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STATE AND TRAIT ANXIETY, ACHIEVEMENT MOTIVATION
AND SKILL ATTAINMENT IN COLLEGE WOMEN

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Elsie Carter Burton, B.Sc., M.Sc.

* * * * *

The Ohio State University
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CHAPTER I

INTRODUCTION

The learner's physical attributes have been studied extensively within the field of physical education. However, until recently, very little attention has been directed to the less readily detectable but equally significant psychological variables present in the learning environment. It is now recognized that both extrinsic and intrinsic psychological variables potentially affect the quantitative and qualitative aspects of learning.

One of the essential prerequisites to learning is motivation. Lockhart states that two things are necessary in order to learn, capability and motivation.¹ Melton sees motivation as having a threefold function in learning; that of energizing the individual, directing his actions, and defining the consequences of these actions, thereby serving an emphasizing or selective function.²

¹Aileene Lockhart, "Prerequisites to Motor Learning," Academy Papers, The American Academy of Physical Education, I (March, 1968).

²Arthur W. Melton, "Motivation and Learning," in Studies in Motivation, ed. by David C. McClelland. (New York: Appleton-Century-Crofts, 1955), pp. 425-27.

The preponderance of published research relative to the role of motivation in physical education has concerned extrinsic motivation, that effected by situational incentives such as encouragement and discouragement,³ and differing motivational techniques.⁴ Very little attention has been directed toward investigating variability in intrinsic motivation and the resultant behavioral differences occurring in the physical education learning environment.

Motivation is a multidimensional construct, one aspect of which is achievement motivation. The theory of achievement motivation refers specifically to behavior involving achievement-oriented activity, that is, activity in which the individual expects to have his performance

³Celeste Ulrich and Roger Burke, "Effects of Motivational Stress Upon Physical Performance," Research Quarterly, XXVIII (December, 1957), 403-14; D. M. Hall and Rolene L. Cain, "Motivational Factors in Sit-Ups," Research Quarterly, XXXVI (March, 1965), 102-3.

⁴Gary F. Hansen, "Effect of Selected Motive-Incentive Conditions Upon Development of Strength Through and Isometric Training Program," Research Quarterly, XXXVIII (December, 1967), 585-92; Barry L. Johnson and Jack K. Nelson, "Effect of Different Motivational Techniques During Training and in Testing Upon Strength Performance," Research Quarterly, XXXVIII (December, 1967), 630-36; E. Dean Ryan, "Effect of Differential Motive Incentive Conditions on Physical Performance," Research Quarterly, XXXII (March, 1961), 83-87; Clinton Strong, "Motivation Related to Performance of Physical Fitness Tests," Research Quarterly, XXXIV (December, 1963), 497-507.

evaluated in terms of some standard of excellence.⁵

Achievement-oriented activities are characterized by the fact that the individual is responsible for the outcome, he anticipates some knowledge of results and there is a degree of uncertainty or risk involved.⁶ All of these factors are aspects of the usual learning situation and therefore are potential variables in skill attainment.

Research conducted by McClelland, Atkinson, and their associates has stimulated considerable investigation of the achievement motivation phenomenon. This has led to the development of comprehensive theoretical formulations and various methods of assessment.

Within the field of physical education two studies have recently been conducted to determine the relationship of achievement motivation to learning. Bethe investigated success in beginning handball as a function of achievement motivation as theoretically conceived by Atkinson.⁷

Daugert investigated the relationship of anxiety and need

⁵John W. Atkinson and Norman T. Feather, A Theory of Achievement Motivation (New York: John Wiley and Sons, Inc., 1966), p. 328.

⁶Ibid., p. 5.

⁷Donald R. Bethe, "Success in Beginning Handball as a Function of the Theory of Achievement Motivation," (unpublished Ph. D. dissertation, The Ohio State University, 1967).

achievement to learning in beginning swimming.⁸ The results of these studies did not indicate a significant relationship between need achievement scores and success in the activities.

There is a trend in current motivational research to functionally relate achievement motivation and anxiety.

Anxiety was originally conceived as a unitary phenomenon. However, the results of an extensive factor analytic study conducted by Cattell and Scheier and published in 1961, revealed two distinct components of the anxiety construct; a varying situational factor which they denoted real-situational anxiety and an enduring personality attribute they termed characterological anxiety.⁹ Following this concept, Spielberger proposed a two factor theory of anxiety in which the transitory situational factor was designated A-State and the enduring personality attribute was termed A-Trait.¹⁰

Very few studies have been conducted in the field of physical education to determine the relationship of the

⁸Patricia J. Dugert, "The Relationship of Anxiety and the Need for Achievement to the Learning of Swimming," (unpublished Ph. D. dissertation, University of Michigan, 1966).

⁹Raymond B. Cattell and Ivan H. Scheier, The Meaning and Measurement of Neuroticism and Anxiety (New York: The Ronald Press Co., 1961), p. 14.

¹⁰Charles D. Spielberger, ed. Anxiety and Behavior (New York: Academic Press, 1966), pp. 16-19.

anxiety constructs to skill learning and performance of women. For the most part, the results of the studies that have been conducted are inconclusive.

There has been only one reported attempt to assess the effects of both anxiety and achievement motivation in a physical education activity. Daugert examined the effects of these variables in beginning swimming. The results of her study indicated a relationship between specific anxiety and achievement motivation and skill attainment, but no relationship was found between general measures and skill learning.¹¹

It has been concluded from the results of a number of studies that individuals differ markedly in emotional responsiveness to different types of learning situations and that the effects of both types of anxiety are highly specific. This evidences the need for studies that will determine whether or not these variables are significant factors in specific skill learning situations.

Statement of the Problem

The purpose of this study was to determine what relationship, if any, exists between the variables state and trait anxiety, achievement motivation and skill attainment in beginning riflery and beginning bowling.

¹¹Daugert, "The Relationship of Anxiety and the Need for Achievement to the Learning of Swimming."

Specific Problems

The investigator was interested in determining:

1. Whether high and low state and trait anxiety subjects are differentially effected by differing physical education activities and learning environments.

2. Whether high and low achievement motivation has a similar relationship to skill attainment in different activities and in differing learning environments.

3. The relationship of state and trait anxiety and achievement motivation to skill attained in beginning riflery and beginning bowling.

4. The relationship between state and trait anxiety and two aspects of achievement motivation.

Significance of the Study

The purpose of this study was to obtain information concerning certain factors potentially effecting motor learning. It was designed to provide information concerning the interaction between certain personality attributes and specific situational influences in the learning environment. It was felt this information would serve to enhance the understanding of the variability among individuals and of their differing responses to situational variables in the physical education environment.

The present emphasis on greater understanding of the nature of the learner in the learning environment,

the inconclusive results of previous studies, and the lack of current research all indicate a need for further study of the relationship of the variables state and trait anxiety and achievement motivation to skill development in women.

Definition of Terminology

Achievement motivation or need achievement.--An affective arousal state directing behavior in an achievement-oriented activity cognitively appraised as potentially satisfying. It is assessed as the motivational dispositions, the need to do a job well and the need to be a success which results in emulation of the successful rather than hard work.

Motivation.--An activated state that exists when a motive has been engaged by a cognitive expectation that performance of the act will provide satisfaction of the goal of that particular motive.

Motive.--A relatively general and stable disposition to strive for a certain kind of satisfaction.

Constrained performance.--Activity restricted to an assigned task. Individual choice consists only of deciding whether to perform the required task or to leave the situation.

Skill attainment.--Increased ability to perform a motor activity as a result of instruction and practice.

State anxiety.--A transitory emotional state or condition characterized by subjective, consciously perceived feelings of tension and apprehension which may vary in intensity and fluctuate over time.

Trait anxiety.--An acquired behavioral disposition based primarily on residues of past experience that predisposes an individual both to view the world in a particular way and to manifest object-consistent response tendencies.

Limitations and Assumptions

1. This study was limited to 104 women students enrolled in beginning riflery and to 108 women students enrolled in beginning bowling at The Ohio State University during Winter Quarter, 1970.

2. It was assumed the State-Trait Anxiety Inventory developed by Spielberger, Gorsuch and Lushene is an adequate measure of state and trait anxiety.

3. It was assumed the Two Scales To Measure Achievement Motivation developed by Costello are adequate measures of the motivational dispositions the need to do a job well and the need to be a success which results in emulation of the successful rather than hard work.

4. It was assumed the scale items evoked valid responses from the subjects tested.

5. Averaged riflery scores and averaged bowling scores were assumed to be adequate measures of skill attainment in the selected activities.

6. It was assumed there would be a situational difference between the intensity of state anxiety in riflery and in bowling.

Hypotheses

I. The state anxiety scores of the riflery students will be significantly higher than the state anxiety scores of the bowling students.

II. The trait anxiety and achievement motivation scores of the bowling and riflery students will not differ significantly.

III. There will be a positive correlation between state and trait anxiety scores.

IV. There will be a positive correlation between the motivational dispositions desire to do a job well and the need to be a success which results in emulation of the successful rather than hard work.

V. State anxiety will correlate negatively with each of the motivational factors.

VI. There will be a negative correlation between trait anxiety and each of the measures of achievement motivation.

VII. The subjects with low anxiety or high achievement motivation scores will attain a higher level of skill in bowling or riflery than will the subjects who have high anxiety or low achievement motivation scores.

CHAPTER II

REVIEW OF RELATED LITERATURE

There has been little reported research in the field of physical education relative to the relationship of achievement motivation and anxiety to skill attainment in women. Therefore, in the review of literature the theoretical development of motivation is presented, followed by a discussion of relevant literature concerning the variables achievement motivation and anxiety, and finally, the relationship of these variables to learning is discussed.

Development of Theories of Motivation

The antecedent of modern motivational theory was psychological hedonism. The doctrine of hedonism was a nonscientific, philosophical value system stemming from ethical philosophy. It postulated that attainment of happiness, or pleasure seeking, was the basis of action and desire resulting in attempts to achieve and maximize pleasure, while avoiding or eliminating displeasure or pain.¹ Hedonism as a determiner of conduct is no longer

¹M. D. Vernon, Human Motivation (New York: John Wiley and Sons, Inc., 1954), p. 3.

accepted in psychological theory, rather, it is considered the emotional accompaniment of motivated behavior.²

The advent of Darwinian theory in the mid-nineteenth century gave rise to the "instinct" school of motivation, which culminated in the theoretical position of William McDougall. McDougall disclaimed hedonistic theory entirely and postulated a "hormic theory" which stressed that the origin of behavior was innate and unlearned instincts. Recognizing the limitations of instinct theory in accounting for the complexity of human motivation, McDougall later revised his theory, attributing human behavior to a number of "innate propensities".³

Modern motivational theories have originated in two fields of psychology which were developing at the beginning of the twentieth century, psychoanalysis and learning theory. Contemporary theories can be divided into two broad classes on the basis of their content, those developing inside personality theory which can be designated as theories of "personality dynamics", and

²J. P. Chaplin and T. S. Krawiec, Systems and Theories of Psychology (New York: Holt, Rinehart and Winston, Inc., 1958), pp. 393-94.

³Vernon, Human Motivation, pp. 4-5.

those developing inside learning theory which may be denoted "learning dynamics".⁴

The central concept of personality dynamics is "need", a construct originating with Murray.⁵ In contemporary theory need is synonymous with motive and is conceived as a general term designating the driving forces behind behavior.⁶ Theorists differ as to the origin of needs. In Murray's theory there are two types of needs differing in origin. He saw viscerogenic needs as being innate, while psychogenic needs though dependent upon viscerogenic needs, develop through cultural influences.⁷ However, in current theory there are conflicting views. Cattell sees all needs as basically constitutional, that is, traceable to hereditary and congenital causation.⁸ Conversely, McClelland postulates that all needs are acquired. He believes all motives are learned although the affective arousal on which motives are based is essentially unlearned.⁹

⁴K. B. Madsen, "Theories of Motivation," in Human Motivation: A Symposium, ed. by Marshal R. Jones (Lincoln: University of Nebraska Press, 1965), p. 50.

⁵Henry A. Murray, Explorations in Personality (New York: Oxford University Press, 1938), pp. 54-129.

⁶Madsen, "Theories of Motivation," p. 51.

⁷Murray, Explorations in Personality, pp. 74-81.

⁸Raymond B. Cattell, An Introduction to Personality Study (New York: Hutchinson House, 1950), pp. 28-29.

⁹David C. McClelland, et al. The Achievement Motive (New York: Appleton-Century-Crofts, 1953), p. 83.

Examples of theories of learning dynamics are those of Hull and Spence. These theories see motivation as divided into two parts, the peripheral "need" and the central "drive".¹⁰

The complexity of human motivation and the diversity of theoretical concepts is illustrated in Madsen's compilation of the twenty principle theories of motivation. On the basis of his analysis, he concludes that three classifications of motives exist in all human beings, and that they differ in frequency and strength as a result of differences in individual dispositions. These three classes of motives are primary, emotional and secondary. Primary motives are essentially organic and include hunger, thirst, sex, temperature, pain-avoidance, nursing, excretion, oxygen, rest and activity. The emotional motives are security and aggression. Secondary motives are those related to contact, achievement, power and possession.¹¹

Heckhausen points out the necessity of distinguishing between potential and actual motivation. He sees potential motivation as a normative state which determines how specific situations must be constituted in order to

¹⁰Madsen, "Theories of Motivation," p. 51.

¹¹K. B. Madsen, Theories of Motivation (Kent, Ohio: The Kent State University Press, 1968), pp. 320-23.

be satisfactory to a certain individual.¹² This is similar to Atkinson's concept of motive as a latent disposition to strive for a particular goal-state or aim.¹³ In contrast, actual motivation is an aroused state that exists when motives have been activated.¹⁴ This involves an expectancy that performance of the act will be instrumental in attaining the goal of that particular motive. In some instances, the cues of a situation will arouse the expectancies that through performance of a certain act several different motives will be satisfied. The resultant behavior then reflects the combined strength of these several motives. Atkinson refers to this resultant behavior as being "overdetermined".¹⁵

Although theories of motivation differ markedly, the foregoing discussion has evidenced three essential motivational components. These are a physiologically

¹²Heinz Heckhausen, The Anatomy of Achievement Motivation (New York: Academic Press, 1967), p. 2.

¹³John W. Atkinson and W. R. Reitman, "Performance as a Function of Motive Strength and Expectancy of Goal Attainment," Journal of Abnormal and Social Psychology, LIII (1965), p. 361.

¹⁴Heckhausen, The Anatomy of Achievement Motivation, p. 2.

¹⁵John W. Atkinson, ed., Motives in Fantasy, Action and Society (Princeton, N.J.: D. Van Nostrand Co., Inc., 1958), pp. 600-1.

functioning organism, an enduring latent disposition, and a situational state that is perceived as being potentially satisfying to one or more motives.

Theoretical Development of Achievement Motivation

Murray was the first to define need achievement. As early as 1938 he utilized a questionnaire to obtain individual differences in strength of the motive to achieve.¹⁶ This was followed in the 1940's by the work of a group directed by McClelland and Atkinson. The work of this group centered in attempts to arouse and control the intensity of the achievement motive and to measure its effect on imagination or fantasy. Their approach was guided by psychoanalytic theory, experimental psychology, and the clinical success of Murray's Thematic Apperception Test.¹⁷ The empirical exploration of this group provided evidence that scores obtained from the Thematic Apperception Test (TAT), were measures of a disposition to strive for achievement in a variety of different situations.¹⁸

Atkinson hypothesized that the positive relationship between need achievement scores and achievement-oriented

¹⁶Murray, Exploration in Personality, p. 165.

¹⁷McClelland, et al., The Achievement Motive, pp. 2-3.

¹⁸Ibid., p. 97-106.

behavior resulted from immediate environmental factors which determine the individual's expectations concerning the effects of successfully completing the task.¹⁹ This lead McClelland, Atkinson and their associates to a distinction between psychogenic need or motive (conceived as a relatively stable but latent personality trait), and the tendency strength actively aroused and expressed in behavior within a particular situation.²⁰

Next the question arose as to how individual differences in the strength of achievement-related motives influences behavior in achievement situations. Empirical evidence from research conducted in the early 1950's lead Atkinson to a theoretical formulation concerning individual differences in strength of achievement motivation. Relying on Tolman's analysis of performance, Atkinson concluded that the strength of motivation to perform some act is the multiplicative function of three variables; the strength of the motive, the expectancy of goal-attainment aroused by the situational cues, and the

¹⁹John W. Atkinson, "The Achievement Motive and Recall of Interrupted and Completed Tasks," Journal of Experimental Psychology, XLVI (1953), p. 389.

²⁰John W. Atkinson, "Some General Implications of Conceptual Developments in the Study of Achievement-Oriented Behavior," in Human Motivation: A Symposium, ed. by Marshal R. Jones (Lincoln: University of Nebraska Press, 1965), p. 8.

incentive value of the particular accomplishment.²¹

Therefore, according to Atkinson, the final strength of tendency portrayed in behavior may represent the cumulative effect of a number of different motives, and thus may be overdetermined.²²

Success and failure in achievement-oriented situations

Achievement-oriented behavior is characterized by an expectation that performance will be evaluated in terms of a standard of excellence.²³ Therefore, the nature of the situation implies expectancy of success as well as anticipation of possible failure. Heckhausen states:

In the final analysis, success and failure are always incidents relevant to an achievement-oriented person-environment relationship and thus are transient terminal states related to achievement motivation.²⁴

Therefore, all achievement-oriented behavior involves "level of aspiration", a concept introduced by Dembo in

²¹John W. Atkinson, "Motivational Determinants of Risk-Taking Behavior," in A Theory of Achievement Motivation, ed. by John W. Atkinson and Norman T. Feather (New York: John Wiley and Sons, Inc., 1966), p. 13.

²²Ibid., p. 14.

²³Atkinson, "Some General Implications of Conceptual Developments," p. 11.

²⁴Heckhausen, The Anatomy of Achievement Motivation, p. 5.

1931.²⁵ The basic nature of this relationship has been repeatedly confirmed in recent research.²⁶

In the past it was assumed that in general the attractiveness of success was a positive function of task difficulty whereas the unattractiveness of failure was a negative function of difficulty. Atkinson recognized the over-simplification of this interpretation and devised a complex formulation involving mathematical computations of the incentive values of success and failure. He also developed a method of calculating individual differences in the strength of the achievement motive and the motive to avoid failure, as well as relating these to aspiration level.²⁷ Heckhausen is critical of Atkinson's formulation, stating that it appears to be mathematized calculus rather than a psychological model.²⁸

Atkinson postulated that high scores in Thematic Apperception measures indicate a stronger motive to achieve, whereas low scores indicate a stronger motive to avoid failure.²⁹ Clark and his associates have

²⁵K. Lewin, et al., "Level of Aspiration," in Personality and the Behavior Disorders, ed. by J. McV. Hunt (New York: The Ronald Press Co., 1944), p. 333.

²⁶Heckhausen, The Anatomy of Achievement Motivation, p. 92.

²⁷Atkinson, "Motivational Determinants," pp. 11-29.

²⁸Heckhausen, The Anatomy of Achievement Motivation, p. 99.

²⁹Atkinson, "Motivational Determinants," p. 23.

designated the extreme patterns of this behavior as "hope of success" and "fear of failure".³⁰ According to Atkinson's theory, when the motive to avoid failure is stronger there is an accompanying anxiety about failure. Therefore, hope of success is associated with lower anxiety and conversely, greater fear of failure is associated with a higher anxiety level.³¹ Reitman and Williams conducted a study to determine the validity of this interpretation. Their results indicated that there was no relationship between the hope of success-fear of failure continuum and need achievement scores. Therefore, they concluded that failure avoidance is an independent dimension not necessarily inversely related to success seeking tendencies.³² The trend in recent research has been to utilize anxiety questionnaires to assess anxiety level rather than inferring its strength from measures designed to assess other variables.

³⁰R. A. Clark, R. Teevan and H. N. Ricciuti, "Hope of Success and Fear of Failure as Aspects of Need for Achievement," Journal of Abnormal and Social Psychology, LIII (1956), pp. 182-86.

³¹Atkinson, "Motivational Determinants," p. 23.

³²E. E. Reitman and C. D. Williams, "Relationship Between Hope of Success and Fear of Failure, Anxiety, and Need for Achievement," Journal of Abnormal and Social Psychology, LXII (1961), pp. 465-67.

Origins of the achievement motive

The developmental theory of achievement motivation has for the most part originated with McClelland. He does not accept the premise that psychogenic motives are built on primary biological drives. Rather, he sees biological need as only one of the conditions which gives rise to motivational associations. McClelland believes the crucial factor in the development of motives is the association of certain cues, namely pleasure or pain, with affective arousal states.³³ Although motives are individually acquired, certain environmental conditions will produce pleasure or pain so consistently, either through biological or cultural arrangements, that there is a high probability of common motives developing in all people.³⁴

The achievement motive is developed by continuously growing possibilities and demands for achievement. It is the product of universal experiences centered in problem solving, such as learning to walk, talk or write. Expectations relative to such tasks involve standards of excellence structured by parents and in the surrounding culture.³⁵ Thus as the child masters various problems

³³David C. McClelland, Studies in Motivation (New York: Appleton-Century-Crofts, 1955), p. 231.

³⁴Ibid., p. 233.

³⁵McClelland, The Achievement Motive, p. 78.

there is opportunity for certain mastery cues, such as effort, difficulty, incompleteness and so forth to become associated with affective arousal. In time this will produce centrally motivating anticipations of success and failure.³⁶

Crandall, Katkovsky and Preston see the achievement motive as the product of social learning. They conceive of the total motivational goal (in early childhood) as being the attainment of parental approval and avoidance of disapproval.³⁷ Heckhausen believes that even though parental attitudes serve as effective reinforcers, they do not constitute the only possible type of reinforcement. He assumes occurrence of a self-reinforcement resulting from experiential pleasure which in turn stimulates self-initiated activity.³⁸ Madsen concurs, stating that in addition to the social contact motive and fear of failure, there is some activity motivation serving as a basis for the achievement motive.³⁹

³⁶McClelland, Studies in Motivation, p. 233.

³⁷V. J. Crandall, W. Katkovsky and Anne Preston, "A Conceptual Formulation for Some Research on Children's Achievement Development," Child Development, XXXI (1960), p. 791.

³⁸Heinz Heckhausen, "Achievement Motive Research: Current Problems and Some Contributions Toward a General Theory of Motivation," in Nebraska Symposium on Motivation, ed., by William J. Arnold (Lincoln: University of Nebraska Press, 1968), pp. 130-31.

³⁹Madsen, "Theories of Motivation," p. 66.

The complex relationship of the social and psychological variables effecting development of the achievement motive is discussed by Heckhausen. He explains that a pure task orientation is rare. Usually situations involve the value or respect one places on himself, or which is attributed to him by relevant others. Most achievement goals are attainable only through a social process. In most instances goals involving task performance also involve self-esteem and social recognition. This is characteristic of a culture in which personal advancement is determined by social evaluation.⁴⁰

There is strong empirical support for the hypothesis that the achievement motive develops in cultures and families in which there is an emphasis on the independent development of the individual. Low achievement motivation appears to be associated with situations in which children are more dependent and in which they are made to feel inferior.⁴¹

It may be concluded that although arising from a mixed organic base, development of the achievement motive is largely the function of experience, particularly that which contributes to the development of independence and

⁴⁰Heckhausen, The Anatomy of Achievement Motivation, p. 36.

⁴¹McClelland, et al., The Achievement Motive, p. 178.

self-reliance. It develops early in childhood and becomes a relatively stable personality attribute which is highly resistant to change.⁴²

The achievement motive in women

There are definite similarities in the motive patterns of individuals. However, studies of the achievement motive as measured by the TAT indicate marked sex related differences within the American culture.

The results of several studies have lead to the following conclusions concerning the achievement motive in women; (1) women get higher need achievement scores than men under neutral arousal conditions, (2) women's scores have not followed the same predictive results as have those of male subjects, and (3) women do not show an increase in need achievement scores as a result of motivating instructions.⁴³

A study by Veroff, Wilcox and Atkinson clearly demonstrated that both male and female subjects respond differently to pictures containing male and female characters. In both sexes there was a greater achievement

⁴²Atkinson, Motives in Fantasy, Action and Society, p. 598.

⁴³McClelland, et al., The Achievement Motive, p. 178.

related response to pictures containing male characters.⁴⁴

Other studies have shown that social acceptability has no effect on the TAT based scores of males, whereas in females there is a definite effect.⁴⁵

It may be concluded therefore, that the achievement motive as measured by the TAT is culturally defined and that in western culture sex differences in the achievement motive are determined by different culturally determined expectations. The achievement motive in men is related to expectations concerning leadership and intellectual prestige, while in women it is associated with social acceptability.⁴⁶ It is therefore erroneous to generalize concerning results of studies related to achievement motivation when the generalization involves the sex other than that utilized to obtain the empirical data.⁴⁷ This factor has served to restrict the types of studies that may accurately be related to the present investigation.

⁴⁴Joseph Veroff, Sue Wilcox and John W. Atkinson, "The Achievement Motive in High School and College Age Women," Journal of Abnormal and Social Psychology, XLVIII (1953), p. 118.

⁴⁵McClelland, et al., The Achievement Motive, p. 180.

⁴⁶Ibid.

⁴⁷Gardner Lindzey and Shirley Heinemann, "Thematic Apperception Test: Individual and Group Administration," Journal of Personality, XXVI (1955), pp. 34-55.

Measurement of achievement motivation

The most widely used technique of assessing achievement motivation is the Thematic Apperception Test. Originally devised by Murray in the 1930's, it was extensively revised by McClelland and Atkinson in 1947.⁴⁸

The TAT is a projective instrument designed to elicit unconscious motives through requiring the individual to create imaginative stories in response to a series of pictures. The content of the subject's fantasy is then analyzed to reveal the unconscious motive components.⁴⁹ Proponents of the TAT assert that it has several advantages over other measures. It is felt bias is minimized, that inner motives of experience and behavior are tapped and that the method allows for wider latitude of individual responses.⁵⁰ There are, however, several external factors which may influence situational arousal conditions during administration of the TAT. These are experimenter communications and role relationship between experimenter and subject, transfer effects from pre-test activities, and special incentives.⁵¹ The basic

⁴⁸Atkinson, Motives in Fantasy, Action and Society, p. 1.

⁴⁹Ibid., pp. 31-36.

⁵⁰Heckhausen, The Anatomy of Achievement Motivation, pp. 9-10.

⁵¹Heckhausen, "Achievement Motive Research," p. 112.

problem associated with use of the TAT is picture cues. The selection of pictures by the investigator determines the range of cues being sampled. These may be so narrow they restrict imagery or so wide general person-environment relationships are sampled.⁵² The outcome of the study may also be related to the experimenter's experience in analyzing the story content.

A second projective measure used in a number of studies is the French Test of Insight. It differs from the TAT in that the stimuli are derived from verbal descriptions rather than pictures. Various types of motivated behavior are presented and the subjects are asked to explain or comment on them.⁵³ Although this technique has been successfully employed on numerous occasions, it has not been as widely accepted as the TAT. Its use is subject to the same limitations as those given in the discussion concerning the TAT.

The oldest and simplest way of measuring human motivation is to ask the subject what his motives are. This involves either direct or indirect methodology.⁵⁴

⁵³Ibid., p. 113.

⁵⁴Elizabeth G. French, "Development of a Measure of Complex Motivation," in Motives in Fantasy, Action and Society, ed., by John W. Atkinson (Princeton, N.J.: D. Van Nostrand Co., 1958), pp. 242-48.

⁵⁴Atkinson, Motives in Fantasy, Action and Society, p. 22.

The direct method involves self-analysis. DeCharms and his associates used the direct method by asking subjects to respond to nine achievement oriented questionnaire items.⁵⁵ Holmes and Tyler asked subjects to indicate how high or low their need to achieve was in comparison to other students. They also utilized a self-peer ranking measure.⁵⁶

There are two types of indirect measures of achievement motivation. One consists of asking the subject to express his like or dislike for a variety of activities, objects or situations. An example of this type is Edwards Personal Preference Scale which forces the subject to make a choice between two statements expressing alternative needs.⁵⁷ A second method of indirect assessment is the self-descriptive inventory. Costello has recently devised an inventory of this type designed to measure two motivational dispositions. These are the desire to do a job well and the need to be a

⁵⁵Richard DeCharms, et al., "Behavioral Correlates of Directly and Indirectly Measured Achievement Motivation," in Studies in Motivation, ed., by David C. McClelland (New York: Appleton-Century-Crofts, 1955), pp. 414-23.

⁵⁶David C. Holmes and John D. Tyler, "Direct Versus Projective Measurement of Achievement Motivation," Journal of Consulting and Clinical Psychology, XXXII (1968), pp. 712-17.

⁵⁷Atkinson, Motives in Fantasy, Action and Society, p. 22.

success which results in emulation of the successful rather than hard work.⁵⁸ The anxiety scales which have been utilized to detect fear of failure are also examples of indirect measures.

The advantages of these types of measures are the ease with which they may be administered and scored, their reliability, and the opportunity they provide for comparison of results from different studies. The weaknesses of these measures are that they do not appear to detect changes in the strength of the motive they purport to measure, and the acquiescence factor (the tendency to go along with any statement even when it contradicts one formerly agreed to).⁵⁹

Ratings by outside observers have on occasion been used to measure motivation. However, on the whole they have not proven satisfactory. Their reliability is questionable and there is no method of determining the extent to which these observations detect the motive in question as the only or principle motive producing the observed behavior.⁶⁰

⁵⁸Charles G. Costello, "Two Scales to Measure Achievement Motivation," The Journal of Psychology LXVI (1967), pp. 231-35.

⁵⁹Atkinson, Motives in Fantasy, Action and Society, pp. 23-25.

⁶⁰Ibid., pp. 26-27.

Physiological measures have been utilized to detect changes in motivational level in studies conducted in the field of physical education. Ulrich and Burke utilized several physiological measures to determine the effect of motivating conditions on performance of a bicycle ergometer task.⁶¹ Lakie examined the relationship between the galvanic skin response, task difficulty, personality traits and motivation. His task was a series of grip tests.⁶² The results of these studies suggest that physiological measures may be of some value in detecting variations in motivational arousal.

Several studies have been conducted to determine the relationship of achievement motivation indices. In a comparative study of direct versus projective measures, Holmes and Tyler found no significant correlation between TAT based scores and self-report measures.⁶³ Lindzey and Heinemann found that TAT scores were not related to direct self-ratings.⁶⁴ DeCharms, et al., found a very low

⁶¹Ulrich and Burke, "Effects of Motivational Stress,"

⁶²William L. Lakie, "Relationship of Galvanic Skin Responses to Task Difficulty, Personality Traits, and Motivation," Research Quarterly, XXXVIII (March, 1967), pp. 58-63.

⁶³Holmes and Tyler, "Direct Versus Projective Measures," p. 716.

⁶⁴Lindzey and Heinemann, "Thematic Apperception Test," p. 46.

positive correlation between need achievement scores and one set of achievement questions and an almost significant negative correlation with another set given the same subjects.⁶⁵ Need achievement scores have been found to be negatively correlated with achievement related sentence completion for male subjects, but positively related for females.⁶⁶

This lack of continuity in achievement motivation measures seems to result from semantic confusion and conceptual ambiguity. Atkinson cautions against calling different measures by the same name or thinking they measure the same motive. He concludes that scores based on the TAT are not likely to be measuring the same thing that is measured by any set of choice-type items.⁶⁷ Krumboltz believes the lack of uniformity in measurement is due to investigators defining motivation in different ways.⁶⁸ Heckhausen postulates that some measures seem to be detecting general culture dependent valuations of achievement abilities and similar characteristics rather than isolating motivational variables.⁶⁹

⁶⁵DeCharms, et al., "Hope of Success, Fear of Failure."

⁶⁶Lindzey and Heinemann, "Thematic Apperception Test," p. 47.

⁶⁷Atkinson, Motives in Fantasy, Action and Society, p. 30.

⁶⁸John D. Krumboltz, "Measuring Achievement Motivation: A Review," Journal of Counseling Psychology, IV (1967), p. 192.

⁶⁹Heckhausen, The Anatomy of Achievement Motivation, p. 7.

Conclusions concerning achievement motivation literature

Achievement motivation has for the most part been conceived as a unitary construct. It has been considered a general motive with possible sub-types.⁷⁰ However, a factor analytic study conducted by Mitchell revealed several varieties of achievement motivation. Mitchell found that the achievement motive is in reality a complex of relatively independent dimensions which differ in implication and possess different empirical correlates. In Mitchell's study:

Twenty-nine indices of achievement motivation were subjected to factor analysis. Six factors were identified: Academic Motivation and Efficiency (the only factor highly predictive of actual academic performance), Wish-Fulfillment Motivation, Nonacademic Achievement Motivation, Self-Satisfaction, External Pressure to Achieve, and Imputed Generalized Motivation without Attendant Effort.⁷¹

Mitchell also detected that tests and test items differ widely relative to which particular aspect of the achievement motive complex they actually measure. He also concludes that identical responses could have very different meanings for different subjects.⁷²

⁷⁰McClelland, et al., The Achievement Motive, p. 332.

⁷¹J. V. Mitchell, "An Analysis of the Factorial Dimensions of the Achievement Motivation Construct," Journal of Educational Psychology, LII (1961), p. 187.

⁷²Ibid., p. 186.

This discussion evidences the specific nature of various components of the motive to achieve in a specified task. This leads to the conclusion that generalizations relative to the achievement motive are for the most part inaccurate. Therefore the role of the motive in a given situation must be deduced from empirical evidence obtained in that particular activity.

The Anxiety Construct

Anxiety was originally conceived as a unitary phenomenon. However, in 1956, Rosenthal did a factor analysis of anxiety variables and concluded that anxiety was not in fact singular in nature.⁷³ By 1961 Cattell and Scheier had successfully isolated two distinct components of anxiety, a varying situational factor which they denoted real-situational anxiety, and an enduring personality attribute they termed characterological anxiety.⁷⁴ Following this concept Spielberger, in 1966, proposed a two factor theory of anxiety, designating situational anxiety as A-State and the personality trait as A-Trait anxiety.⁷⁵

⁷³Irene Rosenthal, "A Factor Analysis of Anxiety Variables," Dissertation Abstracts, XVI (1956), p. 376-77.

⁷⁴Cattell and Scheier, The Meaning and Measurement of Neuroticism and Anxiety, p. 14.

⁷⁵Spielberger, Anxiety and Behavior, pp. 16-19.

As a situational variable anxiety is used in an empirical sense to denote the complex reaction of the otherwise normal individual to a threat of uncertain magnitude. It is therefore, a transitory state or condition of the organism that varies in intensity and fluctuates over time.⁷⁶ This type is considered to be objective anxiety, as the threat imposed by the danger existing in the situation is real and the anxiety reaction is proportional to the magnitude of the external threat.⁷⁷

The term anxiety is also used in referring to an enduring aspect of the personality. In this sense, it refers to a characteristic tension level varying among people and also to the prominent defenses against such a state. This type is referred to as "trait" or "chronic" anxiety. This type differs from objective anxiety in that the source of danger that evokes the reaction is internal rather than external. It implies a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively non-dangerous circumstances as threatening and to respond to these with intensity disproportionate to the magnitude of the objective danger.⁷⁸

⁷⁶ Spielberger, Anxiety and Behavior, p. 12.

⁷⁷ Ibid., pp. 9-10.

⁷⁸ Ibid., p. 17.

Ausubel, Schiff and Goldman explain the two anxiety constructs as follows:

Anxiety precipitated by an environmental hazard because of impaired self-esteem (leading to a predisposition to overreact with fear to threat) is both quantitatively and qualitatively different from the anxiety induced by the same external hazard when the personality predisposition is absent. In the first instance, a general predisposition to react with fear is merely released, in the second, the fear response is freshly and specifically instigated in relation to the situation.⁷⁹

Spielberger postulates that the arousal of A-States involve a sequence of temporally ordered events in which a stimulus cognitively appraised as dangerous evokes a reaction. This reaction may in turn initiate a behavioral pattern designed to avoid the danger situation, or it may evoke defensive maneuvers which then alter the cognitive appraisal of the situation. Differences in A-Trait determine the particular stimuli an individual cognitively appraises as threatening.⁸⁰

Suinn states that individuals who experience one type of anxiety also tend to experience other types of anxiety and therefore, susceptibility to anxiety may be a

⁷⁹David P. Ausubel, Herbert M. Schiff and Morton Goldman, "Qualitative Characteristics in the Learning Process Associated with Anxiety," Journal of Abnormal and Social Psychology, XLVIII (1953), p. 546.

⁸⁰Spielberger, Anxiety and Behavior, p. 18.

general trait.⁸¹ The results of studies measuring levels of A-Trait and A-State have indicated that this tends to be a pattern because individuals with a high level of trait anxiety tend to perceive a wider range of situations as dangerous or threatening and therefore react more frequently to situational variables. However, whether or not an individual with high A-Trait will show corresponding differences in A-State depends upon the extent to which the situation is perceived as dangerous or threatening.⁸²

Theoretical positions relative to anxiety

Theories regarding the origin of anxiety have been primarily derived from two schools of psychological thought, psychoanalytic and learning theory.

Freudian Theory.--Freud was the first to develop a theory of anxiety and several later theories were derived from his hypothesis. Freud modified his theoretical position several times, however, he states conclusively that the ego is the real seat of anxiety. Freud saw

⁸¹Richard Suinn, "Susceptibility to Anxieties: A Generalized Trait," Journal of General Psychology, LXXIII (1965), p. 318.

⁸²Charles D. Spielberger, Richard L. Gorsuch, and Robert E. Lushene, The State-Trait Anxiety Inventory: Test Manual for Form X (Palo Alto, California: Consulting Psychologists Press, 1969), p. 2.

anxiety as the ego's reaction to danger, with the threat existent in potential deprivation of basic physiological needs as the causative agent in the development of anxiety.⁸³

The Theory of the Neo-Freudians.--The Neo-Freudians rejected Freud's concept of primary anxiety and attributed the development of anxiety to the social process. These psychologists theorize that anxiety originates from the young child's realization of his own helplessness and his utter dependence on others for protection and survival. Anxiety then, increases in proportion to the degree of restriction, threat, and punishment used to control the child's behavior. The process increases in complexity due to natural reaction to frustration, that of hostility against the frustrating agent. This may lead to further coercive action by some aspect of the environment and thus the hostility feelings themselves become invested with anxiety. Therefore, most adult anxiety is secondary, occurring as a consequence of threats against the defenses (the adaptive behavior) that prevents primary anxiety from coming into consciousness.⁸⁴

⁸³Sigmund Freud, The Problem of Anxiety (New York: W. E. Norton and Co., Inc., 1936).

⁸⁴Eugene E. Levitt, The Psychology of Anxiety (New York: The Bobbs-Merrill Company, Inc., 1961), p. 33.

Learning theory.--Within learning theory, anxiety is considered a learned drive derived from an innate desire to avoid pain. Therefore anxiety results from the concept of the pain attached to a particular stimulus. The greater the number of association experiences and the more severe the pain, the more intense the resultant fear. This fear may then be generalized in two ways. The organism may learn to fear the things associated with the stimulus and the circumstances within which it is experienced, and the fear stimulus may be generalized to include objects or conditions descriptively similar to the original threatening stimulus.⁸⁵

The relationship of fear and anxiety

Within the literature there are two conflicting views concerning the use of the terms "fear" and "anxiety". Some psychologists (particularly the behaviorists) use the terms interchangeably, whereas others believe there is a distinguishable difference. Those who adhere to the latter position see the distinction in slightly different ways. Some see fear as being characterized by a tendency to withdraw from or avoid confrontation with the threatening situation, whereas anxiety is considered to be an enduring

⁸⁵J. Dollard and N. E. Miller, Personality and Psychotherapy (New York: McGraw-Hill Book Co., Inc., 1950).

internal state which may or may not be overtly revealed.⁸⁶
Fear is also conceived as the antecedent of anxiety.⁸⁷
Anxiety is seen as being qualitatively related to fear
and theoretically there is an anxiety counterpart to every
fear state. Anxiety is also conceived as a failure in
any aspect of a flight response, whether perceptual,
emotional, conceptual, or behavioral.⁸⁸

Some psychologists believe the use of the term
anxiety should be restricted to designation of fear
stemming from a source unidentified by the individual,
while fear should be used to describe the condition
when the person is aware of a threatening object or
situation. However, in practice it is impossible to
maintain this distinction. In most individuals anxiety
reactions are neither a highly specific nor a completely
diffuse apprehension, but rather, they occur at some point
on the continuum between these extremes.⁸⁹

⁸⁶Irving Sarnoff and Philip G. Zimbardo, "Anxiety,
Fear and Social Affiliation," Journal of Abnormal and
Social Psychology LXII (1961), pp. 355-63.

⁸⁷Henry C. Leavitt, "Genetic Relations Between
Anxiety and Fear," Psychoanalytical Review XLIV (1957),
pp. 65-72.

⁸⁸Daniel Eastman, "What is Anxiety?" Psychological
Abstracts XXVI (1952), p. 3495.

⁸⁹Levitt, The Psychology of Anxiety, p. 8.

Anxiety and drive theory

Research conducted to investigate the nature and effects of anxiety has been stimulated by two divergent theoretical positions concerning anxiety as a motivational variable. These two positions have been denoted the Iowa Theory and the Yale Theory.

The Iowa Theory.--The principle proponents of the Iowa Theory are Taylor and Spence. Their work has been based on the assumption that variations in drive level are related to the level of internal anxiety or emotionality.⁹⁰ This assumption was derived from the reasoning of Hull's theoretical formulation relating response strength to drive. The basic assumption of Hull's theory is that the excitatory potential which determines the strength of a given response is a multiplicative function of total effective drive state and habit strength. The total effective drive state in a given situation is therefore the result of the summation of all the individual need states existent at that time, irrespective of their source. Emotional response is related to drive theory through the assumption that

⁹⁰Janet A. Taylor, "A Personality Scale of Manifest Anxiety," Journal of Abnormal and Social Psychology, XLVIII (1953), pp. 285-90.

noxious or aversive stimuli arouse a hypothetical emotional response which enforces drive level.⁹¹

Spence conceives of anxiety as an energizing drive the effect of which is dependent upon the nature of the task. He reasons that in simple tasks where there is a single or highly dominant response tendency, an increase in drive strength should enhance the strength of the response, thereby increasing performance. In situations where there is greater likelihood that more than one response tendency is aroused by the stimulus situation, as in complex learning tasks, whether an increase in drive level will aid or impede performance is dependent upon whether or not the correct response tendency is stronger in relation to other competing tendencies aroused by the stimulus situation. Therefore, if the correct response tendency is the stronger, performance would be aided by an increase in drive level and conversely, if the incorrect response tendency is the stronger, the effects of heightened drive should be deleterious to performance.⁹²

The Yale Theory.--An opposing view has been advanced by a group of psychologists at Yale lead by Mandler and

⁹¹K. W. Spence, "A Theory of Emotionally Based Drive and Its Relation to Performance in Simple Learning Situations," American Psychologist XIII (1958), pp. 131-41.

⁹²Ibid.

Sarason. Their position may be summarized by the following four points.

1. Anxiety is theoretically conceived as a learned drive with the characteristics of a strong stimulus.
2. In situations involving achievement, two types of responses tend to be evoked. These may be either task-irrelevant (tending to disrupt performance), or task relevant (facilitating performance). Task irrelevant responses may result from self centered feelings of inadequacy, whereas task-relevant responses result from attempts to reduce tension through task completion.
3. Situational factors which cause the individual to be ego-involved are of greater significance than task complexity.
4. Significant situational anxieties must be investigated prior to attempts to ascertain the nature of a general anxiety factor.⁹³

These psychologists believe failure becomes invested with an anxiety factor that may be termed "achievement anxiety". They have extensively investigated one aspect of this phenomenon, test anxiety.⁹⁴

Empirical evidence supporting drive theory has been obtained from several laboratory investigations and at the same time, there have been numerous studies which have been interpreted as contradicting the drive interpretation

⁹³Irwin G. Sarason, George Mandler and Peyton Craig-hill, "The Effect of Differential Instructions on Anxiety and Learning," in Studies in Motivation, ed. by David C. McClelland (New York: Appleton-Century-Crofts, 1955), pp. 440-47.

⁹⁴Levitt, The Psychology of Anxiety, p. 116.

of anxiety. At present, the prevailing opinion is that the Iowa interpretation of anxiety effects is too simple because anxiety and its effects are multidimensional and partially dependent upon situational factors.

Anxiety in women

As with achievement motivation, there appears to be sex linked differences in anxiety levels and effects. Sinick found that female subjects scored higher than male subjects on two anxiety scales.⁹⁵ Taylor found that women scored slightly higher than men on the MAS.⁹⁶ Spielberger found that the A-Trait means for male and female subjects in two college samples were approximately the same, but the means for female high school students were slightly higher than those of the high school males. There was also little variation in the A-State scores of the male and female subjects in these samples.⁹⁷

The results of these studies suggest that the differences detected may be attributable to extrinsic factors rather than sex linked characteristics. Support for this interpretation is provided by the results of a

⁹⁵D. Sinick, "Two Anxiety Scales Correlated and Examined for Sex Differences," Journal of Clinical Psychology XII (1956), pp. 394-95.

⁹⁶Taylor, "A Personality Scale of Manifest Anxiety."

⁹⁷Spielberger, Gorsuch and Lushene, The State-Trait Anxiety Inventory, p. 13.

study involving emotional response. This situation evoked a much higher situational anxiety in the female subjects.⁹⁸

Measurement of anxiety

The two most common measures of anxiety are psychological tests and measures of physiological reactivity.

The four most frequently used physiological measures of anxiety are blood pressure, heart rate, respiration rate and the galvanic skin response. On the whole these have not proven satisfactory, as only occasionally have they shown a relationship with each other or to psychological indexes of anxiety. This inconsistency is attributed to the varying patterns of physiological reactivity to anxiety and to the effect of extraneous factors within the experimental environment.⁹⁹

The most commonly used psychological measures of anxiety are projective techniques and the inventory. The projective techniques consist primarily of ink-blot tests. Projective tests have an advantage in that the subjects do not know how to deny or otherwise conceal their anxiety. However, it has disadvantages due to the difficulties

⁹⁸Ibid., pp. 24-25.

⁹⁹Levitt, The Psychology of Anxiety, p. 56.

associated with interpretation of responses, quantification of data and administrative problems.¹⁰⁰

The most frequently utilized measure of anxiety is the inventory, also referred to as a scale or questionnaire. The advantages of the inventory are ease of administration and scoring, and its reliability. The shortcomings of this method are that it measures the extent to which an individual is willing to admit to having experienced anxiety in certain situations; high anxiety scores are obtained from individuals with the tendency to attribute undesirable characteristics to themselves; and high anxiety scores may be obtained by the particularly frank and open or those individuals who are particularly perceptive of their own reactions.¹⁰¹

The first widely used anxiety inventory was the Manifest Anxiety Scale developed by Taylor.¹⁰² Bendig revised the MAS and constructed a twenty item scale that provides scores almost as reliable as the fifty item scale.¹⁰³ Castaneda, McCandless and Palermo devised a

¹⁰⁰Ibid., pp. 57-58.

¹⁰¹Sarason, "Empirical Findings," p. 409.

¹⁰²Taylor, "A Personality Scale of Manifest Anxiety."

¹⁰³A. W. Bendig, "The Development of a Short Form of the Manifest Anxiety Scale," Journal of Consulting Psychology, XX (1956), p. 384.

forty-two item form of the MAS for use with children.¹⁰⁴
The MAS measures a predisposition to anxiety rather than an immediate state and although some psychologists accept it as a valid measure of general anxiety, others question its unqualified application.

Other less commonly used inventories of anxiety-proneness are the Anxiety Scale developed by the Institute for Personality and Ability Testing (IPAT), the S-R Inventory of Anxiousness, the Fear Survey Schedule, the Affect Adjective Check List and the Freeman Manifest Anxiety Test.¹⁰⁵

Spielberger, Gorsuch and Lushene have recently developed a State-Trait Anxiety Inventory based on the theoretical concept of trait anxiety as stable and consistent and state anxiety as a fluctuating condition.¹⁰⁶

All of the previously mentioned measures were designed to assess anxiety as a general phenomenon. Many investigators believe that anxiety is specific in nature and therefore must be assessed by measures designed to detect the unique qualities of this variable in certain

¹⁰⁴A. Castaneda, B. R. McCandless and D. S. Palermo, "The Children's Form of the Manifest Anxiety Scale," Child Development, XXVII (1956), pp. 317-26.

¹⁰⁵Levitt, The Psychology of Anxiety, pp. 63-71.

¹⁰⁶Spielberger, Gorsuch and Lushene, The State-Trait Anxiety Inventory, p. 2.

situations. This view prompted the development of the Test Anxiety Questionnaire by Mandler and Sarason,¹⁰⁷ the test of General Social Anxiety by Dixon, DeMonchaux and Sandler,¹⁰⁸ and the Achievement Anxiety Test by Alpert and Haber.¹⁰⁹

Dember and his associates found the Alpert-Haber Test to be an adequate measure of achievement anxiety in male subjects, but their results with female subjects yielded little significant data. They therefore concluded that its use with female subjects is questionable.¹¹⁰

Through their investigation of social anxieties, Dixon and his associates found that the general factor of social anxiety must be subdivided, making possible a differentiation between a number of types of social fear each of which may be a separate variable.¹¹¹

¹⁰⁷George Mandler and S. B. Sarason, "A Study of Anxiety and Learning," Journal of Abnormal and Social Psychology, XLVII (1952), pp. 166-73.

¹⁰⁸James J. Dixon, Cecily DeMonchaux and Joseph Sandler, "Patterns of Anxiety: An Analysis of Social Anxieties," British Journal of Medical Psychology, XXX (1957), pp. 107-12.

¹⁰⁹Richard A. Alpert and Ralph N. Haber, "Anxiety in Academic Achievement Situations," Journal of Abnormal and Social Psychology LXI (1960), pp. 203-15.

¹¹⁰William Dember, Frank Nairne and Francis J. Miller, "Further Validation of the Alpert-Habor Achievement Anxiety Test," Journal of Abnormal and Social Psychology, LXV (1962), pp. 427-28.

¹¹¹Dixon, DeMonchaux and Sandler, "Patterns of Anxiety," p. 11.

Within the field of physical education only one reported attempt has been made to devise specific anxiety measures. Daugert developed an anxiety scale to measure reactions in a swimming situation. She also modified the Mandler-Sarason Test Anxiety Questionnaire for purposes of measuring fear of failure in a swimming class.¹¹²

Several studies have been conducted to determine the common elements assessed by various inventories. Gordon and Sarason found that anxiety in a testing situation is significantly associated with anxiety in a variety of other situations.¹¹³ However, the results of a study by Alpert and Haber indicated that test anxiety scales and general anxiety scales are to a significant extent measuring something quite different.¹¹⁴ Mandler and Cowan found a positive correlation between the Test Anxiety Questionnaire and the Manifest Anxiety Scale. However, they concluded that even though there was some community of traits measured, it was too low to permit substitution of the two scales for each other, or

¹¹²Daugert, "The Relationship of Anxiety and the Need for Achievement to the Learning of Swimming."

¹¹³Edward M. Gordon and Seymour B. Sarason, "The Relationship Between Test Anxiety and Other Anxieties," Journal of Personality, XXIII (1965), p. 321.

¹¹⁴Alpert and Haber, "Anxiety in Academic Achievement Situations," p. 209.

unqualified comparison of results obtained by the use of these instruments.¹¹⁵ Suinn found that there was a greater relationship between Sarason's General Anxiety test scores and Taylor's Manifest Anxiety Scale scores than between either Sarason's Test Anxiety scores and MAS scores or Test Anxiety and General Anxiety scores. Suinn attributes these results to the differences in the nature of anxiety as measured by the General Anxiety Scale and the MAS. Both were designed to detect general anxiety proneness, whereas the TAQ was devised to ascertain specific situational anxiety.¹¹⁶

Cattell points out that there are in excess of one-hundred and twenty personality type tests purporting to measure anxiety and for the most part they are not empirically related to one another. Therefore, the results of each test creates a unique species of anxiety which may or may not resemble the variables detected by other measures.¹¹⁷

¹¹⁵George Mandler and Judith E. Cowan, "Test Anxiety Questionnaires," Journal of Consulting Psychology, XXII (1958), pp. 228-29.

¹¹⁶Suinn, "Susceptibility to Anxieties," p. 318.

¹¹⁷Raymond B. Cattell and I. H. Scheier, "The Nature of Anxiety: A Review of Thirteen Multivariate Analyses Comprising 814 Variables," Psychological Reports, IV (1958), p. 352.

It may be concluded then, that even though numerous measures of anxiety have been developed and equally numerous behavioral samples studied, a great deal remains to be achieved before the complex nature of anxiety will be ascertained or accurately measured, or its unique situational effects determined.

The relationship of anxiety to
learning and performance

Psychological investigations concerning the role of anxiety in learning and performance may be categorized according to the following descriptions:

1. Those designed to obtain empirical evidence in support or refutation of the drive theory. These studies have for the most part been conducted as laboratory investigations of classical conditioning, human maze learning, and serial and paired-associate verbal learning.¹¹⁸
2. Studies concerned with the nature of the task. Research stimulated by the Iowa Theory has focused on task complexity,¹¹⁹ whereas that following the Yale position has tended toward studies of task difficulty.¹²⁰
3. Research dealing with the effects of stress, primarily that which has been artificially

¹¹⁸I. E. Farber and K. W. Spence, "Complex Learning and Conditioning as a Function of Anxiety," Journal of Experimental Psychology, XLV (1953), pp. 120-25; E. K. Montague, "The Role of Anxiety in Serial Rote Learning," Journal of Experimental Psychology, XLV (1953), pp. 91-96.

¹¹⁹Spence, "A Theory of Emotionally Based Drive."

¹²⁰I. G. Sarason, "The Effects of Anxiety and Threat on the Solution of a Difficult Task," Journal of Abnormal and Social Psychology, LXII (1961), pp. 163-68.

induced. A wide range of stimuli have been employed, with the two most common methods involving either pain or failure, or threats involving these.¹²¹

4. Studies utilizing different types of instructions and/or reinforcement.¹²²

The results of numerous studies provide empirical evidence that both supports and contradicts various theoretical interpretations of anxiety. These apparent inconsistencies are attributable to three factors. These are, a lack of conceptual distinction between different components of anxiety, the extreme diversity of anxiety measures and the differences in situations and samples utilized in various studies.

Accepting the limitations imposed by the conflicting evidence, it is still possible to reach some general conclusions concerning the results of studies relating anxiety to learning and performance. It may be concluded that anxiety effects are significant factors in the learning situation. However, it is not possible to explain their complex relationship in terms of any one psychological formula. Rather, the effects appear to be a

¹²¹Levitt, The Psychology of Anxiety, pp. 77-82.

¹²²I. G. Sarason, "Effect of Anxiety, Motivational Instructions, and Failure on Serial Learning," Journal of Experimental Psychology, LI (1956), pp. 253-60; Francis D. Horowitz and James Armentrout, "Discrimination Learning, Manifest Anxiety, and Effects of Reinforcement," Child Development, XXXVI (1965), pp. 731-48.

function of the interrelationship between the level of trait and state anxiety, the type of perceived stimuli and the rate of stimulus presentation, the type and amount of external reinforcement and the amount of time allocated for completion of the task. The number of variables involved and the complexity of their interrelationships evidences the need for further study of these variables.

The Relationship of Anxiety and the
Achievement Motive to Academic
Achievement

Although many studies have been conducted to determine the relationship between various aspects of academic achievement and the variables anxiety and achievement motivation, the results have not been conclusive.

Rosen found that highly motivated students do better in school.¹²³ However, the results of a study conducted by McKeachie and his associates did not support this hypothesis.¹²⁴ Littig and Yeracaris found a positive correlation between need achievement scores and academic

¹²³Bernard C. Rosen, "The Achievement Syndrome: A Psychocultural Dimension of Social Satisfaction," in Motives in Fantasy, Action and Society, ed., by John W. Atkinson, (Princeton, N. J.: D. Van Nostrand Co., 1958), p. 503.

¹²⁴W. J. McKeachie, et al., "Student Achievement Motives, Achievement Cues, and Academic Achievement," Journal of Consulting and Clinical Psychology, XXXII (1968), pp. 26-29.

achievement in men, but not in women.¹²⁵ Similar results were obtained by Cole and his associates.¹²⁶ Krumboltz concluded that TAT measures have almost no validity as predictors of college grades.¹²⁷

Alpert and Haber found a negative correlation between anxiety and college grades.¹²⁸ Endler and Snyder found that for females test anxiety correlated negatively with achievement variables, but general anxiety had no such effect. Neither test nor general anxiety was correlated with achievement in male subjects.¹²⁹ When high and low ability were also assessed, Spielberger and Katzenmeyer were unable to find a significant relationship between semester grade point averages and MAS scores for male college students.¹³⁰ Similar results were obtained

¹²⁵Lawrence Littig and C. A. Yeracaris, "Academic Achievement Correlates of Achievement and Affiliation Motivations," Journal of Psychology, LV (1963), p. 118.

¹²⁶David Cole, et al., "The Relation of Achievement Imagery Scores to Academic Performance," Journal of Abnormal and Social Psychology, LXV (1962), p. 211.

¹²⁷John D. Krumboltz, "Measuring Achievement Motivation."

¹²⁸Alpert and Haber, "Anxiety in Academic Achievement Situations," p. 209.

¹²⁹Norman S. Endler and Larry S. Snyder, "Anxiety, Aptitude, and Academic Achievement," Ontario Journal of Educational Research, VI (1964), p. 89.

¹³⁰Charles D. Spielberger and W. G. Katzenmeyer, "Manifest Anxiety, Intelligence and College Grades," Journal of Consulting Psychology, XXIII (1959), p. 278.

by Desiderato and Koskinen. They found there was no significant relationship between GPA and anxiety groups within three aptitude levels.¹³¹ In a later study Spielberger found that almost four times as many high anxious college students, as compared to their low anxious classmates, failed to complete their academic degrees. All of the subjects in his sample had scored satisfactorily on Scholastic Aptitude measures.¹³²

Atkinson points out that the variation in results of academic achievement studies is not surprising in view of the complex performance criteria determining grade averages and the variation of school standards.¹³³ It is generally concluded that measurement of a single motive does not provide sufficient predictive information for two reasons. First, a high grade point average requires performance which is highly overdetermined. That is, it involves a combination of several motives varying in interactive effect over a period of time. Secondly, a number of personal and situational variables interact to determine achievement in college courses. The potential

¹³¹Otello Desiderato and Patricia Koskinen, "Anxiety, Study Habits and Academic Achievement," Journal of Counseling Psychology, XVI (1969), pp. 152-65.

¹³²Spielberger, Anxiety and Behavior, pp. 379-80.

¹³³Atkinson, Motives in Fantasy, Action and Society, p. 605.

combination of these factors in infinite variety make it all but impossible to isolate the effects of one particular motive as related to over-all college achievement. It is possible, however, to isolate the effects of some variables in specified academic situations.

Anxiety, achievement, motivation
and feedback effects

Within the literature there are frequent references to the general effects of extrinsic feedback in the learning situation. However, McKeachie hypothesizes that a significant variable previously overlooked in feedback research is the effects of intrinsic and extrinsic motivation. He explains that the rewards for achievement are internalized in the student with high intrinsic motivation. Therefore, when this individual is in an achievement-oriented situation, he is motivated to do well because success will enable him to reach his own level of aspiration, thereby providing intrinsic satisfaction. For the extrinsically motivated student, however, continuous external achievement rewards must be present in the learning situation. External reinforcement is the principle source of this student's motivation. McKeachie also points out that there are contrasting effects on these two types of individuals when they are in a situation where external rewards are emphasized. Both continue to work and the extrinsically motivated

student's performance is usually increased. The intrinsically motivated student, however, may feel driven by excessive motivational strength, or a measure of his original motivational strength may be dispelled when the reward is no longer singly intrinsic.¹³⁴

The results of three studies empirically support McKeachie's hypothesis. Atkinson and Reitman found that under a multi-incentive condition, subjects with high TAT based scores worked fewer arithmetic problems than when achievement alone was the incentive.¹³⁵ Mandler and Sarason found a similar effect with high and low anxiety subjects. An intervening report of success or failure elicited improved performance for the low anxiety group, but depressed the scores of the high anxiety group.¹³⁶ McKeachie and his associates found that there was no interaction between anxiety alone and extrinsic feedback, but there was a significant four-way interaction between sex, achievement motivation, anxiety and the combined grades from selected college classes. Students high in achievement motivation and low in anxiety received higher

¹³⁴W. J. McKeachie, "Motivation, Teaching Methods, and College Learning," in Nebraska Symposium on Motivation, ed., by M. R. Jones (Lincoln: University of Nebraska Press, 1961), pp. 136-37.

¹³⁵Atkinson and Reitman, "Performance as a Function of Motive Strength."

¹³⁶Mandler and Sarason, "Study of Anxiety and Learning," p. 173.

grades in classes low in verbal feedback. Female subjects low in both anxiety and achievement motivation did not like or do well in classes low in extrinsic feedback.¹³⁷

Anxiety, achievement motivation and
the effects of stress

A second non-intellectual correlate differentially effecting individuals high and low in anxiety and achievement motivation is stress.

Due to the difficulties associated with examining stress as it occurs naturally, most investigators have resorted to experimental studies in which stress is artificially induced. A wide range of stress stimuli have been employed, with the two most common methods involving threat of pain or failure. The rationale for the use of pain as a stressor stems from acceptance of the theory that pain is universally feared. Failure is associated with stress due to the acquired drive for success in our achievement-oriented culture.¹³⁸

For the most part, findings in numerous studies involving stress indicate that high anxious subjects are effected more detrimentally by motivating conditions or failure reports than are subjects lower in the anxiety

¹³⁷McKeachie, "Motivation, Teaching Methods, and College Learning," p. 138.

¹³⁸Levitt, The Psychology of Anxiety, pp. 77-82.

score distribution.¹³⁹ No differences were detected between high and low anxious subjects when they were tested under neutral and apparently nonthreatening conditions.¹⁴⁰

Atkinson hypothesizes that need achievement scores indicate the strength of a motive to approach success, whereas Mandler-Sarason Test Anxiety scores indicate the strength of the motive to avoid failure. Further, in the individual in whom the motive to avoid failure exceeds the motive to achieve, there is constant domination of a threat of failure.¹⁴¹ The results of several studies support this hypothesis. However, the results of factor-analytic studies of anxiety and the achievement motive now indicate that the constructs "hope of success" and "fear of failure", may in fact be multidimensional variables with differing situational effects.

¹³⁹J. D. Lucas, "Interactive Effects of Anxiety, Failure and Intraserial Duplication," American Journal of Psychology, LXV (1962), pp. 64-65; W. M. Nicholson, "The Influence of Anxiety Upon Learning," Journal of Personality, XXVI (1958), p. 317; Mandler and Sarason, "A Study of Anxiety and Learning," p. 173; Sarason, "The Effects of Anxiety and Threat," p. 167.

¹⁴⁰Sarason, "Empirical Findings and Theoretical Problems," p. 405.

¹⁴¹John W. Atkinson and George A. Litwin, "Achievement Motivation and Tests Anxiety Conceived as Motive to Approach Success and Motive to Avoid Failure," Journal of Abnormal and Social Psychology, LVIII (1959), pp. 52-53.

Related Anxiety and Achievement
Motivation Studies

Within the field of physical education only five reported studies have been conducted to determine the relationship of anxiety to skill learning and performance of women.

Hutson investigated the relationship of anxiety level to learning the skills of beginning horseback riding. She found that anxiety tended to decrease as skill increased.¹⁴² Peck studied the effects of anxiety on volleyball skill development. She found no significant relationship between anxiety and volleyball test performance. She also induced anxiety by written and verbal suggestions relating poor test performance to low grades, but these efforts were ineffective as no uniform changes in anxiety level occurred.¹⁴³ Karbe studied the relationship of general and specific anxiety to learning swimming skills. She found that subjects with high general and specific anxiety learned fewer skills after eight lessons,

¹⁴²Margaret Hutson, "The Relationship of Anxiety Level to Learning Skills in Beginning Horseback Riding," in Completed Research, The American Association for Health, Physical Education and Recreation, VIII, (1966), .p. 69.

¹⁴³Arden Peck, "The Influence of Anxiety on Volleyball Skills," in Completed Research, The American Association for Health, Physical Education and Recreation, IX (1967), pp. 88-89.

but their performance equalled that of the low anxiety group after sixteen lessons.¹⁴⁴

Only performance criterion were considered in separate studies conducted by Harrington and Diehl. Harrington was unable to find a significant difference in the performance of high, medium and low anxiety subjects on two balancing tasks.¹⁴⁵ Emotional stressors did not produce a significant stress reaction in the 200 high school girls included in Diehl's study. She also found that the high and low anxiety groups did not differ on motor performance under stress.¹⁴⁶

Only one study has been conducted to determine the relationship of both anxiety and achievement motivation to skill learning in women. Daugert examined the effect of these variables in beginning swimming. She found that high swimming anxiety had an adverse effect on swimming achievement and that as swimming anxiety decreased,

¹⁴⁴Wolfgang Karbe, "The Relationship of General Anxiety and Specific Anxiety Concerning the Learning of Swimming," in Completed Research, The American Association for Health, Physical Education and Recreation, IX (1967), p. 85.

¹⁴⁵Eleanor Harrington, "Effect of Manifest Anxiety on Performance of a Gross Motor Skill," in Completed Research, The American Association for Health, Physical Education and Recreation, VIII (1966), p. 41.

¹⁴⁶Bobbie Diehl, "The Effects of Emotional Stress Upon Motor Performance of Anxious and Non-Anxious Subjects," in Completed Research, The American Association for Health, Physical Education and Recreation, VIII (1966), p. 44.

swimming proficiency increased. She also found a relationship between specific need achievement scores and achievement in swimming. However, test anxiety, fear of failure and general need achievement scores did not relate to final swimming achievement.¹⁴⁷

It may be concluded from the results of these studies that anxiety and achievement motivation are significant factors in skill learning but their effect is apparently specific in nature and is difficult to determine. Some of the difficulty may be attributable to the lack of objectivity and reliability of the instruments utilized to assess achievement. Therefore, in the present study, riflery and bowling were selected to provide skill attainment criteria, as achievement in both activities is determined by objective rank order skill scores.

¹⁴⁷Daugert, "The Relationship of Anxiety and Need for Achievement to the Learning of Swimming."

CHAPTER III

METHODS AND PROCEDURES

The Subjects

The data for this study were obtained from the women students enrolled in the beginning riflery and beginning bowling classes at The Ohio State University, Winter Quarter, 1970. All of the subjects were underclassmen. The ages of the subjects ranged from seventeen to twenty-four (see Table 1 below). All of the subjects were beginning students in the selected activities.

TABLE 1
FREQUENCY DISTRIBUTION OF STUDENTS' AGES

Age	Frequency	Per Cent
17	5	2.36
18	142	66.98
19	47	22.17
20	8	3.77
21	4	1.89
22	4	1.89
23	1	.47
24	1	.47
Mean = 18.46	N = 212	SD = .92

A questionnaire was administered by the class instructors at the beginning of the quarter to aid in determining the students' status as beginners. Copies of these inventories may be found in Appendix A. Two additional criteria were employed to insure only beginning bowling students being included in the sample. The instructors were asked to subjectively evaluate the student's skill level at the beginning of the course and the student's bowling scores during the early part of the term were reviewed by the instructors and the investigator. All bowling students whose status as beginners was questionable were eliminated from the sample. None of the riflery students evidenced sufficient prior experience to warrant their exclusion from the study.

The original sample consisted of 123 riflery students and 152 bowling students. It was necessary to eliminate nineteen riflery students and forty-four bowling students from the sample. Subjects were dropped because they failed to complete the course or because their test forms were incomplete. Also, two bowling classes were eliminated due to the inadequate number of beginning students completing the course. Only classes with ten or more students in the sample were retained. The final bowling sample consisted of 108 students enrolled in nine classes which were taught by six

different instructors. Five of the instructors each taught one class, one instructor taught two of the classes and one taught three classes. The final riflery sample was composed of 104 students enrolled in all (six) of the riflery classes offered Winter Quarter. These classes were taught by four women physical education instructors and four instructors from the Army ROTC program. Each class was jointly taught by one of the women instructors and one of the ROTC instructors.

Both the bowling and riflery classes met once a week for nine weeks. The class periods were an hour and forty-five minutes long.

Testing Procedures

The State-Trait Anxiety Inventory (STAI), and the Two Scales to Measure Achievement Motivation were administered to the bowling classes during the sixth class meeting.¹ The same scales were administered to the riflery classes during their seventh class period. The riflery students who were not present during the initial testing period were tested the following week.

¹Charles D. Spielberger, Richard L. Gorsuch and Robert E. Lushene, The State-Trait Anxiety Inventory: Test Manual For Form X (Palo Alto, California: Consulting Psychologists Press, 1969); C. G. Costello, "Two Scales to Measure Achievement Motivation," The Journal of Psychology LXVI (1967), pp. 231-35.

The tests were administered at the beginning of the regular class period. The investigator briefly stated the purposes of the study and the subjects were exhorted to answer as honestly and accurately as possible. The students were told their participation in the study was voluntary and they were free to decline if they so desired.

As recommended by Spielberger and his associates, the A-State scale was given first, followed by the A-Trait scale. The Achievement Motivation scales were administered last. Approximately thirty minutes was required for completion of the test battery.

Form number 125 answer sheets were used to permit machine scoring of the scales. Separate answer sheets were used for the A-State and A-Trait scales and one answer sheet was used for the two Achievement Motivation Scales. This procedure was followed to permit giving specific directions prior to administration of each scale.

The investigator reviewed the printed directions on the test form and gave short additional verbal instructions. The students were told to answer the Self-Analysis Questionnaire Form X-1 (A-State scale) in terms of how they felt when they were actually in the bowling or riflery class situation. When answering Form X-2 (A-Trait scale), they were told to answer in terms of how they generally feel in a variety of situations. They

were told to answer the Personality Questionnaire (Achievement Motivation scales) either "True" or "False" according to whether or not they felt the statements were descriptive of them most of the time. Copies of the scales and a complete outline of the testing procedure can be found in Appendices B and C.

The items which have been marked with an asterisk on the sample copies in the Appendix, were numerically weighted in reverse order during the machine scoring. This procedure was followed to equalize the value of the items that are worded so a high numerical answer indicates low anxiety. Thus a high total score is indicative of high anxiety and conversely, a low score corresponds to low anxiety.

The Achievement Motivation scales were machine scored in the same manner as a True-False test. The number of correct answers on the first ten items was the subject's score for Factor I. The score for Factor II was ascertained from the number of correct answers on the remaining fourteen items. The items marked with an asterisk on the test sample shown in Appendix B were considered correct if answered "True" and the remaining items were considered correct if answered "False".

The Instrument

The Two Scales to Measure Achievement Motivation

The achievement motive was assessed in the present study by the Two Scales to Measure Achievement Motivation developed by Costello. These scales consist of twenty-four "Yes", "No" response type items. Scale I consists of ten items designed to measure the need to achieve through one's own effort, interpreted as the need to do a job well. The fourteen item Scale II assesses the need to be a success which results in emulation of the successful rather than hard work.²

Development of the scales

Costello's original Achievement Motivation Inventory consisted of 100 "Yes", "No" type items. He did not include any items from previously published personality scales, although a number of his items were based on those in the Edwards Personal Preference Schedule. The original inventory was administered to 191 male subjects and an equal number of female subjects. On the basis of the results of this study, thirty-four items were selected and some were reworded. These scales were then administered to a sample of college students consisting

²Costello, "Two Scales To Measure Achievement Motivation."

of 200 subjects, half male and half female. The thirty-four items were intercorrelated and submitted to factor analysis. Ten of the items were then eliminated. The final scale thus consists of ten items to measure Factor I and fourteen items assessing Factor II.

Reliability and validity of the scales

The reliability and validity of the Two Achievement Motivation Scales was determined by administering the scales to a sample of 132 male and 132 female college students. The Taylor Manifest Anxiety Scale, the Maudsley Personality Inventory and Brengelmann's Drive Scale were also administered to this group. The results were a split-half reliability of .82 for Scale I and .73 for Scale II. The intercorrelation of the two scales was a negative .17. The scores of Scale I were shown to have a small negative correlation with the scores on the MAS and the MPIN scale. The scores on Scale II had a large positive correlation with both the MAS and the MPIN.

Although these scales have not as yet been widely utilized in reported research, they are presently being employed in studies in five universities within the United States and in seven other countries.³

³Letter from Charles G. Costello, Department of Psychology, The University of Calgary, Calgary, Alberta, Canada, January 21, 1970.

Selection of the scales

The Two Scales to Measure Achievement Motivation were selected to assess the achievement motive in the present study because they provide objective and reliable measures and because they have been shown to be valid measures when utilized with female subjects. As previously discussed, considerable difficulty has been experienced in the past in attempts to accurately and consistently assess the achievement motive in women. The Two Scales of Achievement Motivation were therefore judged to be the most adequate measures available at the present time.

The State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory was the instrument used to determine anxiety levels in the present study. The STAI is a paper and pencil test consisting of two self-report scales. These scales were designed to measure two anxiety components, state anxiety (A-State) and trait anxiety (A-Trait).

The STAI A-State scale consists of twenty statements. The subject is asked to respond to each statement according to how he feels in a particular situation. The A-Trait scale also contains twenty statements. However, in responding to the A-Trait inventory, the subject is asked to respond according to how he generally feels.

The A-Trait scale is designed to detect variations in individual's disposition to respond to psychological stress with different levels of intensity. The A-State scale is an indicator of the level of transitory anxiety experienced in a situation. The A-State scale items are designed to detect feelings of tension, nervousness, worry, and apprehension.⁴

Development of the inventory

The STAI originated with adaptation of items from three widely used anxiety scales, the IPAT Anxiety Scale developed by Cattell and Schoier, the Taylor MAS and the Welsh Anxiety Scale. Through an extensive series of administrations to college samples under different environmental conditions as well as revision and evaluation of individual items, the two separate twenty item scales were developed.

Reliability and validity of the STAI

Spielberger obtained the test-retest reliability data for the STAI by administering the scales to different subgroups of undergraduate college students. The students were retested after periods of one hour, twenty days, and 104 days. The students in the first group were exposed

⁴Spielberger, Gorsuch and Lushene, The State-Trait Anxiety Inventory.

to three experimental conditions during the one hour test-retest interval. These conditions were a brief period of relaxation training, a difficult IQ test, and a film depicting severely injurious accidents.

The test-retest correlations for the A-Trait scale ranged from .73 to .86 for male subjects. However, for female subjects the range was minimal, varying only from .76 to .77.⁵

The A-State test-retest correlations ranged from .33 to .54 for male subjects and from .16 to .31 for females. These low stability coefficients were anticipated, as a valid measure of A-State should reflect unique situational influences in the testing environment.⁶

Spielberger and his associates felt that due to the transitory nature of anxiety states, measures of internal consistency would provide a more meaningful reliability index. Therefore, alpha coefficients were computed for samples of college and high school students. The reliability coefficients for both male and female college undergraduates were .89. For a large sample of college freshmen, the alpha coefficient for males was .83 and for females it was .86. Similar findings were obtained for the A-Trait Inventory with an alpha reliability for

⁵Ibid., p. 19.

⁶Ibid., p. 18.

undergraduate males of .90 and for females .89. For college freshmen, the reliability coefficients for both male and female subjects was .86. It may be concluded, therefore, that both STAI scales have a high degree of internal consistency.⁷

The validity of the A-Trait scale was assessed by correlations with the IPAT Anxiety Scale, the Taylor MAS and the General Form of the Zuckerman Affect Adjective Checklist. Correlation coefficients of .75 for females and .76 for males were obtained between the IPAT and the A-Trait scale. Correlation of the A-Trait scale and the TMAS resulted in a coefficient of .80 for females and .79 for males. Only a moderate correlation of .52 for females and .58 for males was found between the Affect Adjective Checklist and the A-Trait scale. All of these correlations were obtained from a sample of college undergraduates.⁸

The construct validity of the A-State scale was determined by administering the scale to a large sample of undergraduate college students. During the first administration the students were instructed to answer in terms of how they felt at that moment. On the second administration they were asked to respond according to

⁷Ibid., p. 13.

⁸Ibid., p. 22.

how they believed they would feel just before an important final examination. The mean scores were consistently higher for the examination condition. Scores for all of the individual scale items were significantly higher for female subjects under the examination condition.⁹

Additional validity data for the A-State scale were obtained from a study in which the scale was administered to college undergraduates under four experimental conditions. The mean scores for the female students under each of these conditions were as follows: relaxed 29.60; normal 37.24; examination 43.69; and stressful movie 50.94. These scores evidence the ability of the A-State scale items to differentiate between the degrees and kinds of stress experienced in various situations.¹⁰

Selection of the STAI

The STAI was selected as the instrument to assess anxiety because the investigator was interested in determining the relationship of both trait and state anxiety to skill attainment. Also, these scales have been shown to be reliable and valid measures of anxiety level in female college students. As previously discussed, stability in measures of the anxiety phenomenon in women has been somewhat of a problem in previous studies.

⁹Ibid., p. 21.

¹⁰Ibid., p. 25.

Although these scales have not been utilized in studies specifically concerned with the achievement motive, they have been used in research involving academic achievement-oriented activities.¹¹

Skill Attainment

Skill attainment scores for the bowling students were obtained by averaging the scores from the total number of lines bowled during the term. The number of lines varied considerably due to the various teaching approaches used by individual instructors. Only the lines completed during the regular class period were included in the data. The total number of lines bowled during the quarter and the bowling average of each subject is given in Appendix D.

The riflery students skill attainment scores were obtained by averaging the total number of prone and standing targets fired during the last six weeks of the quarter. The subjects' prone scores were added together and then averaged. The standing scores were treated in the same manner. The two averages were then added together to obtain the skill attainment score. There was uniformity between classes relative to the number of targets fired due to the four instructors involved

¹¹Ibid., pp. 37-42.

utilizing similar teaching procedures. The number of targets completed by each subject in each position and her averages for the two positions are given in Appendix D.

Statistical Procedures

The anxiety and achievement motivation scales were scored on an IBM 1230 Test Scoring Machine. This machine produced a card output containing the weighted item responses of the A-State and A-Trait scales. These cards were then processed with a computer program designed specifically to properly weight the items that must be reversed. This produced a new deck of cards containing the weighted data.

The achievement motivation scales were scored in the same manner as a true-false test and a card output was produced containing a subscore for Factor I and for Factor II.

The subject's skill score was hand punched in the achievement motivation scale output deck. All of the data were then verified for accuracy. The anxiety scale scores were then reproduced onto the achievement motivation scale deck so that one card contained all of the data for each subject.

To determine the degree of relationship between the criterion variable (skill attainment), and the predictor variables (A-State, A-Trait and Factors I and II), and

the intercorrelation between the predictor variables, the Stepwise Regression Program, BMD02R was employed. This program was developed at the University of California at Los Angeles and is available at The Ohio State University Computer Center.

This program computes a sequence of multiple linear regression equations in a stepwise manner. Output includes means and standard deviations for each variable, a covariance matrix and a correlation matrix.

The t ratio for testing the significance of a correlation coefficient was used to evaluate the significance level of the obtained correlations.

A t ratio was computed to test the significance of the difference between the means of the scores obtained on the anxiety and achievement motivation scales.

The .05 level of significance was selected as the reference point for determining whether any of the obtained differences should be attributed to chance. Standard tables of t values were then consulted.

CHAPTER IV

DISCUSSION AND ANALYSIS OF RESULTS

This study was designed to investigate the interaction between certain personality attributes and specific situational influences in the learning environment. It was concerned with assessment of variability among individuals and with differences in basic behavioral processes, and with the relationship of these factors to the development of skill. The results of the study partially confirm the anticipated relationships.

For purposes of clarity, the hypotheses, assumptions and results are presented separately. This is followed by a general discussion of the findings.

Hypotheses, Assumptions and Results

Hypothesis I

The state anxiety scores of the riflery students will be significantly higher than the state anxiety scores of the bowling students.

Assumption.--The physical danger present in the riflery classes will evoke a greater anxiety response than will the less dangerous bowling environment.

Results.--As shown in Table 2, this assumption was not supported. The A-State mean of the riflery group was higher than that of the bowling group, but not significantly so.

TABLE 2
MEANS, STANDARD DEVIATIONS AND t RATIOS FOR THE
ANXIETY AND ACHIEVEMENT MOTIVATION SCALES

	Bowling (N = 108)		Riflery (N = 104)			
Variable	Mean	SD	Mean	SD	diff.	t*
Achievement Motivation						
Factor I	7.24	2.61	7.36	2.58	.12	.36
Factor II	8.06	2.56	7.25	2.62	.81	2.26
Anxiety						
A-State	38.22	10.77	40.78	11.32	2.56	1.67
A-Trait	38.34	9.56	37.15	10.64	1.19	.86

*t = 1.99 necessary for significance at .05 level.

Hypothesis II

The trait anxiety and achievement motivation scores of the bowling and riflery students will not differ significantly.

Assumption.--The students who elect to take riflery will possess dispositional tendencies similar to those of the students who elect to take bowling.

Results.--As indicated in Table 2, the hypothesis was supported for trait anxiety and Factor I of achievement motivation, but was rejected for Factor II.

Hypothesis III

There will be a positive correlation between the state and trait anxiety scores.

Assumption.--The results of this study will support the theory that high trait anxiety subjects tend to perceive a wider range of stimuli as dangerous or threatening and are therefore inclined to react to situational variables with greater anxiety responses. And furthermore, the results will evidence support for the conceptualization of anxiety as a general trait.

Results.--As shown in Table 3, the results strongly supported the hypothesis. The A-State and A-Trait scores of both the bowling and riflery students were positively correlated at the .01 level.

Hypothesis IV

There will be a positive correlation between the motivational disposition to do a job well and the need to be a success which results in emulation of the successful rather than hard work.

TABLE 3
CORRELATION COEFFICIENTS FOR THE ACHIEVEMENT
MOTIVATION AND ANXIETY SCALES

	Factor II	A-State	A-Trait
Achievement			
Motivation			
Factor I			
Riflery Sample	.13	-.10	-.23*
Bowling Sample	.12	-.01	-.34**
Factor II			
Riflery Sample		.35**	.48**
Bowling Sample		.31**	.26**
Anxiety			
A-State			
Riflery Sample			.50**
Bowling Sample			.52**

*P < .05

**P < .01

Assumption.--There will be a consistency in the motivational dispositions assessed as Factors I and II.

Results.--The assumption was partially confirmed. There was a positive correlation between the scores obtained on Factors I and II in both the bowling and riflery groups. However, these results did not approach significance.

Hypothesis V

State anxiety will correlate negatively with each of the motivational factors.

Assumption.--The subjects with a high level of state anxiety will be less motivated than will the subjects with a low level of state anxiety.

Results.--The assumption was not supported by the data. As shown in Table 3, contrasting results were obtained on the correlation of A-State with those obtained on the motivational factors.. In both riflery and bowling there was a negative correlation between state anxiety and Factor I. However, neither correlation was significant. The results of the correlation between A-State scores and those obtained for both groups on Faction II indicates a significant positive correlation between these variables.

Hypothesis VI

There will be a negative correlation between trait anxiety and each of the measures of achievement motivation.

Assumption.--Low trait anxiety subjects will be more highly motivated in achievement-oriented activities than will high anxiety subjects.

Results.--The correlation between A-Trait and Factor I scores followed the anticipated pattern. However, the results of the correlation between A-Trait and Factor II did not support the assumption.

The results of the correlation between A-Trait and Factor I scores are given in Table 3. These results show a significant negative correlation between A-Trait and Factor I scores for both the bowling and riflery students.

As shown in Table 3, a significant positive correlation was found between the A-Trait and Factor II scores of both the bowling and riflery students.

Hypothesis VII

The subjects with low anxiety or high achievement motivation scores will attain a higher level of skill in bowling or riflery than will the subjects who have high anxiety or low achievement motivation scores.

Assumption.--High achievement motivation will enhance learning and performance, whereas high anxiety will be detrimental to the development of skill in beginning riflery and beginning bowling.

Results.--The correlations between the anxiety and achievement motivation variables and the level of skill attained in the activities are given in Table 4. These results indicate that only three significant correlations were obtained and all three were negative.

Where a significant relationship was found between the skill scores and the scores for the anxiety and achievement motivation scales, the significance of the

TABLE 4
CORRELATIONS OF ANXIETY AND ACHIEVEMENT
MOTIVATION SCORES WITH THE SKILL SCORES

	Riflery (N = 104)	Bowling (N = 108)
Achievement Motivation		
Factor I	.09	-.32**
Factor II	-.07	.11
Anxiety		
A-State	-.35**	-.11
A-Trait	-.23*	.17

*P < .05

**P < .01

difference between the skill scores of the high and low groups was computed. As shown in Table 4, only three significant correlations were obtained. Two of these were in riflery and one in bowling.

Due to the limited range of the variable scores, the only feasible way of determining the high and low group was to include all the subjects whose variable scores were above or below one standard deviation from the group mean. Those subjects whose variable scores were one standard deviation above the group mean were

designated as the high group and those whose scores were one standard deviation below the group mean were denoted the low group. Following this separation, the mean and standard deviation of the skill scores for each of these groups were computed. The results of this computation are given in Table 5.

TABLE 5
SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE
SKILL SCORES OF THE HIGH AND LOW GROUPS

Group	N	Mean	SD	diff.	t
Riflery					
Low A-State	17	109.94	3.81	15.99	3.37**
High A-State	22	93.95	17.87		
Low A-Trait	16	108.06	14.58	15.32	3.39**
High A-Trait	16	92.74	10.74		
Bowling					
Low Factor	23	103.56	8.41	9.26	3.20**
High Factor	30	94.30	12.56		

**P < .01

The results given in Table 5 show that all the differences between the high and low groups were highly significant.

Discussion

Results obtained with the A-State Scale

The results shown in Table 2 indicated that the A-State mean of the riflery subjects was 2.56 higher than the A-State mean of the bowling subjects. However, this difference was not significant.

Due to the higher state anxiety mean obtained for the riflery sample there is some indication of an additional anxiety evoking factor present in this situation. However, on the basis of the results obtained in this study, this difference cannot accurately be attributed to the element of physical danger present in the riflery situation. Rather, it may have resulted from differences in the instructional cues given in the two activities. Safety and the need to achieve were continuously emphasized in the riflery classes. Because there was no need to emphasize safety and because the bowling student's scores were not regularly and publicly posted, it is possible to infer that the bowling class atmosphere was more casual and participation more relaxed.

Because the difference between the A-State scores of the two groups was not significant it may be concluded that the state anxiety responses were largely attributable to anxiety evoking factors common to both class situations. As discussed in Chapter II, there is general agreement

that situational anxiety is evoked by environmental factors that threaten self-esteem. This threat may have been equally existent in the two learning environments. It may have originated from fear concerning loss of social approval or from fear of failure in an academic-achievement-oriented situation.

Several studies have provided evidence that social acceptability is a major concern in women. Vernon states that fear of social disapproval is one of the main factors which precipitates anxiety.¹

Although the social aspects of the two activities included in this study were somewhat different, there could have been a similar effect. The riflery students fired with a partner and in close proximity to other students. The bowling students bowled in groups of four on adjacent lanes. Thus both activities provided ample opportunity for social interaction.

The fear of failure factor may be present in any achievement-oriented activity. The pressure precipitated by the need to achieve in an academic situation could have evoked similar anxiety reactions in the two groups. The fact that there was a significant positive correlation between the motivational dispositions to succeed and the

¹Vernon, Human Motivation, p. 145.

A-State scores of both groups adds credence to this interpretation.

The similarity in the A-State scores of the two groups may be attributable to the way the subjects perceived the conditions and demands of the tasks. There was apparently a similarity in the range of stimuli perceived as threatening in the two environments. The tasks also seem to have been equal in perceived complexity and difficulty. Because both groups consisted of beginning students involved in activities demanding precision in the attainment of a concrete goal, it seems reasonable to assume that there was a similarity in perceived difficulty level. This assumption is consistent with the findings of studies involving task complexity.

Although it was not a part of the design of this study to compare the results with those of other studies, it is interesting to note the similarity of results obtained in a study conducted by Spielberger. Due to the fact that ninety four per cent of the subjects in the present study were freshmen women students, it is more accurate to compare the results with those obtained from students in a similar academic classification. Spielberger obtained an A-State mean of 39.39 for a sample of 648 women subjects tested during the freshmen orientation

program.² The A-State mean of the bowling students was therefore 1.17 lower than that obtained by Spielberger and the riflery students mean was 1.39 higher. These results are unusually consistent considering the differences in sample size and in testing situations.

Results obtained with the
A-Trait Scale

It was assumed the trait anxiety and achievement motivation scores of the subjects in both riflery and bowling would follow the same pattern, as the sample for this study was a non-probability sample.³ It was also assumed the scores for trait anxiety would be similar to those obtained with other freshmen college women.

Both of the above assumptions were verified by the trait anxiety scores. There was only a small chance difference between the A-Trait scores of the bowling and riflery students. Also, the data obtained in the present investigation were remarkably similar to that obtained by Spielberger. He reported an A-Trait mean of 38.22 for a

²Spielberger, Gorsuch and Lusheno, The State-Trait Anxiety Inventory, p. 13.

³N. M. Downie and R. W. Heath, Basic Statistical Methods (2nd ed.; New York: Harper and Row Publishers, 1955), p. 118.

sample of 644 freshmen college women.⁴ The mean of the bowling subjects was .12 above and the riflery student's mean was 1.07 below that obtained by Spielberger.

Results obtained with the Achievement Motivation Scales

It will be recalled that the achievement motivation scale was divided into two parts, with the first ten items designated as assessing Factor I, denoted as the need to achieve through one's own efforts. The remaining fourteen items are measures of Factor II, referred to as the need to be a success which results in the emulation of the successful rather than hard work.

The results shown in Table 2 indicate that there was a small chance difference between the Factor I means of the bowling and riflery students. Therefore, the assumption that this motivational disposition would be similar in the two groups was verified.

The obtained means for Factor I were heavily skewed toward high need to achieve through one's own efforts. Forty-three per cent of the bowling and riflery students had scores of either nine or ten on this scale. These results could be expected with a sample of college students, as their presence in the academic environment is presumably indicative of their desire to achieve.

⁴Spielberger, Gorsuch and Lushene, The State-Trait Anxiety Inventory, p. 13.

The significant difference between the Factor II scores of the bowling and riflery students was unanticipated. It was assumed the results for Factor II would be similar to those obtained with Factor I.

These results evidence a marked difference in the motivational disposition of the subjects in the two groups. The students who elect to take bowling are apparently more inclined to seek success through imitation of those who are successful rather than actively striving for personal success. Conversely, the riflery students are more highly motivated to achieve through hard work. There are two interrelated factors that may explain this difference. One is the student's previous level of acquaintance with the activity and the second is their perception of how success in the activity is achieved. The bowling students, as indicated by the bowling experience inventory, had some acquaintance with the activity prior to their enrollment in the course. Also, the preponderance of televised bowling competition provides ample opportunity for observation of the successful. In contrast, most of the riflery students had never fired live ammunition before. They were also unaware of the precision required to hit the center of such a small target at a distance of fifty feet.

These factors may have influenced the student's perception of the course requirements and thereby differentially effected their scores on Factor II. That is, the students may have perceived success in bowling as being possible through emulation of the successful, whereas the riflery students may have recognized the necessity for hard work. Although it is only conjecture, it is conceivable that similar group scores might have been obtained had the scales been administered prior to the students actual participation in the class activity.

The relationship of state and trait anxiety

The highly significant positive correlation between the A-State and A-Trait scales empirically supports the theoretical conceptualization of state and trait anxiety as related constructs. These findings also confirm the interpretation that high A-Trait anxiety predisposes the individual to react with greater A-State intensity in situations involving interpersonal relations. These results also support the interpretation presented in the discussion of hypothesis one concerning the existence of a type of achievement anxiety in both the bowling and riflery situations. The similarity in the relationship of A-State to A-Trait in both groups could be interpreted

as a further indication of the existence of similar anxiety evoking variables in both situations.

Even though the correlations between the A-State and A-Trait anxiety scales were highly significant (.50 for the riflery sample and .52 for the bowling sample), the correlations were not high enough to indicate the two scales were measuring the same variable. It may however be concluded that the scales are measures of separate and highly related variables.

The relationship of achievement
motivation Factors I and II

The results obtained from the correlation of achievement motivation Factors I and II indicated there was only a chance relationship between the two. It appears therefore these two scales are measuring different though somewhat similar characteristics. If the scales are in fact assessing the dispositions Costello has defined as the need to do a job well (Factor I), and the need to be a success which results in emulation of the successful rather than hard work (Factor II),⁶ there would appear to be some community of traits as was indicated by the results of this study.

⁶Charles G. Costello, "Need Achievement and College Performance," The Journal of Psychology, LXIX (1968), p. 17.

It is interesting to note that the findings of the present study contrast with those obtained by Costello. He found that the intercorrelation of the two scales was a negative .17,⁷ whereas the positive correlations in the present study were .13 and .12. The only plausible explanation for this difference is that Costello's results were obtained from a sample including both men and women. As has been discussed previously, the results of achievement motivation studies have frequently shown differences between men and women.

The relationship of anxiety and achievement motivation

The results of the correlation between A-State scores and those obtained on Factor I of the achievement motivation scale indicated there was no relationship between these two factors. There was however a significant positive correlation between A-State scores and those obtained for Factor II. These results did not support the assumption there would be a negative correlation between state anxiety and the motivational dispositions.

There is apparently no relationship between the level of state anxiety experienced in riflery or bowling

⁷Costello, "Two Scales to Measure Achievement Motivation," p. 234.

and the need to achieve through one's own efforts. This is not surprising in view of the difference in the nature of the variables. Whereas Factor I is assumed to be an enduring personality attribute of a general nature which would seem to indicate stability in achievement-oriented situations, state anxiety is conceived as a fluctuating condition which appears to create instability in such situations.

It may be concluded from the results that there is a positive relationship between the level of state anxiety experienced in riflery and bowling and the need to be a success which results in emulation of the successful rather than hard work. This relationship is apparently attributable to the common characteristics assessed by the two scales. Examination of the scale items does reveal some similarity. Some items on both scales appear to be detecting a lack of self-esteem and self-confidence. It also appears both scales measure elements of uncertainty. It is of course impossible to determine the specific nature of the elements measured by both scales without submitting the items to factor analysis. However, on the basis of the data obtained in the present study it is possible to conclude that the two scales consistently assess similar tendencies.

The results of the correlations between A-Trait scores and those obtained for achievement motivation

Factor I indicated there was a significant inverse relationship between trait anxiety and the need to achieve through one's own efforts. On the basis of these findings it can be concluded that a higher level of trait anxiety is associated with a lower level of desire to achieve.

It may be concluded from the results obtained on the A-Trait and Factor II correlations that a higher level of trait anxiety is significantly related to a greater need to be a success which results in emulation of the successful rather than hard work.

The findings concerning the relationship of anxiety to the two motivational dispositions may be related to Atkinson's theory of hope of success and fear of failure.⁸ These results suggest the possibility of less hope of success and greater fear of failure associated with higher levels of anxiety. The level of desire to achieve through one's own efforts may be effected by the individual's perception of task outcome, particularly if it appears there is limited opportunity for success and a possibility of failure. If this were true, these factors would be the major determinants of the individual's

⁸Atkinson, "Motivational Determinants," pp. 11-29.

level of aspiration. This then would explain the positive relationship obtained between trait anxiety and the need to be a success through emulation of the successful. It is conceivable that the individual would have greater hope of success and less fear of failure in situations where there was a concrete example of successful goal attainment. This is presented only as a plausible explanation of a possible relationship. Any warranted conclusions would of course be dependent upon the outcome of research designed to specifically test the relationships implied in the foregoing discussion.

The relationship between achievement
motivation and skill attainment

The relationships between skill attainment and the anxiety and achievement motivation variables did not prove as significant or consistent as had been anticipated, particularly in the case of the bowling subjects.

The correlation of the scores on Factor I and the skill scores of the riflery students revealed no relationship between skill attainment and the need to achieve through one's own efforts. However, when the Factor I and skill scores of the bowling students were correlated, a significant negative correlation was obtained.

The findings with the riflery students seem reasonable, since there may not be a relationship between the need to achieve and the ability to do so in the riflery

situation. There does not however seem to be any plausible explanation for the inverse relationship between need achievement and the development of bowling skill. Apparently the Factor I scale is assessing a variable detrimental to performance in this particular activity. However, the exact nature of this factor has not as yet been ascertained.

As shown in Table 4, the correlation of skill scores and those obtained for Factor II did not reveal a significant relationship between these variables. Although the correlation between Factor II and the riflery skill scores was negative and the correlation between the same factor and bowling scores was positive, the correlations were too low to warrant assumption of any real differences between the two. It therefore must be concluded that there is no relationship between skill attainment in either riflery or bowling and the need to be a success which results in emulation of the successful rather than hard work.

The relationship between anxiety and skill attainment

The correlation of skill attainment and A-State scores resulted in contrasting results in riflery and bowling. Both correlations proved to be negative. However, the correlation between the state anxiety and skill

scores of the riflery students was highly significant, whereas the correlation between A-State and bowling scores did not approach significance. It may therefore be concluded that there is an inverse relationship between the level of state anxiety experienced in riflery and the level of skill attained by beginning students. However, state anxiety does not appear to be a significant factor determining the level of skill attained by beginning bowling students. These results were anticipated, as it was assumed the emotionality associated with higher levels of state anxiety would be more detrimental to the development of skill in an activity such as riflery which requires constancy and relative immobility over a greater period of time.

The results of the correlation between A-Trait and riflery skill scores is given in Table 4. As indicated, the outcome of this correlation was similar to that between A-State and riflery skill in that both correlations were negative and significant. A-Trait scores did not correlate as highly with skill attainment as did A-State scores. However, the A-Trait and riflery skill score correlation did indicate a definite relationship between level of trait anxiety and level of skill attained, with higher levels of trait anxiety associated with lower levels of skill attainment. These results followed the predicted pattern, as it was assumed that due to the high

correlation between state and trait anxiety, the two variables would have a similar effect on skill development.

The correlation between A-Trait scores and the skill level attained in bowling is indeed perplexing. As shown in Table 4, these findings were in the opposite direction anticipated at a level that approached significance. That is, the correlation was positive at the .10 level of confidence. There does not seem to be any satisfactory way of explaining why a higher level of trait anxiety would result in a higher level of skill attainment in bowling when there did not appear to be a relationship between state anxiety and bowling skill.

A review of the skill scores shown in Appendix D indicates there was considerable variation in the mean scores of the different bowling classes. However, this does not account for the inconsistency in the correlations between the psychological variables and the skill scores, because there was an even greater variance in the class means of the riflery skill scores.

There does however seem to be some basis for questioning the reliability of the bowling skill scores. A review of the correlations between bowling skill and the four psychological variables evidences great inconsistency. None of the correlations resemble those obtained with the riflery students. There was one essential difference in the way the riflery student's

skill scores were obtained and the manner of procuring the bowling student's scores. The riflery student's targets were collected by the instructors and scored by the ROTC instructors or students out. ie the class who had been trained in scoring techniques. The scores were then recorded by both the ROTC instructor and the investigator. These scores were compared and any discrepancies were corrected by reference to the target. The bowling student's scores were recorded by other class members bowling on the same alley and were then placed on a summary sheet by the student herself. Although it is only conjecture, the procedure followed in the bowling classes may have permitted a greater margin of error in skill score computation. If this difference did exist, it would account for the lack of continuity in the results shown in Table 4.

Conclusions concerning the relationship
of anxiety and achievement motivation
to skill attainment

The results given in Table 5 indicate there is a significant difference between the level of riflery skill attained by the high and low anxiety groups. It can therefore be concluded that low state and trait anxiety enhances the learning of beginning riflery skills, whereas high state and trait anxiety is deleterious to skill development in this activity.

The significant difference between the bowling skill scores of the groups with high and low scores on Factor I would seem to indicate that low achievement motivation enhances learning in bowling, whereas a high level of desire to achieve impairs learning. There is a glaring inconsistency between these findings and those obtained in other studies relating the achievement motive to performance. Therefore, the findings concerning this factor in the present study remain open to question. Apparently some undetected or improperly described factor is being assessed by the Factor I scale. This is creating a relationship that cannot be explained by the information available at present. Costello has stated, "The real nature of the traits being measured by the scales can be determined only by further validation studies."⁹ The results of the present study support this conclusion.

There are two variables which were not included in the design of the present study, but which may have influenced the results. One is aptitude, and the other is differing anxiety effects in various stages of learning.

Katahn found that the achievement-anxiety-aptitude relationship had an effect in a complex learning

⁹Costello, "Two Scales to Measure Achievement Motivation," p. 232.

situation. His results showed there was interference with performance when high anxiety existed in combination with low or average aptitude whereas high anxiety in combination with high aptitude facilitated performance.¹⁰ Locke found that high ability subjects were more highly effected by differences in motivational level than were low ability subjects.¹¹ These findings as well as those of studies relating ability level to skill development suggest that aptitude may have been a significant factor determining skill attainment in the present investigation. This may partially account for the lack of continuity in the correlations of the riflery and bowling skill scores with the psychological variables.

There are indications that anxiety has different effects during different stages of learning. Wassenaar postulates that situational anxiety may have a more detrimental effect during the earlier stages of the learning process because the subjects are less acquainted with the learning material.¹² This factor could

¹⁰Martin Katahn, "Interaction of Anxiety and Ability in Complex Learning Situations," Journal of Personality and Social Psychology, III (1966), pp. 475-79.

¹¹Edwin A. Locke, "Interaction of Ability and Motivation in Performance," Perceptual and Motor Skills, XXI (1965), pp. 719-25.

¹²G. M. C. Wassenaar, "The Effect of General Anxiety as an Index of Liability on the Performance of Various Psychomotor Tasks," Journal of General Psychology, LXXI (1964), p. 351.

conceivably increase emotionality during performance of required tasks in the early stages of learning. The results of two studies involving swimming empirically support this hypothesis. Karbe found that high anxiety subjects learned fewer skills after eight swimming lessons, but their performance was similar to the low anxiety group after sixteen lessons.¹³ Daugert found that swimming proficiency increased as swimming anxiety decreased.¹⁴

The circumstances involved in the conduct of the present investigation did not permit a division of early and late learning. However, it is conceivable that such a division might have provided an explanation for the differences between the relationship of the bowling and riflery skill scores and the psychological variables.

There is some similarity between the results of the present study and those obtained by Daugert.¹⁵ Although state and trait anxiety were assessed in the present study and Daugert measured swimming anxiety, it is reasonable to assume there is some community of traits in the two different measures. This assumption is

¹³Karbe, "The Relationship of General Anxiety and Specific Anxiety Concerning the Learning of Swimming."

¹⁴Daugert, "The Relationship of Anxiety and Need for Achievement to the Learning of Swimming."

¹⁵Ibid.

verified in the fact that Daugert found that high swimming anxiety had an adverse effect on swimming achievement and similar findings were obtained with the riflery students in the present study. The other parallel that can be drawn between the two studies concerns achievement motivation. Daugert found that general need achievement scores did not relate to final swimming achievement. Similar findings were obtained with the riflery students on both factors of achievement motivation assessed in the present study and with the bowling students on Factor II.

Summary of Results

In summary of the results, it can be concluded there is no relationship between the achievement motive dimension designated as the need to achieve through one's own efforts and the factor denoted as the need to be a success which results in emulation of the successful rather than hard work. Nor is there a relationship between state anxiety and the motivational disposition designated as the need to achieve through one's own efforts. There is however, an inverse relationship between this disposition and trait anxiety.

There is a significant positive relationship between the anxiety constructs assessed in this study. Both anxiety constructs are positively related to the

motivational disposition denoted as the need to be a success which results in emulation of the successful rather than hard work.

The results of the present study indicated there was a significant relationship between state and trait anxiety and the level of skill attained in beginning riflery. However, there was no relationship between the achievement motivation factors and level of skill attained in riflery.

There was no relationship evidenced between the anxiety constructs or achievement motivation Factor II and the level of skill attained in bowling. There was a relationship between achievement motivation Factor I and the skill level attained in beginning bowling. However, because these results are inconsistent with those obtained in riflery and because there was a difference in the manner of determining the skill level scores of the two activities, these results were questioned.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study was conducted to explore the relationship between the variables state and trait anxiety and two motivational dispositions, and to ascertain the relationship of these variables to skill attainment in beginning bowling and beginning riflery.

Procedure

The subjects for this study were 104 beginning riflery students and 108 beginning bowling students enrolled in the physical education classes at The Ohio State University.

State and trait anxiety were assessed through administration of the State-Trait Anxiety Inventory. The motivational dispositions designated as the desire to do a job well and aspirations to be a success through emulation of the successful rather than hard work, were assessed by the Two Scales to Measure Achievement Motivation. At the end of the term, skill attainment measures were obtained by averaging the riflery students target scores and the bowling student's game scores.

The relationships between the anxiety and achievement motivation variables and skill attainment were investigated by means of a stepwise regression analysis. The significance of the difference between the group means of the bowling and riflery students on the anxiety and achievement motivation scales was ascertained by computing t ratios. The difference between the skill score means of the high and low anxiety subjects in the riflery sample and the need achievement scores of the bowling students was also tested for significance by computing t ratios.

Results

The results obtained in this study through assessment of motivational correlates indicates some characteristic difference between students enrolled in different physical education activities.

A reliable difference was indicated in the bowling and riflery student's motivational disposition designated as the need to be a success which results in emulation of the successful rather than hard work. The bowling students were found to be more inclined toward aspirations of success through imitation of the successful rather than hard work.

There does not appear to be a detectable difference between bowling and riflery student's need to achieve

through their own efforts. The results obtained with both groups on this factor were indicative of a high level of need achievement.

Although the state anxiety responses of the riflery students were somewhat higher than those of the bowling students the difference was not significant. It therefore appears that the state anxiety responses were resultant from anxiety evoking factors common to both class situations. This interpretation is consistent with the theoretical conceptualization of an achievement anxiety factor present in academic achievement-oriented situations.

There was a close parallel between the trait anxiety scores of the riflery students and those of the bowling students. On the basis of these findings it would appear that trait anxiety level is not a factor effecting the student's selection of a physical education activity.

There was a close comparison between the results obtained in the present study and those reported by Spielberger. This fact evidences the consistency in results obtained with the State-Trait Anxiety Inventory.

The A-State and A-Trait scores of the students in both bowling and riflery indicated a reliable relationship between the two anxiety constructs. However, the data did not provide evidence of a sufficiently high relationship

to warrant assuming the scales were measuring the same variable. Rather, it lends support to the theoretical conceptualization of state and trait anxiety as separate but related anxiety constructs.

The results did not indicate a relationship between the motivational dispositions assessed in Factors I and II. Nor did these factors have similar relationships to the anxiety variables. It was therefore concluded that there is no relationship between the need to do a job well and the need to be a success which results in emulation of the successful rather than hard work. The fact that the correlations between Factors I and II were positive whereas Costello obtained a negative inter-correlation between the two scales was discussed.

There was no relationship between the need to achieve through one's own efforts and state anxiety. There was however an inverse relationship between this motivational disposition and trait anxiety. The findings with Factor II were more consistent. The need to be a success which results in emulation of the successful rather than hard work was positively related to both trait and state anxiety.

The correlations of the anxiety and achievement motivation variables with the bowling and riflery skill scores yielded only three significant correlations. Factor I of achievement motivation was related to the level of

skill attained in bowling, but was not related to skill attainment in riflery. Factor II however, was not related to the level of skill attained in either activity. The results indicated that there was an inverse relationship between bowling skill development and the need to achieve through one's own efforts. Further analysis indicated that there was a significant difference in the level of bowling skill attained by the subjects with high and low scores on this factor. However, because there was no relationship between this factor and the level of skill attained in riflery and because the results obtained in bowling were inconsistent with those obtained in other studies, the results on Factor I remain open to question. It appears the Factor I scale is measuring a variable which is deleterious to performance in beginning bowling, but it was beyond the scope of this study to ascertain the exact nature of this relationship.

Although similar results were obtained for the two anxiety variables in riflery, the findings relating these factors to bowling skill attainment were highly inconsistent. There was an inverse relationship between trait anxiety level and the level of state anxiety experienced in riflery and the level of skill attained by beginning students. Further analysis revealed that both the high state and high trait anxiety subjects attained a significantly lower riflery skill level than

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the low state or low trait anxiety subjects. The results with the bowling subjects were quite different. There was only a small negative chance relationship between state anxiety and bowling skill level. However, a positive correlation that approached significance was obtained when the bowling skill scores were correlated with trait anxiety. Because there was a high positive correlation between the anxiety variables and because the results obtained with the riflery students contrast with those obtained with the bowling subjects, the reliability of the bowling skill scores was questioned.

In summary of the results of the present study, it can be concluded that more reliable and consistent results were obtained with the State-Trait Anxiety Inventory than with the Two Scales to Measure Achievement Motivation. The anxiety scales more effectively detected performance related factors in the riflery class situation than in the bowling learning environment. The achievement motivation scales did not effectively assess performance related variables in either activity.

Conclusions

Based on the evidence provided by this study the following conclusions appear to be justified:

1. There is some similarity in the motivational dispositions of the women students who elect to take

beginning riflery and beginning bowling. These students are characteristically similar in their need to achieve through their own efforts. However, they differ in the need to be a success which results in emulation of the successful rather than hard work. Student's who elect to take bowling are inclined toward a higher level of aspiration toward success as evidenced in the need to emulate the successful.

2. There is no distinguishable difference in the characteristic anxiety level of the women students who elect to take beginning bowling and those who elect to take beginning riflery.

3. There is no reliable difference in the level of state anxiety evoked by situational factors in the riflery learning environment as compared to that evoked by the bowling class situation.

4. There is a relationship between trait anxiety and the level of state anxiety experienced in the beginning riflery and beginning bowling class situations.

5. There is no relationship between the motivational disposition designated as the need to achieve through one's own efforts and the need to be a success which results in emulation of the successful rather than hard work.

6. There is no relationship between the need to achieve through one's own efforts and the level of state

anxiety experienced in beginning riflery or beginning bowling. However, there is a relationship between the level of state anxiety experienced in these activities and the need to be a success which results in emulation of the successful rather than hard work.

7. There is an inverse relationship between the level of trait anxiety and the need to achieve through one's own efforts. There is a positive relationship however between trait anxiety level and the need to be a success which results in emulation of the successful rather than hard work.

8. State and trait anxiety are significant factors effecting the learning of skill in beginning riflery. Higher levels of state and trait anxiety are deleterious to the learning and performance of women students in this activity.

9. There is no relationship between state and trait anxiety and the learning of beginning bowling skills.

10. The motivational disposition denoted as the need to be a success which results in emulation of the successful rather than hard work is not related to skill attainment in either beginning riflery or beginning bowling.

11. There is no relationship between the need to achieve through one's own efforts and skill learning in beginning riflery.

12. The results of this study indicated that the need to achieve through one's own efforts is inversely related to skill attainment in beginning bowling. However, these results are inconsistent with other results obtained in this study as well as with the findings of other studies relating need achievement to performance. It therefore must be concluded that the results are attributable to artifacts in the present investigation.

Recommendations for Further Study

The findings and conclusions of this study evidence the need for further investigation of the relationship of state and trait anxiety to the learning of gross motor skills. It is suggested that a similar study be conducted utilizing the State-Trait Anxiety Inventory to determine the relationship of these anxiety variables to other physical education activities.

The results obtained with the anxiety inventory would also seem to warrant investigation of the relationship between the anxiety variables and other psychological variables that potentially effect learning, such as body and self cathexis.

A particularly fruitful area of investigation suggested by these findings is the relationship of state and trait anxiety to skill attainment at more advanced levels of learning and performance. Such an investigation

should include the anxiety levels associated with athletic competition.

There is a need for studies comparing the situational anxiety level evoked in the physical education class with that evoked while learning the same skills in a recreational situation. This would aid in determining whether the anxiety level experienced in the physical education class is evoked by stimuli associated with the activity itself or whether in fact it is associated with the need to achieve in the academic environment.

The results obtained with the Two Scales to Measure Achievement Motivation did not support extending their application at this time. However, the results of previous studies have indicated sufficient relationship between the achievement motive and performance to warrant further investigation of this factor. It therefore appears that there is a need for development of objective measures that will assess the individual's need to achieve in specific physical education activities.

In conclusion, it appears that the most urgent need is for development of specific anxiety and achievement motivation scales designed to ascertain the nature and effect of these variables in certain physical education learning situations.

APPENDICES

APPENDIX A

BOWLING EXPERIENCE INVENTORY

NOTE: The information from this inventory will be used for research purposes and will in no way effect your grade in this class.

NAME _____ AGE _____ RANK _____
Last First
CLASS _____ INSTRUCTOR _____
Day Time

I. Record below the number of times you have bowled prior to enrolling in this course.

Place an X in front of the statement that describes the approximate number of times you have previously bowled.

_____ never
_____ less than 5 times
_____ 5 to 10 times
_____ more than 10 times

II. If you have ever bowled before please answer the following questions.

- A. Approximate average bowling score _____.
- B. Have you ever had instruction? yes no
- C. If you have received instruction what was your age at that time _____
- D. If you have had instruction check the item or items that describe the type of instruction.
- _____ instruction by firends or family
- _____ School Instruction (circle one) Jr. High High School College
- _____ Professional Instruction
- _____ Other (Please Describe) _____

E. Place an X in front of the items that describe all of the recreational bowling in which you have participated.

_____ Intramural Activity

_____ League Bowling

_____ Unorganized Recreational Bowling

_____ Other (Describe) _____

RIFLERY EXPERIENCE INVENTORY

NOTE: The information from this inventory will be used for research purposes and will in no way effect your grade in this class.

NAME	AGE	RANK
Last First		

CLASS _____ INSTRUCTOR _____
Day Time

DIRECTIONS

Record below the type of experience you have had with firearms.
Circle the Roman Numeral preceding one of the four statements below that describes your level of experience. If you have previously fired a weapon answer parts A, B, and C.

- I. I have never shot a firearm using live ammunition.
- II. I have used a firearm less than five times.
- III. I have used a firearm five to ten times.
- IV. I have used a firearm more than ten times.

- A. Place an X in front of the types of firearms you have used.

_____ .22 Rifle _____ Shotgun
_____ High Power Rifle _____ Pistol
_____ Other (Please Describe) _____

- B. Place an X in front of the types of targets you have used.

_____ Skeet _____ Indoor Rifle Range
 _____ Outdoor Rifle Range _____ Field Target (tin cans, bottles,
 birds, animals, etc.)
 _____ Other (Please Describe)

- C. Have you had instruction in use of a firearm? yes no

If you have had instruction place an X in front of the items that describe the type or types of instruction.

_____ Instruction by friends or family

_____ Professional Instruction (Describe) _____

_____ Other (Describe) _____

APPENDIX B

SELF-ANALYSIS QUESTIONNAIRE
Form X-1

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and indicate on the answer sheet the appropriate number of the statement that indicates how you feel when you are involved in this physical education activity.

There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to best describe your feeling when participating in this activity.

	Not at all	Some- what	Moder- ately so	Very much so
*1. I feel calm	1	2	3	4
*2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I am regretful	1	2	3	4
*5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortune	1	2	3	4
*8. I feel rested	1	2	3	4
9. I feel anxious	1	2	3	4
*10. I feel comfortable	1	2	3	4
*11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel "high strung"	1	2	3	4
*15. I am relaxed	1	2	3	4
*16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel over-excited and "rattled"	1	2	3	4
*19. I feel joyful	1	2	3	4
*20. I feel pleasant	1	2	3	4

Form X-2

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and indicate on the answer sheet the appropriate number of the statement that indicate how you generally feel.

There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe how you generally feel.

	Almost never	Some- times	Often	Almost always
*1. I feel pleasant	1	2	3	4
2. I tire quickly	1	2	3	4
3. I feel like crying	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I am losing out on things because I can't make up my mind soon enough	1	2	3	4
*6. I feel rested	1	2	3	4
*7. I am "calm, cool, and collected" .	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them.	1	2	3	4
9. I worry too much over something that doesn't really matter	1	2	3	4
*10. I am happy	1	2	3	4
11. I am inclined to take things hard.	1	2	3	4
12. I lack self-confidence	1	2	3	4
*13. I feel secure	1	2	3	4
14. I try to avoid facing a crisis or difficulty	1	2	3	4
15. I feel blue	1	2	3	4
*16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappoints so keenly that I can't put them out of my mind . .	1	2	3	4
*19. I am a steady person	1	2	3	4
20. I become tense and upset when I think about my present concerns .	1	2	3	4

PERSONALITY QUESTIONNAIRE

DIRECTIONS: The questions below have been designed to obtain a score which will describe certain aspects of your personality. There are no "right" or "wrong" answers to these questions. It is therefore impossible to get a good or bad score on this personality scale.

All questions are to be answered either "yes" or "no" by marking in the appropriate box on the answer sheet.

1. Are you inclined to read of the successes of others rather than do the work of making yourself a success?
- *2. Would you describe yourself as an ambitious person?
- *3. Do you work for success rather than daydream about it?
4. Would you describe yourself as being lazy?
- *5. Do you usually work to do more than just get through an examination?
6. Will days often go by without your having done a thing?
- *7. Do you do things "today" rather than putting them off to do "tomorrow"?
8. Are you inclined to take life as it comes without much planning?
- *9. Do you work hard at a job?
10. Do you, or did you, do little preparation for examinations?
- *11. Do you grow excited when telling someone about the work you are doing?
12. Do you usually remain free from boredom when on holidays?
- *13. Are you very interested in the lives of successful people?
14. Do you remain relaxed at the thought of a difficult task you are about to undertake?
15. Are you usually unimpressed by how hard others work?
16. Are you usually able to sleep even when engaged in an exciting job?
- *17. Are you usually awed in the presence of very successful people?
18. Can you usually concentrate on what people are saying to you even when an important job is unfinished?
- *19. Does the great achievement of others sometimes make you feel small?
- *20. Have you at any time tried to model your life on that of a successful person?
21. Do you readily forget your work when you are on holidays?
- *22. Are you influenced by those around you in the amount of work you do?
23. Do you usually remain free from envy when others are successful?
- *24. Do you often compare how well you do something with how well others can do it?

APPENDIX C

SCALE ADMINISTRATION INSTRUCTIONS

Introduction

"I am Mrs. Burton. I am an instructor in the Physical Education Department here at Ohio State. This quarter I am conducting research in several of the bowling and riflery classes.

Today I will be giving you three personality tests. Your scores on these tests will be used for research purposes only and will help us to make our teaching in this activity more effective.

I must have your score sheets identified in order to keep your individual scores together. However, as you see, these will be machine scored and no one will review them to determine your answers on any individual items. Your instructor will not be given the results from any individual's test. Therefore, your answers will in no way affect your grade in this class. It is essential that you be as honest and accurate as possible, or the results of your test will not be meaningful.

Your participation in this study is voluntary and if any of you do not desire to be a part of this study you are free to leave."

Scale Instructions

The students were given the first answer sheet and asked to fill in the proper identifying information, i.e., name, test form, instructor and course. The Self-Analysis Questionnaire Form X-1 was distributed and the printed directions were reviewed. The students were told to answer in terms of how they felt in the actual class situation, that is, when they were actually receiving instructions and bowling or firing the rifle. The investigator then used the first statement as an example, pointing out the headings on each answer column. The students were told to ignore column five on the answer sheet and answer items one through twenty.

When the students had completed Form X-1, the answer sheets and test forms were collected and new answer sheets were distributed. The students again filled in the identifying information. Form X-2 was then distributed and the written directions were reviewed. The investigator pointed out that although this test was similar to the preceding one, there was one primary difference, this test was to be answered in terms of how they generally felt, that is, in a number of different situations the students were told to again ignore column five on the answer sheet and answer only items one through twenty.

When Form X-2 had been completed, the answer sheets and test forms were collected and new answer sheets were

distributed. The students were told this would be the last test and were asked to again fill in the identifying information on the answer sheet. The Personality Questionnaire was then distributed and the written directions reviewed. The students were told to answer "True" or "False" according to whether or not they felt the statements were descriptive of them in most situations. They were told to note that on this test they would be answering twenty-four items by utilizing only the first two columns on the answer sheet.

When the students had completed the Personality Questionnaire the investigator thanked them for their cooperation.

The bowling students were tested in either the Game Room or the Table Tennis Room in the Ohio Union. The riflery students were tested in a classroom adjacent to the rifle range.

APPENDIX D

SKILL ATTAINMENT SCORES FOR THE BOWLING STUDENTS

Student	Number of Lines	Average Score
Class A		
1	14	108.71
2	18	98.22
3	14	71.21
4	13	103.23
5	16	96.56
6	16	77.31
7	12	70.92
8	13	113.92
9	14	106.71
10	16	93.69
11	11	91.55
12	12	83.75
13	12	107.83
14	17	87.82
15	14	87.36
		M = 93.25
Class B		
1	10	100.90
2	9	101.89
3	11	99.18
4	10	105.10
5	10	88.20
6	8	116.13
7	12	104.08
8	9	101.44
9	9	104.78
10	9	112.67
11	10	105.70
12	10	79.70
13	10	76.00
14	11	106.45
15	9	102.33
		M = 100.30

SKILL ATTAINMENT SCORES FOR THE BOWLING STUDENTS (cont'd.)

Student	Number of Lines	Average Score
Class C		
1	9	117.33
2	10	94.00
3	5	85.40
4	9	106.33
5	6	106.50
6	11	95.64
7	5	74.20
8	9	100.22
9	9	113.78
10	8	93.00
11	8	98.13
		M = 98.59
Class D		
1	9	85.78
2	17	108.06
3	15	101.87
4	13	117.31
5	18	117.33
6	16	106.50
7	13	99.00
8	12	94.67
9	14	80.43
10	15	96.93
11	10	84.70
		M = 99.33
Class E		
1	5	81.80
2	9	109.33
3	7	107.71
4	7	102.29
5	9	101.00
6	9	118.33
7	7	94.71
8	11	102.82
9	7	98.00
10	8	106.13
		M = 102.21

SKILL ATTAINMENT SCORES FOR THE BOWLING STUDENTS (cont'd.)

Student	Number of Lines	Average Score
Class F		
1	6	118.50
2	7	101.71
3	5	99.60
4	9	114.22
5	8	96.63
6	8	109.63
7	5	112.80
8	8	116.25
9	8	91.75
10	8	97.38
11	6	106.33
12	8	96.38
13	8	90.38
		M = 103.96
Class G		
1	19	100.58
2	16	97.50
3	17	81.18
4	12	99.25
5	19	106.37
6	19	111.89
7	19	95.68
8	19	102.11
9	22	97.77
10	17	113.06
11	23	82.04
		M = 98.86

SKILL ATTAINMENT SCORES FOR THE BOWLING STUDENTS (cont'd.)

Student	Number of Lines	Average Score
Class H		
1	16	84.31
2	15	87.53
3	17	93.41
4	20	85.70
5	14	116.21
6	24	77.38
7	19	92.16
8	12	94.75
9	12	94.17
10	18	91.22
11	15	83.73
12	14	102.79
		M = 91.78
Class I		
1	28	100.29
2	21	92.29
3	24	98.21
4	23	104.87
5	18	112.11
6	19	96.42
7	21	105.29
8	37	110.46
9	22	103.82
10	30	97.03
		M = 102.07

SKILL ATTAINMENT SCORES FOR THE RIFLERY STUDENTS

Student	Prone		Standing		
	Number of Targets	Average	Number of Targets	Average	Total
Class A					
1	8	73.50	5	25.00	98.50
2	10	64.60	4	21.00	85.60
3	9	65.89	7	29.86	95.75
4	13	53.77	8	27.50	81.27
5	8	79.38	9	24.78	104.16
6	12	75.92	9	27.22	103.14
7	10	72.50	7	30.86	103.36
8	11	61.55	7	24.00	85.55
9	10	74.70	6	30.17	104.87
10	11	47.73	7	14.57	62.30
11	12	52.75	9	13.67	66.42
12	10	61.60	7	29.29	90.89
13	7	52.00	4	21.50	73.50
14	10	70.30	4	46.00	116.30
15	11	75.00	7	34.00	109.00
16	11	69.64	7	39.57	109.21
17	11	71.73	8	44.13	115.86
18	14	73.86	7	38.71	112.57
19	8	71.50	7	32.86	104.36
					M = 95.93
Class B					
1	11	75.00	13	43.15	118.15
2	8	77.88	6	49.67	127.55
3	10	65.60	3	24.67	90.27
4	10	83.90	5	51.80	135.70
5	7	61.86	5	14.20	76.06
6	8	73.75	8	20.50	94.25
7	11	69.36	6	34.00	103.36
8	12	71.33	14	42.29	113.62
9	11	73.36	11	36.00	109.36
10	8	83.63	12	48.92	132.55
11	11	78.00	6	46.00	124.00
					M = 111.35

SKILL ATTAINMENT SCORES FOR THE RIFLERY STUDENTS (cont'd.)

Prone			Standing		
Student	Number of Targets	Average	Number of Targets	Average	Total
Class C					
1	12	70.42	7	38.71	109.13
2	11	73.91	7	27.14	101.05
3	11	65.36	6	44.33	109.69
4	11	58.09	5	19.60	77.69
5	11	76.18	7	39.00	115.18
6	12	69.83	7	13.00	82.83
7	10	74.10	4	19.50	93.60
8	11	70.82	7	29.43	100.25
9	11	51.18	5	19.80	70.98
10	12	62.00	9	15.33	77.33
11	8	71.25	8	23.38	94.63
12	12	76.25	9	31.22	107.47
					M = 94.99
Class D					
1	13	61.46	8	17.00	78.46
2	13	70.08	7	27.00	97.08
3	13	70.69	6	30.83	101.52
4	14	74.29	12	23.25	97.54
5	17	71.88	8	23.50	95.38
6	16	61.38	9	21.44	82.82
7	15	54.93	8	13.88	68.81
8	13	73.85	8	24.50	98.35
9	12	70.58	7	25.14	95.72
10	14	76.31	9	33.00	109.71
11	10	85.50	6	31.67	117.17
12	13	68.62	10	46.10	114.72
13	14	58.50	6	27.33	85.83
14	13	67.31	9	28.11	95.42
15	9	74.67	7	37.14	111.81
16	13	78.62	8	39.25	117.87
17	14	62.50	8	12.00	74.50
18	12	70.42	5	47.00	117.42
19	12	57.50	9	23.00	80.50
20	11	69.45	6	28.33	97.78
21	11	75.55	8	51.38	126.93
22	10	70.30	9	14.78	85.08
					M = 97.75

SKILL ATTAINMENT SCORES FOR THE RIFLERY STUDENTS (cont'd.)

Student	Prone		Standing		
	Number of Targets	Average	Number of Targets	Average	Total
Class E					
1	12	78.17	7	30.29	108.46
2	13	77.38	6	38.17	115.55
3	12	79.33	7	28.43	107.76
4	10	73.80	7	22.86	96.66
5	10	67.80	3	14.67	82.47
6	11	64.18	5	25.40	89.58
7	8	71.25	7	21.29	92.54
8	13	80.69	5	35.60	116.29
9	8	74.88	7	32.14	107.02
10	12	80.92	9	36.89	117.81
11	15	80.73	9	46.22	126.95
12	12	55.50	5	13.00	68.50
13	7	71.00	7	40.00	111.00
14	14	72.50	6	30.67	103.17
15	13	75.54	7	24.43	99.97
16	14	78.07	8	27.63	105.70
17	13	82.31	17	33.53	115.84
18	11	71.73	7	36.14	107.87
19	13	75.33	7	26.14	101.52
					M = 103.93
Class F					
1	16	76.50	8	39.75	116.25
2	10	75.30	7	19.00	94.30
3	10	70.70	6	45.67	116.37
4	10	72.70	9	42.44	115.14
5	12	71.50	8	30.75	102.25
6	9	69.89	10	36.00	105.89
7	13	70.54	10	36.30	106.84
8	7	79.14	7	24.43	103.57
9	12	76.92	6	27.00	103.92
10	13	84.31	11	47.19	131.50
11	11	63.82	7	13.86	77.68
12	10	77.80	10	22.20	100.00
13	9	64.33	9	33.78	98.11
14	9	66.56	4	31.00	97.56
15	9	71.89	6	32.50	104.39
16	10	78.70	8	30.88	109.58
17	12	54.17	7	24.86	79.03
18	10	71.70	8	38.50	110.20
19	13	69.92	7	23.00	92.92
20	11	78.91	7	27.00	105.91
21	12	78.42	9	36.22	114.64
					M = 104.10

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