THE EFFECT OF SELF CONCEPT AND VARIOUS CONCEPTUAL AND
PHYSICAL PRACTICE METHODS UPON THE PERFORMANCE
OF A SELECTED BASKETBALL MOTOR SKILL

DISSERTATION

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF EDUCATION

By

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Denton, Texas
May, 1971

The problem investigated was the effect of various methods of conceptual, physical, and conceptual-physical practice procedures upon performance of the basketball motor skill of foul shooting. The sub-problem under investigation was the effect of self-concept upon the performance of foul shooting.

Eighty male freshman and sophomore students enrolled in physical activity classes were randomly selected to participate in one of five groups. Sixteen subjects were randomly placed in each the (a) No Practice Group, (b) Conceptual Practice Only Group, (c) Physical Practice Only Group, (d) Alternating Conceptual and Physical Practice Group, and (e) Conceptualization and Immediate Physical Practice Group.

The Tennessee Self Concept Scale was utilized to measure self-concept. Analysis of data was based on Total Positive Scores and Physical Self Scores. High self-concepts for both scores were considered to be those above the total group mean. Low self-concepts were those scores on, or below, the total group mean.
The data were treated by a t test for related samples, and two multiple analyses of variance. Two analyses of variances were necessary since high and low self-concept was based first on the Total Positive Score, and then on the Physical Self Score of the Tennessee Self Concept Scale. The hypotheses were tested at the .05 level of significance.

Based on the statistical analysis of data, the following findings were apparent:

1. It was found that group foul shot mean gains were as follows:
   a. Physical Practice Only Group, 3.79;
   b. Conceptualization and Immediate Physical Practice Group, 2.80;
   c. Alternating Conceptual and Physical Practice Group, 2.13;
   d. No Practice Group, .08; and
   e. Conceptual Practice Only Group, .06.

2. There were no significant differences between group mean gain foul shot performances following practice methods which included no practice, conceptual practice only, physical practice only, alternating conceptual and physical practice, and conceptualization and immediate physical practice.

3. There was no significant difference between pretest and posttest performance of the foul shot by the No Practice Group.
4. There was no significant statistical interaction between self-concept, as measured by the Tennessee Self Concept Scale (Total Positive Score), and foul shot mean gain for each group.

5. There was no significant statistical interaction between self-concept, as measured by the Tennessee Self Concept Scale (Physical Self Score), and foul shot mean gain for each group.

The design of the investigation may have caused some factors to occur which had an inhibiting effect upon the findings. These factors are discussed in the implications. As a result of the findings, the following conclusions were deemed appropriate within the limitations of this study:

1. There is no difference between no practice, physical practice, conceptual practice, or conceptual-physical practice techniques in improving performance of the basketball foul shot.

2. Self-concept (Total Positive Score) does not significantly affect group mean gain in performance of foul shooting.

3. Self-concept (Physical Self Score) does not significantly affect group mean gain in performance of foul shooting.

The findings and conclusions regarding the foul shot practice methods were not in agreement with the majority of accomplished studies. The limitations of this study may
have influenced the fact that no relationship was found between (a) conceptual practice and improvement in performance of a motor skill or (b) self-concept and improvement in performance of a motor skill.
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CHAPTER I

INTRODUCTION

Considerable interest has been stimulated in recent years concerning the possibility that motor learning and improved motor performance can be enhanced through conceptual-physical practice methods. Just how much learning is physical and how much is mental has perplexed investigators in the field for some time. In 1899, Anderson (3) had subjects "think" about movements required in the execution of gymnastic skills. After several studies, he concluded that these skills could be learned without the overt use of muscle groups. Many subsequent studies have made physical educators even more aware of the importance of the mental aspects of motor learning and motor performance.

The physical educator and the coach work with both skilled and unskilled performers. Nonetheless each shares a common goal—that of improved performance by their respective students or athletes (2). Often the physical educator or coach is limited by time; therefore, maximum utilization of the time and energy of performers is not only desirable, but necessary to achieve intended goals. Perhaps through studies of mental and motor potentialities ways can be found to equate these learning methods with the results, providing significant improvement in the educative process.
Richardson (11) noted that the trend of most studies indicated that conceptualization procedures do have a facilitating effect upon performance of the motor task. Conceptualization, in this investigation, was defined as the process of mentally rehearsing a motor skill without overt muscle involvement.

Lawther (9) indicated that mental practice may serve as a period of incubation for ideas to be utilized during actual physical performance. He went on to say that mental practice may reduce the tendency for retroactive inhibition to occur.

There is much research to be done in the area of conceptualization before educators will be able to provide practical application for the physical education instructor. Nevertheless, it seems reasonable to expect the physical educator of the future to make greater use of the cognitive processes and their function in the learning and performance of motor skills (12). It was a premise of this study that conceptualization and its relationship to motor skill performance does warrant serious consideration.

The self-concept is not a new area of interest by any means. The self-concept and its relationship to academic success have been studied by educators for many years. There apparently is little doubt that self-concept is related to academic performance.
Lecky (10) found that low academic achievement was often due to a child's definition of himself as a nonlearner. Borislow (4) stated that among those students who indicated an intention to strive for good grades, it was obvious that those who turned out to be underachievers possessed a more pessimistic picture of themselves as students than did achievers. This was true both before and after academic performance. It appears that this same finding might also relate to motor performance.

Much of what is done in physical education is academic in nature. The student is expected to read instructions, listen to instruction, and eventually perform the skill. The student's view of himself cannot be minimized, for it is through his self-concept that he establishes goals or sets limits in relation to his own performance of motor skills. This study attempted to determine the relationship between motor performance and self-concept. This relationship was studied under varying methods of conceptual and physical practice.

Statement of the Problem

The problem considered in this study was the effect of various methods of conceptual, physical, and conceptual-physical practice procedures upon performance of the basketball motor skill of foul shooting by male college freshman and sophomore students.
A sub-problem of this study was the relationship of the self-concept of male college freshman and sophomore students to the performance of the selected basketball motor skill of foul shooting.

Purposes of the Study

To further clarify the study, the following purposes were formulated:

To ascertain the effect of five methods of practice upon the performance of a basketball motor skill. These methods were (1) no practice, (2) physical practice only, (3) conceptual practice only, (4) alternating conceptual and physical practice, and (5) conceptualization and immediate physical practice.

To interpret the findings for the multitude of physical educators, coaches, and others who are striving for improvement in the utilization of the time and energy of students in the learning and performance of motor skills.

To clarify the relationship of the cognitive processes to the learning and performance of motor skills.

A concomitant purpose was to ascertain an understanding of differences in performance between these practice methods as facilitated or inhibited by the self-concept variable.

Hypotheses

The tenability of the following hypotheses was examined:
I. There will be no significant difference in the results of the No Practice Group on pretest and posttest performance of the basketball foul shot.

II. There will be no significant difference in foul shot mean gain performance between the Conceptual Practice Only Group and the No Practice Group.

III. The Physical Practice Only Group will show a significantly greater foul shot mean gain in performance than will (a) the No Practice Group, (b) the Conceptual Practice Only Group.

IV. The Alternating Conceptual and Physical Practice Group will
   (i.) show a significantly greater foul shot mean gain in performance than will the
   (1) No Practice Group,
   (2) Conceptual Practice Only Group,
   (3) not show a significantly greater foul shot mean gain in performance than the Physical Practice Only Group.

V. A comparison of foul shot mean gain performances will show the Conceptualization and Immediate Physical Practice Group to
   (A) be significantly greater than the
   (1) No Practice Group,
   (2) Conceptual Practice Only Group,
   (3) not be significantly greater than the
(1) Physical Practice Only Group,
(2) Alternating Conceptual and Physical Practice Group.

VI. There will be no significant statistical interaction between the Total Positive Self-Concept Scores and foul shot mean gain performance in the (a) No Practice Group, (b) Physical Practice Only Group, (c) Conceptual Practice Only Group, (d) Alternating Conceptual and Physical Practice Group, (e) Conceptualization and Immediate Physical Practice Group, and (f) Total Group.

VII. There will be no significant statistical interaction between the Physical Self Scores and foul shot mean gain performance in the (a) No Practice Group, (b) Physical Practice Only Group, (c) Conceptual Practice Only Group, (d) Alternating Conceptual and Physical Practice Group, (e) Conceptualization and Immediate Physical Practice Group, and (f) Total Group.

Background and Significance of the Study

The complexity of learning is a network of diverse processes. Two of these, motor learning and the mental aspects in the conception of a task, have undergone investigation by a number of individuals in recent years. The distinct role of conceptualization and its effect upon motor learning are still not clear. It should be pointed out, however, that there is a need to pursue the relationship
between conceptual and physical rehearsal. There also is need for a better understanding of how the interaction of these two processes (1) affects the initial learning of a motor task, (2) facilitates or inhibits the retention of a motor task, or (3) improves the immediate performance of a motor task (11).

Weiss (14) stated that most studies have indicated that conceptual practice procedures are associated with improved performance of motor tasks. He also suggested that mental practice facilitates the acquisition of a skill, and when mental practice and physical practice trials are alternated during the acquisition of a skill, the improvement in performance will be as good or better than the physical practice only trials.

In addition, Weiss believed that mental practice produced good habits rather than bad. He based this belief upon the physiological fact that the process of imagining a movement is associated with the presence of action currents in the muscle groups which are used in making the actual movements. Neural patterns perhaps become strengthened through mental practice. Motor responses in turn may become reinforced, while neuromuscular coordination is facilitated. He used mental practice in coaching his tennis teams and felt that it was a definite asset to the tennis program.

Clark (6) found that physical practice for varsity groups, junior varsity groups, and novice groups resulted in
average gains of 16, 24, and 44 per cent respectively. His mental practice groups in these same categories resulted in average gains of 15, 23, and 24 per cent respectively. It can readily be seen that mental practice came very close to being as effective as physical practice for the varsity and junior varsity groups. This did not hold true, however, for the novice groups. In addition, both mental and physical practice groups showed significant gains in performance when tested at the end of the experiment.

Egstrom (7) found through variance analysis and an examination of learning curves that five conceptualizing and manual practice methods were more effective in changing human performance than was limiting practice to taking three tests which were given to the control group at the beginning, middle, and conclusion of the study. He also found the effect of alternating periods of emphasis on mental and manual practice as profitable as successive periods emphasizing manual practice.

It would be difficult to evaluate accurately in just one experiment all the individual variables affecting any motor skill. In previous studies of conceptual practice, such individual variables as imagery, games ability, abstract reasoning, intelligence, kinesthesis, motor ability, and others have been studied (11).

When a person is performing a motor task there is the possibility that his concept of himself has a strong
relationship to how he will actually perform. In performing motor tasks in the presence of others, the concept of physical self may be extremely important. Staines (13) states that the self is of prime importance in a great deal of behavior because of our concern with maintaining and enhancing the self (1) as it appears to the person, (2) as he thinks it ought to be, and (3) as he thinks others believe it to be. Just how important the self is to performance of a motor task is open to speculation.

Brookover, et al. (5) showed that there was a significant and positive correlation between self-concept and performance in the academic role.

Allen and Holyoak (1) concluded that students learning under a physical education program of individualized instruction, as opposed to mass grouping, showed fewer differences between quartile groups in the areas of physical fitness, motor ability, and physical education attitude when grouped on the basis of self-concept.

Hopefully, this study will contribute to the research already accomplished with respect to the self-concept and its relationship to motor skill performance.

Definition of Terms.

The terms used in this study are defined as follows:

**Conceptual practice**: the process of rehearsing a physical skill without gross muscular movement.
Physical practice: the actual involvement of muscle groups in the overt performance of a motor skill.

Retroactive inhibition: when a recently learned task impairs the retention performance of an older learned task.

Self-concept: how a person views himself as a fully functioning person.

Total Positive Score: on the Tennessee Self Concept Scale it is the most important score. It reflects the overall level of self esteem (8).

Physical Self Score: on the Tennessee Self Concept Scale it represents the subject as presenting his view of his body, his state of health, his physical appearance, skills, and sexuality (8).

High self-concept score: those subjects who score above the total group mean.

Low self-concept score: those subjects who score on or below the total group mean.

Motor skill: "muscular movement or motion of the body required for the successful execution of a desired act" (12).

Neuromuscular coordination: the smoothness and speed with which muscles respond to commands of the cognitive processes.

Delimitations

Subjects were freshman and sophomore male students enrolled in regularly scheduled activity classes at North Texas State University during the 1970 fall term.
The subjects were selected from classes which met on Monday, Wednesday, and Friday of each week.

Basic Assumptions

It was assumed that no group would respond any more or less conscientiously than any other group.

It was also assumed that each subject was capable of conceptualizing the process involved in shooting the basketball free throw.

Instrument

The **Tennessee Self Concept Scale** was utilized to evaluate the self-concept of each subject. First developed in 1955, the **Tennessee Self Concept Scale** (hereafter referred to as TSCS) is simple for the subject to complete. It is widely applicable, well-standardized, and multi-dimensional with respect to the description of the self-concept. In completing the TSCS the subject responds to 100 self-descriptive statements which reflect his own inner experiences and feelings. In addition, it is applicable to the whole range of psychological adjustment from healthy, well-adjusted people, to psychotic patients.

The TSCS has been utilized for a variety of purposes, including counseling, clinical assessment and diagnosis, research in behavioral science, and personnel selection. The most important score on the TSCS is the Total Positive Score. This score reflects the overall level of self-esteem.
The Total Positive Score is derived from the arithmetic sum of all the individual positive scores. Subjects who score high on the Total Positive Score tend to have confidence in themselves, like themselves, and reflect personal worth through their behavior. Subjects who score low on the Total Positive Score tend to lack confidence, feel inadequate, anxious, depressed, and unhappy.

The TSCS is actually a two-dimensional, three-by-five scheme with regard to scoring. The two dimensions are defined by rows and columns as indicated in Figure 1.

<table>
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<tr>
<th>In Terms of:</th>
<th>Column &quot;A&quot; Physical Self</th>
<th>Column &quot;B&quot; Moral-Ethical Self</th>
<th>Column &quot;C&quot; Personal Self</th>
<th>Column &quot;D&quot; Family Self</th>
<th>Column &quot;E&quot; Social Self</th>
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<tr>
<td>Row &quot;1&quot;</td>
<td>Identity: What he is</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row &quot;2&quot;</td>
<td>Self Satisfaction: How he accepts himself</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row &quot;3&quot;</td>
<td>Behavior: How he acts</td>
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Fig. 1—The three-by-five scheme of the Tennessee Self Concept Scale.
The standardization group was a broad sample of 626 people. The group included subjects from various parts of the country, with an age range from 12 to 68 years. Sexes, along with Negro and Caucasian races were approximately equal in representation. There were subjects from all social, economic, and intellectual levels. Educational levels ranged from sixth grade through the Doctor of Philosophy degree.

To determine reliability, sixty college students were tested, and then retested at the end of two weeks. The reliability coefficient of the Total Positive Score is .92. The reliability coefficient of the Physical Self Score is .87. The Total Positive Score and the Physical Self Score have an intercorrelation coefficient of .75.

The content validity of the TSCS is intended to insure that the classification system used for the raw scores and column scores is dependable. There are ten items on the test which comprise the Self Criticism Scale. These are mildly derogatory statements that most people admit as being true for them. The remaining ninety items comprise the three-by-five scheme already described. Seven clinical psychologists were employed as judges to classify the items for the scheme. In addition, they judged each item as to whether it was positive or negative in content. On these ninety items there was perfect agreement by the judges. For this reason, it is assumed that the categories utilized in
the TSCS are logically meaningful and publicly communicable. This gives strength to the content validity (8).

Administration of the TSCS adhered to the instructions provided on the inside cover of the test booklet.

Procedures for Collection of Data

Freshman and sophomore male students enrolled in regularly scheduled activity classes during the 1970 fall term at North Texas State University served as subjects for the study. The one-hand basketball foul shot was utilized as the motor skill, and collection of data took place at the Men's Gymnasium on the North Texas State University campus.

Two basketball goals, one in the northwest corner (goal A), and one in the northeast corner (goal B), were used. The basketball backboards were wooden, rectangular, and regulation in size with regulation size goals. The foul shot line was already marked on the playing floor. This line was fifteen feet from the plane of the face of the backboard. The foul shots were attempted from this line directly in front of the basketball goal. Two regulation rubber basketballs were utilized, and they were of the same brand and make. An air pressure of nine pounds per square inch was held constant throughout the experiment.

The subjects wore the uniform which was required of all male students enrolled in the regularly scheduled physical education activity classes.
Sixteen subjects were randomly selected for each of five groups, making a total of eighty subjects who initially began the study.

The five groups were designated as follows:

1. No Practice Group (NP),
2. Physical Practice Only Group (PP),
3. Conceptual Practice Only Group (CP),
4. Alternating Conceptual and Physical Practice Group (ACPP),
5. Conceptualization and Immediate Physical Practice Group (CIPP).

Day by day procedures were as follows:

Wednesday, September 9, 1970: utilized as the day for random selection of groups. Also on this day the subjects completed a Personal Data Sheet (Appendix A), were provided a general overview of their role in the study (Appendix B), and given specific instructions for shooting the one-hand foul shot (Appendix C).

Friday, September 11, 1970: the Tennessee Self Concept Scale was administered to all groups. Scores were recorded on the Personal Data Sheet of each subject.

Monday, September 14, 1970, through Monday, October 12, 1970: this period of time included the days when specific instructions were given and all foul shot data were collected (Appendices D, E, F, G, and H).
Treatment of the Data

A t test for related samples was utilized to test the first hypothesis.

For Hypotheses II through VII a multiple classification analysis of variance was utilized. A two-by-five scheme was used. The two rows were high and low self-concept, and the five columns were the five groups.

The hypotheses were tested at the .05 level of significance.

Tables were used to further clarify findings.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF LITERATURE

The review of literature for this study encompassed two areas. The first dealt with studies which pertained to conceptual practice as a method of improving motor skill or motor task performance; the second focused upon investigations dealing with the relationship of self-concept and motor skill or motor task performance.

Conceptual Practice

The literature concerning the conceptual practice method was reviewed in terms of studies which utilized more than one motor skill, a basketball motor skill, a gymnastics motor skill, strength and endurance tasks, juggling motor skills, unique motor skills, and various other motor skills.

Studies Utilizing More Than One Motor Skill

An early study by Perry (25) utilized five motor tasks. The tasks were (1) three-hole tapping test, (2) card-sorting test, (3) peg board test, (4) symbol digit substitution, and (5) mirror tracing test. Following pretest and posttest, Perry concluded that five imaginary practices were equivalent to two actual practices for card sorting, three actual practices for three-hole tapping, and five actual practices for
the peg board task. He went on to say that the relative efficiency of actual and imaginary practice methods varied with the motor task, and that on all of the motor tasks utilized, except the peg board task, the actual practice method was considered best.

In another early experimental study, Vandell, Davis, and Clugston (39) used thirty-six male subjects. Twelve subjects were in junior high school, twelve were in senior high school, and twelve were college freshmen. The junior high school subjects and the college freshmen used the motor skill of dart throwing. The high school subjects practiced the basketball foul shot. Each of these groups was then divided into three groups for method of practice. One group did not practice, one group practiced daily, and the third group engaged in mental practice. The two groups involved in dart throwing used identical practice methods except the college freshmen were allowed only fifteen minutes of mental practice each day as opposed to thirty minutes for the junior high school subjects. The subjects were tested on the first and last day of the study. Eighteen days of practice were allotted. The following findings were apparent in the experiment involving dart throwing:

1. Junior high school control group—2 per cent improvement. The college freshman control group—no improvement.
2. The junior high school physical practice group showed a 7 per cent improvement. The college freshman physical practice group improved by 23 per cent.

3. The junior high school mental practice group improved by 4 per cent. The college freshmen improved 22 per cent.

The twelve senior boys involved in shooting the basketball foul shot produced the following findings:

1. The no practice group improved by 2 per cent.
2. The physical practice group improved 41 per cent.
3. The mental practice group improved 43 per cent.

Vandell, et al. (39), concluded that under the conditions of the experiment, a lack of mental or physical practice of a motor skill results in no improvement in that skill. The authors further concluded that mental practice appeared to be very close to physical practice in effectiveness as a method of learning the motor skills.

Beattie (4) followed the study of Vandell, Davis, and Clugston (39) with another investigation involving dart throwing. His primary purpose was to confirm the findings of Vandell, et al., but to do so utilizing larger groups. The experiment did yield results which added support to the findings of the earlier study. Morrisett (22) and Arnold (3) also used the motor skill of dart throwing, but found that physical practice was significantly better than mental practice.
Phipps and Morehouse (26) utilized the hock swing to a horizontal bar, jump-foot, and soccer hitch kick as the motor skills in their study of mental practice. These three motor skills are considered to be different in their degree of difficulty. The hock swing is considered to be the least difficult, the jump-foot next most difficult, and the soccer hitch kick the most difficult of all. Eighty male volunteers were randomly assigned to either a control group or a mental practice group. Each subject was tested on the three skills prior to the start of practice sessions. The study consisted of three phases one week each in duration. Different motor skills were practiced during each phase although the practice procedures were similar. The mental practice group received demonstrations and printed copies of how the skill was to be performed. In addition, the investigator read the performance procedures to the mental practice group. Following testing, Phipps and Morehouse indicated that mental practice without prior physical practice did not appear to be effective in learning either the jump-foot or the soccer hitch kick, but it was effective in learning the hock swing. As indicated earlier, the hock swing is considered to be the least complicated of the three motor skills. They went on to suggest that perhaps the value of mental practice depends not only on the difficulty of the skill but is also specific to even the simpler skills.
In another study using more than one motor skill, Oxendine (24) conducted three simultaneous studies involving the pursuit rotor, a soccer kick for accuracy, and a modified basketball jump shot. The subjects were seventh-grade boys. In each experimental study there were four groups and each group practiced for eight successive school days. The four groups for each experiment consisted of the following practice procedures: (1) eight overt practice days with no mental practice, (2) six overt practice days and two days of mental practice, (3) four overt practice days and four mental practice days, (4) two overt practice days and six days of mental practice.

The sequence of practice was as follows: (1) eight overt; (2) one mental--three overt, one mental--three overt; (3) alternating mental and overt; and (4) three mental--one overt, three mental--one overt.

The findings of Oxendine lend support to the theory that mental practice is beneficial in motor learning. Included in his conclusions were the following:

1. Given a specific amount of time, or practice trials, a schedule combining both physical and mental practice can be as beneficial as physical practice only.

2. Up to 50 per cent of practice time or trials can be devoted to mental practice and is as effective as 100 per cent physical practice, provided the motor task is within
3. The nature of the task might serve as a guideline as to how much practice should be mental and how much should be physical.

Oxendine also found that the subjects were receptive to the idea of mental practice with the exception of the groups which primarily utilized the mental practice method. Most of the subjects felt that physical practice was less complicated after mental practice.

Studies Utilizing a Basketball Motor Skill

In a study of mental practice, Clark (7) used the Pacific Coast one-hand foul shot. High school male subjects were grouped according to basketball experiences as varsity, junior varsity, or novice players. Two methods were employed as practice procedures. One was physical practice, and the other was mental practice. All subjects were tested by shooting twenty-five warm-up shots and then twenty-five test shots. For the physical practice groups this procedure was utilized each practice period, except only five warm-up shots were attempted. The mental practice group mentally rehearsed five warm-ups and twenty-five practice shots each day. Clark found that both physical and mental groups improved significantly (p < .01) in performance. It was concluded that mental and physical practice did not differ significantly for the varsity and junior varsity subjects, and that mental practice was not effective for the novice subjects.
Start (33) conducted a study using the basketball foul shot as the motor skill also, but the shot was attempted by the underarm method. He felt this was a motor skill which was new to his subjects. The subjects were twelve-year-old boys from a mixed secondary modern school in Lancashire, England. The pretest and the posttest consisted of ten free throw attempts. The subjects were placed in five groups according to academic achievement. Each group participated in nine daily sessions of five minutes of mental practice. Each practice consisted of either instructor-led or individual mental practice. At the end of the nine practice periods, thirty-five boys had perfect attendance and were posttested. Start concluded that mental practice does contribute to improved performance. This was based on the fact that there was a significant (p < .05) gain in mean average scores from pretest to posttest. He also concluded that there was no significant relationship between intelligence and improvement in performance under conditions of mental practice.

In still another study utilizing the basketball free throw, Hertz (15) divided his subjects into three practice groups to study the effects of mental practice. The first group practiced overtly. The second group was an overt-implicit learning group, which was intended to represent mental and visual aspects of learning, as well as physical learning. The third group utilized a kinesiological method in attempting to improve in free throw shooting. The
subjects were pretested and posttested by attempting fifty free throws. A successful try constituted the subject making the foul shot without hitting the rim of the basket. Following the investigation, Hertz concluded that the over-implicit and kinesiological groups were as effective as the overt practice group.

Halverson (14) also found that groups using physical practice with a basket, and physical practice without a basket, along with mental practice, were significantly improved after practice in shooting the basketball. It should be pointed out, however, that the least amount of improvement was in the mental practice group.

Studies Utilizing a Gymnastics Motor Skill

In a study conducted by Jones (18), the gymnastics motor skill of a hock swing upstart was utilized with college men as subjects. Each subject was given a pass or fail rating on the skill. In order to receive a pass rating the subjects were required to achieve a correct finishing position for the skill on two successive attempts. Two separate stages were utilized in conducting the study. In the first stage, six mental practice sessions were used and a mechanical analysis of the skill was read. The subjects were then divided into two mental practice groups, directed and non-directed. The directed practice was conducted by having the subjects and the experimenter read through the various phases of the hock swing upstart skill and then mentally
practice the various phases of the skill. The undirected group did not utilize any type of verbal or visual aid. Upon being tested following the first stage, the undirected group performed significantly \( p < .02 \) better than the directed group. The second stage differed from the first in that the researcher recorded the number of test days each subject required to obtain a pass rating. Two test trials were allowed each day. Somewhat surprisingly, the undirected mental practice group once again performed significantly \( p < .01 \) better. Jones concluded that male university students could learn a gymnastics gross motor skill by utilizing a learning procedure which involved (1) familiarization with mechanical aspects of the skill and (2) mental practice. He further concluded that undirected mental practice was better than directed mental practice as used in his experiment.

A gymnastics motor skill was also used by Start (32) in another of his studies involving mental practice. The skill was the single-leg upstart on the Olympic high bar. The subjects were college men who were unfamiliar with the motor skill. Each subject mentally practiced the single-leg upstart for five minutes on six consecutive days. A detailed written analysis of the skill was read by each subject prior to his mental practice. On the day after the final mental practice session, the subjects attempted to physically perform the motor skill and were rated by three judges. Start
felt that mental practice did contribute to acquisition of the single-leg upstart.

**Studies Utilizing Strength and Endurance Tasks**

In a study to determine the effect of various practice procedures upon the development of arm strength, Cronk (11) used three groups. These groups utilized physical practice, mental practice, and physical-mental practice techniques. She used twenty-four right-handed females as subjects, and they practiced three times each week for eight weeks. Following the investigation, Cronk's findings showed the physical practice group to be significantly superior to the other two groups. The physical-mental practice group was no more and no less effective than the other practice groups.

Razor (28) also completed an investigation of the effects of mental practice upon increasing strength. The subjects were ninety-one male college students. Five groups were utilized during the study. They were (1) no practice, (2) physical practice, (3) mental practice, (4) physical and mental practice, and (5) mental and physical practice. Hand grip strength was the criterion measure for both the preferred and non-preferred hand. Razor concluded that the physical practice procedure was the most effective method for increasing hand grip strength.

In another study which suggests that physical practice should be used when possible, Kelsey (19) studied the effects
of mental practice upon muscular endurance. His subjects were college men and the motor task was sit-ups. He had three groups which participated in the experiment. One group served as the control group and pretested and posttested only. A second group served as the physical practice group, and the third group was the mental practice group. The pretest, practice procedure, and posttest all involved five minutes daily for the mental practice and physical practice groups. Kelsey concluded that both mental and physical practice, under the conditions of the experiment, were effective in increasing muscular endurance. He went on to say, however, that mental practice should not be used exclusively where physical practice is possible.

**Studies Utilizing a Juggling Motor Skill**

Corbin (9) conducted an experiment in which he studied the effects of mental practice on the development of the unique motor skill of wand juggling. One hundred twenty subjects were assigned to high, medium, and low skill groups following a prepractice juggling test. Following this, the subjects within each skill level were randomly assigned to one of four practice groups. These groups, and their practice methods were as follows:

1. **Control.** This group was subjected to no practice of any kind for the twenty-one-day experimental period.
2. Mental Practice. This group practiced the criterion task mentally thirty times each day for twenty-one days. Subjects performed as prescribed by a direction sheet which was read every day of the practice. The task was demonstrated on the first day of the experiment only.

3. Mental-Physical Practice. This group practiced the criterion task in action fifteen times each day and fifteen times each day mentally as prescribed by a practice sheet. They also practiced for twenty-one consecutive days.

4. Physical Practice. This group practiced the criterion task in action thirty times each day for twenty-one consecutive days (9).

Following the experimental practice period all subjects were again tested on the criterion task. The results indicated that mental practice was not effective in facilitating improved performance of the motor skill under the conditions of the study. Corbin felt that his study supported the premise of other experiments, that mental practice is most effective in combination with physical practice.

In still another study by Corbin (10), the effects of mental practice were again observed. High school boys served as subjects, and wand juggling was the motor task. Three groups had controlled physical practice for five days. For the thirteen days following the controlled practice, one group did not practice, the second group mentally practiced, and the third group continued physical practice. It was
found that the physical practice group was superior in performance. However, it was felt that mental practice did seem to facilitate actual skill performance after controlled practice, and mental practice appeared to be better utilized when based on experience and when actual practice preceded performance of the skill. Corbin also found that the subjects did have some degree of confidence in the worth of mental practice. This is basically the same finding of Johnson (17), who indicated that actual physical practice was the most effective method of improving performance of a gross motor skill. Johnson did suggest, however, that it appeared that experience and skill in the use of conceptualizing techniques logically should make additional contributions to human learning and performance of gross motor activities.

With college women as subjects, and juggling tennis balls as the motor skill, Trussell (37) studied the effects of mental practice, utilizing five groups. These groups were (1) control; (2) physical practice—twenty daily sessions; (3) mental practice—six days, followed by fourteen days of physical practice; (4) mental practice—fourteen days, followed by six days of physical practice; and (5) twenty days of mental practice only. The findings showed that the group which utilized six days of mental practice and fourteen days of physical practice learned the task best. Physical practice only was the next best group. The mental practice
only group and the control group failed to gain significantly in performance.

Studies Utilizing Unique Motor Skills

Twining (38) utilized a ring toss to see if mental practice would facilitate improved performance. His subjects were college men. Three groups were formed to employ the procedures of (1) no practice, (2) physical practice only, and (3) mental practice only. The control group was tested on the first and twenty-second days of the study. The physical practice group tossed seventy rings each practice day in addition to testing and retesting. The mental practice group was tested and then spent fifteen minutes each practice day rehearsing the ring toss before being retested. There was improvement in mean scores in both the mental practice and physical practice groups. However, the physical practice group improved by 137 per cent and the mental practice group improved by 36 per cent.

A novel motor skill was also used by Egstrom (13) in his study involving conceptualizing practice techniques. The subjects used a wooden paddle held in the nonpreferred hand and attempted to strike a small rubber ball and direct it toward a large target twenty feet away. The subjects were pretested and posttested on the motor skill. Six groups were employed during the study. They were (1) manual practice only; (2) first half manual, second half conceptual;
(3) first half conceptual, second half manual; (4) alternating conceptual and manual practice; (5) conceptual practice only; and (6) no practice. Testing and manual practice consisted of striking twenty-five balls at the target. Conceptualizing practice consisted of a five-minute rehearsal session of the skill. A written description of the mechanics involved in the skill was read prior to each conceptual practice session. Egstrom felt that this findings supported the theory that conceptualizing practice is effective as a means of acquiring gross motor skills. He did feel, however, that manual practice was better than conceptual practice and that practice methods which alternate conceptual and manual practice do have merit.

Tossing a handball at a compartmentalized target was the motor skill used in a study by Stebbins (34). The target compartments were different colors and each color had a different value. His subjects were male college students. Individuals of the mental practice group observed individuals of the physical practice group as they practiced. This was intended to provide the mental practice subjects a more vivid picture of the movements involved in the motor skill. An initial test and a final test were given to the subjects in order to determine practice results. He concluded that the greatest amount of improvement in performing the motor skill was accomplished by practice methods involving combinations of mental and physical practice techniques. One of these
combinations was a group which practiced nine times mentally and then nine times physically; the other combination group reversed the order of practice. He further concluded that, under the conditions of his study, the mental practice only method did not facilitate improved performance.

Richardson (29), in his review of mental practice research, pointed out a study by Gilmore and Stolurow which also found mental practice to be ineffective. In their study, the subjects utilized a Munn type of ball-and-socket task. Following posttesting it was found that the mental practice group actually declined in performance. The experiment was independently repeated and the same results were obtained.

A tracking task served as the skill in the investigation by Williams (40). Male and female physical education majors were used as subjects for his study. One hundred sixty subjects were randomly assigned to four treatment groups. These groups were (1) mental practice group, (2) physical practice group, (3) placebo control group, and (4) strict control group. The practice sessions ran for sixteen consecutive days. The mental practice group covertly practiced for eleven minutes each day. The physical practice group overtly practiced for eleven minutes each day. The placebo group practiced isometric exercises each day, and the strict control group did not report until posttesting. Williams concluded that mental practice and physical practice
were superior to the other two groups, but there was no significant difference between mental and physical practice.

Smith and Harrison (31), in their study involving mental practice, utilized a one-minute speed test-retest on a three-hole stylus punchboard as the motor task. They employed six groups which used different practice methods. The six groups were (1) control, (2) visual, (3) reversed visual, (4) mental, (5) motor, and (6) guided practice. Following retest, they concluded that visual practice and mental practice improved accuracy on the motor task, and motor and guided practice did not. Another interesting factor in the study was the finding that the control, mental, and reversed visual practice groups significantly improved performance in terms of correct hits and the total number of trials; however, the errors were not reduced. The visual and mental practice groups did reduce their total number of errors while significantly increasing their improvement in performance.

Studies Utilizing Other Selected Motor Skills

DeWall (12) used ninth-grade girls in her study of the effects of mental practice upon target archery shooting. The subjects had no experience with archery shooting prior to the study. A shooting test followed one week of instruction concerning the motor skill. The subjects were involved in one of three methods of practice. These methods were
(1) physical practice—fifteen minutes daily, (2) mental practice—seven and one-half minutes, followed by physical practice—seven and one-half minutes, and (3) mental practice—fifteen minutes each session. Following ten days of practice a posttest was administered. DeWall found no significant changes in performance for any of the groups.

An investigation to determine if mental practice would facilitate improved performance of the volleyball motor skills of volleying and serving was conducted by Shick (30). The subjects were college women. The investigation was carried out as three substudies. The first substudy involved two groups—mental practice and no practice. The no practice group did not participate in mental or physical practice during the two-week experimental period. The mental practice group devoted three minutes of daily mental practice to each motor skill—the volley and service. Following posttesting, it was found that there was no significant difference between the two groups on the volley skill. However, the mental practice group did perform significantly better (p < .025) on the service motor task. The second substudy combined physical and mental practice and lasted for five weeks. Following testing over the two motor skills, the subjects were divided into high, medium, and low skill categories and randomly assigned to one of two groups. Both groups physically practiced during regular class sessions, but one group mentally practiced each skill for one minute.
each day while the second group mentally practiced each skill three minutes each day. After posttest analysis, it was found that there was no significant difference between the two groups on the volley motor skill. The three-minute mental practice group did perform significantly better (p < .05) than the one-minute mental practice group on the serve motor skill. It was found that most of the improvement came in the low skill group. The third substudy combined physical and mental practice and was the same as the second substudy, except for duration. This study was only three weeks long. Posttest analysis revealed no significant differences in the two groups at any of the three skill levels. Shick concluded that improved performance in the volley motor skill is not facilitated by mental practice.

No definite conclusions were reached concerning the value of mental practice in improving the service motor skill even though in two of the substudies results indicated significant improvement in performance. The conclusion that mental practice does not contribute significantly to improved performance was similar to those of Wills (41) and Wilson (42).

Buck (6), in ascertaining the effects of mental practice upon improved performance in swimming, utilized three groups. One group did land practice. Another group practiced different activities than the selected strokes, and the third group practiced mentally. Although all groups improved significantly on the selected swimming strokes, it was concluded
that mental practice or land practice did not facilitate improved performance any more than additional time in the water participating in different activities.

Conceptual practice of a motor skill is apparently of value in learning the skill and also in improving performance. Evidently, the degree of success with which conceptual practice may be used depends upon the difficulty of the skill, the student's familiarity with the skill, the amount of time allotted for conceptual practice, and quite possibly is unique to various skills.

Self-Concept

After a perusal of literature related to self-concept, it is apparent that most, if not all, authors agree that self-concept is related to individual behavior. Each individual has a conception of himself. By the very process of living in an ever-changing world, of interacting with others, each person develops his own personal concept of himself. Every individual develops within his own mind some idea of his limitations, or capabilities. The degree to which these limitations and capabilities are deemed desirable or undesirable by their family, significant others, and society, help the individual to develop his self-concept. This self-concept basically constitutes the attitude which a person has toward himself. Research seemed to indicate that the behavior of people is related to this perception of self (16).
Maltz says:

The most important psychologic discovery of this century is the discovery of the "self-image." Whether we realize it or not, each of us carries about with us a mental blueprint or picture of ourselves. It may be vague and ill-defined to our conscious gaze. In fact, it may not be consciously recognizable at all. But it is there, complete down to the last detail. This self-image is our own conception of the "sort of person I am." It has been built up from our own beliefs about ourselves. But most of these beliefs about ourselves have unconsciously been formed from our past experiences, our successes and failures, our humiliations, our triumphs, and the way other people have reacted to us, especially in early childhood. From all these we mentally construct a "self" (or a picture of a self). Once an idea or belief about ourselves goes into this picture it becomes "true," as far as we personally are concerned. We do not question its validity, but proceed to act upon it just as if it were true (21, p. 2).

To Combs and Snygg (8) all the ways an individual has of perceiving himself is organized into what is called the phenomenal self. For each person his own unique way of seeing himself constitutes his Gestalt of his concepts of self. The phenomenal self "... is the individual as he seems from his own vantage point" (8, p. 126). The self-perceptions of any individual contribute to the phenomenal self and this, in turn, determines the behavior of the person.

As individuals associate with others it is important that they maintain an adequate self-image. Torrance (36) suggests that a lack of self-esteem may occur when an individual feels rejected by the group. He goes on to say that a lack of self-esteem may occur if a new skill is too complex.
In this study there was concern for two areas of self-concept; the total self-concept and the physical self-concept.

Anderson has stated:

Everyone has an image or a concept of himself as a unique person or self, different from every other self. This concept pertains to one's self both as a physical person and as a psychological person—i.e., each one has a physical self-image and a psychological self-image (2, p. 2).

In narrowing the perceived self to encompass only the aspects of physical self as measured by the Tennessee Self Concept Scale, it was the intent of this study to further clarify the relationship between this aspect of total self-concept and behavior, i.e., motor skill performance.

Mussen, Conger, and Kagan (23) indicate that "... some of the basic dimensions upon which the individual in our culture assesses himself include good versus bad, intelligent versus incompetent; adequate body image versus inadequate body image" (23, p. 516).

Apparently there have been few studies which simply investigated the relationship between self-concept and motor skill performance. Wylie (43) did a survey of literature related to self-concept. This thorough investigation was completed in 1961 and revealed a few studies which were concerned with self-concept and a person's body image or physical characteristics (43, pp. 159, 221, 263).
Zion (45) utilized freshman college women as subjects in an investigation of body concept as it relates to self-concept. The subjects provided self-assessment in such areas as physical attractiveness, manner and style of body movement, grooming and appearance, qualities of expressiveness, and qualities of masculinity-femininity. It was determined from the data that there was a relationship between self-concept and the way an individual views his physical self.

Solway and Gehr (35) used freshman college students as subjects to investigate the effects of experimentally induced success and failure on level of self-acceptance. Three groups were employed. They were (1) success group, (2) failure group, and (3) control group. Following an initial test to determine self-acceptance, the subjects in the success and failure groups participated in a perceptual discrimination test. The success group was told that they achieved very good scores. The failure group was told that their scores were low. In addition, the success and failure groups were told that the perceptual discrimination test had been found to be a very good indicator of success or failure in graduating from college. Immediately following the perceptual discrimination test each subject of all three groups once again took the self-acceptance test. The success group significantly ($p < .01$) increased in self-acceptance. The failure group also increased but not significantly. It was concluded that self-acceptance is not significantly influenced
by success or failure. It was also suggested that the reason for the increase in self-acceptance by the failure group was possibly due to their compensation for apparent failure in striving to maintain a favorable self-image.

In a similar study, Ludwig and Maehr (20) asked junior high school subjects to perform a physical skill in a physical education class. As students performed the task a "physical development expert" made comments of approval or disapproval concerning their performance. The skill of the performing subject was not considered as comments were made. Disapproving remarks were directed to skillful performers and approving comments were directed to unskilled performers. It was found that the subjects who received comments of approval had an increase in self-rating which decreased after a period of time. On the other hand, the subjects who had derogatory remarks made about their performances had a decrease in self-rating but tended to recover after a period of time. It was concluded that people who receive expressed reactions from others who are considered significant to them do have a change in self-concept.

Yeatts and Gordon (44) investigated the effects of physical education taught by an individual who was considered to be a specialist on physical fitness and self-image. Seventy-five seventh-grade students served as subjects. Forty-six of the subjects were taught by a specialist in their school while the twenty-nine others did not have a
specialist to instruct them in their school. The following conclusions concerning self-image were drawn:

1. There was no significant difference between the two groups on self-image.

2. There was no significant relationship between self-image and physical fitness for the entire group.

It was further suggested that each individual considers his personal self-adequacy in relation to those around him. Therefore, the self-image of subjects in the two groups did not differ because their performance was adequate in the group in which they performed.

Allen and Holyoak (1) tried to determine if there was a relationship between self-concept scores and areas of physical fitness, motor ability, and physical education attitude. The subjects were sixth-grade boys and girls enrolled in two separate elementary schools. The subjects were administered Gordon's "How I See Myself Scale," and then divided into quartile groups in each school. Individualized instruction was utilized in one school, while mass instruction methods were utilized in the other school. It was concluded that when quartile groups were based on self-concept the individualized instruction method showed fewer differences between the groups in the areas of physical fitness, motor ability, and physical education attitude, than the mass instructional method.
The relationships between self-concept, aspiration level, and competitive performance were investigated by Boyd (5). The subjects were high school track and field athletes. The self-concept was considered to be the image each athlete had of himself as a track and field competitor. A Semantic Differential Scale was utilized to obtain the self-concept rating. Prior to seven track meets each subject was asked to predict how he would perform in each of his events. Also, the coach predicted how each athlete would perform. The official event standings following each meet served as the performance measure. The following conclusion concerning self-concept was suggested as appropriate within the limits of the study: The self-concept of competitive high school tracksters, as measured by the Semantic Differential, is significant to performance (5, p. 117).

Pyne (27) utilized varsity basketball squads from selected high schools in his study of the relationship of measures of self-concept, motivation, and ability to succeed in competitive athletics. The self-concept was measured by a Self Rating Inventory, which was developed by Brownfain. The self-concept as a player was also measured. This was based upon each subject's self-assessment of how well he could perform the component skills of the game of basketball. After the season was completed and the data analyzed, the following conclusions were drawn:
1. Successful and unsuccessful players, as groups, do differentiate on the basis of their self-concept as a player and level of aspiration.

2. Successful and unsuccessful players cannot be differentiated, as groups, on the basis of their self-concept as a person.

The relationship between the total self-concept and motor performance is not the stated purpose of some of the foregoing studies, but the investigations do seem to indicate that researchers believe the two to be related. This also holds true for studies relating to the physical self-concept. Those investigations involving body image were considered to be somewhat related to the physical self-concept of the present study and were therefore reviewed.


33. , "Relationship Between Intelligence and the Effects of Mental Practice on the Performance of a Motor Skill," The Research Quarterly, XXXI (December, 1960), 644-649.


42. Wilson, Margaret E., "The Relative Effect of Mental Practice and Physical Practice in Learning the Tennis Forehand and Backhand Drives," unpublished doctoral dissertation, Department of Physical Education, State University of Iowa, Iowa City, Iowa, 1960.


45. Zion, Leela C., "Body Concept as it Relates to Self-Concept," The Research Quarterly, XXXVI (December, 1965), 490-495.
CHAPTER III

PROCEDURES OF THE STUDY

Selection of the Subjects

Regular classes for the 1970 fall semester began at North Texas State University on Monday, August 31, 1970. The subjects were selected on Wednesday, September 9, 1970, from seven physical activity sections of Physical Education 116. Sections which met on Monday, Wednesday, and Friday at nine and ten o'clock in the morning, and two o'clock in the afternoon were utilized.

Eighty freshman and sophomore male students were randomly drawn from the seven sections. Thirty-two subjects were drawn from each of the nine and ten o'clock sections. Sixteen subjects were drawn from the two o'clock section.

The subjects were randomly placed in groups which were to meet at the time of their regularly scheduled activity class. These times and groups were as follows:

Nine o'clock: Physical Practice Only
             Conceptual Practice Only

Ten o'clock: Alternating Physical and Conceptual Practice Group
             Conceptualization and Immediate Physical Practice Group

Two o'clock: No Practice Group
Experimental Equipment

The motor skill for this study was the one-hand basketball foul shot (Appendix C). Therefore, the study took place at the Men's Gymnasium located on the campus of North Texas State University.

The equipment consisted of two regulation rectangular wooden basketball backboards with regulation goals. Standard nets were attached to each goal. The goals were located the regulation ten feet from the playing floor.

One goal was located in the northwest corner of the gymnasium and was designated as goal A. The other goal was located in the northeast corner of the gymnasium and was designated as goal B. These were the only two goals utilized during the study and they were used an equal number of times by all subjects, except for the No Practice Group.

Two rubber basketballs were used throughout the study. They were both regulation in size and of the same make and model. The pounds of air pressure per square inch was checked for both basketballs before each practice day. Nine pounds of air pressure per square inch was held constant for each ball during the study.

The foul shot line was already painted on the playing floor. It was located fifteen feet from the plane of the face of the backboard. The foul shots were attempted from this line directly in front of the basketball goal.
Each subject wore the uniform required of all male students enrolled in activity classes at North Texas State University.

General Instructions

On September 9, 1970, the subjects were provided an overview of the study. In order to maintain consistency, the general instructions (Appendix B) were read to the subjects.

As a part of the general instructions, the subjects were asked to complete the top portion of the personal data sheet (Appendix A).

In addition, the subjects were informed of the appropriate method of shooting the one-hand foul shot (Appendix C). First the information was read to the subjects and then the accepted technique was demonstrated by the researcher. Since the subjects were to use their preferred hand for shooting, the shot was demonstrated with both the left hand and the right hand.

The reading of the general instructions, and completion of the personal data sheets, took place in the west balcony of the Men's Gymnasium. The reading of instructions for shooting the one-hand foul shot took place on the playing floor in the northwest corner of the gymnasium. The goal located in the northwest corner (goal A) was utilized for the physical demonstration of the foul shot. All questions
concerning the one-hand method of shooting foul shots were answered.

**Measurement of Self-Concept**

The **Tennessee Self Concept Scale** was utilized in measuring the self-concept of each subject. A complete description of the **Tennessee Self Concept Scale** (hereafter referred to as TSCS) is provided in Chapter I.

Administration of the TSCS took place in the west balcony of the Men's Gymnasium on Friday, September 11, 1970. Instructions for taking the TSCS are included on the inside cover of the test booklet. These instructions were read to the subjects. Each subject was allowed as much time as he needed to complete the test. All eighty subjects completed the TSCS.

The answer sheets were hand scored and the results were entered on the personal data sheet of each subject. Two scores were recorded for each subject. One score was the Total Positive Score, and the other score was the Physical Self Score.

**Familiarization with the Basketball Foul Shot**

Prior to starting the practice procedures, it was felt that each subject should be provided an opportunity to become familiar with the basketball foul shot. The physical experience of shooting foul shots was initially provided on
Monday, September 14, 1970. Each subject physically attempted five foul shots at goal A and five foul shots at goal B. The basketballs to be used throughout the study were utilized. As the subjects practiced their shots, suggested corrections were given when improper shooting technique was noticed.

Foul Shot Pretest

Before an objective measurement of the improvement made by the groups utilizing the various practice methods could be ascertained, it was necessary to determine the proficiency with which each subject could perform the basketball foul shot prior to the experimental practice sessions. This measurement was conducted on Wednesday, September 16, and Friday, September 18, 1970. The measurement is referred to as the foul shot pretest.

The subjects attempted sixteen foul shots on each of the two days for a total of thirty-two foul shots. The successful tries were recorded on the personal data sheets.

Following the pretest, it was necessary to determine the comparability of the groups. To provide this information, a test of homogeneity of variance was run. It was found that the groups did not differ significantly at the .05 level of confidence.

Seventy-eight subjects completed the two day pretest and continued in the study to the practice sessions. The initial number of subjects to start practice sessions for
1. No Practice Group—fifteen subjects,
2. Physical Practice Only Group—fifteen subjects,
3. Conceptual Practice Only Group—sixteen subjects,
4. Alternating Conceptual and Physical Practice Group—sixteen subjects, and
5. Conceptualization and Immediate Physical Practice Group—sixteen subjects.

Group Practice Methods

The group practice methods for the study were as follows:

1. No Practice Group: The No Practice Group did not participate in foul shots between pretest and posttest. They attended their regular activity class. Detailed instructions were followed throughout the study (Appendix D).

2. Physical Practice Only Group: The Physical Practice Only Group physically practiced the foul shot for eight practice sessions. They attempted eight shots each practice day for a total of sixty-four practice shots. This group followed explicit instructions each practice session (Appendix E).

3. Conceptual Practice Only Group: Between pretest and posttest, the Conceptual Practice Only Group did not physically participate in foul shots. They conceptualized eight foul shots each practice session for a total of sixty-four attempts. The subjects were allowed to sit or stand in
the vicinity of the goal on which they were to practice. Some subjects closed their eyes and some did not. Each one was allowed to use the method which was felt best for himself in conceptualizing. Each practice day they conceptualized eight foul shots for a total of sixty-four attempts for the eight days. Specific instructions were given to the group each practice session (Appendix F).

4. Alternating Conceptual and Physical Practice Group: During the eight practice sessions, this group utilized both physical and conceptual practice techniques. The first, third, fifth, and seventh practice day they utilized physical practice. On the second, fourth, sixth, and eighth practice day they employed conceptual practice methods. Regardless of method of practice, the subjects attempted eight foul shots each practice session for a total of sixty-four shots. They were provided detailed instructions each day (Appendix G).

5. Conceptualization and Immediate Physical Practice Group: This group practiced a total of eight foul shots each day. A subject would go to the foul line and, while holding the basketball, he would conceptualize one foul shot. Immediately following the conceptual attempt the subject would physically shoot a foul shot. The subject did this four times for a total of eight shots each practice session. This constituted sixty-four total practice attempts for the eight practice days. Daily instructions were provided (Appendix G).
Throughout the practice sessions care was taken to ensure that each group practiced an equal number of times on both goals A and B. All successful foul shots were recorded on the personal data sheets.

Corrections in shooting technique were suggested when appropriate. Care was taken to ensure that comments made to the subjects would not be motivational in nature, but would be corrective for shooting technique.

Subjects were allowed to speak to each other when not shooting, but were instructed not to talk to the shooter on the foul line. The Conceptual Practice Only Group did not speak to each other as they practiced. This was also true for the Alternating Conceptual and Physical Practice Group on the days they practiced conceptually.

**Foul Shot Posttest**

A final objective measurement of the subjects' proficiency in shooting foul shots was necessary following the various practice methods. This measurement is referred to as the foul shot posttest. The foul shot posttest procedures were just like those for the pretest. The posttest was accomplished on Friday, October 9, and Monday, October 12, 1970. Sixteen foul shots were attempted on each of these two days for a total of thirty-two. Seventy-two subjects participated in the foul shot posttest. The number of subjects who completed the study are indicated by group below:
1. No Practice Group--twelve subjects,
2. Physical Practice Only Group--fourteen subjects,
3. Conceptual Practice Only Group--sixteen subjects,
4. Alternating Conceptual and Physical Practice Group--fifteen subjects, and
5. Conceptualization and Immediate Physical Practice Group--fifteen subjects.

Scoring of Foul Shot Performances

The determination of proficiency in shooting the foul shot was based upon the number of successful tries accomplished of the total attempted. A successful try constituted the foul shot being made.

Recording Foul Shots

Successful foul shots were recorded on the personal data sheet of each subject. Successful tries were recorded for the pretest, practice sessions, and the posttest.

As may be noted on the personal data sheet, a space was provided for recording both conceptual and physical shots made. It was felt that a subject who conceptualized the foul shot, as intended for this study, would know if the shot was successful or unsuccessful and could report this to the researcher.

It may also be noted that the shots "Attempted" area of the personal data sheet was completed by inserting a four or an eight. This was done to save time in recording shots.
The fours were provided to accommodate the Conceptualization and Immediate Physical Practice Group since they conceptualized four shots and physically practiced four shots each practice session.

When a subject completed the total number of shots to be attempted for the day, he reported his name and the number of shots made. The successful tries were recorded in the appropriate area and the proper shots "Attempted" number was circled.
CHAPTER IV

ANALYSIS OF DATA

The primary purpose of this study was to examine the effect of five different methods of practice upon performance of the basketball motor skill of foul shooting. A concomitant purpose was to determine the inhibiting or facilitating effect of self-concept upon performance of the foul shot, as conducted in this study. The procedures for collection of data, relative to these purposes, were discussed in the previous chapter. In this chapter, the data are presented, analyzed, and interpreted.

Once the initial data were acquired, two statistical techniques were used to reduce them to a more manageable form. These techniques were the t test for related samples, and the multiple analysis of variance. The results of the raw data being treated through these statistical techniques provided the bases upon which the tenability of each hypothesis could be determined.

Data Initially Collected from All Groups

The initial data which were procured prior to utilization of the t test and the two multiple analysis of variances consisted of the following:
1. The Total Positive Score (TPS) from the Tennessee Self Concept Scale (TSCS),
2. The Physical Self Score (PSS) from the Tennessee Self Concept Scale (TSCS),
3. Foul shot pretest (shots made of thirty-two attempts),
4. Foul shot posttest (shots made of thirty-two attempts),
5. Foul shot gain or loss for each subject and for each group, and
6. Group mean gain on foul shots between pretest and posttest performance.

Seventy-two subjects completed the study and the initial data obtained, except for group mean gains, were tabulated by group.

Of the twelve subjects who completed the study in the No Practice Group, it may be noted that only four gained in score (Appendix I). Of the other eight subjects, four had no gain or loss, and the four remaining subjects had a loss in the number of foul shots made.

The Physical Practice Only Group had ten subjects who showed a gain in foul shooting, while four had a loss (Appendix J). It may also be noted that the Conceptual Practice Only Group (Appendix K), had eight subjects who had an improvement in foul shooting between pretest and posttest, while the other eight subjects either showed no gain or had a loss.
Fifteen subjects completed the study in the Alternating Conceptual and Physical Practice Group. Of this number, ten showed a gain in foul shooting, two had no change, and three declined in the number of successful attempts (Appendix L).

The Conceptualization and Immediate Physical Practice Group had fifteen subjects who completed the investigation. Nine of the subjects had a gain in foul shots made, while six either did not gain or showed a loss in shots made (Appendix M).

Summary of Preliminary Findings Related to All Practice Groups

The data presented in Table I indicate that the mean gain in foul shooting for each group was as follows:

1. Physical Practice Only Group (PP), 3.79;
2. Conceptualization and Immediate Physical Practice Group (CIPP), 2.80;
3. Alternating Conceptual and Physical Practice Group (ACPP), 2.13;
4. No Practice Group (NP), .08; and
5. Conceptual Practice Only Group (CP), .06.

When all groups were considered on the Total Positive Score, the two groups which had the least amount of mean gain on the foul shot also had larger numbers of subjects who had low self-concepts than high self-concepts. The data in Table I also show the No Practice Group and the Conceptual
TABLE I

GROUP FOUL SHOT MEAN GAINS AND NUMBER OF SUBJECTS WHO HAD HIGH OR LOW SELF-CONCEPT BASED ON THE TOTAL POSITIVE SCORE

<table>
<thead>
<tr>
<th></th>
<th>NP</th>
<th>PP</th>
<th>CP</th>
<th>ACPP</th>
<th>CIPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-Concept*</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Low Self-Concept**</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Total in Group</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Foul Shot Mean Gain</td>
<td>.08</td>
<td>3.79</td>
<td>.06</td>
<td>2.13</td>
<td>2.80</td>
</tr>
</tbody>
</table>

*Based on scores which were above the group mean for the Total Positive Score. The group mean was 337.43.

**Based on scores which were on, or below, the group mean for the Total Positive Score.

Practice Only Group to have had more subjects with a low self-concept than high self-concept and, at the same time, these two groups had smaller mean gains in foul shooting when compared to the other three groups.

When the same type of data were examined for the Physical Self Score, there was no clear relationship evident between group foul shot mean gain and high or low self-concept. It can be ascertained from the data in Table II that the Physical Practice Only Group had the largest ratio of high self-concept subjects when compared to low self-concept subjects, and this group also had the highest mean gain in foul shooting. However, the Conceptualization and Immediate Physical Practice Group had the next highest mean gain in
TABLE II

GROUP FOUL SHOT MEAN GAINS AND NUMBER OF SUBJECTS WHO HAD HIGH OR LOW SELF-CONCEPT BASED ON THE PHYSICAL SELF SCORE

<table>
<thead>
<tr>
<th></th>
<th>NP</th>
<th>PP</th>
<th>CP</th>
<th>ACPP</th>
<th>CIPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Self-Concept*</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Low Self-Concept**</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Total in Group</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Foul Shot Mean Gain</td>
<td>.08</td>
<td>3.79</td>
<td>.06</td>
<td>2.13</td>
<td>2.80</td>
</tr>
</tbody>
</table>

*Based on scores which were above the group mean for the Physical Self Score. The group mean was 69.88.

**Based on scores which were on, or below, the group mean for the Physical Self Score.

Foul shooting, but this group had more subjects with low self-concepts than high.

Discussion of the t Test for Related Samples

The sample means to be compared were the pretest foul shot mean and the posttest foul shot mean provided by the No Practice Group. These two sample means were considered to be related since they were taken from the same group of subjects. Since the means to be compared were from the same group, a special statistical t model was used which included correlation of the pretest and posttest of the No Practice Group scores.

The t formula employed was adopted from Popham (1, p. 152), and was as follows:
\[
    t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} - 2r \left( \frac{s_1}{\sqrt{n_1}} \right) \left( \frac{s_2}{\sqrt{n_2}} \right)}}
\]

The data presented in Table III show the results of an analysis of the significance of the difference between mean scores on pretest and posttest for the No Practice Group.

The value of \( t \) at the .05 level of significance, with eleven degrees of freedom, is 2.20. The obtained value of \( t \) for the significance between the means of the No Practice Group on foul shot pretest and posttest was .33. The first hypothesis stated that there would be no significant difference in the results of the No Practice Group on pretest and posttest performance of the basketball foul shot; therefore, this hypothesis was retained.

<table>
<thead>
<tr>
<th>No Practice Group</th>
<th>Subjects</th>
<th>Group Means</th>
<th>Standard Deviation</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>12</td>
<td>12.9</td>
<td>3.97</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>12</td>
<td>13.0</td>
<td>4.88</td>
<td>.33</td>
</tr>
</tbody>
</table>
Findings Related to the Treatment of Data for All Groups by Use of Multiple Analysis of Variance

The multiple analysis of variance statistical technique, as discussed by Spence, et al. (2, pp. 174-194), was utilized in this investigation. Two separate analyses of variance were employed. Each consisted of a two-by-five factorial design, with high and low self-concept as rows, and the experimental groups as columns. Two multiple analyses of variance were necessary because high and low self-concepts were based on (1) the Total Positive Score of the Tennessee Self Concept Scale and (2) the Physical Self Score of the Tennessee Self Concept Scale. The multiple analysis of variance provided an F-ratio which was evaluated for significance at the .05 level of confidence.

Results of the Multiple Analysis of Variance for High and Low Self-Concept Based on the Total Positive Score and Foul Shot Mean Gains of the Experimental Groups

The information presented in Table IV indicates the results of the multiple analysis of variance when based on the data provided by Total Positive Scores on the Tennessee Self Concept Scale, and the foul shot mean gains of the experimental practice groups. High self-concept was interpreted as all scores which were above the mean for all groups. Low self-concept was interpreted as scores which were on, or below, the mean for all groups. The mean was 337.43.
Table IV

Summary of the Analysis of Variance of the Experiment on Foul Shooting as Related to High and Low Self-concept Based on the Total Positive Score of the Tennessee Self Concept Scale

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Concept</td>
<td>2.34</td>
<td>1</td>
<td>2.34</td>
<td>0.11</td>
<td>NS</td>
</tr>
<tr>
<td>Foul Shot Practice Method</td>
<td>155.84</td>
<td>4</td>
<td>38.96</td>
<td>1.81</td>
<td>NS</td>
</tr>
<tr>
<td>Interaction</td>
<td>11.48</td>
<td>4</td>
<td>2.87</td>
<td>0.13</td>
<td>NS</td>
</tr>
<tr>
<td>Within</td>
<td>1336.54</td>
<td>62</td>
<td>21.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1506.21</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With 1 and 60 degrees of freedom (throughout the chapter the between group degrees are mentioned first, followed by the within group degrees) at the .05 level of confidence, an F-ratio of 4.00 was needed for significance for the self-concept variance. The obtained F-ratio of 0.11 was found with 1 and 62 degrees of freedom; therefore, there was no significant relationship between self-concept based on the Total Positive Score and foul shot mean gain performance.

Using 4 and 60 degrees of freedom at the .05 level of confidence, an F-ratio of 2.52 was required for significance for the foul shot practice methods. The obtained F-ratio of 1.81 was found with 4 and 62 degrees of freedom. These data were utilized to test the tenability of Hypotheses II through V. Hypothesis II, which stated that there would be no
significant difference in mean gain performance between the Conceptual Practice Only Group and the No Practice Group, was supported.

Hypothesis III stated that the Physical Practice Only Group would show a significantly greater mean gain in performance than (1) the No Practice Group and (2) the Conceptual Practice Group. This hypothesis was rejected.

The fourth hypothesis indicated that the Alternating Conceptual and Physical Practice Group would show a significantly greater mean gain in performance than the (1) No Practice Group and (2) the Conceptual Practice Only Group. This portion of the fourth hypothesis was rejected. The fourth hypothesis also stated that the Alternating Conceptual and Physical Practice Group would not show a significantly greater mean gain in performance than the Physical Practice Only Group. This aspect of the fourth hypothesis was retained.

The fifth hypothesis stated that a comparison of mean gain performances would show the Conceptualization and Immediate Physical Practice Group to be significantly greater than the (1) No Practice Group and (2) Conceptual Practice Only Group. This part of the fifth hypothesis was rejected. Hypothesis V went on to indicate that a comparison of mean gain performances would show the Conceptualization and Immediate Physical Practice Group to be not significantly greater than the Physical Practice Only Group or the Alternating Conceptual and Physical Practice Group. This part of the fifth hypothesis was supported.
Once again using 4 and 60 degrees of freedom at the .05 level of confidence, an F-ratio of 2.52 was required for significance of interaction between self-concept and practice methods. The F-ratio of 0.13 was found, using 4 and 62 degrees of freedom. These data were used to examine the tenability of Hypothesis VI. It stated that there would be no significant interaction between the total positive self-concept scores and mean gain performance in the (1) No Practice Group, (2) Physical Practice Only Group, (3) Conceptual Practice Only Group, (4) Alternating Conceptual and Physical Practice Group, (5) Conceptualization and Immediate Physical Practice Group, and (6) the total group. Based on the obtained F-ratio for the interaction variance, this hypothesis was retained.

Results of the Multiple Analysis of Variance for High and Low Self-Concept Based on the Physical Self Score and the Experimental Groups’ Foul Shot Mean Gain

The data presented in Table V indicate the results of the multiple analysis of variance when based on the Physical Self Score of the Tennessee Self Concept Scale, and the results of the foul shot mean gains for the experimental practice groups. High self-concept was interpreted as all scores which were above the mean for all groups. Low self-concept was interpreted as all scores which were on, or below, the mean for all groups. The mean established for all groups was 69.88.
TABLE V

SUMMARY OF THE ANALYSIS OF VARIANCE OF THE EXPERIMENT ON FOUL SHOOTING AS RELATED TO HIGH AND LOW SELF-CONCEPT BASED ON THE PHYSICAL SELF SCORE OF THE TENNESSEE SELF CONCEPT SCALE

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Concept</td>
<td>6.09</td>
<td>1</td>
<td>6.09</td>
<td>0.28</td>
<td>NS</td>
</tr>
<tr>
<td>Foul Shot Practice Method</td>
<td>148.40</td>
<td>4</td>
<td>37.10</td>
<td>1.72</td>
<td>NS</td>
</tr>
<tr>
<td>Interaction</td>
<td>6.20</td>
<td>4</td>
<td>1.55</td>
<td>0.07</td>
<td>NS</td>
</tr>
<tr>
<td>Within</td>
<td>1337.73</td>
<td>62</td>
<td>21.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1498.42</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With 1 and 60 degrees of freedom at the .05 level of confidence, an F-ratio of 4.00 was needed for significance for the self-concept variance. The obtained F-ratio of 0.28 was found, using 1 and 62 degrees of freedom. Therefore, there was no significant relationship between self-concept, based on the Physical Self Score, and foul shot mean gain.

The foul shot practice method variance required an F-ratio of 2.52 for significance at the .05 level of confidence, when using 4 and 60 degrees of freedom. The obtained F-ratio of 1.72 was found, utilizing 4 and 62 degrees of freedom. This indicated that there was no significant difference between the foul shot practice methods.

Using 4 and 60 degrees of freedom at the .05 level of confidence, an F-ratio of 2.52 is required for significance of interaction between self-concept and practice method.
The obtained F-ratio of 0.07 was found, using 4 and 62 degrees of freedom. The tenability of Hypothesis VII was examined, utilizing these data. This hypothesis stated that there would be no significant interaction between the Physical Self Scores and mean gain performance in the (1) No Practice Group, (2) Physical Practice Only Group, (3) Conceptual Practice Only Group, (4) Alternating Conceptual and Physical Practice Group, (5) Conceptualization and Immediate Physical Practice Group, and (6) the total group. As a result of the obtained F-ratio, this hypothesis was supported.
CHAPTER BIBLIOGRAPHY


Summary

The problem investigated was the effect of various methods of conceptual, physical, and conceptual-physical practice procedures upon performance of the basketball motor skill of foul shooting. The sub-problem under investigation was the effect of self-concept upon the performance of foul shooting.

During the fall semester of 1970, eighty male freshman and sophomore students at North Texas State University were randomly selected to participate in the study. The subjects were drawn from seven physical activity sections of Physical Education 116.

Sixteen subjects were randomly placed in each group. These groups were to meet on Monday, Wednesday, and Friday at the time of the subjects' regularly scheduled activity class. These times and groups were as follows:

Nine o'clock: Physical Practice Only Group
Conceptual Practice Only Group

Ten o'clock: Alternating Conceptual and Physical Practice Group
Conceptualization and Immediate Physical Practice Group

Two o'clock: No Practice Group.
The **Tennessee Self Concept Scale** was utilized as the instrument to measure self-concept. It was administered to all eighty subjects. Following this, each subject was provided an overview of the study, and then given instructions in shooting the one-hand basketball foul shot. All groups were given an opportunity to practice the foul shot physically prior to beginning their group practice methods.

The five groups, and their foul shot practice procedures, were as follows:

1. **No Practice Group**: This group served as the control group. They did not participate in the foul shot practice sessions and were only pretested and posttested.

2. **Physical Practice Only Group**: This group physically practiced the foul shot each practice session.

3. **Conceptual Practice Only Group**: This group conceptualized the foul shot each day of practice.

4. **Alternating Conceptual and Physical Practice Group**: This group would physically practice foul shots one practice session, and then they would conceptually practice the next practice session.

5. **Conceptualization and Immediate Physical Practice Group**: This group would conceptualize the foul shot, and then immediately they would physically attempt a foul shot.

Seventy-two subjects completed the study and all of the data were collected at the Men's Gymnasium located on the campus of North Texas State University.
Two basketballs and two basketball goals were used throughout the study. The basketballs were of the same make and model. All subjects, except those in the control group, completed the same number of foul shots at each basketball goal. A successful foul shot consisted of the attempt being made. Daily successful tries were recorded on the personal data sheet of each subject.

Once the data were collected, the t test for related samples and two multiple analyses of variance were utilized to make them more manageable. The hypotheses were tested at the .05 level of significance.

Summary of Findings

Based on the statistical analysis of data, the following findings were apparent:

1. It was found that group foul shot mean gains were as follows:
   a. Physical Practice Only Group, 3.79;
   b. Conceptualization and Immediate Physical Practice Group, 2.80;
   c. Alternating Conceptual and Physical Practice Group, 2.13;
   d. No Practice Group, .08;
   e. Conceptual Practice Only Group, .06.

2. There were no significant differences between group mean gain foul shot performances following practice methods
which included no practice, conceptual practice only, physical practice only, alternating conceptual and physical practice, and conceptualization and immediate physical practice.

3. There was no significant difference between pretest and posttest performance of the foul shot by the No Practice Group.

4. There was no significant statistical interaction between self-concept, as measured by the Tennessee Self Concept Scale (Total Positive Score), and foul shot mean gain for each group.

5. There was no significant statistical interaction between self-concept, as measured by the Tennessee Self Concept Scale (Physical Self Score), and foul shot mean gain for each group.

Conclusions

The design of the investigation may have caused some factors to occur which had an inhibiting effect upon the findings. These factors are discussed in the implications. As a result of the findings, the following conclusions were deemed appropriate within the limitations of this study.

1. There is no difference between no practice, physical practice, conceptual practice, or conceptual-physical practice techniques in improving performance of the basketball foul shot.
2. Self-concept (Total Positive Score) does not significantly affect group mean gain in performance of foul shooting.

3. Self-concept (Physical Self Score) does not significantly affect group mean gain in performance of foul shooting.

Implications

The findings and conclusions regarding the foul shot practice methods were not in agreement with the majority of accomplished studies. The limitations of this study may have influenced the fact that no relationship was found between conceptual practice and improvement in performance of a motor skill. The implications of these limitations are discussed in the following paragraphs.

1. The findings indicate that eight foul shots each practice period were not enough to provide sufficient improvement in order to gain significant differences in practice methods. It was felt that this may have been an inhibiting factor that influenced the nonsignificant results obtained between the various practice methods. The total practice attempts could have been increased by (a) increasing the number of attempts each practice period, (b) increasing the total number of practice sessions, or (c) increasing the number of practice sessions and the number of attempts each session. This would have eliminated the factor of
insufficient practice attempts, and perhaps significant differences could have been found between practice methods. The number of practice shots taken during each practice session were controlled. Regardless of practice method, each subject attempted eight shots during eight practice periods, for a total of sixty-four shots. Perhaps the conceptual practice method should have been controlled by time and not by attempts. The rationale underlying the regimen of the shots attempted was to keep the subjects from rushing through the conceptual practice, and to assure an equal number of practice shots for each. It also provided a tighter control on the study.

2. If one judges from the successful foul shot attempts, most of the subjects would be classified as novice basketball players. Other studies seem to indicate that novice performers improve more when given an opportunity to physically practice the selected motor skill. The Physical Practice Only Group did show a greater mean gain in performance than the other four groups, although it was not significant. It is also noticeable that the No Practice Group and the Conceptual Practice Only Group had mean gains which were less than the three remaining groups. Although the findings were nonsignificant, it was felt that the practice techniques which held the most promise for use by coaches and physical educators were physical practice only, alternating conceptual and physical practice, and
conceptualization and immediate physical practice. Had the total number of practice attempts been increased, it is probable that these three practice methods would have been significantly better than no practice or conceptual practice only.

3. The Conceptual Practice Only Group utilized non-directed practice during this investigation. Perhaps a more directive approach should have been employed. This could have been accomplished by reading directions to the group, having the group read directions, or having the group watch foul shot films prior to each conceptual practice. It is also possible that the group should have been controlled with regard to sitting or standing, eyes opened or closed, and location on the playing floor.

4. The reasons underlying the nonsignificant findings related to the effect of self-concept upon performance of the foul shot were also obscure. The likelihood is present that a different method should have been utilized to dichotomize the high and low self-concept scores. Perhaps the true effect could have been obtained by eliminating the middle range of self-concept scores. It is also feasible that the subjects who had high self-concept scored the highest on the foul shot pretest and would have therefore not gained as much as someone who scored lower on the foul shot pretest. With this in mind, it would appear that foul shot skill and self-concept should have been correlated to determine their relationships.
5. The self-concept scores did reflect that the two groups which improved least on foul shot mean gain also had higher numbers of subjects with low self-concept than high self-concept.

6. Another inhibiting factor may have been the small number of subjects in each group. A minimum of thirty subjects in each group would have been preferable. This would have lessened the impact of extreme scores upon the self-concept scores and the mean gain performance in foul shooting.

7. The possibility that all subjects were not capable of conceptualizing the basketball foul shot may have been a limiting factor. Also, some subjects may have been more capable of conceptualizing the foul shots if they had practiced this before beginning the experimental sessions.

Recommendations

In view of the results of this experiment, the following recommendations are suggested:

1. Any investigation of this nature should make every possible effort to (a) increase the number of practice attempts above eight for each practice session, (b) increase the number of practice sessions beyond eight, or (c) increase both practice attempts and practice sessions beyond eight.

2. More studies utilizing conceptual practice methods need to be accomplished involving (a) alternating conceptual
and physical practice, (b) varying conceptual and physical practice, (c) conceptualization and immediate physical practice, and (d) directed and non-directed conceptual practice techniques.

3. It is recommended that studies which investigate the effect of conceptual practice upon performance gains eliminate the conceptual practice only technique.

4. Further investigations to determine the relationship between self-concept and motor skill performance is recommended. This should be done by (a) dichotomizing high and low self-concept scores by other than the group mean, and (b) correlating motor skill test scores and high and low self-concept scores.

5. An attempt should be made to have at least thirty subjects in each experimental group in order to reduce the effect of extreme scores upon the obtained data.

6. In studies utilizing conceptual practice, all subjects should be provided an opportunity to practice the conceptualizing technique prior to initiation of various group practice methods.

7. It is further recommended that an attempt be made to determine if a subject is able to conceptualize the selected motor skill. A knowledge of this may be valuable in reducing limitations of subsequent studies.
APPENDIX A

PERSONAL DATA SHEET

Name ____________________________

Last ____________________________  First ____________________________  M.I. __________

Circle One:  Freshman        Sophomore

Physical Education Class __________________ Section __________________

Group ________________________________

Tennessee Self Concept Scale Scores:

H L Total Positive Score __________________  Group Mean

H L Physical Self Score __________________  Group Mean

Basketball Foul Shot Test:

Pretest (9-16-70, 9-18-70)  Posttest (10-9-70, 10-12-70)

Attempted 16 + 16 = 32

Made __________________ + —

Foul Shot Practice Scores:

<table>
<thead>
<tr>
<th>Date</th>
<th>Conceptual Practice</th>
<th>Physical Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Made</td>
<td>Attempted</td>
</tr>
<tr>
<td>Monday, 9-21-70</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Wednesday, 9-23-70</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Friday, 9-25-70</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Monday, 9-28-70</td>
<td></td>
<td>4</td>
</tr>
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<td>Wednesday, 9-30-70</td>
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<td>4</td>
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<td>Friday, 10-2-70</td>
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<td>Monday, 10-5-70</td>
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<td>Wednesday, 10-7-70</td>
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<td>4</td>
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<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>32</td>
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</table>

83
GENERAL PARTICIPANT INSTRUCTIONS

You have been selected to participate in a study involving the foul shot in basketball. You will be utilizing the one-hand shot with which many of you are already familiar. I am not concerned at this point with your ability to make the shot. I am concerned that you do your best while attempting your shots.

It is imperative that you follow directions very carefully. The accuracy of this study depends upon your willingness to cooperate.

Before we proceed I want you to complete the Personal Data Sheet. (Each person will be told his group at this time.)

The one-hand method of shooting is probably the most popular basketball shot at this time. We want to take just a few minutes to familiarize you with the shot. Even though I will demonstrate with right and left hands, you will utilize your preferred hand throughout the study. The following points will be covered as the shot is explained and demonstrated (see Appendix C).

1. Position of feet
2. Ball grip and release
3. Body Balance
4. Shooting—as one fluid motion.

You will utilize both corner goals on the north end of the gymnasium. The northwest goal is goal A, and the northeast goal is goal B. You will alternate each practice period between these two goals. You will be told on which goal to practice each day.

Regardless of your practice method you are to attempt at least one shot, but no more than one shot, approximately every ten seconds when you are on the foul line, or when you are practicing conceptually. The primary concern is that you do not rush through your practice method.
You are expected to report on time each class day. Please report to me each class day for instructions for the day.

The next class period you will be given a written test. You will be provided specific instructions by the test booklet. The test will require approximately twenty minutes of your class period. Please report to me in the northwest corner of the gymnasium. It will not be necessary for you to dress out for this particular class period. Pencils will be furnished.

The class period following the written test you are to report in your regulation uniform. Specific instructions will be furnished at that time.

Are there any questions?

Thank you for your attention. I will see you next class period.
APPENDIX C

THE ONE-HAND BASKETBALL FOUL SHOT

You stand with your right foot* approximately one inch behind the free-throw line with your left foot approximately twelve inches back. The feet should be shoulder width apart and the knees slightly bent. Balance must be maintained, though most of the weight will be forward. The ball is held by both hands and just in front of the face. Your left hand should be under the ball in order to control it and the back of your right hand should be facing you. Elbows should be in close to your body. The shot is initiated by a simultaneous straightening of your knees and a raising of your right elbow. As the elbow is raised, a forward push of the forearm and a snap of your wrist pushes the ball toward the basket. The ball should leave from the index and forefinger of your right hand and complete follow-through should leave your arm fully extended and your wrist broken completely over so that your palm will be facing downward. All of the above is to be one fluid motion.**

*This written illustration is for those who shoot right-handed. For those who shoot left-handed, the hand and feet descriptions should be reversed.

APPENDIX D

NO PRACTICE GROUP

Wednesday, 9-9-70: Selection to this group. General instructions. Complete Personal Data Sheet.

Friday, 9-11-70: Check attendance. Administer Tennessee Self Concept Scale. Record scores on Personal Data Sheets.

Monday, 9-14-70: Check attendance. You have been selected at random to be in this group. This is the No Practice Group. As members of this group today you will participate in actual physical practice of the foul shot. You will attempt five shots each at goals A and B. Please try to make each shot. Do not become discouraged if you make none. Your successful attempts will not be recorded today.

The next class period will serve as a time of foul shot testing. You are not to think about or physically practice foul shots between now and the next class period.

Upon arriving for class each day please report to me for instructions.

You may shoot your practice shots and leave. Please begin on goal A and then rotate to goal B for your second five attempts.

Wednesday, 9-18-70: Check attendance. This is the first day of your foul shot test. You will shoot sixteen shots on goal A. You may shoot in any order. Shoot eight shots at a time and rotate clockwise. Please have one man only on the line at one time. Do not talk to the shooter while he is on the foul line.

The man behind the shooter is to help him keep track of his attempts and successful tries.

You are not to mentally or physically participate in basketball foul shots before the next class period. Your complete cooperation is necessary on this request.

You may now begin your test shots. Come by and tell me your name and your number of successful attempts.
Friday, 9-18-70: Check attendance. Today you will again shoot sixteen foul shots. The procedure is the same as for the last class period except that you are to shoot on goal B.

Following today's shots you are to return to your regular class. You are not to practice foul shots physically or mentally until you are again notified to report to me for instructions. This will occur several weeks from now.

After you have completed your sixteen attempts, please come by and tell me your name and the number of successful tries.

If there are no questions you may begin.

Monday, 9-21-70: No Practice.

Wednesday, 9-23-70: No Practice.

Friday, 9-25-70: No Practice.

Monday, 9-28-70: No Practice.

Wednesday, 9-30-70: No Practice.

Friday, 10-2-70: No Practice.

Monday, 10-5-70: No Practice.

Wednesday, 10-7-70: No Practice.

Friday, 10-9-70: Check attendance. Today will be conducted just like your first foul shot test day. You will attempt sixteen shots on goal A. You may shoot in any order, but you are to rotate off the foul line after your first eight shots. Please try to perform your best. After you have completed your sixteen shots come by and tell me your name and your number of successful tries.

Monday will also serve as a day of testing. It is imperative that you attend class for the completion of your testing.

If you have no questions, you may begin shooting on goal A.

Monday, 10-12-70: Check attendance. Shooting procedures are the same as last Friday, except you are to shoot on goal B. Thank you for participating. You may begin shooting.
APPENDIX E

PHYSICAL PRACTICE ONLY GROUP

Wednesday, 9-9-70: Selection to this group. General instructions. Complete Personal Data Sheet.

Friday, 9-11-70: Check attendance. Administer Tennessee Self Concept Scale. Record scores on Personal Data Sheets.

Monday, 9-14-70: Check attendance. You have been randomly selected to be in this group. This is the Physical Practice Only Group. As members of this group you will physically practice the one-hand foul shot each class day. Today will serve as a familiarization day with the foul shot. You are to shoot five shots each at goals A and B. Please try to make each shot. Do not become discouraged if you make none. Your successful tries will not be recorded today.

The next class period will serve as a time of foul shot testing. You are not to think about or physically practice foul shots between now and the next class period.

Upon arriving for class each day, please report to me. Please begin on goal A today.

If there are no questions, you may begin shooting on goal A.

Wednesday, 9-16-70: Check attendance. This is the first day of your pretest on the foul shot. You will shoot on goal A.

You may shoot in any order but you are to attempt eight shots and then rotate clockwise around the lane until sixteen shots have been taken. One man only on the foul line at one time. Please do not talk to the shooter while he is on the foul line.

After shooting sixteen shots, please come by and tell me your name and the number of shots made. Please be accurate. Remember, the man behind you will help you keep your shots attempted and made.
Please do not participate mentally or physically in basketball foul shots except for this study. It is imperative that you cooperate on this request.

Report to me before each class session. If there are no questions, you may begin shooting on goal A.

Friday, 9-18-70: Check attendance. This is the second day of your pretesting. Today is to be conducted just like last Wednesday. If you have no questions, you may begin shooting on goal B.

Monday, 9-21-70: Check attendance. Each class period beginning today you are to practice foul shots physically. You are to use the one-hand method previously demonstrated. Try to make each shot.

Each session you will attempt eight foul shots. You are to shoot four and rotate clockwise. Please, only one man on the foul line at one time. Do not talk to the shooter while he is on the foul line.

Each class period you are to alternate goals. I will inform you each day of the correct goal. Today, you will shoot on goal A.

If there are no questions, you may begin shooting. Don't forget to report to me your successful attempts.

Wednesday, 9-23-70: Check attendance. Procedures for today are the same as for the previous class period. You are to shoot on goal B.

Friday, 9-25-70: Same as previous class day, except use goal A.

Monday, 9-28-70: Same as previous class day, except use goal B.

Wednesday, 9-30-70: Same as previous class day, except use goal A.

Friday, 10-2-70: Same as previous class day, except use goal B.

Monday, 10-5-70: Same as previous class day, except use goal A.

Wednesday, 10-7-70: Same as previous class day, except use goal B.
Friday, 10-9-70: Check attendance. This day will be conducted just like the first test day. You will shoot sixteen shots on goal A. Please do your best as you shoot.

Shoot eight shots at a time and rotate clockwise around the lane. One man on the foul line at one time. Do not talk to the shooter while he is on the foul line.

After shooting sixteen shots, report your name and successful attempts to me. Please be accurate.

If you have no questions, you may begin shooting on goal A.

Monday, 10-12-70: Check attendance. This is the last test day. Your procedure is just like last Friday, except you are to use goal B.

After shooting sixteen shots, report your name and successful attempts to me. Please be accurate.

Following today the study is completed. You will return to your regular class activities. Thank you for your cooperation.
APPENDIX F

CONCEPTUAL PRACTICE ONLY GROUP

Wednesday, 9-9-70: Selection to this group. General instructions. Complete Personal Data sheets.

Friday, 9-11-70: Check attendance. Administer Tennes- see Self Concept Scale. Record scores on Personal Data Sheets.

Monday, 9-14-70: Check attendance. You have been randomly selected to be in this group. This group is the Conceptual Practice Only Group. As members of this group you will conceptualize the one-hand foul shot each class period. However, today you will familiarize yourself with the foul shot by physically shooting five shots each at goals A and B. Please try to make each shot. Do not become discouraged if you make none. Your successful attempts will not be recorded today.

The next class period will serve as a time of foul shot testing. You are not to think about or physically practice foul shots between now and the next class period.

Upon arriving for class each day, please report to me for instructions.

Today you will first shoot five shots on goal B and then rotate to goal A for five shots. One man on the foul line at one time. Do not talk to the shooter while he is on the foul line.

If there are no questions, you may begin shooting on goal B.

Wednesday, 9-16-70: Check attendance. This is the first day for your foul shot test. You will shoot sixteen shots on goal B. Please do your best. You may shoot in any order, but be sure to rotate to next shooter after your first eight attempts. One man only on the foul line at one time. Please do not talk to the shooter while he is on the foul line. After shooting sixteen shots, report your name and the number of successful attempts to me. Please be accurate. Remember, the man behind you will help you keep an accurate account of your attempts and successful tries.
You are not to participate mentally or physically in foul shot shooting before the next class period. This will hold true between each class period. Please cooperate on this request.

Report to me before each class session starts. This is imperative for the study to be successful. If there are no questions, you may begin shooting on goal B.

Friday, 9-18-70: Check attendance. Today your shooting procedures are the same as for last Wednesday, except you are to shoot on goal A. If you have no questions, you may begin shooting.

Monday, 9-21-70: Check attendance. Each class period beginning today you are to practice conceptually the one-hand foul shot. Please do not practice more or less than directed. Your full cooperation is imperative.

Beginning today, you will conceptually attempt to make eight shots each practice period. You are to practice conceptually on goal B today. You will alternate to goal A every other practice period.

As you practice, please try to see yourself actually going through the motions of shooting, even to the point of knowing whether the attempt was successful or unsuccessful. Do not rush through the mental practice session. Remember, you have approximately ten seconds to utilize for shooting each shot.

As you practice your shots, try to imagine that others are rebounding the ball and throwing it back to you for another try. When you miss a shot, try to capture a conceptual picture of the corrections you should make for the next attempt.

Try to make every shot. However, be accurate in reporting your successful tries to me at the end of each session. Since eight shots is not too many to attempt at one time, you will not be given a break. Therefore, it is very important for each of you to concentrate as much as possible while practicing.

Please do not think about, or physically participate in, basketball foul shots during this study, except as directed for practice sessions.

Please report to me prior to each class period. If there are no questions, you may begin your conceptual practice on goal B.
Wednesday, 9-23-70: Same as previous class day, except use goal A.

Friday, 9-25-70: Same as previous class day, except use goal B.

Monday, 9-28-70: Same as previous class day, except use goal A.

Wednesday, 9-30-70: Same as previous class day, except use goal B.

Friday, 10-2-70: Same as previous class day, except use goal A.

Monday, 10-5-70: Same as previous class day, except use goal B.

Wednesday, 10-7-70: Same as previous class day, except use goal A.

Friday, 10-9-70: Check attendance. This day will be conducted just like the first foul shot test day. You will physically shoot sixteen shots on goal B. Please do your best.

Shoot eight shots at a time and rotate clockwise around the foul lane. One man on the foul line at one time. Do not talk to the shooter while he is on the foul line. After shooting sixteen shots, report your name and successful attempts to me. Please be accurate.

You may begin shooting on goal B.

Monday, 10-12-70: Check attendance. This is your final test day. The procedures are the same as for last Friday, except you are to shoot on goal A. Be sure to come by and tell me your successful attempts.

Today completes the study. Thank you for your cooperation. You may begin shooting.
APPENDIX G

ALTERNATING CONCEPTUAL AND PHYSICAL PRACTICE GROUP

Wednesday, 9-9-70: Selection to this group. General instructions. Complete Personal Data Sheets.

Friday, 9-11-70: Check attendance. Administer Tennessee Self Concept Scale. Record scores on Personal Data Sheets.

Monday, 9-14-70: Check attendance. You have been randomly selected to be a member of this group. This is the Alternating Conceptual and Physical Practice Group. As members of this group, you will participate in practice methods which are conceptual and physical in nature. You will utilize the one-hand foul shot for both situations. At the conclusion of the study you will have practiced an equal number of conceptual and physical foul shots.

Today will serve as a familiarization day with regard to the foul shot. You are to shoot physically five shots each at goals A and B. Please try to make each shot. Do not become discouraged if you make none. Successful attempts will not be recorded today.

The next class period will serve as a time of foul shot testing. You are not to think about or physically participate in the foul shot at any time except as directed for the study. Your full cooperation on this point is imperative.

Upon arriving for class each day, you are to report to me. If there are no questions, you may begin your shooting on goal A.

Wednesday, 9-16-70: Check attendance. This is the day you will take your foul shot test. You will shoot sixteen on goal A. Please try to make each shot.

You may shoot in any order, but be sure to rotate to the next shooter after your first eight attempts. One man only on the foul line at one time. Please do not talk to the shooter while he is on the foul line.
After shooting sixteen shots, report your name and the number of successful attempts to me. Please be accurate.

Remember, you are not to participate mentally or physically in foul shots during the study except as directed. Please cooperate on this request.

Report to me before each class session starts. This is imperative for the study to be successful.

If there are no questions, you may begin testing on goal A.

Friday, 9-18-70: Check attendance. Today is the second testing session. The procedures for shooting are the same as for last Wednesday. If you have no questions, you may begin shooting on goal B.

Monday, 9-21-70: Check attendance. Every other class period beginning today you are to practice foul shots physically. You are to use the one-hand method previously demonstrated. Try to make each shot.

Each session you will attempt eight foul shots. You are to shoot four and rotate clockwise. Please, only one man on the foul line at one time. Do not talk to the shooter while he is on the foul line.

Each class period you are to report to me to get your instructions for the day.

Today you will begin on goal A. If there are no questions, you may begin shooting. Don't forget to report your successful attempts to me.

Wednesday, 9-23-70: Check attendance. Every other class day beginning today, you are to practice conceptually the one-hand foul shot. Please do not practice more or less than directed. Your full cooperation is imperative.

During conceptual practice sessions, beginning today, you will conceptually attempt to make eight shots each practice period. You are to practice conceptually on goal A today. You will be given instructions each day concerning your practice method and the goal to be used.

As you practice, please try to see yourself actually going through the motions of shooting, even to the point of knowing whether the attempt was successful or unsuccessful.
Do not rush through the mental practice sessions. Remember you have approximately ten seconds to utilize for shooting each shot.

As you practice your shots, try to imagine that others are rebounding the ball and throwing it back to you for another try. When you miss a shot, try to capture a conceptual picture of the corrections you should make for the next attempt.

Try to make every shot. However, be accurate in reporting your successful tries to me at the end of each session.

Since eight shots is not too many to attempt at one time, you will not be given a break. Therefore, it is very important for each of you to concentrate as much as possible while practicing.

Please report to me prior to each class period. If there are no questions, you may begin your conceptual practice on goal A.

**Friday, 9-25-70:** The same as 9-21-70, except use goal B.

**Monday, 9-28-70:** The same as 9-23-70, except use goal B.

**Wednesday, 9-30-70:** The same as 9-25-70, except use goal A.

**Friday, 10-2-70:** The same as 9-28-70, except use goal A.

**Monday, 10-5-70:** The same as 9-30-70, except use goal B.

**Wednesday, 10-7-70:** The same as 10-2-70, except use goal B.

**Friday, 10-9-70:** Check attendance. This day will be conducted just like the first foul shot test day. You will physically shoot sixteen shots on goal A. You may shoot in any order.

Shoot eight shots at a time and rotate clockwise around the foul lane. One man on the foul line at one time. Do not talk to the shooter while he is on the foul line.

After shooting sixteen shots, report your name and successful attempts to me. Please be accurate. You may begin shooting on goal A.
Monday, 10-12-70: Check attendance. Today is the last test day. The procedures are the same as last Friday, except you will shoot on goal B. Thank you for your cooperation during the study.
APPENDIX H

CONCEPTUALIZATION AND IMMEDIATE PHYSICAL PRACTICE GROUP

Wednesday, 9-9-70: Selection to this group. General instructions. Complete Personal Data Sheets.

Friday, 9-11-70: Check attendance. Administer Tennessee Self Concept Scale. Record scores on Personal Data Sheets.

Monday, 9-14-70: Check attendance. You have been selected at random to be in this group. This is the Conceptualization and Immediate Physical Practice Group. As members of this group, you will utilize both conceptual and physical aspects of practicing the one-hand foul shot, as previously demonstrated.

Today, however, is a day of familiarization with the foul shot. You will each shoot ten foul shots. Five each at goals A and B. Please try to make each shot. Do not become discouraged if you make none. Successful tries will not be recorded today.

The next class period will serve as a time of foul shot testing. You are not to think about or participate physically in foul shots at any time, except as directed for the study. Your full cooperation on this point is imperative.

Upon arriving for class each day, you are to report to me. If there are no questions, you may begin shooting on goal B.

Wednesday, 9-16-70: Check attendance. This is the day you will take your foul shot test. You will shoot sixteen shots on goal B. Please try to make each shot.

You may shoot in any order. Shoot eight shots at a time and rotate clockwise around the lane. One man only on the foul line at one time. Please do not talk to the shooter while he is on the foul line.

After shooting sixteen shots, report your name and the number of successful attempts to me. Please be accurate.
Remember, you are not to participate physically or mentally in foul shots except for the study. Please cooperate on this request.

Report to me before each class session starts. This is imperative for the study to be successful.

You may begin shooting on goal B.

Friday, 9-18-70: Check attendance. The procedure for today is the same as for last Wednesday, except you are to shoot on goal A. If there are no questions you may begin.

Monday, 9-21-70: Check attendance. Today you begin your practice method. Please pay careful attention to your instructions. It is imperative that guidelines be followed explicitly.

The conceptual practice aspect of your group method is just what it implies. You are to picture mentally yourself shooting a foul shot. Try to capture every detail possible, even to whether or not you make the goal. Do not rush the mental practice portion of your attempts. Remember, you have approximately ten seconds to shoot each shot. Mentally make corrections when they are needed. Your conceptual practice will take place on the foul line.

Immediately after having conceptualized the foul shot, you are to attempt physically a foul shot. The conceptual try constitutes one attempt and the physical try is also one attempt. If you need assistance in keeping accurate count of your shots, you may ask the man behind you to help.

Each class period you will attempt eight total foul shots. Please, only one man on the foul line at one time. Do not talk to the shooter while he is on the foul line. You may shoot in any order.

Again, you are to conceptualize a shot; then, immediately shoot the shot physically until you have attempted four of each.

Each class session you are to alternate goals. I will inform you each day of the correct goal. Today you will shoot on goal B.

When you have attempted eight total shots, be sure to give me your name and the number of successful attempts. This includes mental and physical attempts.
Wednesday, 9-23-70: Check attendance. Procedures for today are the same as for the previous class period, except shoot on goal A.

Friday, 9-25-70: Same as previous class, except use goal A.

Monday, 9-28-70: Same as previous class, except use goal B.

Wednesday, 9-30-70: Same as previous class, except use goal B.

Friday, 10-2-70: Same as previous class, except use goal A.

Monday, 10-5-70: Same as previous class, except use goal A.

Wednesday, 10-7-70: Same as previous class, except use goal B.

Friday, 10-9-70: Check attendance. Today will be conducted just like the first foul shot test day. You will physically shoot sixteen shots on goal B.

Shoot eight shots at a time and rotate around the foul lane. One man on the line at one time. Do not talk to the shooter while he is on the line.

Be sure to report your successful attempts to me. If there are no questions you may begin shooting on goal B.

Monday, 10-12-70: Check attendance. Today is to be conducted just like last Friday, except you will shoot on goal A.

After today the study is completed. Thank you for your cooperation.

You may begin shooting on goal A.
APPENDIX I

TABLE VI

RAW DATA FOR THE NO PRACTICE GROUP (NP)

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Total 12 155 156 1

*a* High self-concept—above the total positive score (TPS) mean for all groups. The mean was 337.43.

*b* Low self-concept—one, or below, the TPS mean for all groups.

*c* High self-concept—above the physical self score (PSS) mean for all groups. The mean was 69.88.

*d* Low self-concept—on, or below, the PSS mean for all groups.
APPENDIX J

TABLE VII

RAW DATA FOR THE PHYSICAL PRACTICE GROUP (PP)

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Total 14 186 239 53

^a High self-concept—above the total positive score (TPS) mean for all groups. The mean was 337.43.

^b Low self-concept—on, or below, the TPS mean score for all groups.

^c High self-concept—above the physical self score (PSS) mean for all groups. The mean was 69.88.

^d Low self-concept—on, or below, the PSS mean for all groups.
**APPENDIX K**

**TABLE VIII**

RAW DATA FOR THE CONCEPTUAL PRACTICE ONLY GROUP (CP)

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Total 16 183 184 1

<sup>a</sup>High self-concept--above the total positive score (TPS) mean for all groups. The mean was 337.43.

<sup>b</sup>Low self-concept--on, or below, the TPS mean for all groups.

<sup>c</sup>High self-concept--above the physical self score (PSS) mean for all groups. The mean was 69.88.

<sup>d</sup>Low self-concept--on, or below, the PSS mean for all groups.
**APPENDIX L**

**TABLE IX**

RAW DATA FOR THE ALTERNATING CONCEPTUAL AND PHYSICAL PRACTICE GROUP (ACPP)

<table>
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<tr>
<th>Subjects</th>
<th>Foul Shot Pretest</th>
<th>Foul Shot Posttest</th>
<th>Gain/Loss</th>
<th>TSCS TPS</th>
<th>TSCS PSS</th>
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<sup>a</sup>High self-concept—above the total positive score (TPS) mean for all groups. The mean was 337.43.<br>

<sup>b</sup>Low self-concept—on, or below, the TPS mean for all groups.<br>

<sup>c</sup>High self-concept—above the physical self score (PSS) mean for all groups. The mean was 69.88.<br>

<sup>d</sup>Low self-concept—on, or below, the PSS mean for all groups.
## APPENDIX M

### TABLE X

**RAW DATA FOR THE CONCEPTUALIZATION AND IMMEDIATE PHYSICAL PRACTICE GROUP (CIPP)**

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<thead>
<tr>
<th>Subjects</th>
<th>Foul Shot Pretest</th>
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<th>Gain/Loss</th>
<th>TSCS TPS</th>
<th>TSCS PSS</th>
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<sup>a</sup>High self-concept—above the total positive score (TPS) mean for all groups. The mean was 337.43.

<sup>b</sup>Low self-concept—on, or below, the TPS mean for all groups.

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<sup>d</sup>Low self-concept—on, or below, the PSS mean for all groups.
BIBLIOGRAPHY

Books


Articles


Perry, Horace M., "The Relative Efficiency of Actual and Imaginary Practice in Five Selected Tasks," Archives of Psychology, XXXIV (July, 1939), 5-75.


Start, K. B., "Relationship Between Intelligence and the Effects of Mental Practice on the Performance of a Motor Skill," The Research Quarterly, XXXI (December, 1960), 644-649.


Zion, Leela C., "Body Concept as it Relates to Self-Concept," The Research Quarterly, XXXVI (December, 1965), 490-495.

Publications of Learned Organizations


Williams, Roger L., "The Effects of Mental Practice and Arousal on a Tracking Task," Proceedings, Annual Meeting 73rd, National College Physical Education Association for Men, Minneapolis, Minnesota, 1970.
Unpublished Material


Wilson, Margaret E., "The Relative Effect of Mental Practice and Physical Practice in Learning the Tennis Forehand and Backhand Drives," unpublished doctoral dissertation, Department of Physical Education, State University of Iowa, Iowa City, Iowa, 1960.