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An Investigation into the Effects of Classroom Guidance Activities on Self-Concept and Arithmetic Achievement in Third Graders

Betty Elaine Barrick

AN INVESTIGATION INTO THE EFFECTS OF CLASSROOM GUIDANCE ACTIVITIES ON SELF-CONCEPT AND ARITHMETIC ACHIEVEMENT IN THIRD GRADERS

An Abstract of

A Thesis

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

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by

Betty Elaine Barrick

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ABSTRACT

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This study was designed to investigate the effect of classroom guidance activities on the self-concept and arithmetic achievement of third graders, and to determine what relationship exists between self-concept and arithmetic achievement. Effects of the treatment were examined between experimental and control groups and between boys and girls. Forty subjects participated in the study, 20 in the experimental and 20 in the control group. Initial equivalence of math instruction and of the two groups of students was established by examining Iowa Tests of Basic Skills class composites for the previous five years for classes of the two instructors, and by comparing results of Gates-MacGinitie Reading Subtests for the students involved in the study. Pretests in self-concept and in arithmetic achievement showed no significant difference in groups initially. A treatment of teacher-directed classroom guidance activities, designed specifically for self-concept enhancement, was given to the experimental group, while the control group experienced no specific guidance activities other than ordinary classroom

experiences. Post-tests were administered to both groups in self-concept and in arithmetic achievement to measure the results.

Results of the study were:

1. There was no significant difference in self-concept scores for control and experimental groups as a result of treatment as evidenced by $\underline{t}$ value of -1.14.

2. There was no significant difference in arithmetic achievement scores for control and experimental groups as a result of treatment as evidenced by $\underline{t}$ value of -0.63.

3. There were no significant differences in the self-concept scores of boys and girls following treatment as indicated by the F value of 0.0 for the interaction of sex and group membership.

4. There were no significant differences in math scores of boys and girls following treatment as indicated by the F value of 2.49593 for the interaction.

5. There was a significant relationship between self-concept scores and arithmetic achievement for girls, but not for boys or for total group of subjects. ($P = 0.043$ for females)

Based on the results of the study, the following recommendations are made: replication of the study in other population groups, replication using larger samples of a population and/or longer durations of time, a modification of the study to utilize other measures of self-concept along with self-report, replication of the study with subjects who have been identified as low achievers and/or exhibiting low self-concepts, and design

of a study whereby math achievement of low-achieving girls is manipulated to determine if their self-concepts may be enhanced.

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has been approved as meeting the thesis requirement for the Degree of Master of Arts in Education

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CHAPTER I

INTRODUCTION

The problem of underachievement in our nation's schools is foremost in the minds of educators, researchers, and the general public. Questions raised by all concerned usually center around causes of the underachievement and possible solutions. It has become clear, through many research studies, that student achievement is a complex area consisting, not only of factors such as intelligence, background and experiences, quality of instruction, but also of self-concept. Comments such as that of Arterberry, Pelan, Scroggins, and Zirges (1975) are common:

> The lack of commitment characteristic of the underachiever and the maladjusted is in many instances the consequences of limited perceptions of himself and his world. Increasing evidence further suggests that early elementary school students who seem to be lacking in one or more of the basic academic skills frequently have such difficulty because they have learned to see themselves as incapable of handling school work. (p. 34)

Various researchers have linked self-concept with school achievement. Many have also pinpointed a time in the child's school experiences when the self-concept becomes less positive and achievement, likewise, takes a turn downward. Morse (1964) found that in analyzing the

responses of 900 children, the sharpest decrease in self-concept occurred between third and sixth grade. About 84% of the third graders in the study indicated they were proud of their school work, while a decreasing amount, less than 50%, of the eleventh graders were proud of their achievement. Brookhover, Thomas, and Patterson (1964) found that self-concept and grade point average were positively and significantly correlated in 7th grade students, and also that self-concept is significantly and positively correlated with perceived evaluations of the student by other significant people. Shaw and McCuen (1960) found that males begin to underachieve in the third grade, and females seem to decline in their achievement as early as sixth grade. They also found that, for a small percentage of boys and girls, achievement decline began as early as the first grade.

An abundance of literature can be found concerning the relationships between self-concept and achievement. This area has been studied from many perspectives. Many studies have dealt with reading achievement, especially beginning reading. Likewise, studies abound centering on low socio-economic classes of children, minorities, the gifted, the extreme underachiever, etc. Many age groups have been studied, including adults; however, literature pertaining to self-concept and its relationship

to arithmetic achievement in the primary grades is limited. In many studies a third factor, such as school organization, teacher style, program used, etc. has been manipulated with a subsequent study of the effects on self-concept and areas of achievement, including arithmetic. Generally speaking, these investigations did not have, as a major goal, the enhancement of self-concept through specific teacher-directed classroom guidance activities.

Statement of the Problem

The purpose of this study was to determine whether a treatment of classroom guidance activities, designed to enhance self-concept, would cause more positive self-concepts in third grade students from middle-class, white, rural or small-town backgrounds, and whether those activities would subsequently improve the arithmetic achievement of the students. The study was also concerned with a possible difference between the sexes in these two areas.

The investigation centered on five major research questions: the effect of classroom guidance activities on self-concept, the effect of classroom guidance activities on arithmetic achievement, possible differences between sexes in the area of self-concept, possible differences between sexes in arithmetic achievement, and the relationship between self-concept and arithmetic achievement.

Hypotheses to be Tested

The first research question examined whether classroom guidance activities designed to enhance self-concept would cause third graders to have more positive self-concepts. The hypothesis derived from this question was:

Ho_1: There are no significant differences in self-concept scores between the experimental group and the control group.

The second research question examined whether classroom guidance activities designed to enhance self-concept would cause third graders to increase arithmetic achievement. The hypothesis derived from this question was:

Ho_2: There are no significant differences in arithmetic achievement scores between the experimental group and the control group.

The third research question examined whether there was a significant difference following the treatment on the self-concept of girls and boys. The hypothesis derived from this question was:

Ho_3: There are no significant differences in the self-concept scores of girls and boys following treatment.

The fourth research question examined whether there was a significant difference following treatment in the arithmetic achievement of girls and boys. The hypothesis derived from this question was:

Ho_4: There are no significant differences in the arithmetic achievement scores of girls and boys following treatment.

The fifth research question examined whether there was a significant relationship between self-concept and arithmetic achievement for the total group and by sexes. The subhypotheses derived from this question were:

Ho_{5a}: There is no significant relationship between self-concept and arithmetic achievement for the total group.

Ho_{5b}: There is no significant relationship between self-concept and arithmetic achievement by sexes.

Significance of the Study

As stated previously, literature is not plentiful in the area of self-concept and arithmetic achievement in the primary grades, although many studies claim that somewhere during third grade, ages 8 or 9, positive self-concept appears to diminish with a possible correlated decline in student achievement. To many in the fields of education and psychology, this is a crucial time for the maintenance, change, or the enhancement of self-concept. Research also indicates that the self can and does change, although less easily with age. Gordon (1969) says, "Age trends are discernible in self-development. The self-concept is not a unified structure, but is multidimensional, with different aspects of the self system moving into

sharper focus at different age levels" (p. 1227). Engel and Raine (1963) claim that "In third-graders, the self-concept seems organized around two main factors: 1. the quality of interpersonal relationships with peers and adults and 2. highly valued bodily attributes such as strength and bravery" (pp. 135-136).

Gordon (1969) further states that:

> Emotions and values are in a transactional relationship with classroom behavior and learning. Children's self-esteem not only is related to family background variables but also can be modified by the school situation. Positive self-regard, the internalization of values, and the development of a repertoire of cognitive styles begin early but are modifiable through experience in school. . . . Curricula must take social-emotional factors into account, so that not only the subject field but also the child is considered. Teacher education in understanding the meaning of behavior and ways of modifying it is essential if teachers are to provide settings in which the child can make the most of the information available. . . . Only when all aspects of the child's development are seen as interrelated and mutually dependent can schools accomplish the valid purpose of self-development, uniting cognitive with affective development. (p. 1228)

If, indeed, the primary grades, and specifically the third grade, are considered to be crucial times for a child and his or her self-concept and achievement, it behooves us as educators, to study this age group and these factors in an attempt to find the relationship that exists between these variables. If the self-concept, as Gordon claims, is modifiable through school experience,

and if, in fact, this modification affects school achievement, as addressed in this study, educators should be made aware of the implications. The results of the study are intended to describe one method of responding to the problem of underachievement.

Definition of Terms

For the purpose of this study, the following terms were used:

Self-concept. Self-concept, for the purpose of this study, is defined as "all the beliefs, attitudes, and opinions which an individual holds true about himself" (Arterberry et al. 1975, p. 34).

Classroom Guidance Activities. The term referred to those activities conducted by the classroom teacher for the specific purpose of self-concept enhancement. These involve a minimum of one thirty-minute session per week. Activities were used primarily from 100 Ways to Enhance Self-Concept in the Classroom, using those which apply to the third grade age group, and which provide selections under categories of:

Environment of Positive Support

My Strengths

Who Am I?

Accepting My Body

Where Am I Going?

Language of Self

Relationships with Others.

In addition to these activities, an on-going project involving photography in the classroom to enhance individual and class self-concept was used. This involved children's individual pictures in various bulletin board displays.

Positive Self-Concept. Positive self-concept in this study is operationally defined as the score on the Piers-Harris Children's Self-Concept Scale (Piers, 1969). This was measured on a raw score scale of 0-80, with 80 representing the highest or most positive self-concept score. The normed scores were not used since they did not fit the particular age group involved in this study.

Arithmetic Achievement. The operational definition of arithmetic achievement is the composite standard score on the California Achievement Test, Levels 13 and 14, Form C (CTB/McGraw-Hill 1977, 1978).

Arithmetic/Math. These two terms are used interchangeably to denote the computational component of the study.

Boys/Male. These two terms are used interchangeably to refer to the male sex in the study.

Girls/Female. These two terms are used interchangeably to refer to the female sex in the study.

High Achievers in Math. This term denotes students judged by the classroom teacher to be operating at a higher level of achievement on the basis of classroom performance in that area of the curriculum.

CHAPTER II

REVIEW OF THE LITERATURE

Self-Concept Formation and Implications for Enhancement

Arterberry et al. (1975) defined self or self-concept similarly to other writers with these words, ". . . as all the beliefs, attitudes, and opinions which an individual holds true about himself. The self is the center of the individual's universe of experience and is the criterion against which the world is measured" (p. 34). This directly implies that the self-concept is affected by the experiences and significant others acting upon it, and it in turn is used by the individual to judge his or her environment. It also implies the totality of the person, not a separateness of the affective and the cognitive domains. Gordon (1976) reiterates this with:

> Scientific research in the areas of human development and bio-feedback stresses continuity of the self, totality of the person. No clear-cut break exists between affect and intellect, between mind and body. Behavior is always of a piece; we cannot separate the genetic from the experimental in easy fashion. What we see in a person's behavior is a complete mix of genetic and environmental experiences interwoven into a unique organization. (p. 123)

Coopersmith (1967) emphasizes and investigates parental influences on self-esteem as the first

significant others. However, just as parents influence the self as the first significant others, so do all others who subsequently act upon one's self-concept. Coopersmith explains:

> An important consequence of the different patterns of social treatment associated with various levels of self-esteem are the expectations that these treatments establish with regard to oneself and the situations one encounters. Persons with high self-esteem, conditioned and fortified by favorable treatment and by performance they believe to be successful, appear far more likely to expect successes in their social and academic encounters than are the individuals with low self-esteem who have previously experienced rejection, disrespect, and failure. In general, we may assume that an individual arrives at a crude ratio of his successes and failures and employs that ratio in estimating future possibilities of success. An individual who achieves below-average performances or encounters rebuffs in the majority of his experiences is unlikely to believe he will lead the pack in his future encounters; a person who has led his class in performance and has been its social leader is quite likely to believe that his future actions will be equally successful and well received. (p. 250)

Although there is agreement that the home exerts the first and most powerful influence on the self-concept, there are many studies which substantiate the fact that the school exerts a significant effect as well. Rossmiller (1978) cites Bowles (1970) who suggested the average amount of time a teacher spent in guidance activities is important to educational productivity. Murnane (1975) was also cited by Rossmiller as finding that quality of classroom environment exerts an effect on

mathematics achievement. Vochko (1977) in studying Schools Without Failure, claims that, given a group of children the same chronological age, the teacher can develop an atmosphere for learning where all children feel warmly accepted, emphasize friendliness and doing of worthwhile things, help pupils search out relevance, and build on past and present successes of pupils as a means of motivation.

Samuels (1977) claims that:

> . . . studies have supported the importance of minimizing failure experiences in vulnerable children. They have indicated that performance and self-feeling improve as realistic, positive statements about the students' work are given and as they develop the ability to reinforce themselves. Ultimately, self-reinforcement is to be preferred as studies . . . have shown those who are overdependent on others for evaluation are lacking in positive self-feeling. If we bolster children's feelings with realistic evaluations, they should develop more intrinsic satisfaction and self-evaluative mechanisms. As they feel satisfaction from performance, there should be less and less of a need for external reinforcement. (p. 190)

Felker (1974) cites studies to substantiate his theory that low achievement and low self-concept can be explained by lack of self-reinforcement. Felker puts praise at the center of his theory; children should see adults realistically praising themselves, children should be helped to praise themselves, and to praise others.

He also emphasizes the importance of helping children set reasonable goals and evaluating themselves realistically.

Edeburn (1976) emphasizes the role of the elementary school in the process of helping the child become a self-actualizing person. He claims that:

> If in the elementary school, cognitive growth is emphasized and affective growth ignored, the child may be subjected to a highly competitive weeding process that could seriously erode his feelings of personal adequacy. If affective growth is emphasized and cognitive growth neglected, the latter may be limited. It would seem that any institution interested in enhancing human potential should be extremely concerned about facilitating continual growth in both arenas. (p. 372)

Purkey (1970) lists six factors to be considered in creating a classroom atmosphere conducive to developing favorable self-images in students: challenge, freedom, respect, warmth, control, and success. He states that:

> The self is remarkably conservative, and once a child has formed a negative image of himself as a learner, the task of the teacher becomes extremely difficult. Therefore, the prevention of negative self-concepts is a vital first step in teaching. (p. 43)

Purkey quotes Staines (1958) who:

> Concluded that changes in the child's self concept do occur as an outcome of the learning situation, and that the self must be recognized as an important factor in learning. Teaching methods can be adapted so that definite changes of the kind sought for will occur in the self without injury to the academic program in the process. (p. 44)

Samuels (1977) reports research that suggests that realistic standards of excellence, the elimination of excessive experiences of failure, the creation of conditions that maximize success, and motivation all lead to positive self-concept, allowing the child to be open to new experiences. She also agrees with previous researchers on a primary goal of education:

> Combs and Snygg (1959) and Combs (1962) stressed that in order to be really effective, education's primary goal must be to help students develop positive views of themselves, to identify with others, and to be open to experience and acceptance by others. It is fortunate if children come to school already on the road to such goals as a result of their early life with a warm, loving family. The school's responsibility becomes that of continuing the process begun in the home, by helping the children as they mature to expand their positive feelings about their body self, their social self, and their cognitive self. A sense of competence and worth, which high self-concept children seem to have, is related to higher achievement, curiosity, creativity and greater independence. (p. 175)

Samuels feels intervention is necessary for low-concept children, and that a continued fostering of positive self-feelings is necessary for those with an overall positive self-feeling.

Glasser feels that a major problem of the schools is a problem of failure, and regardless of the reasons, recommendations for change must fall within the existing framework of the schools. Glasser (1969) claims that

"Unless we can provide schools where children, through a reasonable use of their capacities, can succeed, we will do little to solve the major problems of our country" (p. 6). He feels that we must discover why children are failing and then develop an educational philosophy that will lead us to developing atmospheres in which success is much more possible. This must start in early childhood, according to Glasser, since we will never succeed in "patching people up." Glasser feels that "the first years of school are critical for success or failure. . . . not only for deprived children but for all children" (p. 26). An important opinion on providing success experiences, improving self-image, and generally helping the child get a good start in life and in school is expressed by Glasser:

> If, however, the child experiences failure in school during these five years (from ages five to ten), by the age of ten his confidence will be shattered, his motivation will be destroyed, and he will have begun to identify with failure. Convinced that he is unable to fulfill his needs through the logical use of his brain, he will return to behavior directed by his emotions, behavior that he had learned to avoid when he was successful in the past. He will abandon the pathways of love and self-worth and grope blindly toward what seem to him to be the only paths left open, those of delinquency and withdrawal. Although success in school is still possible, with each succeeding year it becomes more difficult and more unlikely. (pp. 26-27)
>
> The critical years are between ages five and ten. Failure, which should be prevented throughout school, is most easily prevented at this time. When failure

> does occur, it can usually be corrected during these five years within the elementary school classrooms by teaching and educational procedures that lead to fulfillment of the child's basic needs. The age beyond which failure is difficult to reverse may be higher or lower than ten for any one child, depending upon the community he comes from, the strength of his family, and his own genetic resources; regardless of these variations, however, it is amazing to me how constant this age seems to be. Before age ten, a good school experience can help him succeed. After age ten, it takes more than a good school experience, and unfortunately, shortly after age ten he is thrust into junior and senior high situations where he has much less chance for a corrective educational experience. Therefore, although children can be helped at any school level, the major effort should be in the elementary school. (pp. 27-28)

To summarize this portion of the literature, it would seem that researchers would agree that it is difficult, albeit impossible, to separate the affective and the cognitive in students. Furthermore, it would seem worthwhile, and likely essential, to reinforce positive self-images and attempt to improve the low self-images of students. If then, these are worthy, essential goals for education, and assuming that educators have methods and materials available to effect these goals, to what extent can one hope to expect achievement to be affected by a change in self-concept?

Self-Concept and Achievement

Samuels cites Lecky (1945) as being one of the first investigators to relate self-concept to school

achievement. His investigation was prompted by observations of children and their spelling errors. They seemed to make the same number of errors on each page, regardless of the varying difficulty of the words. His explanation was that their responses resulted from how they felt they could spell rather than their actual spelling ability.

Many studies have correlated reading and self-concept; however, since most were done after the kindergarten experience, researchers at times wrestle with trying to discern if school perhaps influences self-concept as much as self-concept influences school performance. However, studies such as that of Wattenberg and Clifford (1964) measured self-concepts of beginning kindergarteners as well as their intelligence, then two and a half years later determined reading progress and repeated the self-concept measures with these subjects. They found that the measured self-concept at the kindergarten level was predictive of reading achievement two and a half years later. Bridgeman and Shipman (1978), in a similar study found that, although the self-esteem scores of kindergarteners were not predictive of their third grade achievement, children with high self-esteem in the third grade were achieving in reading and mathematics at that time. Armstrong (1969), Borowitz et al. (1970), and

Kohn and Rosman (1974) are among researchers who evaluated preschool children and found positive correlations between various social-emotional characteristics and later school achievement. Bridgeman and Shipman (1978) contend that educators in the early elementary grades should be alert to the behaviors of themselves and others in the schools which may decrease the high level of self-esteem a child initially possesses. Likewise, Wattenberg and Clifford (1964) claim that:

> Efforts should be made to study the phenomena at other age levels and with respect to other areas of academic competence, and finally, to seek experimentally to change self-concepts in order to discover whether such changes affect academic achievement.

Purkey (1970) asserts that:

> . . . there is a persistent and significant relationship between the self concept and academic achievement at each grade level, and that change in one seems to be associated with change in the other. . . . Although the data do not provide clear-cut evidence about which comes first--a positive *self concept or scholastic success, a negative self* concept or scholastic failure--it does stress a strong reciprocal relationship and gives us reason to assume that enhancing the self concept is a vital influence in improving academic performance. (p. 27)

Wylie (1961) in her survey of pertinent literature on the self concept, states that it is often assumed that self-concept characteristics are antecedent to the

cognitive behavior, at times it is assumed that it is basically the influence of motivation upon learning, but nonetheless feels that there is enough evidence of the correlations between the two to warrant further exploration.

Rogers, Smith, and Coleman (1978) studied the relationships between academic achievement and self-concept, using within-classroom achievement as a moderator variable. They found a significant relationship between math and self-concept both when relative within-classroom achievement was, and was not considered. In 1966 Rushton (from Thomas, 1973) reviewed research studies on self-concept and achievement and reported that 70% of them revealed that stability or adjustment is positively connected with academic achievement. A study of Title I versus non-Title I children in grades 1, 2, 3 and 7 in the District of Columbia (NTS Research Corp., 1976-77) resulted in self-concept and achievement tending to be relatively high or low together for all self-concept scales and at all grades. This study also revealed a general decline in both self-concept and achievement together from year to year.

Peper's study (1970) was conducted to examine the relationship between arithmetic and esteem. In this study, he tested the hypothesis that rankings of

achievement in arithmetic made by pupil, peers, and teacher are related to achievement in arithmetic. The results suggested there is agreement in judgments of achievement as rated by self, peers, standardized tests, and the teacher. Peper quotes Stagner (1948) and Sears and Hilgard (1964) "The teacher exerts a significant influence on his pupils' social and academic development" (p. 284).

Other studies conducted to examine the self-concept and achievement variables have dealt with specific groups as well as various instructional organizations. Dean (1977) studied effects of gifted seventh and eighth grade students' self-concepts on performance on various types of learning tasks. He found that self-concept was related to learning across tasks for the gifted and also found no sex differences in self-concept. Scheer (1978) examined the two variables with 8-15 year olds in a math education clinic with resultant changes in math achievement and attitude toward math; however, there was no significant difference between the two groups with respect to self-concept. Lukasevich (1978) studied effects of instructional style (open vs. non-open) and architectural design (open space vs. non-open space) with third graders and found math achievement was higher with the conventional teaching style and self-contained rooms, but self-concept was up in open space classrooms. Geer (1979) studied

achievement and self-concept of students in grades 1-4 as affected by cross-age tutoring and found significantly improved self-concepts and achievement scores for all.

Hermansen (1978) found sixth graders did not change in reading, math, and self-concept scores as a result of success experiences. Hamilton (1978) tried to ascertain if an increase in math rate would affect self-concept. He found math performance was affected, but not self-concept. Rossmiller (1978) treated self-concept both as input (what students bring to school) and output (affected by school process) and found social confidence had a statistically significant partial correlation with math achievement and accounted for 56% of the variance in math scores. He concluded that there were implications for further research in the relationship between self-concept and academic performance in both ways.

Researchers vary in regard to importance of sex differences when studying self-concept and/or achievement. Bailey and Bailey (from Robitaille, 1974) contend boys tend to overrate their ability while girls tend to underrate theirs. Fox (1976) claims that studies are consistent in support of the premise that sex differences in math achievement result, at least in part, from social influences. She feels the differences do not surface during the elementary years, most likely because courses

are not optional as they become later. Robitaille (1974) tested and treated 2654 girls and 2786 boys in grades 5-8, concentrating on relationships between self-confidence and achievement for boys and girls. His recommendation was that:

> Further studies in this area might concentrate upon an investigation of the effects of manipulating the self-confidence variable. It may be the case that, beginning in an area of math, where girls do outperform boys, girls' self-confidence in math can be enhanced. If such is the case, the literature would seem to indicate that teachers might be able to expect enhanced achievement in math from their female students. (p. 12)

In summary, it would appear that opinions support the premise that there is a positive relationship between self-concept and arithmetic achievement, especially at a younger age. Many authorities agree that self-concept and achievement have a direct correlation. The importance of school experiences, particularly the early ones, is a matter of record. Because of this, intervention for the purpose of self-concept enhancement and of arithmetic achievement should be a worthy goal. There does seem to be a need to investigate this relationship as well as to examine the effects across sex groupings.

CHAPTER III

METHOD OF PROCEDURE

The purpose of this study was to determine the effect of specific classroom guidance activities on self-concept, the effect of specific classroom guidance activities on arithmetic achievement, possible differences between sexes in the area of self-concept following treatment, possible differences between sexes in arithmetic achievement following treatment, and the relationship between self-concept and arithmetic achievement. This chapter notes hypotheses to be tested and describes subjects, treatment, data collection procedures, data analysis techniques, assumptions, and limitations.

Hypotheses to be Tested

The following hypotheses, derived from five major research questions, were tested:

Question 1: Will classroom guidance activities designed to enhance self-concept cause third graders to have more positive self-concepts?

Ho_1: There is no significant difference in self-concept scores between the experimental group and the control group.

Question 2: Will classroom guidance activities designed to enhance self-concept cause third graders to

have increased arithmetic achievement?

Ho_2: There is no significant difference in arithmetic achievement scores between the experimental group and the control group.

Question 3: Will there be a significant difference in self-concept scores between sexes following treatment?

Ho_3: There is no significant difference in self-concept scores of girls and boys following treatment.

Question 4: Will there be a significant difference in arithmetic achievement between sexes following treatment?

Ho_4: There is no significant difference in arithmetic achievement scores of girls and boys following treatment.

Question 5: Will there be a significant relationship between self-concept and arithmetic achievement for the total group and by sexes?

Ho_{5a}: There is no significant relationship between self-concept and arithmetic achievement for the total group.

Ho_{5b}: There is no significant relationship between self-concept and arithmetic achievement by sexes.

Description of Sample

The investigation was conducted with students in two third grade classrooms, consisting of a total of 40 students, 20 in the experimental group, and 20 in the

control group. Numbers were equalized by randomly deleting one subject from the experimental group. All were third graders (8-9 years old), white, non-handicapped, rural or small-town Iowans. Intact classrooms were used, since randomization was not possible in this school situation.

Equivalence between groups and math instruction was established by the following steps:

> Comparing the Iowa Tests of Basic Skills classroom composite math scores for the previous 5 years for each of two teachers participating in the study.
>
> Comparing mean standard scores on the vocabulary and reading comprehension subtests of the Gates-MacGinitie Reading Test for the control and experimental groups.
>
> Children in the two classrooms in the study were assigned to the two instructors alphabetically by the principal.

The two instructors were in comparable teaching situations with equal access to materials and equipment, and with the same teaching time.

Treatment

During the interim between pre- and post-tests on the dependent variables, the experimental group received weekly treatment of a minimum of thirty-minute periods of classroom guidance activities designed to enhance self-concept. Activities were primarily selected from 100 Ways to Enhance Self-Concept in the Classroom. Those selected applied to the third grade age group, and

provided selections under categories of:

Environment of Positive Support
My Strengths
Who Am I?
Accepting My Body
Where Am I Going?
Language of Self
Relationships with Others.

The program of treatment involved a variety of projects and class discussions. Photography was also used as an intervention procedure. Individuals were photographed and the photos were used in various bulletin board displays. The control group had no treatment in self-concept enhancement other than the ordinary classroom situation.

Data Collection Procedures

Participants in the study were tested in their individual classrooms. Pre- and post-tests were administered in self-concept and in arithmetic achievement, the pre-test in mid-October, and the post-test in mid-April. During the interim between pre- and post-tests on the two dependent variables, the experimental group received weekly treatment designed to enhance self-concept.

Instruments

Arithmetic achievement was measured by the use of the California Achievement Test, Levels 13 and 14, Form C. High achievers in both groups were given post-tests in Level 14 (4 in experimental, 6 in control group), and

scores determined by the following conversion process (California Achievement Test, Norms Tables, 1977-78, p. 11):

1. Raw scores from Level 14 testing were converted to scale scores by using the "Raw Score to Scale Score" table in the Level 14 Norms Tables.
2. Those scale scores were converted to new raw scores by using the "Raw Score to Scale Score" table in the Level 13 Norms Tables.
3. Still working with the Level 13 Norms Tables, the new raw scores were converted to appropriate percentile ranks by using the table "Raw Score to Percentile Rank and Stanine" for that trimester when students were tested.

Maximum raw score for the total mathematics battery is 85. This is subdivided into mathematics computation with 40 items, and mathematics concepts and applications with 45 items. Test 8, Mathematics Computation, contains 40 items that measure addition, subtraction, multiplication, and division skills. Each operation is measured by 10 items arranged in an alternating sequence. Test 9, Mathematics Concepts and Applications, contains 45 items that measure specific skills in understanding and using mathematical concepts. The test requires students to recognize concepts and apply problem-solving operations in various contexts including numeration, number theory, number sentences, number properties, common scales, geometry, measurement, graphs, and story problems. This test is published by CTB/McGraw-Hill, DelMonte Research

Park, Monterey, California 93940, Copyright 1977, 1978. Raw scores may be converted to percentile ranks, stanines, normal curve equivalents, and grade equivalents. The Buros Tests of Mental Measurements Yearbook, 1978 edition, refers to the Fifth Edition which reports Kuder-Richardson Formula 21 reliability coefficients ranging from .84 to .97 for the total mathematics battery.

The self-concept instrument, the Piers-Harris Children's Self-Concept Scale (Piers, 1969) consists of 80 declarative statements (e.g., My classmates in school think I have good ideas.) For each statement the student marks yes or no. Approximately one-half of the statements are positively worded, and the remainder are negatively worded in order to reduce effects of acquiescence. Items are orally administered, according to the suggestions for administering the Piers-Harris to children functioning at or below the fifth-grade level. The Piers-Harris yields a composite score that may range from 0-80. The scale may also be scored for six cluster scores, designed to measure one of the subdivisions of self-concept: 1) Behavior, 2) Intellectual and School Status, 3) Physical Appearance and Attributes, 4) Anxiety, 5) Popularity, and 6) Happiness and Satisfaction. The Piers-Harris manual (Piers, 1969) reported Kuder-Richardson Formula 21 homogeneity coefficients ranging

from .78 to .93. Four-month test-retest coefficients of stability ranged from .71 to .77.

Data Analysis Techniques

Data was secured from administration of pre- and post-tests in self-concept and arithmetic achievement. All information from pre- and post-tests was coded according to the format shown in Appendix A. All information was then transferred to IBM cards which were used in the specific analysis of data.

Pre-treatment equivalence of groups in self-concept and arithmetic achievement was calculated by using the t test for difference between independent means.

The test was calculated by the formula:

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{S_{\bar{x}_1 - \bar{x}_2}}$$

Because the null hypothesis assumes $\mu_1 = \mu_2$, then $\mu_1 - \mu_2 = 0$, and the formula for actual calculation was:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{\bar{x}_1 - \bar{x}_2}}$$

where

$$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

and the degrees of freedom for the t test of significance are equal to $n_1 + n_2 - 2$. Significant t values at the .05 level, values greater than 1.96, on the differences between the two means on any individual test indicate rejection of the hypothesis $\mu_1 = \mu_2$.

Analysis of post-test data on both self-concept and arithmetic achievement utilized an analysis of variance (ANOVA) technique. This examined differences between scores by different groups and sexes.

Correlational coefficients were utilized to examine the relationship of self-concept to arithmetic achievement. Coefficients were also calculated to determine the relationship between the two variables according to sex.

Statistical significance was tested at the .05 level for all analysis procedures.

Assumptions

Several assumptions have been made in the present study as follows:

(1) Because the experimental and control groups were subdivided by sections, sections rather than individuals received the treatment.

(2) Other characteristics, not directly measured in the study, are randomly distributed in the experimental and control groups.

(3) The pre-test does not interact with the treatment or influence the post-test results.

(4) Maturational changes have occurred equally among the groups over time.

(5) Attrition among the groups does not introduce bias into the study.

Limitations

Since this study was conducted in a public elementary school setting, where it was necessary for intact classes to be used for the experimental and control groups, it has a possible selection limitation. The study was limited to a population which is white, primarily rural, middle-class, and ages 8-9. Consequently, it may be difficult to generalize the results to unlike populations. However, this writer has found little literature (in this area) pertaining to the above-mentioned population; therefore, it could be quite applicable to populations which are similar, and it is believed that there would be many in this category.

CHAPTER IV

RESULTS

This chapter presents the results of statistical analyses in relation to the questions raised in Chapter I. The purpose of the study was to find the effect of classroom guidance activities on self-concept, the effect of classroom guidance activities on arithmetic achievement, possible differences between sexes in the area of self-concept, possible differences between sexes in arithmetic achievement, and the relationship between self-concept and arithmetic achievement.

To establish equivalence of arithmetic instruction, pre-treatment data was secured from school records of the Iowa Tests of Basic Skills for the previous five years. The means of composite math scores attained by classes taught by the two instructors were compared. As indicated in Table 1, there was no significant difference between the two classes in arithmetic achievement with these instructors.

Using standard scores obtained from the Gates-MacGinitie Reading Test, means of the two groups on the vocabulary and reading comprehension subtests were compared.

As indicated in Table 2, no significant difference in mean standard scores in vocabulary and reading

Table 1

A Comparison of Iowa Tests of Basic Skills Composite Math Scores for Past Five Years for Two Classrooms

	Control		Experimental		
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	t value
Composite Grade Equivalent	33.56	2.023	35.04	2.248	1.094

Table 2

A Comparison of Means of Control and Experimental Groups on Vocabulary and Comprehension Subtest Standard Scores

	Control		Experimental		
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	t value
Vocabulary	57.85	6.08	58.9	5.946	.552
Comprehension	56.45	6.605	57.6	5.509	.598

comprehension was found for the two classes involved in this study.

Equivalence of groups was also established by the alphabetical assignment of students to the instructors by the principal.

The first major research question examined was: Will classroom guidance activities designed to enhance self-concept cause third graders to have more positive self-concepts?

Ho_1: There is no significant difference in self-concept scores between the experimental group and the control group.

As indicated in Table 3, no significant difference was found between control and experimental groups on either the pre- or post-tests of self-concept. Therefore, the null hypothesis failed to reject.

Table 3

Means, Standard Deviations, and t values on Pre- and Post-tests in Self-Concept for Control and Experimental Groups

	Control		Experimental		
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	t value
Pre-test	55.65	14.061	58.75	12.413	-0.74
Post-test	54.65	13.124	59.50	13.809	-1.14

The second major research question tested was: Will classroom guidance activities designed to enhance self-concept cause third graders to have increased arithmetic achievement?

Ho_2: There is no significant difference in arithmetic achievement scores between the experimental group and the control group.

As indicated in Table 4, there was no significant difference between groups in arithmetic achievement. Therefore, the null hypothesis failed to reject.

Table 4

Math Scale Pre- and Post-test Scores for Control and Experimental Groups

	Control		Experimental		
	$\bar{X}$	S.D.	$\bar{X}$	S.D.	t value
Pre-test	365.95	24.55	367.45	31.318	-0.17
Post-test	474.10	37.59	482.45	46.336	-0.63

The third major research question was: Will there be a significant difference between sexes in self-concept scores following treatment?

Ho_3: There is no significant difference in the self-concept scores of girls and boys following treatment.

As indicated in Table 5, there was no significant difference between groups on self-concept scores. There was a significant difference between sexes on self-concept scores, but the F value of 0.0 for the interaction of

sex and group membership was not significant. Therefore, the null hypothesis failed to reject.

Table 5

Means, Standard Deviations, and Analysis of Variance Summary Table for Self-Concept Raw Scores

Sex	Control		Experimental	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Girls	51.625	13.37	56.125	16.4355
Boys	62.625	10.9275	67.125	9.94898

ANOVA Summary

Source	SS	DF	MS	F
Sex	968	1	968	5.80199
Group	162	1	162	.970994
Interaction	0	1	0	0
Within	4671.5	28	166.839	

The fourth major research question was: Will there be a significant difference between sexes in arithmetic achievement following the treatment?

Ho_4: There is no significant difference in arithmetic achievement scores of girls and boys following treatment.

As indicated in Table 6, there was no significant difference between sexes within groups on math scores as indicated by the interaction F value of 2.49593. Therefore, the null hypothesis failed to reject.

Table 6

Means, Standard Deviations, and Analysis of Variance Summary Table for Math Scale Scores

Sex	Control		Experimental	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Girls	465	35.976	497.625	53.923
Boys	486.13	40.41	468.38	47.96

ANOVA Summary

Source	SS	DF	MS	F
Sex	132	1	132	.0649
Group	442	1	442	.217336
Interaction	5076	1	5076	2.49593
Within	56944	28	2033.71	

The fifth major research question was: Will there be a significant relationship between self-concept and arithmetic achievement for total group and by sexes?

Ho_{5a}: There is no significant relationship between self-concept and arithmetic achievement for the total group.

Ho_{5b}: There is no significant relationship between self-concept and arithmetic achievement by sexes.

As indicated in Table 7, there was no significant relationship between self-concept scores and arithmetic achievement scores for the total group tested. Therefore, the null hypothesis Ho_{5a} was not rejected. There was likewise no significant relationship between self-concept scores and arithmetic achievement scores for males. Results did show a significant relationship between self-concept scores and arithmetic achievement scores for females. Therefore, the null hypothesis Ho_{5b} was rejected.

Table 7

Pearson Product-Moment Coefficients Between Self-Concept and Arithmetic Achievement

	Self-Concept Scores		
	Total Group	Males	Females
Arithmetic Achievement Scores	.1926	-0.1217	0.3655
	(N = 40)	(N = 17)	(N - 23)
	P = 0.117	P = 0.321	P = 0.043

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The results of the statistical analyses are discussed in this chapter. It was the purpose of this study to determine if: specific guidance activities designed to enhance self-concept would cause third graders to have more positive self-concepts; if such activities would cause third graders to improve arithmetic achievement; whether there would be significant differences between girls and boys in self-concept and arithmetic achievement following the treatment; and if there is a relationship between self-concept and arithmetic achievement for total group and by sexes.

A treatment of teacher-directed classroom guidance activities designed specifically for self-concept enhancement was given to the experimental group, while the control group experienced no specific guidance activities other than ordinary classroom experiences. Pre- and post-tests were administered to both groups in self-concept and in arithmetic achievement to measure the results.

Specific results of the study were:

1. There was no significant difference in self-concept scores for control and experimental groups as a

result of treatment as evidenced by t value of -1.14.

2. There was no significant difference in arithmetic achievement scores for control and experimental groups as a result of treatment as evidenced by t value of -0.63.

3. There was no significant difference in the self-concept scores of boys and girls following treatment as indicated by the F value of 0.0 for the interaction of sex and group membership.

4. There was no significant difference in math scores of boys and girls following treatment as indicated by the F value of 2.49593 for the interaction.

5. There was a significant difference in self-concept scores for boys and girls when considering total group of subjects, control and experimental, in favor of higher self-concept scores for boys. (See Table 5 F value of 5.80199 for Sex).

6. There was a significant relationship between self-concept scores and arithmetic achievement for girls, but not for boys or for total group of subjects, including experimental and control. (P = 0.043 for females, Table 7).

Discussion

Care was taken in the study to establish equivalence of math instruction and equivalence of the control and experimental groups in the pre-treatment stage. There

were no significant differences in these areas prior to treatment. Pre-tests in math also established equivalence of groups; therefore it is was expected that no significant differences were found in post-test math scores between the two groups.

Self-concept pre-tests established equivalence of groups in that area. It may be noted that on a maximum raw score of 80 on the Piers-Harris Test, mean scores across groups for both pre- and post-tests in self-concept were relatively high, ranging from 54.65 - 59.50. One can conclude that individuals involved in this study, for the most part, were not in the low self-concept range; therefore there may have been less room for change than in a study involving only quite low or negative self-concepts. It would also seem worthy of note that although there was no statistically significant change, there was no sharp decline in self-concept scores. This would seem to be a positive result since various researchers (Glasser, Morse, Shaw and McCuen) have contended that self-concept declines between the ages of 5-10, beginning in most cases around the second or third grade. If, as the study shows, self-concept scores were maintained for these subjects who had overall positive self-concepts originally, it may be noteworthy in light of suggestions of Samuels (1977). At any rate, indications are that treatment did not affect

subjects negatively either. Obviously, there was not a significant change in either classroom, indicating, perhaps, that an overall positive classroom atmosphere may be equally as effective as specific self-concept enhancement activities.

The size of the population sample may have played a significant role in the results of the study. The study involved two classrooms of 20 students each; ideally considerably more subjects would be involved.

The time factor involved may also account for no significant differences. The self develops over time, and change may very well not be evidenced within the relatively short period of time of 7 months of a school year.

The relative instability of the self-report instruments available for the study of self-concept may also account for inability to detect significant change. At the primary level, it is difficult to obtain an accurate picture of the self-concept, even though instruments attempt to account for acquiescence. Children at this age are conscious of answering in a socially acceptable manner, and subsequently, instruments to measure affective attributes adequately are not highly reliable. At any age, part of the "self" is impenetrable to the would-be observer.

Even though there were no significant differences between sexes in both self-concept scores and in math

scores as a result of the treatment, when considering total boys and girls, regardless of group membership, boys had significantly higher self-concept scores, indicating more positive self-concepts. Bailey and Bailey (from Robitaille, 1974) contend from their studies that boys tend to overrate their abilities, and girls tend to underrate theirs. Since there was no concurrent significant difference in math achievement, it would lead one to believe that the study corroborates the opinion expressed in Bailey and Bailey's study. In fact, in the study, experimental girls surpassed experimental boys in means of math post-tests, although boys surpassed girls in mean self-concept scores, which would concur with the above-mentioned investigation.

Significant in this study was the correlation between self-concept and arithmetic achievement for girls. If, indeed, these two areas are related for girls, as this study indicates, implications hold that a reciprocal influence is apparent, and that improvement of math skills may be a way of enhancing self-concept for females. Social influence seems to be a factor in this area, as suggested by Fox (1976), although she feels these differences do not surface during elementary years. From this writer's observations in primary classrooms, it would seem they do surface quite early in a child's school career, and may be

an area that needs to be studied and improved upon. If girls do generally report lower self-concepts, and if their self-concepts are significantly correlated with math achievement, one could subscribe to manipulation of one of the variables to cause upward movement in the other as Robitaille (1974) suggests. If self-concept enhancement is not effective in affecting math achievement, possibly we should provide more successful math experiences for girls, with the hope of influencing their self-concepts. Possibly, in an area such as math, girls may not have been allowed to explore and discover their environment to the extent that boys have in early childhood years, thereby not actually assimilating mathematical concepts. They may be in a state of pseudo-learning in the math area by the third grade, with a subsequent lack of confidence in their abilities.

Conclusions

In this particular study, the conclusion is that specific classroom guidance activities designed to enhance self-concept had no effect on either self-concept scores or on math scores of third graders. This is in agreement with numerous studies which have attempted to manipulate the self-concept variable for the purpose of effecting higher achievement. Most researchers have expressed

belief in a relationship between self-concept and achievement, but generally do not commit themselves to stating which is the causal agent for the other. Wylie and Purkey both contend there is a relationship between the two, and Purkey (1970) feels self-concept enhancement may be assumed to be a vital force in improving achievement in school. This study did not confirm Purkey's supposition; however, it did agree with those who found correlations between the self-concepts of girls and math achievement.

Recommendations

The contradictory nature of research findings, the difficulty of finding reliable instruments to measure self-concept among a large quantity available, the relative inaccuracy of self-report, and the numerous generalizations regarding relationships between self-concept and achievement may be sufficient evidence to warrant further empirical research in the area.

Based on the results of the study, the following recommendations are made:

1. The study needs to be replicated in other population groups to determine if the same results would be produced in both similar and/or dissimilar situations.

2. A study using larger samples of a population is needed to ascertain if there would be similar results.

3. A longitudinal study is needed to assess self-concept and achievement over a longer period of time with periodic testing to determine if there is a significant change in self-concept and if so, if the change is related to math achievement.

4. A study is needed which utilizes other measures of self-concept along with self-report, e.g., observation by the teacher and/or parents, thereby providing for a more reliable self-concept evaluation of each individual.

5. A similar study needs to be made with students who have been identified as low achievers and/or exhibiting low self-concepts.

6. A study needs to be made whereby math achievement of low-achieving girls is manipulated to determine if their self-concepts may be enhanced.

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APPENDIX A

CODING FORMAT

CODING FORMAT

Column Number	Information
1-2	I.D. Number
3	Group (1 = control, 2 = experimental)
4	Sex (0 = male, 1 = female)
5-6	Pre-test, self-concept score
7-8	Post-test, self-concept score
9-10	Pre-test, math raw score
11-13	Pre-test, math scale score
14-15	Pre-test, math percentile score
16-17	Post-test, math raw score
18-20	Post-test, math scale score
21-22	Post-test, math percentile score

APPENDIX B

SELF-CONCEPT PRE- AND POST-TEST RAW SCORES FOR CONTROL GROUP

SELF-CONCEPT PRE- AND POST-TEST
RAW SCORES FOR CONTROL GROUP

Girls		Boys	
Pre	Post	Pre	Post
40	43	33	45
58	62	63	49
48	46	66	69
60	57	71	67
63	63	73	75
65	61	58	70
72	57	61	57
37	38	58	69
35	24	26	42
65	57		
61	42		

APPENDIX C

SELF-CONCEPT PRE- AND POST-TEST RAW SCORES FOR EXPERIMENTAL GROUP

SELF-CONCEPT PRE- AND POST-TEST RAW SCORES FOR EXPERIMENTAL GROUP

Girls		Boys	
Pre	Post	Pre	Post
37	32	74	69
60	71	68	74
67	66	70	75
46	44	60	58
62	47	68	77
49	39	45	48
53	50	72	72
33	54	70	64
75	78		
48	66		
56	61		
62	45		

APPENDIX D

MATH PRE- AND POST-TEST SCALE SCORES FOR CONTROL GROUP

MATH PRE- AND POST-TEST SCALE
SCORES FOR CONTROL GROUP

Girls		Boys	
Pre	Post	Pre	Post
396	530	371	530
341	416	429	548
346	455	394	522
350	442	371	463
361	463	350	455
379	499	356	442
364	472	354	466
374	482	346	463
324	435	402	516
359	450		
352	433		

APPENDIX E

MATH PRE- AND POST-TEST SCALE SCORES FOR EXPERIMENTAL GROUP

MATH PRE- AND POST-TEST SCALE SCORES
FOR EXPERIMENTAL GROUP

Girls		Boys	
Pre	Post	Pre	Post
398	472	446	558
369	499	366	509
422	582	352	478
364	494	346	418
352	469	374	472
392	499	327	416
324	400	350	458
341	486	333	438
400	538		
374	522		
357	486		
362	455		