

THE RELATIONSHIP BETWEEN SELF CONCEPT AND MOTOR PERFORMANCE  
OF SIXTH GRADE GIRLS, EIGHTH GRADE GIRLS,  
AND COLLEGE WOMEN

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## CHAPTER I

### ORIENTATION TO THE STUDY

#### Rationale for the Study

Self concept is considerably more difficult to measure than it is to define. Combs and Snygg<sup>1</sup> define it as "the symbol or generalization of self which aids in perceiving and dealing with self." It is what an individual believes about himself. This is not to be confused with self report which is a description of self reported to an outsider. Self concept is the central point of one's personality structure. Changes in behavior only occur in relationship to events which are perceived as having a bearing on self.

Very little research has been reported in the area of self concept and motor performance or self concept and skill in physical education activities. Londow<sup>2</sup> undertook a study in an effort to develop a pictorial animal test which would estimate three factors in primary grade children's perceptions of themselves and other persons; namely, evaluation, potency, and activity. A study undertaken by Marshall<sup>3</sup> entailed an investigation of the relationship

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<sup>1</sup>Arthur W. Combs and D. Snygg, Individual Behavior (2nd ed.: New York: Harper and Row, 1959), p. 127.

<sup>2</sup>Mattie Londow, "The Development of an Animal Picture Test to Assess the Self-Concepts of Primary Grade Children" (unpublished paper, Texas Woman's University, 1969).

<sup>3</sup>Katie Grant Marshall, "The Relationship Between Participation in a Program of Planned Aquatic Activities and Changes in the Self Concept of Children with Orthopedic Limitations" (unpublished Ph.D. dissertation, Texas Woman's University, 1969).

between participation in a planned program of aquatic activities and changes in the self concept of orthopedically handicapped children. Marshall's findings indicated that there was a positive relationship between participation by the subjects in the program of planned aquatic activities and their changes in self concept.

There seems to be little doubt of the importance of self concept as a determiner of behavior.<sup>1,2,3</sup> The difficulty lies in the ability to assess the degree of relationship between measured self concept and such variables as academic achievement or motor performance. Piers and Harris<sup>4</sup> found a significant relationship between self concept scores and I.Q. and academic achievement. These previous studies have shown significantly that individuals with a high, or more adequate, self concept also have a higher I.Q. and academic achievement. Implications have been drawn concerning the possibility of experimentally changing self concept in order to discover whether such changes affect academic achievement.

A review of the literature indicates that most of the studies have been done at the high school or college level. Relatively few

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<sup>1</sup>Billy J. Paschal, "The Role of Self Concept in Achievement," The Journal of Negro Education, XXXVII (Fall, 1968), p. 392-396.

<sup>2</sup>John J. Brownfain, "Stability of the Self-Concept as a Dimension of Personality," Journal of Abnormal and Social Psychology, XLVII (Fall, 1959), p. 597-606.

<sup>3</sup>Arthur W. Combs, Daniel W. Soper and Clifford C. Courson, "The Measurement of Self Concept and Self Report," Educational and Psychological Measurement, XXIII (1963), p. 493-500.

<sup>4</sup>Ellen V. Piers and D. B. Harris, "Age and Other Correlates of Self Concept in Children," Journal of Educational Psychology, LV (1964), p. 183-202.

investigations of self concept and achievement or performance have been conducted at the elementary school level.

In the present study, the relationship between self concept and motor performance of sixth grade elementary school girls, eighth grade junior high school girls, and college women was determined.

#### Statement of the Problem

This investigation entailed a study of approximately ninety female subjects during the academic year of 1970-1971 in an effort to determine the significant relationship between their expressed self concept and motor performance scores. Thirty subjects were selected from physical education classes in each of the following schools in Denton, Texas: (1) sixth grade elementary school girls enrolled in the Stonewall Jackson School; (2) eighth grade girls enrolled in the Congress Junior High School; and (3) college women enrolled in a swimming class at the Texas Woman's University. Upon the basis of the findings, the investigator drew conclusions concerning the relationship between self concept and motor performance of the selected groups of students.

#### Purpose of the Study

The general purpose of the study was to determine if a significant relationship exists between self concept, as measured by the Tennessee Self Concept Scale, and motor performance, as measured by the Photoelectric Rotary Pursuit Tachometer, the Mirror Tracer with electric scoring, and the Dekan Automatic Performance Analyzer. Specifically, the investigator proposed to test the following



## hypotheses:

- A. There is no significant relationship between performance scores on the pursuit rotor and performance scores on the Dekan performance analyzer of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.
- B. There is no significant relationship between performance scores on the Dekan performance analyzer and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.
- C. There is no significant relationship between performance scores on the pursuit rotor and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.
- D. There is no significant relationship between performance scores on the pursuit rotor and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.
- E. There is no significant relationship between performance scores on the Dekan performance analyzer and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.
- F. There is no significant relationship between performance scores on mirror tracing and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.

### Delimitations of the Study

The study was subject to the following delimitations:

- A. Thirty sixth grade elementary school girls enrolled in Stonewall Jackson School in Denton, Texas.
- B. Thirty eighth grade junior high school girls enrolled in Congress Junior High School in Denton, Texas.
- C. Thirty college women enrolled in the required physical education program at the Texas Woman's University in Denton, Texas.
- D. Students who have received prior instruction in physical education activities in the selected schools.
- E. The objectivity, reliability, and validity of the selected instruments to measure self concept and motor performance.
- F. The degree to which the students are representative of the population from which they were drawn.

### Definitions and/or Explanations of Terms

For the purpose of clarification, the following definitions and/or explanations of terms were established for use in the study.

- A. Tennessee Self Concept Scale: The Scale was used in this study for the purpose of measuring self concept.
- B. Self Concept: The investigator accepted the following definition of self concept as stated by Combs, Soper, and Courson:

It is what an individual believes about himself;  
the totality of his ways of seeing himself.<sup>1</sup>

- C. Motor Performance: The term "motor performance" refers to those tasks performed on the Photoelectric Rotary Pursuit Tachometer,

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<sup>1</sup>Combs, Soper and Courson, Educational and Psychological Measurement, 493-500.

the Mirror Tracer, and the Dekan Automatic Performance Analyzer.

- D. Photoelectric Rotary Pursuit Tachometer: The pursuit rotor was utilized for the purpose of measuring a subject's response to a visual moving target.
- E. Mirror Tracer: The mirror tracer was utilized to measure a subject's response to a reverse image stimulus.
- F. Dekan Automatic Performance Analyzer: The performance analyzer was utilized for the purpose of measuring total body movement time.
- G. Movement Time: For the purpose of this investigation, movement time refers to the length of time required for a subject to move as quickly as possible in a straight line across a space ten feet in length. The investigator accepted the following definition of movement time as stated by Singer:

The time a particular act takes to be completed after it has been initiated.<sup>1</sup>

### Survey of Related Literature

A comprehensive review of the related literature disclosed that the present investigation is not identical to any previous study.

In 1964, Wattenberg and Clifford<sup>2</sup> completed a study entitled "Relationship of Self-Concept to Beginning Achievement in Reading."

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<sup>1</sup>Robert N. Singer, Motor Learning and Human Performance: An Application to Physical Education Skills, (New York: The Macmillan Company, 1968), p. 67.

<sup>2</sup>William W. Wattenberg and Clare Clifford, "Relation of Self-Concept to Beginning Achievement in Reading," Child Development, 35; (1964), p. 461-467.

Previous studies had indicated an association between poor self concepts and reading disabilities. The purpose of the study was to determine whether poor self concept or reading disability was the antecedent phenomenon.

Measures of mental ability and self concept were obtained for 185 children in kindergarten in two elementary schools in Detroit, Michigan. Two and one-half years later, self concept measures were repeated and measures were obtained of their progress in reading.

Intellectual ability was measured by the Detroit Beginning First Grade Intelligence Test. The difference in reading method and vocabulary used in the two textbooks required reading achievement to be measured by the textbook series publishers. A quantified measure of self concept was obtained through the use of tape recordings. The remarks of the children were recorded while they drew pictures of their families and responded to an incomplete sentences test. The classroom teachers and a clinically trained interviewer were utilized to rate the children.

Wattenberg and Clifford concluded that the measures of self concept taken in kindergarten were significantly predictive of reading progress but not significantly related to mental test scores.

Caplin<sup>1</sup> undertook a study entitled "The Relationship Between Self Concept and Academic Achievement" in an effort to determine if both white and Negro children attending a de facto segregated school had less positive self concept than did children attending a desegregated

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<sup>1</sup>Morris D. Caplin, "The Relationship Between Self Concept and Academic Achievement," The Journal of Experimental Education, 37; (Spring, 1969), p. 13-16.

school, and if there was a significant relationship between self concept and reading achievement.

The sample consisted of 180 intermediate grade children from three elementary schools in a small city in New Jersey. Thirty pupils from the long-term desegregated school served as the base group. Sixty pupils from the de facto segregated school and sixty pupils from a newly desegregated school were then matched to the base group. Analyses of variance were computed on the scores obtained from the self concept instrument and correlations between these scores and achievement scores were calculated.

Findings from the study indicated that there was a significant positive relationship between self concept and academic achievement. Caplin suggested the possibility that a higher self concept may contribute to higher achievement and higher achievement may contribute to a higher self concept.

Paschal<sup>1</sup> conducted a study entitled "The Role of Self Concept in Achievement." The purpose of this investigation was to compare two groups of subjects whose scores on the Spivack Response Form were compared with academic achievement as determined by over-all grade point average. The sample included 152 subjects randomly selected from the seventh grade class of a junior high school in Dade County, Florida.

The response form provided for three different response choices on each item. The sum of the score values for the 132 item test constituted the total self-rejection score. The higher the

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<sup>1</sup>Billy J. Paschal, "The Role of Self Concept in Achievement," The Journal of Negro Education, (1968), p. 392-396.

score, the greater the self-rejection. The data were treated with the chi square technique. The conclusions indicated that a positive relationship did exist between self concept and teacher assigned grades.

In 1964, Piers and Harris<sup>1</sup> completed a study entitled "Age and Other Correlates of Self-Concept in Children." A 140-item self concept scale was administered to four third-grade classes, four sixth-grade classes, and four tenth-grade classes in a large school system. Statements on the scale were classified by three judges as reflecting high or low self concept.

Means and standard deviations were computed for the high scores. Correlations were determined between high scores and I.Q. and achievement test scores. A correlation of .32 was reported between achievement and self concept. This was a significant positive correlation, but low. No consistent sex differences were observed.

### Summary

In this chapter, the investigator discussed the importance of self concept as a determiner of behavior and the difficulty in trying to measure self concept was pointed out by the fact that only a limited amount of research in this area has been published to date.

Also in Chapter I, the investigator presented the research design of this inquiry under the headings: Statement of the Problem, Purposes of the Study, and Delimitations of the Study. Four studies were reviewed and discussed that utilized self concept tests.

Chapter II will describe the procedures used in the development of the study.

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<sup>1</sup>Ellen Piers and Dale Harris, "Age and Other Correlates of Self Concept in Children," Journal of Educational Psychology, (April, 1964), p. 91-95.

## CHAPTER II

### PROCEDURES FOR THE DEVELOPMENT OF THE STUDY

The general purpose of the study was to ascertain if the scores of the female students enrolled in physical education classes from three selected schools indicated a significant relationship between self concept, as measured by the Tennessee Self Concept Scale, and motor performance, as measured by the Mirror Tracer, Dekan Automatic Performance Analyzer, and Photoelectric Rotary Pursuit Tachometer.

#### Sources of Data

The Stonewall Jackson Elementary School and the Congress Junior High School selected for this study were located in Denton, Texas, and under the jurisdiction of the Denton Independent School District. A sixth-grade girls physical education class was selected from Stonewall Jackson Elementary School and an eighth-grade girls physical education class was selected from Congress Junior High School for utilization in the study. During the month of February, 1971, the investigator contacted Dr. Joseph L. Fearing to apply for permission from the Joint Study Group for the Denton Independent School District to conduct the study. In March, 1971, permission was granted to conduct the study.

A swimming class from the required physical education program in the College of Health, Physical Education, and Recreation at the Texas Woman's University in Denton, Texas, was selected for utilization in the study. The swimming class was conducive to the study.

The students who participate in a swimming class are in a horizontal position in the water and are not in contact with the ground as compared to other activity classes in which the students are in a vertical position and are in contact with the ground.

Permission to conduct the study was granted by Dr. Anne Schley Duggan, Dean of the College of Health, Physical Education, and Recreation at the Texas Woman's University. During the month of March, 1971, the investigator contacted personally the physical education teachers of each school to explain the purpose of the research design and to ask for their assistance in the administration of the tests. The response was affirmative and each teacher offered their assistance.

The students who agreed to participate in the study were enrolled in physical education classes within the selected schools at the time the instruments were administered. The subjects were of sixth-grade, eighth-grade, and college classification and had at least one year of previous instruction in physical education activities. Thirty students were utilized from each of the three selected schools.

### Selection of Instruments

#### Tennessee Self Concept Scale

In the study, the Tennessee Self Concept Scale was utilized to measure self concept. The Scale is available in two forms, a Counseling Form and a Clinical and Research Form. The Clinical and Research Form may be utilized in research studies but is more difficult to score and interpret and deals with more variables. It is generally used in clinical evaluations. The Counseling Form is



quicker and easier to score since it deals with fewer variables and scores and requires less knowledge in psychometrics and psychopathology by the examiner. The Counseling Form yielded a Total Positive Score which reflected the subject's overall self esteem.

The Tennessee Self Concept Scale consists of 100 self descriptive statements which the subject uses to portray his own picture of himself. The Scale is a paper-pencil test and is self administering for either individuals or groups and can be used with subjects age twelve or higher.

The test-retest reliability was .88 for the Total Positive Score. Most of the scores on the Tennessee Self Concept Scale correlate with the Minnesota Multiphasic Personality Inventory scores.<sup>1</sup> Correlation coefficients significant at the .01 level were found between the Tennessee Self Concept Scale and the Taylor Anxiety Test, the Cornell Medical Index, and the Inventory of Feelings.<sup>2</sup> The correlation coefficient between the California F-Scale and the Tennessee Self Concept Scale was significant at the .05 level.<sup>3</sup>

#### Dekan Automatic Performance Analyzer

The Dekan Automatic Performance Analyzer was utilized for the purpose of measuring movement time. Movement time refers to the period from the beginning of the response to the completion of a movement. It is the length of time required for the response itself.

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<sup>1</sup>William H. Fitts, Manual for Tennessee Self Concept Scale, (Nashville, Tennessee: Counselor Recordings and Tests, 1964), p. 25.

<sup>2</sup>Ibid.

<sup>3</sup>Ibid.

The subject responded to an auditory stimulus to moving as quickly in a straight line across a space ten feet in length. The subject stood with the toe resting on the start pedal. An auditory stimulus acted as the start signal at which time the subject moved off the pedal and moved to step on a mat. The clock automatically began recording the time when the subject stepped off the pedal; the time stopped when the subject stepped on the mat. Each subject took five trials and the sum of the scores on the five trials was recorded.

#### Photoelectric Rotary Pursuit Tachometer

The Photoelectric Rotary Pursuit Tachometer was utilized for the purpose of measuring a subject's response to a visual moving target. The circle plate was placed on the pursuit rotor with the rotor set at 15 RPM. The subject stood in front of the pursuit rotor with the stylus held in the preferred hand. At the command "Ready, Go" the rotor was started and the subject attempted to keep the stylus on the target. Each subject took two practice trials of thirty seconds each. Each subject completed five trials. Each score recorded reflects the length of time the stylus remained on the moving target. The sum score of the five trials was recorded for each subject.

#### Mirror Tracer

A mirror tracing device with electric scoring was utilized to measure the subject's response to a reverse image stimulus. The star pattern was utilized. The shield on the instrument was adjusted to prevent the subject from looking directly at the star plate. The subject looked at the mirror and traced the star pattern with the

stylus held in the preferred hand. The subject was sitting. The number of errors, recorded by the electric counter, and the period of time required to complete the star pattern was recorded. Each time the stylus touched the side of the copper plate, the electric scorer recorded the error. One-half (.50) of a second was added to the subject's score for each error committed during a trial. The maximum time allowed to complete the task was three minutes. One practice trial was allowed each subject and then she completed five trials. The sum of the five trials was recorded.

#### Administration of the Instruments

At the convenience of the physical education teachers at each of the three schools, testing dates were established for the administration of the self concept test and the motor performance tests in each of the selected schools. The tests were administered by the investigator during the subjects' physical education class in each school. An assistant was trained by the investigator and assisted in administering the tests and recording the scores. One class period was required for the administration of the self concept test for each of the three groups. Two class periods were required for the administration of the motor performance tests for each of the three groups. Electrical outlets were available and extension cords were not required. The Dekan Automatic Performance Analyzer test was administered on the first day of testing to each of the three groups. On the second and third days of testing, the three groups were divided in half. One half of each group was assigned to the Photoelectric Rotary Pursuit Tachometer and the other half of the group to the

Mirror Tracer. As soon as each subject had completed her five trials on the pursuit rotor or mirror tracing, she rotated to the other group. Two days were required to complete the testing on the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer. All the subjects completed the tests within the allotted time.

Each subject was given a number which was written on their motor performance score cards. Depending upon their grade classification, the subjects wrote a six, an eight, or college in the designated space at the top of their answer sheet for the self concept test and the motor performance tests. To insure the anonymity of the subjects, the investigator requested each girl not to write their names on either the motor performance score cards or the answer sheets for the Tennessee Self Concept Scale. Results of the tests were sent to each participating physical education instructor.

#### Treatment of Data

The investigator utilized an adding machine to obtain the sum score of the five trials for each subject on each of the motor performance tests. The answer sheets for the Tennessee Self Concept Scale were scored by a computer. The sum score for each subject on the Photoelectric Rotary Pursuit Tachometer and the Dekan Automatic Performance Analyzer was obtained by adding the scores on each of the five trials. The sum score for each subject on the Mirror Tracer was obtained by adding the score on each of the five trials. One-half (.50) second was added to each subject's score for each error committed during a trial.

Upon completion of the scoring, the range, mean, standard deviation, and standard error of mean of each motor performance test

and of the self concept test was computed for: (1) Stonewall Jackson Elementary School girls; (2) Congress Junior High School girls; and (3) Texas Woman's University women.

Pearson product-moment correlation was utilized for determining the degree of relationship between each of the motor performance tests and between each motor performance test and the self concept test for each of the three grade levels. The formula utilized for testing the degree of relationship was:

$$r = \frac{\sum xy}{\sqrt{(\sum x^2)(\sum y^2)}}$$

A t-test was utilized for determining the significance of correlation between each of the motor performance tests and between each motor performance test and the self concept test for each of the three grade levels. The formula utilized for testing the significance of correlation was:

$$t = \frac{r\sqrt{N-2}}{\sqrt{1-r^2}}$$

#### Summary

In this chapter, the investigator discussed the procedures utilized in the development of the study under the headings: Sources of Data, Selection of Instruments, Administration of the Instruments, and Treatment of Data.

Pearson product-moment correlation was the statistical procedure selected for use in the treatment of the data as they related to the hypotheses enumerated in Chapter I. A t-test was utilized for determining the significance of correlation.

Chapter III will include an analysis and interpretation of the data upon which the conclusions and implications of this study are based.

## CHAPTER III

### ANALYSIS AND INTERPRETATION OF DATA

#### Introduction

The general purpose of the study was to ascertain if the scores of the female students enrolled in physical education classes from three selected schools indicated a significant relationship between self concept, as measured by the Tennessee Self Concept Scale, and motor performance, as measured by the Mirror Tracer, Dekan Automatic Performance Analyzer, and Photoelectric Rotary Pursuit Tachometer.

As denoted in Chapter II, the findings of this study were based upon data collected from three Denton, Texas, girls' physical education classes during the spring semester of the academic year 1971. These three schools were Stonewall Jackson Elementary School, Congress Junior High School, and Texas Woman's University. Table 1 indicates that ninety volunteers from the three girls' physical education classes in the three selected schools provided the data upon which the findings of this study are based.

The data obtained from the three schools are presented in tabular form and analyzed with respect to significant relationships between the scores on the Tennessee Self Concept Scale, Mirror Tracer with electric scoring, Automatic Performance Analyzer, and Photoelectric Rotary Pursuit Tachometer for each group. The Pearson product-moment correlation was utilized to determine the degree of

relationship of each group's scores between each of the three motor performance tests and the self concept test. A t-test was applied to determine the significance of correlation between each of the four tests for each group.

TABLE 1

TOTAL NUMBER OF VOLUNTEER FEMALE SUBJECTS FROM THREE SCHOOLS  
(N=90)

Schools	Subjects
Stonewall Jackson Elementary	30
Congress Junior High	30
Texas Woman's University	30
Total	90

Table 2 indicates the range, mean, standard deviation, and standard error of mean for the test scores on the Photoelectric Rotary Pursuit Tachometer of each group.

TABLE 2

RANGE, MEAN, STANDARD DEVIATION, STANDARD ERROR OF MEAN OF EACH  
GROUP ON THE PHOTOELECTRIC ROTARY PURSUIT TACHOMETER  
(N=90)

Schools	Range	M	SD	SE <sub>M</sub>
Stonewall Jackson Elementary	76-139	110	15.87	2.90
Congress Junior High	69-143	115	16.63	3.04
Texas Woman's University	81-148	126	17.21	3.11



From Table 2 it may be seen that the range was 76-139 seconds for the elementary group, 69-143 seconds for the junior high group, and 81-148 seconds for the university group. The mean was 110 seconds for the elementary group, 115 seconds for the junior high group, and 126 seconds for the university group. The standard deviation was 15.87 seconds for the elementary group, 16.63 seconds for the junior high group, and 17.21 seconds for the university group. The standard error of mean was 2.90 seconds for the elementary group, 3.04 seconds for the junior high group, and 3.11 seconds for the university group.

Upon the basis of these findings for the elementary group, it may be stated that the standard deviation is small when compared to the range and reveals that there were few individual differences with respect to performance scores on the Photoelectric Rotary Pursuit Tachometer. The standard deviation and range reveals that the frequency distribution closely approaches a normal curve. The standard error of mean is small when compared to the size and standard deviation of the group.

Upon the basis of these findings for the junior high group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Photoelectric Rotary Pursuit Tachometer. The standard deviation and range reveals that the frequency distribution is positively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the university group, it may be stated that the standard deviation is large when compared to the

range and reveals that there were many individual differences with respect to performance scores on the Photoelectric Rotary Pursuit Tachometer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Table 3 indicates the range, mean, standard deviation, and standard error of mean for the test scores on the Mirror Tracer for each group.

TABLE 3

RANGE, MEAN, STANDARD DEVIATION, STANDARD ERROR OF MEAN  
OF EACH GROUP ON THE MIRROR TRACER  
(N=90)

School	Range	M	SD	SE <sub>M</sub>
Stonewall Jackson Elementary	53-959	335	254.46	46.46
Congress Junior High	96-455	197	78.13	14.27
Texas Woman's University	78-363	165	69.40	12.67

From Table 3 it may be seen that the range was 53-959 seconds for the elementary group, 96-455 seconds for the junior high group, and 78-363 seconds for the university group. The mean was 335 seconds for the elementary group, 197 seconds for the junior high group, and 165 seconds for the university group. The standard deviation was 254.46 seconds for the elementary group, 78.13 seconds for the junior high group, and 69.40 seconds for the university group. The standard error

of mean was 46.46 seconds for the elementary group, 14.27 seconds for the junior high group, and 12.67 seconds for the university group.

Upon the basis of these findings for the elementary group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Mirror Tracer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the junior high group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Mirror Tracer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the university group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Mirror Tracer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Table 4 indicates the range, mean, standard deviation, and standard error of mean for the test scores on the Automatic Performance Analyzer for each group.

TABLE 4

RANGE, MEAN, STANDARD DEVIATION, STANDARD ERROR OF MEAN FOR  
EACH GROUP ON THE AUTOMATIC PERFORMANCE ANALYZER  
(N=90)

School	Range	M	SD	SE <sub>M</sub>
Stonewall Jackson Elementary	3-7	4	.812	.148
Congress Junior High	3-6	4	1.109	.202
Texas Woman's University	4-8	6	.875	.159

From Table 4 it may be seen that the range was 3-7 seconds for the elementary group, 3-6 seconds for the junior high group, and 4-8 seconds for the university group. The mean was 4 seconds for the elementary group, 4 seconds for the junior high group, and 6 seconds for the university group. The standard deviation was .812 seconds for the elementary group, 1.109 seconds for the junior high group, and .875 seconds for the university group. The standard error of mean was .148 seconds for the elementary group, .202 seconds for the junior high group, and .159 seconds for the university group.

Upon the basis of these findings for the elementary group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Automatic Performance Analyzer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the junior high group, it

may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Automatic Performance Analyzer. The standard deviation and range reveals that the frequency distribution is negatively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the university group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Automatic Performance Analyzer. The standard deviation and range reveals that the frequency distribution closely approaches a normal curve. The standard error of mean is large when compared to the size and standard deviation of the group.

Table 5 indicates the range, mean, standard deviation, and standard error of mean for the test scores on the Tennessee Self Concept Scale for each group.

TABLE 5

RANGE, MEAN, STANDARD DEVIATION, STANDARD ERROR OF MEAN FOR  
EACH GROUP ON THE TENNESSEE SELF CONCEPT SCALE  
(N=90)

School	Range	M	SD	SE <sub>M</sub>
Stonewall Jackson Elementary	246-419	328	37.28	6.18
Congress Junior High	223-387	317	35.53	6.49
Texas Woman's University	266-395	334	38.30	6.99

From Table 5 it may be seen that the range was 246-419 for the elementary group, 223-387 for the junior high group, and 266-395 for the university group. The mean was 328 for the elementary group, 317 for the junior high group, and 334 for the university group. The standard deviation was 37.28 for the elementary group, 35.53 for the junior high group, and 38.30 for the university group. The standard error of mean was 6.18 for the elementary group, 6.49 for the junior high group, and 6.99 for the university group.

Upon the basis of these findings for the elementary group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Tennessee Self Concept Scale. The standard deviation and range reveals that the frequency distribution closely approaches a normal curve. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the junior high group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Tennessee Self Concept Scale. The standard deviation and range reveals that the frequency distribution is positively skewed. The standard error of mean is large when compared to the size and standard deviation of the group.

Upon the basis of these findings for the university group, it may be stated that the standard deviation is large when compared to the range and reveals that there were many individual differences with respect to performance scores on the Tennessee Self Concept Scale.

The standard deviation and range reveals that the frequency distribution is leptokurtic. Of the thirty cases, 100 per cent fell within  $\pm$  two standard deviations of the mean. The standard error of mean is large when compared to the size and standard deviation of the group.

To determine if a significant relationship exists between self concept and motor performance as measured by the Tennessee Self Concept Scale and the Photoelectric Rotary Pursuit Tachometer, Mirror Tracer, and Dekan Automatic Performance Analyzer, respectively, the scores from the respective instruments were subjected to the Pearson product-moment correlation technique. The data were grouped according to the six proposed hypotheses and are presented in tabular form. For the Photoelectric Rotary Pursuit Tachometer and the Tennessee Self Concept Scale, the subjects' scores would increase in size of number as the subjects' performance on the test improved. For the Mirror Tracer and the Dekan Automatic Performance Analyzer, the subjects' scores would decrease in size of number as the subjects' performance on the test improved.

Table 6 indicates the degree of relationship and the level of significance for the test scores of each group on the Photoelectric Rotary Pursuit Tachometer and Dekan Automatic Performance Analyzer. The reader is reminded that the higher the score the better the performance on the Photoelectric Rotary Pursuit Tachometer. Whereas, on the Dekan Automatic Performance Analyzer, the lower score represents the better performance.

TABLE 6

RELATIONSHIP BETWEEN TEST SCORES ON THE PHOTOELECTRIC ROTARY  
PURSUIT TACHOMETER AND AUTOMATIC PERFORMANCE  
ANALYZER FOR EACH GROUP  
(N=90)

Group	r	Level of Significance	
		<u>t</u>	P
Elementary	-.012	-.0532	N.S.
Junior High	-.179	-.9684	N.S.
University	-.343	-1.919	N.S.

NOTE: t-value required for significance at .05 level = 2.048  
t-value required for significance at .01 level = 2.763

A coefficient of correlation of  $-.012$  indicates a negligible degree of relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Automatic Performance Analyzer for the elementary group. A coefficient of correlation of  $-.179$  indicates a negligible degree of relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Automatic Performance Analyzer for the junior high group. A coefficient of correlation of  $-.343$  indicates a slight degree of relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Automatic Performance Analyzer for the university group. A t-value of 2.048 was required for significance at the .05 level of confidence between the scores of the Photoelectric Rotary Pursuit Tachometer and Automatic Performance Analyzer for each of the three groups. This level was not reached by any of the three groups which indicates an insignificant relationship



between the subjects' scores on the Photoelectric Rotary Pursuit Tachometer and Automatic Performance Analyzer.

Table 7 indicates the degree of relationship and the level of significance for the test scores of each group on the Automatic Performance Analyzer and Mirror Tracer.

TABLE 7

RELATIONSHIP BETWEEN TEST SCORES ON THE AUTOMATIC PERFORMANCE ANALYZER AND MIRROR TRACER FOR EACH GROUP  
(N=90)

Group	r	Level of Significance	
		$\underline{t}$	P
Elementary	-.019	-.1064	N.S.
Junior High	.164	.8597	N.S.
University	-.295	-1.664	N.S.

NOTE:  $\underline{t}$ -value required for significance at .05 level = 2.048  
 $\underline{t}$ -value required for significance at .01 level = 2.763

A coefficient of correlation of  $-.019$  indicates a negligible degree of relationship between the scores of the Automatic Performance Analyzer and Mirror Tracer for the elementary group. A coefficient of correlation of  $.164$  indicates a negligible degree of relationship between the scores of the Automatic Performance Analyzer and Mirror Tracer for the junior high group. A coefficient of correlation of  $-.295$  indicates a slight degree of relationship between the scores of the Automatic Performance Analyzer and Mirror Tracer for the university

group. A t-value of 2.048 was required to depict a significant relationship between the scores of the Automatic Performance Analyzer and Mirror Tracer for each of the three groups at the .05 level of confidence. This level was not reached by any of the three groups which indicates an insignificant relationship between the subjects' scores on the Automatic Performance Analyzer and Mirror Tracer.

Table 8 indicates the degree of relationship and the level of significance for the test scores of each group on the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer. The reader is reminded that the higher the score the better the performance on the Photoelectric Rotary Pursuit Tachometer. Whereas, on the Dekan Automatic Performance Analyzer, the lower score represents the better performance.

TABLE 8

RELATIONSHIP BETWEEN TEST SCORES ON THE PHOTOELECTRIC ROTARY PURSUIT TACHOMETER AND MIRROR TRACER FOR EACH GROUP  
(N=90)

Group	r	Level of Significance	
		<u>t</u>	P
Elementary	-.403	-2.310	.05
Junior High	-.514	-3.137	.01
University	.181	.982	N.S.

NOTE: t-value required for significance at .05 level = 2.048  
t-value required for significance at .01 level = 2.763

A coefficient of correlation of -.403 indicates a fair degree of relationship between the scores of the Photoelectric Rotary Pursuit

Tachometer and Mirror Tracer for the elementary group. A coefficient of correlation of  $-.514$  indicates a fair degree of relationship between the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer for the junior high group. A coefficient of correlation of  $.181$  indicates a negligible degree of relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer for the university group. A  $t$ -value of  $2.048$  was required to depict a significant relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer for each of the three groups at the  $.05$  level of confidence. The  $.05$  level of confidence was satisfied by the  $-2.310$  level of significance of the elementary group. This inverse relationship indicates that elementary school girls who performed well on the Photoelectric Rotary Pursuit Tachometer also performed well on the Mirror Tracer. The  $.01$  level of confidence was satisfied by the  $-3.317$  level of significance of the junior high group. This inverse relationship indicates junior high school girls who performed well on the Photoelectric Rotary Pursuit Tachometer also performed well on the Mirror Tracer. The  $.05$  level of confidence was not reached by the  $.9820$  level of significance of the university group which indicates an insignificant relationship between the subjects' scores on the Photoelectric Rotary Pursuit Tachometer and Mirror Tracer.

Table 9 indicates the degree of relationship and the level of significance for the test scores of each group on the Photoelectric Rotary Pursuit Tachometer and Tennessee Self Concept Scale.

A coefficient of correlation of  $.161$  indicates a negligible degree of relationship between scores of the Photoelectric Rotary

Pursuit Tachometer and Tennessee Self Concept Scale for the elementary group. A coefficient of correlation of .631 indicates a moderate to marked degree of relationship between scores of the Photoelectric Rotary Pursuit Tachometer and Tennessee Self Concept Scale for the junior high group. A coefficient of correlation of  $-.088$  indicates a negligible degree of relationship between the scores of the Photoelectric Rotary Pursuit Tachometer and Tennessee Self Concept Scale for the university group.

TABLE 9

RELATIONSHIP BETWEEN TEST SCORES ON THE PHOTOELECTRIC ROTARY PURSUIT TACHOMETER AND TENNESSEE SELF CONCEPT SCALE  
(N=90)

Group	r	Level of Significance	
		<u>t</u>	P
Elementary	.161	.0086	N.S.
Junior High	.631	4.293	.001
University	-.088	-.4781	N.S.

NOTE: t-value required for significance at .05 level = 2.048  
t-value required for significance at .01 level = 2.763

As noted in Table 9, only one group of subjects demonstrated a significant relationship between their scores on the Photoelectric Rotary Pursuit Tachometer and the Tennessee Self Concept Scale. The junior high school girls' scores were significantly related -- .001 level of confidence. This finding indicates that junior high school

girls who performed well on the Photoelectric Rotary Pursuit Tachometer also manifested a high self concept score.

This high level of significance indicates that junior high school girls who performed well on the Photoelectric Rotary Pursuit Tachometer also Performed well on the Tennessee Self Concept Scale.

Table 10 indicates the degree of relationship and the level of significance for the test scores of each group on the Automatic Performance Analyzer and Tennessee Self Concept Scale. The reader is reminded that the higher the score the better the performance on the Tennessee Self Concept Scale. Whereas, on the Dekan Automatic Performance Analyzer, the lower score represents the better performance.

TABLE 10

RELATIONSHIP BETWEEN TEST SCORES ON THE AUTOMATIC PERFORMANCE  
ANALYZER AND TENNESSEE SELF CONCEPT SCALE  
FOR EACH GROUP  
(N=90)

Group	r	Level of Significance	
		<u>t</u>	P
Elementary	-.032	-.3441	N.S.
Junior High	-.133	-.6938	N.S.
University	-.325	-1.787	N.S.

NOTE: t-value required for significance at .05 level = 2.048  
t-value required for significance at .01 level = 2.763

A coefficient of correlation of  $-.032$  indicates a negligible degree of relationship between the scores of the Automatic Performance Analyzer and Tennessee Self Concept Scale for the elementary group. A

coefficient of correlation of  $-.133$  indicates a negligible degree of relationship between the scores of the Automatic Performance Analyzer and Tennessee Self Concept Scale for the junior high group. A coefficient of correlation of  $-.325$  indicates a slight degree of relationship between the scores of the Automatic Performance Analyzer and Tennessee Self Concept Scale for the university group. A  $t$ -value of  $2.048$  was required to depict a significant relationship between the scores of the Automatic Performance Analyzer and Tennessee Self Concept Scale for each of the three groups at the  $.05$  level of confidence. This level was not reached by any of the three groups which indicates an insignificant relationship between the subjects' scores on the Automatic Performance Analyzer and Tennessee Self Concept Scale.

TABLE 11

RELATIONSHIP BETWEEN TEST SCORES ON THE MIRROR TRACER AND  
TENNESSEE SELF CONCEPT SCALE FOR EACH GROUP  
( $N=90$ )

Group	r	Level of Significance	
		$t$	P
Elementary	$-.066$	$-.3753$	N.S.
Junior High	$-.238$	$-1.308$	N.S.
University	$.257$	$1.425$	N.S.

NOTE:  $t$ -value required for significance at  $.05$  level =  $2.048$   
 $t$ -value required for significance at  $.01$  level =  $2.763$

Table 11 indicates the degree of relationship and the level of significance for the test scores of each group on the Mirror Tracer

and Tennessee Self Concept Scale. The reader is reminded that the higher the score the better the performance on the Tennessee Self Concept Scale. Whereas, on the Mirror Tracer, the lower score represents the better performance.

A coefficient of correlation of  $-.066$  indicates a negligible degree of relationship between the scores of the Mirror Tracer and Tennessee Self Concept Scale for the elementary group. A coefficient of correlation of  $-.238$  indicates a slight degree of relationship between the scores of the Mirror Tracer and Tennessee Self Concept Scale for the junior high group. A coefficient of correlation of  $.257$  indicates a slight degree of relationship between the scores of the Mirror Tracer and Tennessee Self Concept Scale for the university group. A  $t$ -value of  $2.048$  was required to depict a significant relationship between the scores of the Mirror Tracer and Tennessee Self Concept Scale for each of the three groups at the  $.05$  level of confidence. This level was not reached by any of the three groups which indicates an insignificant relationship existed between the subjects' scores on the Mirror Tracer and Tennessee Self Concept Scale.

#### Summary

In this chapter the investigator presented the analysis and interpretation of data upon which the findings of this study were based. Data concerning the elementary, junior high, and university subjects were collected from the score sheets of the Photoelectric Rotary Pursuit Tachometer, Automatic Performance Analyzer, Mirror Tracer, and Tennessee Self Concept Scale. There were five administrations of the motor performance tests and one administration of

the self concept test.

The data contributed by the ninety students from one elementary school, one junior high school, and one university in Denton, Texas, were analyzed and presented in tabular form. Discussion followed each table.

In Chapter IV, the investigator will present a summary of the study, conclusions and implications of the findings, and suggestions for future studies.



## CHAPTER IV

### SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS FOR FUTURE STUDIES

This chapter will include a summary of the study, conclusions based upon the findings, implications of the conclusions and recommendations for future studies.

#### Summary of the Study

Self concept has been used as a predictor of reading achievement, general academic achievement, teacher assigned grades, and intelligence quotient. The investigator attempted to determine whether a significant relationship existed between self concept and motor performance.

The hypotheses which guided the development of this study were proposed to ascertain if: (1) a significant relationship existed between performance scores on the pursuit rotor and performance scores on the performance analyzer of the sixth grade elementary school girls, the eighth grade junior high school girls and the college women; (2) a significant relationship existed between performance scores on the performance analyzer and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women; (3) a significant relationship existed between performance scores on the pursuit rotor and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college

women; (4) a significant relationship existed between performance scores on the pursuit rotor and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women; (5) a significant relationship existed between performance scores on the performance analyzer and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women; (6) a significant relationship existed between performance scores on mirror tracing and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women.

The study was limited to female students enrolled in physical education classes in three schools in Denton, Texas: Stonewall Jackson Elementary School, Congress Junior High School, and Texas Woman's University. The physical education instructor and the principal of the elementary school and the junior high school aided the author in the administration of the self concept test and the motor performance tests.

The procedures utilized in the conduct of the study were discussed in Chapter II under the following headings: Sources of Data, Selection of Instruments, Administration of the Instruments, and Treatment of Data. Human sources utilized in this study were ninety students from the three selected schools. Documentary sources utilized in this study were books, periodicals, theses, and dissertations. The research instruments selected for use in this study were the Photo-electric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, Mirror Tracer with electric scoring, and Tennessee Self

Concept Scale. The Photoelectric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, and Mirror Tracer were utilized to determine motor performance scores of the ninety subjects. The Tennessee Self Concept Scale was utilized to determine self concept of the ninety subjects. The procedures for the administration of the instruments were described and each step in the analysis and treatment of the data were discussed.

Chapter III was concerned with an analysis and interpretation of the data upon which the findings of this study were based. The means, standard deviations, and standard error of means of the raw scores for each of the three groups from the administration of the Photoelectric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, Mirror Tracer, and Tennessee Self Concept Scale were depicted in tabular form. Pearson product-moment correlation was utilized to compute the degree of relationship between the motor performance and self concept test scores for each of the three groups. A t-test for significance of correlation was utilized to determine the level of significance for each coefficient of correlation. The .05 level of confidence was accepted by the investigator.

#### Summarization of Findings

A summary of the findings of this investigation is presented in relation to each of the hypotheses tested.

A. Hypotheses related to relationships between the motor performance tests for each group as measured by the Photoelectric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, and Mirror Tracer.

1. There is no significant relationship between performance scores

on the pursuit rotor and performance scores on the performance analyzer of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Reject (Table 6).

2. There is no significant relationship between performance scores on the performance analyzer and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Reject (Table 7).
3. There is no significant relationship between performance scores on the pursuit rotor and the performance scores on mirror tracing of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Support for Elementary Group ( $< .05$ , Table 8).  
Failed to Support for Junior High Group ( $< .01$ , Table 8).  
Failed to Reject for University Group (Table 8).

B. Hypotheses relating to relationships between the self concept test and motor performance tests for each group as measured by the Tennessee Self Concept Scale and the Photoelectric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, and Mirror Tracer, respectively.

1. There is no significant relationship between performance scores on the pursuit rotor and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Reject for Elementary Group (Table 9). Failed to Support for Junior High Group ( $< .001$ , Table 9). Failed to Reject for University

Group (Table 9).

2. There is no significant relationship between performance scores on the performance analyzer and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Reject (Table 10).
3. There is no significant relationship between performance scores on mirror tracing and the self concept of the sixth grade elementary school girls, the eighth grade junior high school girls, and the college women. Failed to Reject (Table 11).

Conclusions

The findings of this study seem to warrant the following basic conclusions:

1. Elementary and junior high school female students demonstrated a significant relationship between their ability to perform equally well on two target-type tests -- the Photoelectric Rotary Pursuit Tachometer, a moving target; and the Mirror Tracer, a stationary, reverse-image target.
2. A significant relationship appeared to exist between the junior high school girls' self concept and their ability to perform on the Photoelectric Rotary Pursuit Tachometer.
3. No significant relationship was found to exist between university womens' scores on the Photoelectric Rotary Pursuit Tachometer, Mirror Tracer, Dekan Automatic Performance Analyzer, or Tennessee Self Concept Scale.

4. Movement time was not significantly related to ability to perform on the Photoelectric Rotary Pursuit Tachometer, Mirror Tracer or Tennessee Self Concept Scale for the elementary, junior high, or university female students.

### Implications

The results of this inquiry lead the investigator to surmise that of the three motor performance tests, only one test (Photoelectric Rotary Pursuit Tachometer at the junior high level) indicated a significant relationship to self concept. With two exceptions, (Photoelectric Rotary Pursuit Tachometer and Mirror Tracer at the elementary and junior high level) the subjects' scores on the motor performance tests did not indicate a significant relationship to each other.

This leads the investigator to speculate that self concept is not a general determiner of motor performance, as measured by the Photoelectric Rotary Pursuit Tachometer, Dekan Automatic Performance Analyzer, and Mirror Tracer, nor is performance on these motor tasks a determiner of self concept for girls enrolled in physical education classes at the elementary, junior high, and university level. Scores on the specific motor tasks utilized in this study indicate that a high self concept score does not necessarily indicate a high motor performance level and vice versa; nor does a low self concept score necessarily indicate a low motor performance level and vice versa.

### Recommendations for Future Studies

The investigator recommends the following future studies which may be of value to future investigators in the areas of self concept

and motor performance.

1. A study to determine whether effected changes in a person's self concept affect his motor performance.
2. A study to determine whether effected changes in a person's motor performance affect his self concept.
3. A study to determine if teacher assigned grades in physical education affect a student's self concept.
4. A study to determine if a specific level of self concept is peculiar to athletes and non-athletes.
5. A study to determine the effects of democratic, autocratic, and laissez-faire teaching procedures on students' self concept and motor performance.

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