A STUDY OF THE RELATIONSHIP BETWEEN SELF-CONCEPT LEVELS AND ACCURACY OF PREDICTION FOR MATHEMATICAL COMPUTATION OF CHILDREN

By

RICHARD FRANK PALAZZO

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1974

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
December, 1977

A STUDY OF THE RELATIONSHIP BETWEEN SELF-CONCEPT

LEVELS AND ACCURACY OF PREDICTION FOR

MATHEMATICAL COMPUTATION OF CHILDREN

THESIS APPROVED:

Paul G. Warden
Thesis Adviser

Darrel D. Ray

Vernon Troxel

Norman N. Durham
Dean of the Graduate College

ACKNOWLEDGMENTS

During the preparation of this study several individuals were instrumental in nuturing my ideas.

The positive criticisms and assistance provided by Dr. Darrell Ray and Dr. Vernon Troxel made the task of writing this thesis enjoyable, instead of tedious.

A special note of thanks is included for Dr. Paul G. Warden. The constant encouragement Dr. Warden offered for the last three years has proven to be a positive and invaluable influence on my career. I am grateful to him for not only chairing my committee but also for introducing me to a field of psychology which I can live with.

My sincerest appreciation is extended to these gentlemen for their sense of humor concerning my use of written grammar.

I will be forever grateful to my parents for the financial and emotional support they've provided me throughout my college career. Bobbie Brown did an exceptionally fine job of typing the final draft. Mr. and Mrs. Larry Barsh and L. C. White supplied me with much spiritual support during the writing of this paper.

Finally, a note of thanks to Pam Greenwood for saying, "That's a good one."

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Many children acquire persistent feelings of inadequacy and other negative attitudes regarding their personal worth that are formed out of either irrational estimates of themselves or failures to accept themselves realistically as they are. Teachers today suspect many students are having difficulty with school work not because of low intelligence or a specific learning disability but because they have learned to consider themselves unable to do the specific task. We know now that students tend to behave in terms of what they view to be true and often their expectations are not consistent with what the facts are.

A student's perception of his "self" is composed mainly of a history consisting of selected memories and the onslaught of experiences ranging from success to failure. The version of a student's past is made to seem more real, fixed, and final; whereas, what the student can do at the present moment often seems fleeting and intangible. It is from these dynamics that the under-achiever begins believing irrational upper-limits for his own performance, which in turn hampers his progress and attitude (Fellows, 1973). Prescott Lecky (1945) with his theory of Self-Consistency was first to indicate that low academic achievement may be related to a student's conception of himself as unable to learn the academic material.

In the years since Lecky's initial investigation both a person's expectancy for success and self-concept have been found to influence performance on specific tasks. The beliefs an individual has about himself can be expressed in terms of self-appraisals and expectations of his own ability. In some persons, particularly low or underachievers, there is a significant discrepancy between their levels of aspiration and levels of performance. For years, researchers have demonstrated repeatedly that both unsuccessful students and underachievers are prone to inaccurate appraisals of their ability (Sears, 1940; Dembo, Festinger, Sears, 1944; and McClelland, 1960). It is generally agreed that underachievers sadly underestimate themselves (Hammacheck, 1965).

Another point brought out by the literature in this area is that either under- or over-estimating one's ability would not be conducive for optimal growth and learning (Steiners, 1957 and McClelland, 1960). As demonstrated by McClelland (1961) and Kassarjian (1963), failure or a large discrepancy between level of aspiration and level of achievement are related to negative or non-adjustive personality variables.

The accumulation of research findings form a vague picture of the relationship between self-concept level and accuracy of student's predictions of his performance. To know more concerning the relationship of self-concept levels and accuracy for correct predictions would be useful in lieu of the lack of literature concerning this relationship in terms of specific learning tasks. A shortcoming of the experimental studies in this area has been the artificiality of the specific tasks employed by the researchers. These studies require the assumption that data from experimentally created experiences of goal-setting may be translated into real life life situations. Also, little experimental work has been done attempting to isolate variables associated with character or personality traits in level of aspiration tasks (Hoppe, 1935; Frank, 1935; and Jucknat, 1945).

A problem does exist because there is no clear evidence establishing a relationship between a student's self-concept level and accuracy of predictions for math computation problems. Also, there is no information concerning the extent to which this relationship changes with age.

Unless the student is accurate concerning his own predictions, he runs the risk of misinterpreting the reality of the situation and of setting unrealistic goals. Such was the case in Prescott Lecky's research, wherein the subjects were found to have a definite standard of poor spelling, which they unconsciously endeavored to maintain. The subjects had imposed irrational upper-limits for their own spelling performance beyond which they could not master. Some elementary students might respond in the same manner because of the increasingly complex configuration of the math problems. Especially in the area of math, some students are confronted daily with a disparity between self-expectations and performance. When the difference becomes marked and persistent, the children may acquire a poor self-concept. Teachers must seek new ways to develop within the child a basis for self-appraisal that leads to some feeling of success. This concern is shared by many of the more current authors of affective education. For example;

> It is vital for us to recognize how a child comes to evaluate himself. His self-concept is based largely upon what others tell him and show him about his own being and performance. (Bessell and Palamores, 1972, p. 17)

Before this objective can be dealt with sufficiently the teacher must know something of the student's accuracy for predicting his performance and his current self-concept level. In a systematic procedure both of these variables were accurately recorded and analyzed across tasks which were characteristic of the mathematical work assigned in current intermediate elementary classes. Previous efforts in the diagnostic assessment of mathematical ability have stressed the area of computation (Buswell and John, 1925; Sangren and Reidy, 1931; Woody and McCall, 1936; and Brueckner, 1955). Traditionally this area of operations would include the four computation processes of addition, subtraction, multiplication and division.

The four computation subtests of the Key Math Arithmetic Diagnostic Test were chosen. These four subtests represent the task about which students were asked to make predictions about concerning whether or not they felt they could solve the problem correctly. The area of math computation was selected as the task for accuracy of estimate for the following reasons. First, they could be viewed precisely enough to insure a minimum degree of confusion regarding the specific nature of the abilities to be rated. Secondly, they could be measured with moderately high reliability. And finally, the logical scope, sequence, and difficulty level of these math computation problems provided an adequate means to demonstrate the discrepancy between prediction and actual performance.

Various techniques and instruments have been developed recently which yield a valid and reliable measurement of affective variables such as "self-concept." One of the instruments which has been used successfully for research purposes is the Piers-Harris Childrens Self-Concept Scale. This instrument was used to indicate the individual's self-concept level.

The purpose of this research is to investigate the relationship between the self-concept levels of intermediate elementary students and their ability to accurately predict their performance on math computation problems.

Experimental Questions

1. Will a student's accuracy for estimating his own performance for math computation problems be positively related to his level of self-concept?
2. Will the relationship of accuracy for estimating math computation performance and self-concept change across grades?

CHAPTER II

LITERATURE REVIEW

Introduction

The research concerning level of aspiration has grown from empirical findings, and research has been influenced by various considerations. Some studies have tried to determine factors that influence the raising and lowering of the level of aspiration and to understand the conditions of success and failure.

The focus of this review will be to trace the development and the degree to which personality traits play a role in level of aspiration tasks. The personality characteristic of specific concern will be the self-concept and its relationship to level of aspiration tasks.

Level of Aspiration and Self-Concept

The term "level of aspiration" was first introduced by Dembo (1930) and since then has been an important construct in motivational theory. The attainment and non-attainment of goals and their effect on behavior has received much attention in the following two decades. Workers in this field soon began to agree that the "level of aspiration" tasks were favorable situations in which to observe individual traits relating to competitive and goal behavior of subjects.

A student of Dembos, Hoppe (1930), attempted to study the reciprocal relationship between goals and feelings of failure and success, i.e., how the latter affected the height of goals and how the height of goals determined whether a given performance level would be interpreted as failure or success. Hoppe was able to study the dynamics of the problem with some accuracy because both actual performance scores and introspections were obtained at the close of the experiment. A variety of tasks were used, nine in all, ranging from thought problems to throwing rings on a moving target. The height of the individual's goal or "aspiration level" was ascertained by Hoppe largely in qualitative terms, causing the precision of the measurements to be questionable.

Despite this obvious drawback, Hoppe observed certain general changes in aspiration level in all of his four main subjects, i.e., with success the aspiration level increased and with failure there was a tendency for the aspiration level to be decreased. Despite the limitations of the Hoppe study (too few subjects and lack of quantitative analysis in the results), never-the-less this study is considered a significant contribution. The Hoppe study demonstrated significant individual differences in the definition of, and reaction to, "success" and "failure." These led the way to the realization that momentary goal-strivings in relation to a given task were not solely dependent on the goals set and on the actual ability of the subject. These responses were now thought to be related to an individual's inner strivings which motivated both his ambitions and behavior.

Hausmann (1933) recognized that reactions to success and failure could provide significant clues to personality organization. He utilized the aspiration level technique "to evaluate personality traits" in 150 subjects, most of whom were psychoneurotics and pre-psychotics.

His approach was largely qualitative, although he did record the performance scores using such terms as "the speed with which estimates were adjusted upwards or downwards" and the "large or small steps" in such adjustments. On the basis of these analyses alone, he came to certain conclusions regarding personality characteristics of the individual such as "agressiveness," "perseverance," "stubbornness," and "instability."

Frank (1935) was impressed by Hoppe's finding of the relationship between aspiration level and the character of the individual. Frank was initially interested in studying the generality of this measure of individual striving. In his study, Frank reported a quantitative technique for the study of the level of aspiration that soon became the standard technique in the field. This technique, known as the "average difference score," was accomplished by presenting each task with a given number of trials and then recording the differences between performance and aspiration.

In Frank's experiment there were three groups of 12 subjects each and three tasks (printing, spatial relations and quoits). Each task was given twice, in two sessions with about a week intervening between each session. Utilizing the average difference scores, Frank studied the general applicability of this measure by correlating the different scores on the two tasks.

Franks concluded that there are certain traits of the personality which can be measured through the behavior of the level of aspiration. These traits are, to a large extent, independent of the physical nature of the task in which they are aroused. Literature concerning Frank's conclusion was very critical. It has questioned the significance of the conclusion by pointing out three weaknesses of the experimental structure: (1) failure to consider either the possible effect of the level of performance on the range of aspiration-estimates, (b) the possible distorting influence of the relationship of performance ability in different tasks to one another, and (c) the use of both a small number of tasks and subjects.

With these problems in mind, Gould (1939) set out to determine the validity of the assumption that the "average difference score" is a relatively stable characteristic of the individual. She employed six tasks, which in a narrow sense measured verbal, arithmetic, rote learning, and motor ability. Performances were recorded for 82 white male college undergraduates from a psychology class.

The quantitative measure of aspiration level was the average difference score. The correlation between individual variability in average difference scores was only .33, indicating that if subjects differ with respect to generality of aspiration level, as measured by difference scores, this difference is not primarily a function of height of level of aspiration. Gould also concluded that her study could offer no evidence one way or another to prove that an ascertainment of "true aspiration level," would in itself be a significant clue to the personality organization and "deeper strivings" of the individual. Gould explained that there was no doubt that aspiration level techniques do bring to the surface certain significant personality characteristics, but she felt there were other laboratory methods which accomplished the task more easily and completely.

One year later, Gould and Kaplan (1940) studied the relationship between the average difference score as a personality characteristic revealed in the laboratory and other more or less accepted questionnaire measures of personality determinants. The same six tasks which had been found to be unrelated to each other in performance (Gould, 1939), were presented to 80 Columbia University undergraduates. The investigators found only insignificant relationships between discrepancy scores and scores (a) for dominance-feeling (Maslow Social Personality Inventory) and (b) extraversion-introversion (Guilford).

Sears (1940) made clinical studies of selected small groups of fourth, fifth, and sixth graders who were highly motivated for good school work and had been either (a) highly successful or (b) unsuccessful at obtaining good school status over a period of several years. When her subjects were divided according to size of discrepancy scores for experimental school type tasks, certain related factors also appeared differentiating these groups. Those subjects showing a predominantly "high" discrepancy pattern were poorer in school achievement than other groups and were rated as showing an attitude of low self-confidence accompanied by rather free admission of their incompetence. Those subjects showing characteristically the "low positive" discrepancy, on the other hand, were rated as highly confident, successful, and comfortable in their achievement. In this study, Sears provided an example of a specific relationship between goal-setting for success and self-confidence.

Intrigued by the promise of this recent behavioral technique for personality testing, Julian Rotter (1942) was also concerned over the lack of any definite results which related stable, specific personality variables to responses within the level of aspiration tasks. Her two main criticisms were directed to previous endeavors in this area and are explained in her statement,

> In order to determine the nature of these personality variables it would be necessary to develop instructions that are not easily misinterpreted by the subject and in which previous experience with the task is controlled. It would also be necessary to examine all aspects of the individual's response, rather than limiting a description only to the difference between the expressed and achieved goals (p. 101).

In Julian Rotter's study a modified form of instruction, originated by Haussman (1933), and a simple, but novel, motor task (Aspiration Board) were tested with 205 subjects who had been categorized into six different groups. The instructions were successful in both eliminating the possibility of misinterpretation without involving judgment as a factor in the subject's reaction and reducing the extent of individual differences. The results of the study found Rotter's "Aspiration Board" to be a task which met the seven criteria points for holding situational factors as constant as possible. The task created a great deal of interest; it did not appear to be influenced by performance level, showed little learning after a short practice period, and appeared to be free of attitudes and standards resulting from previous contact with a similar task. Also, the "Aspiration Board" task allowed for a large number of trials and provided adequate quantative results in a relatively short period of time.

Along with the successful evaluation of her new method, Rotter elaborated on the discrepancy patterns revealed by her study. Three patterns of response, the low positive, slightly negative, and medium high discrepancy patterns were designated as "socially acceptable." Six other patterns were identified as "socially unacceptable:" very high positive, high negative discrepancies, step, rigid, confused and achievement-following patterns.

Gruen (1945) was the first to investigate the level of aspiration behavior of adolescents differing in selected personality characteristics. The Rogers Test of Personality Adjustment was administered to seventh and eighth graders of a local high school. Only those subjects making high total scores and very low total were selected as subjects. The task was a simple one, requiring subjects to substitute shorthand symbols for letters of the alphabet. At the end of each trial subjects were asked to estimate how well they thought they would do on the next trial--the estimate being their "level of aspiration."

In general, the subjects set their goals for the next trial a little higher than the score they had just received. That is, most of the well-adjusted students did so. The poorly adjusted adolescents, however, showed two deviant kinds of goal-setting. Either they lowered their level of aspiration so that they could be sure of success or else they compensated for their feelings of inadequacy by setting goals they had little hope of attaining.

Gruen explains this phenomena in terms of "fear of failure." So great was the "fear of failure" for one group, that they lowered their level of aspiration so that they could be sure of success or else they compensated for their feelings of inadequacy by setting goals they had little hope of attaining. The author concluded that the poorly adjusted adolescents appeared to be trying to maintain a shaky self-esteem.

F. W. Irwin (1944) pointed out, in a theoretical discussion, "The Realism of Expectations," that level of aspiration involves both cognitive and affective factors. Irwin prefers to use level of expectations except in cases where goals are clearly implied. Irwin distinguishes between realistic and unrealistic aspirations, terms of expectations, and goals. He views realistic aspirations as those aspirations based upon an appraisal of the extent to which the individual is capable of meeting the demands of the situation with which he is confronted. In this respect, realistic aspirations are seen as evoked by "expect" instructions. On the other hand, unrealistic aspirations are viewed as those aspirations which are based upon hopes, fears, and wishes originating in the individual and evoked more directly by "hope" instructions.

Pursuing the studies of variables underlying explicit goal statements and level of aspiration, Cohen (1952) redefined certain aspects of the concept of self-esteem or self-regard to feelings of adequacy and self-acceptance. Rorschach examinations were used for estimates of these two variables for fifty subjects selected from medical and surgical wards of a hospital. Utilizing Rotter's "Aspiration Board," Cohen failed to find a significant relationship between goal-level setting and feelings of adequacy and self-acceptance.

Cohen explained his findings in light of previous investigations by Holt (1946), who had indicated that goal statements are defensive reactions rather than indications of motivation to achieve. Both authors agreed that if a third variable, such as realism or objectivity of judgment, were involved then a linear relationship would be impossible to demonstrate. Cohen did find a curvilinear relationship between goal-level setting and self-acceptance. His results indicated that the attitude toward the self is in fact an important correlate to high or low goal-setting. Results of Cohen's experiment are aligned with Sears' (1940, 1941) findings that only secure children could state goals that were closely related to actual achievement and that insecure children protected themselves by the use of very high or very low goal-level settings.

Rotter, (1954) in her critical review of methodology for aspiration level tasks, spoke of a "minimum goal." She stated that,

> The degree of excellence is experienced as a compulsory claim on oneself whether it is in the form of a requirement set by the task, by the need for self-actualization, or by an accepted social norm (p. 120).

Rotter then concluded that the attainment or lack of attainment of the "degree of excellence" will affect the self-esteem of the individual.

Steiners' (1957) finding is also illuminating; he found that setting very high goals is correlated with uncertain self-image. Forty-four members of an undergraduate class in psychology were measured for two commonly neglected dimensions of self-perception. One measurement technique yielded a measure of uncertainty of self-perception, while the other produced an index of pessimism in self-perception. The measure of goal-setting behavior for this study was a task requiring subjects to make realistic, optimistic and pessimistic estimates of how many three letter words they could make out of the letters contained in an eight letter word.

Persons with uncertain self-perceptions were found to set goals which were high relative to their past performance, to expect their performance scores to vary considerably over time, and to be more likely than others to overestimate their future performances. There was also an indication that these subjects were less certain than other persons that their announced goals were realistic. Subjects who were pessimistic with their self-appraisals made low and pessimistic estimates of their future performance. Persons whose self-appraisals were favorable were less certain than others that their announced goals were realistic. The latter also tend to set their goals high relative to their past performance.

Only one year later, in 1958, Richard M. Brandt published an extensive investigation in the area of self-estimates, self-perception, and self-concept. The purpose of the study was three-fold: (a) to develop a new self-rating procedure, (b) to offer an analysis of a "normal" school children population, and (c) to answer several questions involving the nature of self-perception and self-concept. Particular interest was focused upon the accuracy of self-estimates. Brandt introduced this term, the accuracy of self-estimate, referring to the degree to which students correctly rate their own abilities and social reputations.

A group of 139 students, composed of sixth and eleventh graders, were asked to rate themselves in comparison with their classmates on how well they expected to do on several academic and physical tasks. Soon thereafter they performed the tasks to enable comparison of predicted and actual performance. Later the same students completed a questionnaire, developed by the author, and designed to measure social reputation. For this review, we shall only be concerned with the questions concerning the reliability, validity and individual differences in accuracy of self-estimates.

This self-rating method and the data collected were found to be sufficiently reliable for two reasons. First, students were highly consistent in the accuracy with which they rated the same ability on two separate occasions. When the three or four students whose ratings changed the most were excluded from the calculations, reliability coefficients exceeding .80 and frequently .90's were obtained in every group, over every task. The author attributes any large differences found to changes in the self-concept itself. The second reason the self-rating method seemed reliable is that, even when all students were included, reliability coefficients exceeding .77 were found in all groups and in all areas with the exception of the baseball throwing task.

Themes, interviews, and self-evaluation remarks were used to determine the validity of the self-rating data. The assumption was made that the areas of competency that were mentioned by the students in their themes, lists, and interviews represented areas of inadequacy or adequacy. A close similarity was found between the freely volunteered, self-evaluative remarks made in themes, interviews, and the earlier self-ratings. Brandt concluded that the methods of his study were valid in view of the agreement between the spontaneous self-evaluations and the self-ratings.

An analysis was done to determine whether or not significant individual differences existed in accuracy of self-estimates. An F-ratio comparison of between-individual and within-individual variances revealed that the variance difference could not be attributed to chance factors. The differences in accuracy of self-estimates were found to be more dependent on the individuals making the ratings than on the characteristics rated.

Brandt's extensive work concerning accuracy of self-estimates, the nature of self-evaluations and the self-concept established a firm base for several more recent studies which demonstrate that personality variables can influence students' estimates of their success at academic tasks. Those who investigated personality variables include, Wolfe (1972) who found that among experienced college students, subjects high in internal control (Rotter, 1966) were more accurate in estimating their grades than those high in external control. Another who investigated, Petzel, (1972) found that college students with a high need for approval, as measured by the Social Desirability Scale (Crowne and Marlowe, 1964), estimated their grades on an examination more accurately than the low-approval-motivated subjects.

Some recent work relevant to this present study is the experiment by Morrison, Thomas and Weaver (1973). In their experiment three measures of self-esteem were used to test the hypothesis that college students with low self-esteem would predict getting lower grades on an examination than the high-self-esteem subjects.

Data were fathered on a final sample of 73 students enrolled in two sections of an introductory psychology class. At the beginning of the term subjects completed both the Coopersmith Self-Esteem Inventory (Coopersmith, 1967) and the Ziller Social Self-Esteem Scale (Ziller, et al., 1969). At midterm the students took an objective test on material covered in class, and before handing in their papers, the subjects were asked to estimate on a five-point scale (A, B, C, D, F) the letter grade they would receive.

The hypothesis was confirmed for the Coopersmith Self-Esteem Inventory but not for the Ziller Social Self-Esteem Scale or for the subscale of the Coopersmith Inventory specifically relevant to school self-esteem.

Comparison of this study by Morrison, Thomas, and Weaver (1973) with those of Wolfe (1972) and Petzel (1972) is made difficult by the way in which the variables were defined. Each study found that the personality variable used (need for approval, locus of control, self-esteem) influenced estimation of academic achievement. The findings of the Morrison, Thomas, and Weaver (1973) study are also very relevant to the two main criticisms leveled at self-esteem instruments, which rely on verbal self-report. First, self-report data has been criticized (Ziller, et al., 1969) because it might reflect the subject's interest in presenting himself in a certain way as much as level of self-esteem. Second, many are of the opinion that the level of self-esteem can vary from situation to situation thus making measures of global self-concept attitudes insensitive to important situational influences. Both of the above-mentioned criticisms were not supported by the results of this study. Only the Coopersmith Self-Esteem Inventory, a self-report measure of global or general self-esteem, identified high and low self-esteem groups that behaved in the predicted manner of the stated hypothesis. The implication here is that the concept of global or general self-esteem is a better predictor of estimation of academic performance than differential measures of self-esteem.

Summary

This review began by tracing the early years of "level of aspiration" research when little work was being pursued concerning the isolation of variables associated with differences in aspiration levels.

The early work of Hoppe, Hausmann, and Frank in the 1930's could only establish that level of aspiration increased with success and decreased with failure. Within the following decade Gould, Kaplan, and Sears had repeatedly established a relationship between "high discrepancy patterns" in aspiration level setting behavior and low self-confidence. Gruen (1945) only suspected self-esteem to be a factor influencing adolescents to either lower their level of aspiration to ensure success or set unattainable goals as compensation for feelings of inadequacy. Although her subjects were of school age, there was no measurement of self-concept employed and the task utilized could hardly be considered academically relevant. Cohen, Rotter, and Steiners had employed factors related to the self-concept and were able to conclude that only secure persons could state goals closely related to their actual achievement. But, these authors failed to include a school-age population within their investigations.

Although Brandt (1958) did investigate academic tasks, his school-age subjects had no exposure to the specific tasks prior to rating them. Brandt was more interested in the student's perception of his ability in relation to peer ability, rather than the student's perception of his ability in relation to the difficulty level of the task. Also, Brandt's procedure and method of measuring self-concept lacked the validity and the reliability afforded by the self-concept instruments available today. Several more recent studies in the 1970's by Wolfe, Petzel, Morrison, Weaver, and Thomas are closely related to both Brandt's work and this study. They all dealt directly with personality variables and their influence on students' estimates of success with academic tasks. But only the work of Morrison, Thomas, and Weaver was concerned specifically with self-concept. Unfortunately, the subjects in the study were college students and academic semester grades were estimated instead of competence at a specific task.

The concensus of this literature review strongly suggests that failure to accept one's ability realistically is not conducive for optimal growth and learning.

To date, studies have demonstrated a variety of personality variables that can influence a student's estimates of his performance on academic tasks and his performance in comparison to others. The literature has failed to present an investigation of how a global measurement of self-concept relates to a specific area of arithmetic (mathematical computational problems) across a population of intermediate age elementary students.

CHAPTER III

METHODOLOGY

Operational Definitions

For the purpose of this study the major variables will be operationally defined as follows.

Self-Concept Level - In this study, self-concept level was operationally defined in terms of the single test score on the Piers-Harris Childrens Self-Concept Scale. This instrument purports wholly or partly to measure a global or very general evaluative attitude toward self.

Predicted Performance - The predicted performance is equivalent to the number of future performances, across a set of math computation problems, an individual states explicitly that he can correctly solve.

Actual Performance - Actual Performance is considered to be the level of present performance which an individual has demonstrated across a set of math computation problems.

Accuracy of Prediction - In this study accuracy of prediction was defined operationally as the total number of math problems correctly predicted by the subjects as those which they could or could not correctly solve.

Math Computation Problems - The addition, subtraction, multiplication and division subtests of The Key Math Diagnostic Arithmetic Test were utilized to supply an adequate range of math computation problems.

Elementary School Students - The sample of students used in this study were selected using a random procedure from the population of all third-, fourth-, and fifth-grade students enrolled in the 1976-77 school program of the Pawhuska Elementary School.

Assumptions

1. An adequately large and random number of subjects were selected to support the assumption that the sample size represents a normal distribution of ability and thus is representative of the larger Pawhuska elementary school population.
2. Self-concept (as defined) is a valid and measurable portion of the affective domain.
3. The Piers-Harris Childrens Self-Concept Scale is a sufficiently valid and reliable instrument for measuring the self-concept level of children.
4. The Operation subtests of the Key Math Diagnostic Arithmetic Test yield a valid and reliable measure of math computation ability and are representative of typical math computation tasks used in elementary school curriculum.

Selection of Subjects

Subjects (N=90) for this study were selected at random for a Northeastern Oklahoma elementary school system during the 1976-77 school program.

A population of approximately 274 students made up the total population from which the final 90 sample subjects were selected. Thirty subjects for each grade level were selected. Their ages ranged from 7 years 4 months to 12 years 0 months.

The Instrument

To secure a measure of self-concept the Piers-Harris Children's Self-Concept Scale was selected. The Piers-Harris Children's Self-Concept Scale (PHCSCS) was chosen after deliberation and comparison of several other instruments used for self-concept measurement of elementary age children. The PHCSCS in its present form consists of eighty declarative sentences worded at third-grade reading level. The test has been described as one of the more satisfactory self-report instruments for measuring childrens self-regard (Wylie, 1961; Buros, 1965). Recently Shreve (1973) evaluated several school age, self-concept instruments and concluded that the PHCSCS showed the greatest promise according to criteria posed in the Technical Standards for Educational and Psychological Tests (French and Michael, 1966).

The PHCSCS has gone through several revisions, 1969 being the latest. All items are presented within a four-page booklet with twenty sentences to a page. Half of the declarative statements are worded to indicate a positive self-concept.

Concerning criteria for selection, three major factors were considered:

1. Validity and reliability of the Scale,
2. Readibility and comprehension level, and
3. Response format.

First, the validities and reliabilities reported for the PHCSCS were sufficient and have been found to be adequate for research purposes. To evaluate the homogeneity of the test, Kuder-Richardson reliabilities for six different samples, grades 3 through 10, ranged from .78 to .93. Stability of the instrument was checked by a four-month test-retest which yielded correlations ranging from .71 to .72. The Spearman-Brown odd-even formula was applied for half of the grade-six and grade-ten sample, resulting in coefficients of .90 and .87, respectively.

The authors of the PHCSCS attempted to build content validity into their self-concept scale by including items covering qualities which most children reported that they liked or disliked about themselves. Non-discriminating items were later dropped, allowing a better reflection of a child's general or global self-concept. A significant concurrent validity correlation has been established by Mayer (1965) between the PHCSCS and Lipsitt's Children's Self-Concept Scale (1958) of .68. Cox (1966) using subjects from sixth-grade through tenth-grade found appreciable correlations between the PHCSCS and teacher and peer ratings of socially effective behaviors. Cox (1966) also reports correlations of .40 and .52 with the PHCSCS and ratings of superego strength.

Although the problem of controlling the influence of social-desirability tendencies and faking is unresolved, in an effort to possibly reduce the effects of social desirability, the authors chose to use a forced-choice technique within the response format. For a short test, the impure form (single statement) ordinarily gives a higher correlation with a criterion than does a short forced-choice test. When the number of items is very large, the purer forced-choice is more valid. Since the PHCSCS was designed for children, the short, single statement form was chosen (Piers and Harris, 1969).

Apparatus

Thirty-five millimeter color slides were taken of the forty computational problems found within the Operation subtests of the Key Math

Diagnostic Arithmetic Test. The slides were shown individually on a viewing screen; whose dimensions were approximately 55" by 41". The slide projector used was a 1974 Kodak Carousel, Model #850H. This particular model has built-in automatic exposure shutter and a four-inch lense.

A copy of the Piers-Harris Self-Concept Scale for Children test booklet was used for each individual subject. An answer sheet used for recording predictions, while viewing the slide presentation, was also supplied. The answer sheet consisted of one sheet of paper, with blanks numbered one through forty. The computation answer sheet consisted of the same forty computation problems arranged on two sheets of paper, in the identical order as viewed during the slide presentation.

A pilot study was required to determine an appropriate length of exposure time for each computation problem viewed during the slide presentation. This was accomplished by first taking a random sample of four students from each of the three grades represented. These twelve students were timed individually over ten computation problems. They were asked simply to raise their finger as soon as they had made a decision concerning the question asked by the experimenter. Subjects were not required to verbalize their predictions. Only the simple response of raising one finger to signal when they had decided whether they could or could not solve the problem correctly was required.

Responses ranged from 3 seconds to 7 seconds. The average response time over ten trials for the twelve students was approximately 4.55 seconds. This number was rounded off to 5.0 seconds during the actual experimentation.

Collection of the Data

This study was conducted in three phases. All three phases were conducted in the film room of the elementary school. During phase I, nine classes of elementary age students were seen by the same examiner for group administration of the PHCSCS. The experimenter was introduced by the teacher of each class, the introduction was followed by a brief explanation of the nature of the task at hand. Sufficient time was spent stressing the point that a honest response, rather than a socially desirable one, was needed. The instructions for administration of the PHCSCS were then repeated verbatim as they appear within the test booklet (see Appendix).

Instructions of the PHCSCS

The students were then asked to complete the form while the examiner read the eighty self-concept statements aloud. Identification of individual subjects was maintained by using a corresponding code number for each student's name. The following week a random selection of ninety code numbers was made to identify those students composing the sample of subjects which were to be used in the second and third phase of this experiment.

Phase II was also conducted in the film room of the elementary schoo school. Groups of five students at a time were shown the forty photographic slides. The subjects were allowed to view each problem on a single slide for five seconds. Before viewing each slide, the subjects were asked the following question, "Do you believe this is a problem that you can solve correctly?" The subjects were then instructed to record either a yes or no in the appropriate blank of their prediction answer sheet. Immediately following the slide presentation and the recording of the predictions, the prediction answer sheets were taken up by the examiner.

The third and final phase of the experiment was begun immediately following the slide presentation. Copies of the computation problem work sheet (see Appendix) were given to each subject. The subjects were then instructed to solve as many of the problems as they could. A period of time was allowed which provided all subjects ample time to finish.

Statistical Technique

The single scores yielded from the PHCSCS and the total number of accurate predictions were converted to standard scores. A product moment correlation coefficient was obtained for self-concept level and accuracy of estimate at each grade level, as well as for all grade levels combined. The $p < .05$ was selected as the level necessary for rejection of the null hypothesis.

Limitations of Study

1. The results of this study can be generalized only to grade school children of the rural northeastern Oklahoma community used in the sample, or other sufficiently similar populations.
2. The scope of this study is limited to the third, fourth, and fifth grades. Any generalizations made from this study concerning elementary grade levels above or below those indicated should be extrapolated cautiously.

CHAPTER IV

RESULTS

Collection of the data for this study involved three phases. In phase I the Self-Concept scale was administered to all third, fourth, and fifth graders. The following week phase II began by having subjects predict their success or failure across a series of math computational problems. The same day phase III was completed by having subjects attempt to solve the identical mathematical computational problems they had viewed during phase II.

Data was returned at the close of each testing session from each of the subjects. It was not necessary to exclude any of the persons for absenses or incompletion of answer sheets; all returned data was complete.

Data Summary

The means and standard deviations for self-concept level and accuracy of prediction are presented in Tables I and II. The product moment coefficients of correlation for the three grade levels and total sample are presented in Table III. Proportion of variance for each correlation coefficient is also reported in Table III.

TABLE I

SELF-CONCEPT MEANS AND STANDARD DEVIATIONS

Third		Fourth		Fifth		Total	
$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
51.6	13.9	54.0	13.5	55.8	14.3	53.8	13.9

TABLE II

ACCURACY OF PREDICTION MEANS
AND STANDARD DEVIATIONS

Third		Fourth		Fifth		Total	
$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
30.5	6.4	29.2	4.6	30.5	3.8	30.10	4.9

TABLE III

CORRELATION COEFFICIENTS FOR SELF-CONCEPT
AND ACCURACY OF PREDICTION

	r	Proportion of Variance
Third Grade	.73	.53
Fourth Grade	.30	.09
Fifth Grade	.50	.25
All Groups	.50	.25

Since the observed value of t (t_{obs} - 5.6, .05 = level of significance) exceeds the critical value of 2.61, the second decision rule is used and H_o is rejected for the third- and fifth-grade subjects. The observed values of t (t_{obs} = 2.78, .05 = level of significance) for all groups combined also exceeds the critical value of 2.61. Conforming to the second decision rule results in rejecting the H_o when all groups are combined. The observed value of t (t_{obs} - 1.25, .05 = level of significance) did not exceed the critical value of 2.61, the first decision rule is realized and the null hypothesis is not rejected for the fourth-grade group of subjects. It should be noted that the observed values of t for third- and fifth-grade subjects and all groups combined also exceed the .01 level of significance.

Results of Analysis

The attendant implication is that there is a relationship in the population between self-concept level and accuracy for prediction of mathematical computational problems when all groups combined. Although the data from the fourth-grade group indicated a trend similar to the relationship found in the other grades, a statistically significant relationship did not exist between self-concept level and accuracy of estimates for the fourth grade.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The present investigation was a relationship study involving a global self-concept measurement of children and their accuracy of estimates for math computation problems. Approximately 90 intermediate age elementary school subjects were randomly selected from the student population of a northeastern Oklahoma rural school system.

All 90 subjects were administered the Piers-Harris Self-Concept Scale for Children (Piers and Harris, 1965). All subjects were exposed to a slide presentation consisting of computational problems. While viewing the individual slides, subjects were asked to predict whether they could correctly solve the problem. After the predictions had been recorded, the subjects were provided with a worksheet consisting of the same problems that had been previously viewed in the slide presentation. The comparison of predictions to actual performance yielded a number of accurate predictions for each subject.

Findings

This study was designed to determine whether a relationship existed between the self-concept level and accuracy of estimate for math computation problems in intermediate elementary age students.

The analysis of data yielded a significant correlation coefficient between self-concept level and accuracy of estimate when all grades were combined. A significant relationship was also found to exist for the third and fifth grades. A trend similar to that observed in the other grades was evident among the fourth-grade subjects. However, no statistically significant relationship was found to exist at the fourth-grade level.

Conclusions

In this study it was predicted that a student's self-concept level would be positively related to the student's accuracy of estimating for math computational performance. A significant positive relationship was demonstrated between self-concept level and accuracy of estimate when all grades were combined. A significant relationship was also revealed among the third- and fifth-grade students. An explanation concerning the failure to demonstrate a relationship among fourth-grade subjects will be offered in the following section.

The hypothesis confirmed in this study is closely aligned with the findings of studies by Lewin, Dembo, Festinger, and Sears (1944) and Gruen (1945) who indicated that failure or a large discrepancy between the level of aspiration and level of achievement was related to negative or non-adjustive personality variables. These results are also congruent with the findings of Cohen (1952), Rotter (1954), and Steiners (1957) who found that adults demonstrating high self-esteem were more accurate in the goals they set for themselves than subjects with low self-esteem. Although a strict comparison of results between the present study and those of Petzel (1972) and Wolfe (1972) is difficult, the different but closely related personality factors (need for approval, locus of control, self-esteem) were all found to influence the estimations of academic performance.

Recommendations

Both a child's expectancy for success and self-concept have been found to influence performance on specific tasks. Inaccurate estimates of one's mathematical computational ability by an elementary-age child may be reflected in global measure of self-concept. Several recommendations are offered which logically follow the stated conclusions of this study.

A conjecture is offered to help explain the failure in finding a relationship between self-concept level and accuracy of estimate with the fourth-grade group. It is possible that the greater majority of students felt fairly comfortable with their predictions concerning the addition and subtraction subtest areas. But, the higher difficulty level of multiplication and division problems, coupled with lack of familiarity for those specific math operations could have influenced the accuracy of estimates made by the fourth-grade group.

It would seem logical that the third grade subjects were less familiar with multiplication and division than the other grades and would be comfortable in predicting failure for themselves across these types of computation problems. The fifth-grade subjects have had much more exposure and are aware of the fact that multiplication and division problems are common within their fifth-grade curriculum. This factor may have convinced the fifth-grade subjects that they were expected to be able to perform these type problems, which in turn, prompted radical or more risk-taking type predictions. Finally, the fourth-grade subjects, having experienced a minimum amount of exposure to the multiplication and division operations, may have responded with more conservative estimates as compared to the other two grades.

An obvious implication for further research stemming from the previous conjecture would be an item analysis of the computation problems used in the present study. This would indicate the math operation mean for each grade level which are subject to different estimations of accuracy. Also a downward and upward extension of grade levels would provide a more comprehensive view of this relationship across all elementary school levels.

Future relationship studies involving global measurements of self-concept and the attribution of more or less ability to oneself than is warranted by the reality of the situation should involve several more specific academic tasks. Findings similar to this study examined across other specific academic tasks would promote the notion of the self-concept being strongly dependent upon situational factors.

Foremost in the mind of the author was the ease for the applicability of this technique in obtaining information regarding the two variables of concern in the study. Both the self-concept scale and mathematical diagnostic test are suitable for teacher administration and evaluation. The use of these or similar instruments are popular and widespread in school systems today. The findings of this study offer a technique which could provide valuable information during a child's development when attitudes toward mathematics are crucial and often irreversible. Until the teacher or parent knows how the student perceives his ability in a specific math situation, he or she cannot make valid inferences about the nature or meaning of the child's behavior.

SELECTED BIBLIOGRAPHY

Atkinson, J. W., and Reather, N. T. (Eds.) _A Theory of Achievement Motivation_. New York: Wiley, 1966.

Atkinson, J. W. and Raynor, J. O. _Motivation and Achievement_. New York: Wiley, 1974.

Bessell, H. W. Palonares. _Methods in Human Development_. San Diego, Human Development Training Institute: 1972.

Brandt, R. M. The Accuracy of Self-Estimates: A Measure of Self-Concept Reality. _Genetic Psychology Monograph_, 1958, _21_, 1-115.

Brownfain, J. J. Stability of the Self-Concept as a Dimension of Personality. _Journal of Abnormal and Social Psychology_, 1962, _47_, 98-115.

Cohen, L. D. Level of aspiration behavior and feelings of adequacy and self-acceptance. _Journal of Abnormal and Social Psychology_, 1954, _49_, 238-244.

Connolly, A. J., Nachtman, W. and Pritchett, E. M. _Key Math Diagnostic Arithmetic Test_. American Guidance Service, Inc., 1972.

Crowne, D. P. & Marlowe, E. _The Approval Motive_. New York: Wiley, 1964.

Dembo, T. Arger als dynamisches Problem. _Psychologische Forschung_, 1931, _15_, 1-114.

Feslinger, L., Lewin, K., and Sears, P. A theoretical interpretation of shifts in level of aspiration. _Psychology Review_, 1944, _49_, 235-250.

French, J. W. and Michael, W. B. (Eds.). _Standards for educational and psychological tests and manuals_. Washington, DC: American Psychological Associates, 1966.

Gould, R. An experimental analysis of "level of aspiration." _Genetic Psychology Monographs_, 1939, _21_, 3-115.

Gould, R., & Kaplan, N. The relationship of "level of aspiration" to academic and personality factors. _Journal of Social Psychology_, 1940, _11_, 31-40.

Gruen, E. W. Level of aspiration in relation to personality factors in adolescents. _Child Development_, 1945, _16_, 181-188.

Hausmann, M. F. A test to evaluate some personality traits. Journal of General Psychology, 1933, 9, 179-189.

Holt, R. R. Level of aspiration: Ambition or defense? Journal of Experimental Psychology, 1945, 36, 398-416.

Hoppe, R. Erfolg and Misserfolg. Psychol. Forsch., 1930, 14, 1-62.

Hunt, J. M. (Ed.). Personality and the Behavior Disorders. Vol. 1, New York: Ronald Press, 1944.

Irwin, J. E. "The Realism of Expectations." Psychological Review, 1944, 51, 120-126.

Lecky, P. Self-consistency: A Theory of Personality. New York: Island Press, 1945.

Morrison, T. L., Thomas, M. D., and Weaver, S. J. Journal of Consulting and Clinical Psychology, 1973, 41, 412-415.

Petzel, T. P. Approval motive and self-estimates of academic performance. Journal of Consulting and Clinical Psychology, 1972, 39, 199-201.

Piers, E. V. and Harris, D. B. The Piers-Harris Children's Self-Concept Scale. Nashville, Tenn.: Counselor Recordings and Tests, 1969.

Roth, R. M. The role of self concept in achievement. Journal of Experimental Education, 1959, 27, 265-281.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80, (L, Whole No. 609).

Rotter, J. B. Level of aspiration as a method of studying personality. I. A critical review of methodology. Psychological Review, 1942, 49, 463-474.

Sears, P. Levels of aspiration in academically successful and unsuccessful children. Journal of Abnormal Social Psychology, 1940, 35, 498-536.

Shreve, E. E. A critical analysis and evaluation of evidence regarding the reliability and validity of four selected measures of self-concept. Unpublished doctoral dissertation, University of Southern California, 1973.

Steiners, I. D. Self-perception and goal-setting behavior. Journal of Experimental Psychology, 1957, 53, 343-355.

Wolfe, R. N. Perceived locus of control and prediction of own academic performance. Journal of Consulting and Clinical Psychology, 1972, 38, 80-83.

Wylie, R. C. The self-concept: A critical survey of pertinent research literature. Lincoln: University of Nebraska Press, 1961.

Ziller, R. C., Hagey, J., Smith, B. C., & Long, B. H. Self-esteem: A self-social construct. Journal of Consulting and Clinical Psychology, 1969, 33, 84-95.

APPENDIXES

APPENDIX A

THE PIERS-HARRIS SELF-CONCEPT SCALE

THE WAY I FEEL ABOUT MYSELF

NAME . . . .

AGE . . . . GIRL OR BOY . . . .

GRADE . . . . SCHOOL . . . .

DATE . . . .

Here are a set of statements. Some of them are true of you and so you will circle the yes. Some are not true of you and so you will circle the no. Answer every question even if some are hard to decide, but do not circle both yes and no Remember, circle the yes if the statement is generally like you, or circle the no if the statement is generally not like you. There are no right or wrong answers. Only you can tell us how you feel about yourself, so we hope you will mark the way you really feel inside.

1. My classmates make fun of me . . . . yes no
2. I am a happy person . . . . yes no
3. It is hard for me to make friends . . . . yes no
4. I am often sad . . . . yes no
5. I am smart . . . . yes no
6. I am shy . . . . yes no
7. I get nervous when the teacher calls on me . . . . yes no
8. My looks bother me . . . . yes no
9. When I grow up, I will be an important person . . . . yes no
10. I get worried when we have tests in school . . . . yes no
11. I am unpopular . . . . yes no
12. I am well behaved in school . . . . yes no
13. It is usually my fault when something goes wrong . . . . . yes no
14. I cause trouble to my family . . . . yes no
15. I am strong . . . . yes no
16. I have good ideas . . . . yes no
17. I am an important member of my family . . . . yes no
18. I usually want my own way . . . . yes no
19. I am good at making things with my hands . . . . yes no
20. I give up easily . . . . yes no
21. I am good in my school work . . . . yes no
22. I do many bad things . . . . yes no
23. I can draw well . . . . yes no

24. I am good in music . . . . yes no

25. I behave badly at home . . . . yes no

26. I am slow in finishing my school work . . . . yes no

27. I am an important member of my class . . . . yes no

28. I am nervous . . . . yes no

29. I have pretty eyes . . . . yes no

30. I can give a good report in front of the class . . . . yes no

31. In school I am a dreamer . . . . yes no

32. I pick on my brother(s) and sister(s) . . . . yes no

33. My friends like my ideas . . . . yes no

34. I often get into trouble . . . . yes no

35. I am obedient at home . . . . yes no

36. I am lucky . . . . yes no

37. I worry a lot . . . . yes no

38. My parents expect too much of me . . . . yes no

39. I like being the way I am . . . . yes no

40. I feel left out of things . . . . yes no

41. I have nice hair . . . . yes no

42. I often volunteer in school . . . . yes no

43. I wish I were different . . . . yes no

44. I sleep well at night . . . . yes no

45. I hate school . . . . yes no

46. I am among the last to be chosen for games . . . . yes no

47. I am sick a lot . . . . yes no

48. I am often mean to other people. . . . . yes no

49. My classmates in school think I have good ideas . . . . . . yes no

50. I am unhappy . . . . yes no

51. I have many friends . . . . yes no

52. I am cheerful . . . . yes no

53. I am dumb about most things . . . . yes no

54. I am good looking . . . . yes no

55. I have lots of pep . . . . yes no

56. I get into a lot of fights . . . . yes no

57. I am popular with boys . . . . yes no

58. People pick on me . . . . yes no

59. My family is disappointed in me . . . . yes no

60. I have a pleasant face . . . . yes no

61. When I try to make something, everything seems to go wrong.yes no

62. I am picked on at home . . . . yes no

63. I am a leader in games and sports . . . . yes no

64. I am clumsy . . . . yes no

65. In games and sports, I watch instead of play . . . . yes no

66. I forget what I learn . . . . yes no

67. I am easy to get along with . . . . yes no

68. I lose my temper easily . . . . yes no

69. I am popular with girls . . . . yes no

70. I am a good reader . . . . yes no

71. I would rather work alone than with a group . . . . yes no

72. I like by brother (sister) . . . . yes no

73. I have a good figure . . . . yes no

74. I am often afraid . . . . yes no

75. I am always dropping or breaking things . . . . yes no

76. I can be trusted . . . . yes no

77. I am different from other people . . . . yes no

78. I think bad thoughts . . . . yes no

79. I cry easily . . . . yes no

80. I am a good person . . . . yes no

Score __________

APPENDIX B

PREDICTION ANSWER SHEET

STUDENT NUMBER ______________ GRADE ______________

ANSWER SHEET

1. ________	21. ________
2. ________	22. ________
3. ________	23. ________
4. ________	24. ________
5. ________	25. ________
6. ________	26. ________
7. ________	27. ________
8. ________	28. ________
9. ________	29. ________
10. ________	30. ________
11. ________	31. ________
12. ________	32. ________
13. ________	33. ________
14. ________	34. ________
15. ________	35. ________
16. ________	36. ________
17. ________	37. ________
18. ________	38. ________
19. ________	39. ________
20. ________	40. ________

APPENDIX C

COMPUTATION ANSWER SHEET

1 +3	500 - 94	5)15	$100.00 - 99.95	12)1,308	
66 + 4	5 7/8 -3 1/4	2,391 548 +1,210	6 1/4 -2 2/3	86 +29	4)132
75 X75	25 -16	7 +9	5 1/2 X 4 =	8 X3	5 1/2 +2 5/8
76 -12	27.3 +24.09	3/8 - 1/2 =	3)69	8 -2	3 X3

2/4	5	25		14	47
+1/4	-3	X14	2)6	- 6	+ 2

	370	15	4	3 1/4	62.07
3)$24.60	- 82	X 6	X2	+2 1/8	- 7.9

$409.74		5	$30.40	75
+ 93.25	15)105	+4	X 7	X 8

VITA

Richard Frank Palazzo

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF THE RELATIONSHIP BETWEEN SELF-CONCEPT LEVELS AND ACCURACY OF PREDICTIONS FOR MATHEMATICAL COMPUTATION IN CHILDREN

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Kansas City, Missouri, April 18, 1952, the son of Mr. and Mrs. Frank A. Palazzo.

Education: Attended Memorial High School, Tulsa, Oklahoma; received Bachelor of Science degree with a major in Psychology from Oklahoma State University in 1974; completed requirements for the Master of Science degree with a major in Educational Psychology at Oklahoma State University in December, 1977.

Professional Experience: Psychiatric Technician for the Tulsa Psychiatric Center, 1973-76; graduate assistant for the Department of Curriculum and Instruction and Supervisor for "Right to Read Program," 1974-75; school psychology internship for Bi-State Community Mental Health Center, 1975-77; educational therapist for affective education during the summer session at Bi-State Community Mental Health Center, 1976; school psychologist for the Pawhuska School System, 1976-77; consultant for the Tri-County Headstart Program, 1976-77; Board of Directors, Osage Mental Health Association, 1977.