA (Table 2), did not account for the second most amount of variance in field

Table 3

Stepwise Multiple Regression Values Among Variables

<u>Step</u>	<u>Variable</u>	<u>R²</u>
1	PA	.20
2	NET	.21
3	BIT	.22
4	BET	.23
5	RED	.23
6	PS	.24
7	NIT	.24
8	OIT	.24
9	OET	.24

goal shooting percentages. PA and PS share considerable commonality, $r = .81$. Therefore, PA accounted for most of the field goal shooting percentage variance explained by both PA and PS in regression step number one. However, PS accounted for a significant amount of the variance in field goal shooting percentages beyond the .05 level of probability, $R^2 = .12$. Therefore, Hypothesis 3 can be accepted.

Similarly BET, which correlated third with field goal shooting percentage, did not account for the next most amount of variance in shooting percentages after PA. NET, which was moderately correlated with BET, did. NET accounted for most of the field goal shooting percentage variance explained by both NET and BET in regression step two. This issue of multicollinearity will be addressed in the following chapter.

The seven attentional scales of the BBAS alone explained 13% of the variance in field goal shooting percentage. BET, which as most highly correlated with field goal shooting percentage, accounted for most of the variance in the dependent variable, $R^2 = .06$. Respectively, NIT, BIT, NET, OET, OIT, and RED accounted for the remainder of the variance. Based on the results of the multiple regression analysis of all nine predictor variables, one must conclude that the seven attentional scales alone do not predict a significant amount of the variance in field goal shooting percentages. Therefore, Hypothesis 1 must be rejected.

Summary

Internal consistency of the BBAS was calculated by

Cronbach's (1951) coefficient alpha analysis. Adjusted reliability coefficients for the attentional scales of the BBAS varied from .52 (NET) to .75 (OIT).

Pearson product-moment correlation assessed the relationships among all variables. Values ranged from a low of $-.23$ (BET and RED) to a high of $.81$ (PA and PS). Pearson r values were high for some of the scale relationships, indicating that some scales share significant variance and are not discrete. All attentional scales of the BBAS were moderately correlated with one another. All were moderately related to PA as well. Slightly lower relationships were found between the scales of the BBAS and PS.

PA and PS were most highly correlated with field goal shooting percentage. Of the seven attentional scales of the BBAS, BET was most highly correlated with field goal shooting percentage.

Stepwise multiple regression analysis assessed the overall degree of relationship between the nine predictor variables and the single criterion measure. All nine predictor variables in sum explained 24% of the variance in field goal shooting percentages, a significant amount. Therefore, Hypothesis 4 was accepted. PA alone explained 20% of the variance in the dependent variable. Therefore, Hypothesis 2 was accepted. PS accounted for 12% of the variance in the dependent variable. Because PA and PS share considerable commonality, Hypothesis 3 was accepted. The seven attentional scales of the BBAS alone

explained 13% of the variance in shooting percentages. This is not a significant amount in itself, therefore Hypothesis 1 was rejected.

Chapter 5

DISCUSSION OF RESULTS

The results presented in chapter 4 will be discussed in this chapter. Topics include the following: (a) internal consistency of the BBAS; (b) intercorrelations of attention, PA, and PS; (c) multiple regression analyses of the predictor variables (attention, PA, PS) with field goal shooting percentage; and (d) summary.

Internal Consistency of the BBAS

Coefficient alpha reliabilities for the attentional scales of the BBAS are reported in Table 1. Cronbach's (1951) alpha reliability is a measure of internal consistency, the degree to which each item relates to a specific scale. Attentional scales of the BBAS with moderate to high alpha levels contain items that were answered in a homogeneous manner. Corrected reliabilities with superscripts (Table 1) represent reliabilities adjusted by deleting items correlating negatively or below .10 with the scale as a whole. Corrected alpha reliabilities ranged from .52 (NET) to .75 (OIT).

An item analysis of which situations, if removed from a particular scale, would have some meaningful effect on the coefficient for the whole scale was derived from coefficient alpha analysis. From this analysis, some interesting points can be drawn. Every item associated with the BET scale involved knowing the location of the defender when the shot was taken,

except the items that were deleted. The deleted items involved knowing the situation, such as how much time is left on the clock, the score, and the positions of rebounders. It would seem that a broad external focus encompasses the recognition of one significant variable, a defender. It may be that the recognition of more than one variable tends to overload the shooter. These items might best have been considered within the OET scale.

Four deletions of 11 items associated with the RED scale suggest that it may be difficult to identify at what point an effective narrow attentional style becomes ineffective. As stated in chapter 1, an underinclusive focus of attention is an ineffective attentional style in which the focus is reduced and directed toward selected internal or external cues. It would seem that gauging the point at which a reduced focus becomes ineffective is a difficult task. Upon examination of the original 11 items associated with this scale, a pattern does not emerge.

The external scales, BET (.56) and NET (.52), had the lowest internal consistency. However, BET and NET accounted for the most variance in field goal shooting. This evidence indicates that it may be beneficial to attend to broad external and narrow external cues when one is shooting a basketball, but it also suggests that it might be difficult to pinpoint exactly which stimuli are categorized as broad external and narrow external.

Both narrow scales, internal (.65) and external (.52), had moderate internal consistency. In previous sport studies on

attentional style (Ford, 1981; Massey, 1981; Taylor, 1979), only one narrow scale, which was comprised of both internal and external items, was utilized. This scale was reported to have low to moderate internal consistency; .43 (Ford, 1981), .33 (Massey, 1981), and .67 (Taylor, 1979). This finding led these investigators to recommend the separation of the NAR scale into internal and external components. Hooper (1983) used both the NET and NIT scales in his study on the attentional style of soccer athletes. His results indicated moderate internal consistencies for both narrow scales (NET .68 and NIT .65). Dunphy (1983) found slightly lower internal consistencies (NET .56 and NIT .57) in her study on the attentional style of female field hockey athletes.

Intercorrelations of Attention, PA, and PS

The intercorrelation values for the seven attentional scales, PA, PS, and field goal shooting percentage are reported in Table 2. Interscale correlations were in the direction (i.e., positive or negative) expected by the investigator. Correlations were positive between all effective scales (BET, BIT, NET, NIT), positive between all ineffective scales (OET, OIT, RED), and negative between all effective and ineffective scales.

Some of the Pearson r values were slightly higher than expected. Low correlations indicate discrete and individual variables. A high correlation between some scales indicates a commonality between those scales. For example, BIT and NIT showed a correlation of .64. These two scales comprise the

directional component of an internal focus but are opposite in the width component, broad and narrow. Thus, the items on these two scales do not differentiate the scales from each other as initially thought. Likewise, NET and NIT showed a correlation of .65. These two scales possess opposite directional components (internal and external), but possess the same width component (narrow). Again, these predictor variables were not as discrete as assumed.

Another unexpectedly high correlation occurred between BIT and NET, $r = .62$. Similarly, Dunphy (1983) reported a correlation of .61. These two scales differ in both width and direction, therefore, one would expect a somewhat lower correlation. Perhaps some items on these scales should be revised in order to make the scales more discrete.

Correlations between the attentional scales and PA revealed moderate relationships for the effective scales ($r = .35$ to $.58$) and the ineffective scales ($r = -.34$ to $-.51$). Correlations between the attentional scales and PS revealed slightly higher relationships for the effective scales ($r = .39$ to $.60$) and slightly poorer relationships for the ineffective scales ($r = -.25$ to $-.50$). Farrar and Glauber (1967) report that the issue of suppression and multicollinearity among attentional scales hampers the interpretation of their univariate relationships with PA and PS.

The correlation between PA and PS was expectedly high, $r = .81$. Apparently, individuals who perceived themselves high on

ability also tended to perceive themselves high on success. Therefore, athletes' perceptions of their sport abilities are somewhat similar to the perceptions of their successes in sport. This relationship was expected because athletes will often describe their ability based on their previous success. For example, a female collegiate basketball player may perceive her ability to be greater if her team has participated in a post-season tournament than if it has not.

Multiple Regression Analyses of the Predictor Variables

Multiple regression of the significant predictor variables on field goal shooting percentage accounted for 24% of the variance. Seventy-six percent of the variance was not explained by the predictor variables. Although the predictor variables provided support for the fourth hypothesis by explaining a significant amount of the variance, it is well known that other psychological variables (e.g., motivation, anxiety, and locus of control) ignored in the current study are also related to athletic performance. In other words, there was a significant percentage of variance accounted for when one considers the other unmeasured psychological components that could contribute to the total field goal shooting variance.

In addition, there are numerous physical components (e.g., size and strength) that contribute to field goal shooting variance. If these physical components account for a portion (X) of the variance, then psychological variables could only account

for less than all of what it takes to be a good field goal shooter (100% - X). The significant predictor variables of field goal shooting success (in order of percent variance explained) were as follows: PA, NET, BIT, BET, RED, PS, NIT, OIT, and OET.

PA alone explained 20% of the variance in field goal shooting percentages. This evidence supports the contention that the athlete's perception of ability mediates many achievement behaviors, including attention (Roberts, 1984). Indeed, what one thinks and normally verbalizes affects behavior.

The BBAS alone explained 13% of the field goal shooting variance. The attentional variables, in order of percent variance explained, were as follows: BET, NET, NIT, BIT, OET, OIT, and RED. It seems that basketball athletes who attend to internal stimuli do not possess the attentional abilities to successfully meet the task demands of field goal shooting. Effective performance during the course of a game is predicated on remaining external (both broad and narrow), in order to select and act upon the proper environmental cues. It would seem that, in field goal shooting, a single cue or action does not yield enough information to allow one to make a correct decision.

Pearson r values between field goal percentage and the scales BET and NET showed slight relationships ($r = .25$), though better than other relationships. These correlations make the external focus appear, on the surface, to be an important variable in the prediction of field goal shooting success.

A broad external focus is necessary to effectively integrate

many environmental stimuli at one time. By being broad and external, field goal shooters can read cues from the court as well as maintain eye contact on the basket. Because the series of events leading up to a shot are unpredictable, with cues arising all around the individual, it would seem a necessity to be almost simultaneously aware of this information.

Once these cues and their consequences are processed, it would seem that a switch to narrow and external would be appropriate. The individual must next focus on the basket in order to properly execute the task.

A narrow internal focus refers to the ability to narrow attention to concentrate effectively. Field goal shooters must be able to effectively develop or maintain a focus on individual thoughts or strategies (i.e., performance options) that would be appropriate for the task demands of shooting.

Broad and internal refers to an attentional style that assesses the degree to which an athlete can anticipate what will occur next on the court. Field goal shooters may enhance their performance by pre-selecting cues that may occur in the basketball environment.

Field goal shooters who attempt to attend to many stimuli simultaneously become externally overloaded and, therefore, cannot effectively attend to any. The shooter who worries about unfamiliar surroundings, the lighting in the gym, or missing shots cannot attend to important cues. Similarly, internally overloaded shooters think of too many things at once and are

confused by multiple thought patterns. For example, a shooter may be overly concerned with crowd reaction after a missed shot and miss her next attempt as well.

Athletes with reduced attention selectively attend to isolated cues. This prevents them from capturing the entire environment and, often, task-relevant information is excluded. Athletes who are tunnel-visioned do not possess the attentional abilities to successfully meet the task demands of field goal shooting because valuable cues essential to performance are often missed.

A possible explanation for the seemingly small amount of variance explained by the predictor variables is the ineffectiveness of these variables to capture the specificity of field goal shooting. Basketball is really a team sport although shooting is an individual task. Players must interact with others. The playing effectiveness and the success of individual athletes is partially controlled by those around them, both teammates and opponents. Perhaps the testing instruments, the BBAS in particular, do not capture the subtleties of success in a team sport context. However, the tests did provide evidence that attentional style, PA, and PS are important factors in field goal shooting.

Stepwise analysis revealed which of the variables were most important in explaining the success variance when all variables were considered simultaneously. The small amount of variance explained may have been due to the shared variance of significant

predictor variables. On the surface, when all nine variables are considered, it would seem that BET would explain more variance than NET after PA, because BET explained the most variance when attentional variables were considered alone. However, NET explained more variance. BET does not seem to be as important a discriminating variable as NET when all nine variables are considered. Evidence from interscale correlations points out that the predictive value of BET may have been suppressed by other variables whose correlations with BET were relatively high. Because of its shared variance with other attentional variables, BET was less likely to discriminate field goal shooting success than NET. The multicollinearity of predictor variables seems an important factor in the prediction of athletic success and should be researched further.

Summary

Corrected coefficient alpha reliabilities for the attentional scales of the BBAS ranged from .52 (NET) to .75 (OIT). Some items, if removed from a particular scale, had a meaningful effect on the coefficient for the whole scale. This indicates that it may be difficult to grasp what it really takes to be a good field goal shooter.

In previous sport studies on attentional style (Ford, 1981; Massey, 1981; Taylor, 1979), only one narrow scale, NAR, comprised of both internal and external components was investigated. This scale was reported to have low to moderate internal consistency, prompting the investigators to suggest that

this scale be separated into external (NET) and internal (NIT) components. Following this suggestion, NAR was separated into NET and NIT. Alpha reliabilities for these scales were .65 and .52, respectively. These reliabilities are consistent with previous studies utilizing these two narrow attentional scales.

Interscale correlations for the seven attentional scales, PA, and PS were in the direction expected by the investigator. However, some Pearson r values were slightly higher than expected. This indicates high commonality or less independence between these scales than was initially assumed. Unexpectedly high correlations occurred between BIT and NIT, NET and NIT, and BIT and NET. Correlations between attentional scales and PA were moderate as anticipated, likewise between attentional scales and PS. The correlation between PA and PS was expectedly high, lending support to the thought that athletes often describe their ability based on their previous success.

Multiple regression analysis revealed that the predictor variables accounted for 24% of the variance in field goal shooting success, a significant amount when one considers that other relevant psychological variables ignored in the present study are also related to athletic success. These psychological variables could only account for less than what it takes to be a good field goal shooter because physical variables such as size and strength were also neglected.

Findings in the current study support the idea that athletes' perception of ability often mediate many achievement

behaviors (Roberts, 1984). That is, PA alone explained 20% of field goal shooting variance. Attentional variables alone explained 13% of the variance. It would seem that effective performance during the course of a basketball game is predicted on remaining external (both broad and narrow) to select and act upon proper environmental cues.

Multicollinearity among variables might explain the seemingly small amount of variance explained by the attentional variables. Evidence from interscale correlations suggests that the predictive value of some variables may have been suppressed by others whose correlations with these were relatively high. This probable shared variance among predictor variables is an important issue and should be considered further.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study investigated the relationship of nine predictor variables and field goal shooting success. Two tests were administered to 78 female basketball athletes ranging from high school varsity to NCAA Division III to NCAA Division I. The tests administered were the BBAS and the PAQ.

The BBAS consists of 64 items that represent attentional demands specific to field goal shooting. Seven types of attentional foci are each represented by a separate scale. The PAQ measured each athlete's perceptions of her ability and success in field goal shooting.

Internal consistency of the BBAS was reported by Cronbach's (1951) coefficient alpha analysis. Values ranged from .52 (NET) to .75 (OIT). To quantify the relationship among the nine predictor variables, Pearson product-moment correlation was used. Overall, moderate relationships were revealed for the seven attentional scales. Some correlations between BBAS scales were higher than expected, indicating a lack of discreteness of these scales. PA and PS correlated positively with the effective scales (BET, BIT, NET, NIT) and negatively with the ineffective scales (OET, OIT, RED). A high correlation between PA and PS indicated that athletes' perceptions of their ability were similar to those of their success.

The stepwise procedure of multiple regression was utilized to assess the relationship between the predictor variables and the single criterion variable. Field goal shooting success was revealed to be predicted by four primary variables, namely PA, NET, BIT, and BET. Nine predictor variables, PA, PS, BET, NET, BIT, NIT, OET, OIT, and RED, accounted for 24% of the variance in field goal shooting percentages.

Conclusions

The results of this study yielded the following conclusions regarding the relationship among attentional style, PA, PS, and field goal shooting success:

1. There is not a significant relationship between basketball players' scores on the BBAS attentional scales and their NCAA field goal percentages.
2. The evidence indicates that an external attentional style with both broad and narrow characteristics might be conducive to successful field goal shooting performance.
3. There is a significant relationship between basketball players' PA as measured by the PAQ and their NCAA field goal shooting percentages.
4. Basketball players with higher PA had higher field goal percentages.
5. There is a significant relationship between basketball players' PS as measured by the PAQ and their NCAA field goal percentages.
6. Basketball players with higher PS had higher field goal

percentages.

7. Basketball field goal shooting percentage can be predicted from attention and self-perception.

Recommendations

The following recommendations for further study were made after the completion of this investigation:

1. A large scale factor analysis of the BBAS scales should be conducted to assess the discreteness of the BBAS scales and to eliminate overlapping test items.

2. The relationship between the TAIS and the BBAS should be investigated.

3. A large scale study should be conducted with basketball athletes similar to those who participated in the current study.

4. The issues of suppression and multicollinearity in attentional scales should be considered prior to future analysis of multiple predictor variables.

Appendix A

TEST OF BASKETBALL SHOOTING ATTENTIONAL STYLE

INSTRUCTIONS

USE NO. 2 PENCIL. DO NOT WRITE ON THE TEST BOOKLET

Read each item carefully and then answer according to the frequency with which it describes you or your sport behavior. For example, item 1 is "I generally find it difficult to ignore my defender's comments and actions as I prepare to shoot the ball."

A - NEVER

B - RARELY

C - SOMETIMES

D - FREQUENTLY

E - ALWAYS

If your answer to the first item is SOMETIMES, you would darken C on the answer sheet for item number 1. The same key is used for every item, thus each time you mark an A you are indicating NEVER, etc.

1. Please be sure to mark your name in the space provided at the top of the answer sheet.
2. Fill in your school's name in the space above the name "blocks".

1. I generally find it difficult to ignore my defender's comments and actions as I prepare to shoot the ball.
2. I remember that my defender has given me the jump shot instead of letting me penetrate on my last two attempts. I still make appropriate adjustments on my next shot attempt.
3. I am worried about having my shots blocked.
4. It is equally easy for me to concentrate against less skilled and more skilled defenders.
5. I am always aware of the situation when I shoot the ball, such as how much time is left on the shot clock and in the game, the score, and the positions of offensive rebounders.
6. I consciously talk to the ball as I shoot it saying, "Get in!"
7. I have just missed a shot. My teammates tell me to shake it off but I continue to think about the error and miss my next shot as well.
8. In important games, excessive pressure to do well leads me to take shots I normally wouldn't.
9. A teammate has just complained to me that I missed an open shot. The next time I get the ball I am determined to score to make it up.
10. When playing away from home I may be distracted by the surroundings, particularly early in the game.
11. My defender is playing me tight so I drive by her.
12. My shooting performance deteriorates in a brightly lit gym.
13. I am about to shoot when my opponent shouts and waves her arms. I am distracted by this.
14. The referee has just called me for charging. I don't let it distract me and take the ball to the basket the next opportunity I get.
15. I get frustrated when a teammate shouts for the ball just as I am about to shoot.
16. I take advantage of a defender who is slow recovering and make an easy jump shot.
17. It is easy for me to see open spots in the defense and to

create shooting opportunities for myself.

18. I shoot, unaware of my teammates and opponents other than my own defender.
19. I am aware of how my defender is playing me when I shoot the ball.
20. There are less than two minutes to go and we're behind. I begin to do desperate things, such as taking a shot outside my range.
21. I am posting up on the block and my defender is playing me on the high side so I am ready to dropstep baseline to the basket and score.
22. My friends are watching and I try to impress them with my shooting.
23. I can observe a situation and think ahead when I shoot.
24. I am out in front with the ball on a fastbreak. There is one defender back. I decide whether to pull up and take a jumpshot or drive by her for the lay-up and do it decisively.
25. It is equally easy for me to concentrate when I shoot whether we play home or away.
26. When I am shooting, I "coach" myself mentally with encouraging instructions (e.g., follow-through).
27. I have been fouled while shooting but the referee does not call it. I immediately complain to him, forgetting the game.
28. It is not unusual for me to have negative feelings about the outcome of my shot just before I shoot the ball.
29. It is equally easy for me to concentrate while shooting whether it is a close game or not.
30. Sometimes I miss open jumpshots because I "think too much."
31. If I have a poor shooting performance in the first few minutes of a game, I am unable to forget about it and concentrate for the remainder of the game.
32. When I am shooting the basketball, I am almost totally unaware of the spectators.
33. The ball is passed to me and I pass it away. The coach

then tells me I passed up a good shot and should take ones like it when given the opportunity.

34. I have just taken a bad shot, but quickly deal with distractive negative feelings.
35. I tend to pass up good shots because I decide too late whether or not to shoot.
36. I can anticipate certain movements by my defender and get easy shots because of this anticipation.
37. I often find myself passing up good shots.
38. My shot has just been blocked. At the other end of the floor I commit a frustration foul.
39. When a coach shouts instructions while I am shooting, my performance declines because I try to listen to the instructions.
40. I ignore any comments from the opposition's bench when I am shooting.
41. My defender is sagging into the key so I am ready to shoot a jumpshot when I catch the ball.
42. I remember previous shooting errors, such as falling short or not following through, and quickly make adjustments.
43. I am ready to shoot when a teammate calls for the ball. I am distracted by this.
44. I have missed my last three shots. I continue to think about the misses and my shooting performance declines.
45. I would describe myself as an intelligent shooter, recognizing good shot opportunities and taking advantage of them.
46. When I am slightly injured and continue to play I tend to lose concentration, thinking about my injury.
47. When I take my shot up in a crowd I am able to stay singularly focused on my shot even when there is a lot of congestion around me.
48. My defender is cheating baseline. I recall how the coach suggested I take advantage of this and do it, hitting an easy jumper.
49. I shoot the ball from the block and miss, unable to decide

whether to shoot off the glass or not.

50. I concentrate so well when I am shooting that I am not aware of the coach shouting instructions.
51. When I miss a shot I have trouble forgetting it and have trouble concentrating on my next shot.
52. When I shoot I often wonder whether I should have passed off instead.
53. I have been called for charging. I do not drive to the rest of the game for fear of committing a foul.
54. I am double-teamed but I am still able to receive a pass and score.
55. In a close game, I tend to take more shots than I should because I really want to succeed.
56. I would rather shoot the ball early, in less pressured situations.
57. I can develop a mental picture of myself shooting the ball before I actually do it.
58. I have just shot well in the first half. I sit back on my performance with the feeling that I've earned considerable playing time in the second half.
59. I can usually stay confident even through one of my poorer shooting performances.
60. When I am tired I tend to make mistakes and lose concentration while shooting.
61. My defender has just given me the baseline and I make an easy lay-up. I remember this the next time up the court and am ready to take advantage of it.
62. I have just been warned by the referee to stop questioning his calls.
63. My first shot of the game is an air-ball. The crowd hisses. I have trouble concentrating on my next shot.
64. My performance deteriorates considerably when the crowd is loud.

Appendix B

ITEM NUMBERS FOR BBAS SCALES

Attentional

Scale

Item Number

BET	2, 16, 19, 21, 41, 54
OET	10, 12, 13, 15, 35, 37, 39, 43, 64
BIT	23, 26, 31, 34, 36, 42, 48, 61
OIT	3, 6, 30, 38, 44, 46, 49, 52, 56, 60, 63
NET	1, 11, 17, 18, 24, 32, 40, 47
NIT	4, 14, 25, 28, 29, 50, 59
RED	7, 9, 20, 27, 51, 53, 62

Appendix C

PERSONAL ASSESSMENT QUESTIONNAIRE (FORM S)

Name: _____

Institution: _____

Please mark an X in the space that best represents your personal assessment of the statements. Example: If you have always been a successful shooter, mark an X in the left hand space; if you have been unsuccessful as often as successful, mark an X in the middle space; if you have been an unsuccessful shooter, mark an X in the right hand space.

As a shooter I have been generally

successful	_____	_____	_____	_____	_____	unsuccessful
unnoticed	_____	_____	_____	_____	_____	recognized
frustrated	_____	_____	_____	_____	_____	rewarded
happy	_____	_____	_____	_____	_____	sad
uncertain	_____	_____	_____	_____	_____	confident

My shooting ability is

above average	_____	_____	_____	_____	_____	below average
bad	_____	_____	_____	_____	_____	good
ridiculed by coach	_____	_____	_____	_____	_____	praised by coach
superior	_____	_____	_____	_____	_____	inferior
limited	_____	_____	_____	_____	_____	broad
praised by others	_____	_____	_____	_____	_____	ridiculed by others
encouraging	_____	_____	_____	_____	_____	frustrating
strong	_____	_____	_____	_____	_____	weak
worse than most	_____	_____	_____	_____	_____	better than most

Appendix D

Informed Consent Form

1. a) Purpose of the study Purpose is to predict basketball shooting success based on information regarding the personality variables attention and self-confidence.
- b) Benefits To date, little attempt has been made to assess shooting performance based on psychological variables and no attempt has been made to assess the shooting performance of female athletes. This study has potential utility from both a research perspective and from a coach decision-making perspective.
2. Method Subjects will complete two inventories, a Test of Basketball Shooting Attentional Style and a Personal Assessment Questionnaire. These inventories will take approximately 45 min to complete. Subjects are asked to devote uninterrupted time to the task.
3. Will this hurt? No physical or psychological risks are evident. Some frustration might arise during the completion of the inventories. The investigator will offer assistance to negate frustration.
4. Need more information? Additional information can be obtained from either Barbara Hebel (607 257-1271) or Dr. A. Craig Fisher (607 274-3112). All questions are welcomed and will be answered.
5. Withdrawal from the study Participation is voluntary. Subjects are free to withdraw their consent and discontinue at any time.
6. Will the data be maintained in confidence? All data will be confidential. Once data are collected, names of subjects will be discarded and replaced by subject number (e.g., Subject 54). Data will be analyzed by group, not by individual subject.
7. I have read the above and I understand its contents and I agree to participate in the study. I acknowledge that I am 18 years of age or older.

Signature

Date

Appendix E

TELEPHONE MESSAGE TO HEAD COACHES

Your basketball team has been randomly selected from female collegiate basketball teams in the Northeast to represent your sport in a research study. We are trying to predict field goal shooting success based on the personality variables attention and self-confidence. Might I continue to see whether or not you are interested?

To date, little attempt has been made to assess shooting performance based on psychological variables, and no attempt has been made to assess the shooting performance of female athletes. This study has potential utility from a research perspective and from a coach decision-making perspective. We will ask your players to complete two inventories, a Test of Basketball Shooting Attentional Style and a Personal Assessment Questionnaire. Task completion should take approximately 45 min and may be done so at your players' convenience. In addition, we will ask you to send us a copy of your team's official NCAA statistical sheet at the completion of the season. This is so that we may evaluate shooting performance.

May I approach the members of your basketball team about the possibility of participating in this study?

Appendix F

INSTRUCTIONS TO COACHES

1. Please assemble the members of your team in a quiet area that is void of distractions.
2. Before administering each packet to the athletes, please read the following text to your team members:

The game of basketball has undergone alterations over the years and today it is a fast moving game wherein all of the players have an opportunity to score. The very nature of the game indicates that accurate shooting is essential to the final outcome. But accurate shooting is a difficult task. Add to that the need for consistency and the difficulty is magnified.

It seems legitimate to suppose that a basketball field goal shooter must locate, select, and focus on relevant cues in order to be successful. Perception, particularly attention, is important in human athletic performance. If an athlete focuses on irrelevant cues, the performance will be less than optimal.

It seems that, like attention, self-confidence may be related to field goal shooting success. Researchers have investigated the relationship between individual personality dimensions and their contribution to successful performance in athletics and found that winners generally have higher levels of self-confidence than losers.

For these reasons, it has been hypothesized that attention and self-confidence are extremely important to basketball field goal shooting. To test this hypothesis, the researchers have asked that each of you complete two inventories. One is a Test of Basketball Shooting Attentional Style and the other is a Personal Assessment Questionnaire. The inventories will take approximately 45 min to complete.

Please understand that participation in this study is completely voluntary. If you do not wish to participate, please don't. If you do wish to participate, please understand that you are free to withdraw from participation at any time should you choose. Is there anyone here who would like to participate in this study?

3. Please excuse those who do not wish to participate from the room and administer one packet to each of those individuals who are remaining.
4. Upon your athletes' completion of the inventories, please collect the packets and return them to me in the enclosed envelope.

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