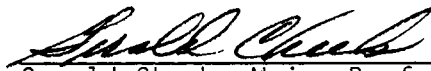
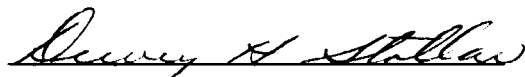


To the Graduate Council:

I am submitting herewith a dissertation written by Eunice Huddleston Reynolds entitled "Comparison and Effects of Inverse and Traditional Tutoring for Reading Improvement in the 1984-85 Campbell County Secondary Vocational Improvement Programs." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Vocational-Technical Education.


Gerald Cheek, Major Professor

We have read this dissertation
and recommend its acceptance:







Accepted for the Council:


Vice Provost
and Dean of the Graduate School

COMPARISON AND EFFECTS OF INVERSE
AND TRADITIONAL TUTORING FOR
READING IMPROVEMENT IN THE
1984-85 CAMPBELL COUNTY
SECONDARY VOCATIONAL
IMPROVEMENT
PROGRAMS

A Dissertation
Presented for the
Doctor of Education
Degree
The University of Tennessee, Knoxville

Eunice Huddleston Reynolds
August 1986

DEDICATION

This dissertation is dedicated with love and deep appreciation to my parents, Everett and Evelyn Huddleston; to my devoted husband E. L.; to my darling son, Eric; to my 7 sisters and their families: Janice, Agnes, Mildred, Nancy, Gail, Norma, and Rhonda; to my brother, Jay; to my dear friends, Dr. Helen Morgan, Mrs. Lois Carroll, Dr. Joan Clark, and Dr. Jackie Jackson; and to the Superintendent of Schools in Campbell County, Kenneth Miller, who has shown love and concern for the county's students.

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To the writer's family go special thanks: to her parents, Everett and Evelyn Huddleston, for their lifelong love, devotion, and encouragement; to her 7 sisters and 1 brother, special appreciation.

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ABSTRACT

Very little research had been done in the use of peer tutoring in vocational education prior to this study. This experiment was conducted to investigate 2 methods of instruction to ascertain the effects, if any, of inverse tutoring versus traditional tutoring in improving reading competencies of secondary vocational improvement program (VIP) students at Campbell County High School in Jacksboro, Tennessee.

Experimental subjects of this study were randomly assigned by intact classes to 1 of 4 treatment groups: nontutored, inverse tutors, inverse tutees, or traditional tutees. The Gates-MacGinitie Reading Tests, Survey Level E, Form 1, were used as pretests; Form 2 of these same tests was used to posttest the students. There were 50 sessions of treatment. Pretest, posttest, and posttest gain scores were tested in separate one-way analysis of variance (ANOVA) tests for each group. No significant differences were observed between any groups. Multiple linear regression analysis was applied to the data to identify intervening variables that might have the most significant impact on posttest gain scores. Selected independent variables were tested for relationships with the mean achievement scores of the groups. No significant relationships were found. Separate Pearson's product-moment correlation coefficient tests were run on the 2 measures of reading achievement: the Tennessee State

Proficiency Test (TSPT) and the pretests and the TSPT and the posttests. There were significant relationships established at the .05 level in various instances. However, post hoc analysis was not done since no significant relationships were found from the testing of the 2 major hypotheses.

It was concluded that long-term academically and socioeconomically disadvantaged students were not significantly affected by their tutoring roles. Additionally, intervening variables such as IQ, reading abilities, sex, age, or parents' occupational status are not likely to be significantly related to reading achievement scores of this homeogeneous grouping.

Recommendations were that future studies be conducted to determine the effects of various tutorial arrangements for disadvantaged students for longer periods than 10 weeks and that these studies be conducted in earlier grades than high school. It was further recommended that future tutorial studies be conducted in both academic and vocational programs and that these studies include larger, more heterogeneous groupings of students.

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CHAPTER I

INTRODUCTION

In 1962, a report from the Panel of Consultants on Vocational Education charged that vocational education programs have been insensitive to the needs of various segments of the population, specifically those youth whose socioeconomic and academic disadvantages make it difficult for them to profit from regular occupational programs. Thus, the Vocational Education Act of 1963, Public Law 88-120, expanded the scope of vocational education to include serving the disadvantaged and handicapped. The law provided that 10% of the funding be earmarked for the disadvantaged and handicapped (Williams, 1971). With the Vocational Education Amendments of 1968, Public Law 90-576, 15% of each state's allocation of federal funds were earmarked as "set-asides" for special programs for the disadvantaged.

The Carl D. Perkins Vocational Education Act of 1984 continues to place emphasis on these special needs students, requiring that the states spend 57% of their basic vocational grants to meet the needs of these groups. This legislation mandates that supplemental services be provided for these special needs students who are mainstreamed and are enrolled in regular vocational training programs in high school but who are needing supplemental academic support in order to achieve

a satisfactory degree of success in their chosen occupation (Cobb and Kingsbury, 1985).

Throughout the state of Tennessee, Vocational Improvement Programs (VIP) are operated by many local high schools. Proposals are written and submitted to the State Department of Education, Division of Vocational Education. Approved programs are contracted and funded on an annual basis through the State Board of Education using federal flow-through funds. The primary objective of these VIP programs is to help students enrolled in regular vocational programs to overcome difficulties in their communications (reading, spelling, oral, and written communication) and/or math computational skills.

The Campbell County Comprehensive High School VIP programs are designed to assist those students enrolled in achieving developmental objectives prescribed for them. Each VIP student receives a minimum of 2 evaluations per year by the multidisciplinary team (M-team) for vocational program placement, continuation, or transfer back to general education programs. In addition, an annual M-team session is devoted to development of an individualized education plan (IEP) for each VIP student.

Nothing has been done across the state of Tennessee to evaluate the effectiveness of the programs in assisting students in improving their skills. Nearly a million students are served annually in similar programs across the nation (Kemp, 1972). Yet, there has been no determination as to whether VIP programs are successful in assisting students in eliminating any of their deficiencies or in

determining what teaching methods or learning activities produce the greatest success.

Reading skills are greatly in need of improvement. One need only examine recent low scores of Tennessee's ninth graders on the Tennessee State Proficiency Test, which each student must successfully pass in order to be graduated from high school. The State of Tennessee recently passed new certification standards for all elementary and secondary education majors requiring that any person desiring a Tennessee teaching certificate take 6 quarter hours in methods of teaching reading (Williams, 1986). This certification requirement became effective July 1, 1982 (Tennessee Code Commission, 1984). Beginning September 1, 1985, prior to recommending a candidate to receive certification in any area of secondary education, the candidate's transcript must further indicate successful completion of 3 credit hours of "Methods of Teaching Reading in the Content Area" (George, 1986). These new certification standards should signal to all that reading is a skill which all students greatly need to master, a skill that is essential in order to attain " . . . educational and vocational success in our society; and the ability to read newspapers, magazines, and books adds greatly to the quality of life" (Doehring, Trites, Patel, and Fiedorowicz, 1981, p. 1).

I. Statement of the Problem

In Campbell County as is true across the State of Tennessee, there is a need to systematically evaluate the effectiveness of

various learning activities and teaching methods used in the vocational improvement programs (VIP). No system exists to ascertain whether or not the VIP programs are successful in achieving the prescribed goal of assisting academically disadvantaged youth to improve their reading abilities. A portion of the federal funds received by the State for vocational education are "set-aside" annually for the purpose of assisting disadvantaged youth who are a minimum of 2 years behind in reading competence. Thus, there must be some determination of the effectiveness of various instructional methods employed to improve reading skills. The absence of evidence indicating the effectiveness of the VIP programs is the problem constituting the basis for this research study.

II. Purpose of the Study

The purpose of this study was to investigate 2 methods of instruction to ascertain the effects, if any, of inverse tutoring versus traditional tutoring in improving the reading competencies of secondary vocational improvement program (VIP) students at Campbell County High School.

III. Research Objectives

Information was sought in this study to meet the following research objectives:

1. To assess the effectiveness of inverse and traditional tutoring in improving reading

competencies/achievement of secondary VIP students among students receiving inverse tutoring, traditional tutoring, and those administering the inverse tutoring.

2. To assess the interactive effect of such independent variables as reading ability/achievement, IQ, age, sex, and parents' occupational status with the main effect of 2 different tutoring methods.

IV. Theoretical Framework

The need for a tutorial program usually arises from the academic limitations of the student(s). Through the review of literature in education and psychology, many examples of tutoring programs were found. Many studies report students in the same classroom effectively working with each other in tutoring settings (Ehly and Larsen, 1980).

The advantages of children learning from their peers has become common knowledge; but that children learn more from teaching other children is now a topic of great interest to many researchers. That the tutor may benefit more than the tutee is reasonable since the tutor must be involved in the tutoring situation in more ways and must do more with the instructional material than the tutee (Gartner, Kohler, and Riessman, 1971).

In traditional tutoring studies, Oakland and Williams (1975) and Ross (1972) reported that tutoring as a form of instructing

students who are behind in their reading skills is beneficial for both tutors and tutees. Stanbrook (1979) found that the tutor in an inverse tutoring situation benefited more and increased reading achievement more from the tutorial experience than did the tutee.

Learning may be affected by many different factors. Lavin (1965) explained that failure on the part of the researcher to control for these extraneous variables or factors may lead to many difficulties and misleading conclusions. He reported that sex, ability, and socioeconomic status are the 3 basic factors which correlate most consistently with academic performance (Lavin, 1965, p. 43). Studies have also been conducted to determine the relation between the parents' occupation and their children's reading achievement. It is necessary to determine which of the possible independent variables in this particular study will impact and interact more with the tutorial treatments and the reading achievement test scores.

V. Hypotheses

Research Hypotheses

The following research hypotheses pointed the direction of this study:

- 1.0 On a standardized reading test, the mean achievement test scores will be higher for those students conducting inverse tutoring than for those

who receive no tutoring or who are inversely or traditionally tutored.

Multiple linear regression will be applied to help select independent variables that have the greatest impact with respect to the dependent variable, reading achievement. Variables under consideration include the researcher-selected variables of IQ and reading ability/achievement, and other possible variables involved in this study; such as, age, sex, and parents' occupational status.

2.0 Mean achievement test scores will be directly affected by such secondary independent variables as sex, age, and parents' occupational status.

Null Hypotheses

The following null hypotheses were formulated and tested at the .05 level of significance:

H₀₁: There are no significant differences in the mean achievement scores on a standardized reading test among students conducting inverse tutoring, those receiving inverse tutoring, those receiving traditional tutoring, and those who receive no tutoring.

H₀₂: There are no significant relationships between achievement scores on a standardized reading test for students and their IQ scores, reading

abilities, sex, and occupational status of their parents.

VI. Rationale

Children teaching other children has been an occurrence throughout recorded educational history. Peer tutoring began and may be traced back to times when little red schoolhouses were staffed with only 1 teacher (Ehly and Larsen, 1980, p. 10). Because the teacher had to serve as teacher, guidance counselor, principal, health aide, and custodian, the use of students tutoring other students was a frequent happening.

The theory that children may learn more from teaching other children than does the child being taught is relatively new and is receiving broader research attention (Gartner, Kohler, and Riessman, 1971). According to Cloward (1976), the tutorial area needs further educational research in order to determine the value of tutoring on different populations.

Vocational students who are academically disadvantaged are enrolled in the VIP programs in Campbell County. This academic disadvantage means that students lack reading skills and require special services, assistance, or programs in order to enable them to succeed in their vocational education programs (State Board of Education, 1983). According to Phelps (1980), students of the same age with or without the same disability can tutor each other and improve their skills.

If some forms of instructional techniques and methods can be ascertained as being successful in improving reading abilities of vocational students, and specifically VIP students, these methods can then be utilized to assist students in developing stronger basic skills needed in obtaining and maintaining employment.

VII. Assumptions

The following assumptions provided direction in completing the study:

1. Scores obtained on standardized reading tests may be used to describe reading competency.
2. Scores obtained within the past 2 years on a standardized intelligence test may be used as an indicator of the student's ability to learn; thus, these IQ scores may be used as an independent variable or as a covariate to study interaction between this variable and the main effect.
3. The research design and researcher controls in this study were planned to give maximum internal and external validity.
4. The Gates-MacGinitie Reading Test is a standardized instrument that will directly measure the effect of the treatment when mean scores are adjusted for other confounding variables.

VIII. Limitations

This study was restricted in that the population of this 1 school, Campbell County Comprehensive High School in Jacksboro, Tennessee, was the only accessible population. The sample included VIP students enrolled in this 1 high school during the school year 1984-85. The study was further limited since the tutorial treatments were possible for a period of only 10 weeks.

Random assignment was made of entire intact classes since normal school organization and operations would not permit the true random assignment of individual students to the main treatment groups.

IX. Definition of Terms

The following terms are used throughout this study and are operationally defined for clarity and understanding.

Individualized Educational Plan (IEP). A specific program planned as an annual guide for 1 individual student's curriculum and instructional activities. Each VIP student has an IEP based upon his/her occupational training program, individual problems, academic limitations, and career objectives. The IEP's are developed by the VIP M-team.

Inverse tutoring. The tutorial arrangement where the student who is serving as a tutor has the same low-level competencies and is

tutoring fellow students. Both the tutor and the tutee are in need of remediation in reading.

Multidisciplinary team (M-team). A group of professional instructional staff members who combine efforts to study the individual students' needs and who attempt to prescribe the necessary curriculum and instructional activities which will maximize the individual's potential. Members of the Campbell County VIP M-team include the Coordinator of Special Vocational Programs, the Vocational Director (in cases involving particularly difficult situations and in the absence of the Coordinator), the VIP instructor, the student's vocational instructor, a guidance counselor, and the principal or his/her designee, which often is the guidance counselor.

Peer tutoring. " . . . children teaching other children, usually on a one-on-one basis" (Ehly and Larsen, 1980, p. 3).

Traditional tutoring. The tutorial arrangement where the student serving as the tutor has higher ability than the tutee. The tutor is at or above grade level in reading ability.

Tutee. The student who is being assisted and taught by the fellow student.

Tutor. The student who is assisting and teaching a fellow student.

Vocational Improvement Program (VIP). A program designed to assist students who are enrolled in regular vocational training

programs with their communications skills in order to help them succeed in their chosen occupational area.

X. Organization of the Study

The study is organized in the following chapters:

Chapter I contains the introduction, which includes the statement of the problem, purpose of the study, research objectives, theoretical framework, hypotheses, rationale, assumptions, limitations, definition of terms, and organization of the study.

Chapter II contains a review of related literature including general information about tutoring and tutorial arrangements, information about various factors or intervening variables affecting or impacting on learning and achievement, related studies as they contribute to this study, and a summary written to tie the subsections together with the theoretical framework.

Chapter III contains the methodology and procedures used in the study, the population and sample, the design, the data and instrumentation, special procedures and the method of data analysis.

Chapter IV contains the analyses of data collected in the study.

Chapter V contains the summary of overall findings, conclusions drawn by the researcher, and her recommendations.

In addition, a list of references and a set of appendices are included.

CHAPTER II

REVIEW OF LITERATURE

A review of the literature and available research pertaining to peer tutoring using both inverse tutoring, where the tutor is a remedial student and tutors another like student, and traditional tutoring, where the tutor has above average ability, has been conducted by this researcher. This review will be presented as follows:

Section I will deal with general information about tutoring and tutorial arrangements. In Section II, this researcher will discuss available information in the literature dealing with various factors or intervening variables affecting or impacting on learning and achievement. Section III will present related research studies as they contribute to this research study. In Section IV, this researcher will present a summary logically tying the foregoing subsections together with the theoretical framework of the study.

I. General Information About Tutoring and Tutorial Arrangements

In early education there was only 1 teacher per schoolhouse. The teacher was forced to rely upon the older children to assist with the younger ones. Ehly and Larsen (1980) reported historical

beginnings of tutoring. They referred to Gartner, Kohler, and Riessman (1971), who reported on the works of John Comenius, which was probably completed in the early 1600's, yet was first published in 1849. Comenius (1921), in his Didactica Magna, translated into The Great Didactic (1921) had stated that those who teach others teach themselves. They referred to similar uses of peer tutoring or children teaching children, in their references to Lancaster's (1806) "spontaneous" experiments and his "monitoring system" in his book, Improvements in Education and also in Andrew Bell's (1832) statement that he who teaches learns.

William Bentley Fowles (1866) provided educational theory that supported peer tutorial practices utilizing the monitorial approach. He felt that those who taught were better able to learn materials, since they were constantly reviewing. He proposed children as better teachers than adults are because they are more "learner-focused" (Fowles, 1866).

According to Ehly and Larsen (1980) American educators learned from their "European counterparts," Fowle, Lancaster, and Bell. Since there was insufficient money to hire more than 1 teacher per town, settlement, or community, the teacher had to rely on students to teach other students (Johnson, 1970).

These early tutoring arrangements were usually cross-age tutoring, where the older students assisted the younger ones (Ehly and Larsen, 1980).

Early peer tutorial projects reported during the 1960's remained largely cross-age small projects involving very few students. In the early 60's Peggy and Ronald Lippitt conducted their first cross-age studies at the University of Michigan Laboratory School. They explained that tutoring is beneficial and state that:

There are limits to the amount of individualized attention the learner can receive when the major weight of all learning transactions is placed on the relationship between adults and a large group of youngsters. . . . It is an observed fact that children, with proper training and support from adults, are able to function effectively in the role of helpers and teachers. . . . (Lippitt and Lohman, 1965, p. 113).

This study was later expanded to 2 Detroit public schools (Lippitt and Lohman, 1965). In the mid '60's larger projects, such as the Mobilization for Youth project in New York City and the Youth Tutoring Youth, YTY, programs in major cities in the Northeast, were reported. The YTY program involved students tutoring underachieving disadvantaged ghetto-area students (National Commission on Resources for Youth, 1968).

These early research studies reported benefits for both the tutors and tutees. The tutees showed increased skills, while the tutors were reported as showing greater interest and motivation.

The Each One Teach One, EOTO, project began in Yonkers, New York (Gartner, Kohler, and Riessman, 1971). This program had as its goal the increase in both affective and cognitive areas for the tutees. Since its beginning, it has been used in many different parts of the nation.

These projects have inspired other less formalized uses of peer tutoring. Tutoring was hailed as 1 of the highest forms of teaching by Sabatino and Mann (1982). They identified the beauty of the process as the student's involvement in the discovery form of learning. Tutoring involves the process of presenting small areas of content to the tutee; and through repetition, the opportunity for advancement and greater achievement is provided as verbal endorsement and reinforcement are given by the tutor (Sabatino and Mann, 1982).

Gearhart (1980) warned that special needs students must be given the opportunity to develop self-concepts in conjunction with their academic development and learning. The feeling of self-fulfillment cannot be separated from motivation to achieve academic success (Blumenfeld, 1974).

Chiang, Thorpe, and Dorch (1980) stated that peer tutoring is 1 method of helping satisfy the mandate that teachers individualize programs and instruction for learning disabled students. They found tutoring to be mutually beneficial for both tutors and tutees. Gains were identified in academic and affective domains as both tutors and tutees benefited from the social interaction at the same time they were improving academic skills. This highly controlled research attempted to eliminate such confounding factors as the pygmalion effect and short-term experimental designs. They found improved word recognition skills, classroom behavior and attitudes toward reading (Chiang, Thorp, and Dorch, 1980).

Cohen (1982) advised that students be paired so that their complementary learning deficits benefited from the tutoring process. In this study, it was noted that academic skills and attitudes about learning appeared to be enhanced by peer tutoring. The tutors' self-concepts were enhanced due to their roles as instructional models, while the tutees benefited from the individual attention.

Special needs students may require specific tutorial processes to accommodate their needs. Sabatino and Mann (1982) identified adaptation of materials, tutoring to learning preferences, and tutoring as a support system as 3 possible adaptations.

Gallagher (1960) noted a specific value of tutoring as providing for maximum flexibility based on the special needs of each child. He stated that an additional advantage was that tutoring allowed the tutor full opportunity to deal with the special attention or motivational problems of each child (Gallagher, 1960, p. 49).

The transfer of benefits from the tutoring session to classroom situations are alluded to by Gallagher (1960) who indicated that benefits spill over from the child tutored to all other children and to the classroom teacher. Had the child not received tutoring, there would be a greater tendency to disrupt and disturb the class. This is often done both in an effort to cover up for poor skills and abilities and/or to seek some sort of recognition and attention (Gallagher, 1960).

This theory was further supported by Koskinen and Wilson (1982) who stated:

Students receiving tutoring help are not the only ones who profit. Classmates benefit as an otherwise distracted student begins to focus on learning. Teachers gain as the student becomes a successful learner. Parents see their child happy and successful instead of sad and frustrated. The total school population generally benefits from seeing a tutoring program a helping program in which learning is important (Koskinen and Wilson, 1982, p. 2).

According to Melargno (1976), the school must find a way to impart knowledge and to effect learning. Tutoring can be the answer when conventional or traditional methods are unsuccessful. With mass education in a society that deals with mass production as well, the school must find ways to individualize instruction to meet the needs of the students (Ozmon and Craver, 1981). Giving them this special attention lets them know they are important. According to Whitmore (1980), the educational climate in the classroom must provide optimal learning, needs satisfaction, and stimulate growth and development in all students. They are legally guaranteed this right to a "free and appropriate public school education in the least restrictive environment . . . " in any public school in America (Whitmore, 1980, p. 403).

Gallagher (1960) indicated that progress resulting from tutoring may be due to the arrangement of tutoring and that "improvements may have been the result of the increased enthusiasm, excitement, and motivation in the staff that the new program generates" (Gallagher, 1960, p. 162). He explored the "Hawthorne effect" extensively and examined the report of Roethlisberger (1939) and the early experiment in industrial psychology. He compared

Roethlisberger's experiment at Western Electric Company and its impact on employee morale and productivity to the benefit of involving students in tutorial arrangements. He questioned whether the gains obtained were due more to the emotional relationship formed between the tutor and the student plus the extra attention given to the student coupled with the extra emphasis placed on learning rather than to the particular content of the actual tutoring lessons. Gallagher (1960) concluded that the emotional relationships formed between the tutor and the other child do, in fact, greatly influence the child's readiness to learn. However, he noted that no learning takes place until instructional content follows the motivation produced by the good emotional relationship of tutoring.

According to Woodward (1981), the task of any human being is to preserve his/her own integrity; and the only integrity maintained everyday in the classroom is that of the teacher. According to Glasser (1965), there are 2 basic needs that all human beings seek to satisfy: the need to love and to be loved and the need to feel worthwhile. Satisfying these needs is difficult for any student and particularly so for the disadvantaged underachieving student.

Dabbs (1977) reported a 1976 pronouncement from the Circuit Court Judge of Pinellas County, Florida, Judge Charles M. Phillips, Jr., that 80% of the new criminals who enter his courtroom would not be there if they were literate, had graduated from high school, and could read and write.

Deitrich's (1970) statement that reading is the basic communications skill essential to both the release and training of human potential is more than evident.

For the disadvantaged student, the search to establish identity is complicated by feelings of worthlessness caused by academic failures. Their attempt to meet basic needs is then virtually impossible without some assistance. Teachers may successfully supply their assistance through tutorial arrangements (Woodward, 1981). The teacher's responsibility, according to Woodward, is to establish a learning environment conducive to students' educational success and feelings of accomplishment. According to Bond and Tinker (1967), teachers are more aware of students' individual instructional needs than was true in earlier schools. They have better methods of diagnosing needs and are better trained in these diagnostic procedures to be able to identify learning difficulties and to help prevent many serious reading problems from occurring. Yet, there are many disadvantaged, underachieving students who have learning disabilities. These students feel inadequate and deficient in comparison to their peers (Woodward, 1981, p. 125). It is somewhat ironic to this writer that the peers themselves may be the answer or solution to this dilemma through their own involvement as they lend assistance to their peers through tutoring situations or arrangements.

II. Information About Various Factors or Intervening Variables Affecting or Impacting on Learning and Achievement

When the population of a study consists of students already identified as disadvantaged, such as VIP students must be, one would tend to assume that a variety of factors will influence the treatments provided in the tutorial arrangements (Tennessee State Department of Vocational-Technical Education, 1983). Though some of the studies reviewed alluded to interactive effects of various intervening factors that often affect disadvantaged children, those who may have been born to illiterate parents, reared in poverty-ridden homes where 1 or both parents are missing or are likely unemployed, yet these specific interactive variables were not widely considered in tutorial studies.

Some literature reviewed did indicate that age, sex, mental ability, and parental occupation were influential in reading achievement. The interactive effects of the disadvantaging characteristics may result in the students' decreased self-worth. A diminished self-worth affects all learning. Its effect on reading performance was indicated in several studies. Roswell and Natchez (1977) reported that reading disability results from disharmony in the life of a child. The disharmony may be due to a variety of problems related to physical, psychological, environmental, educational, and other difficulties or from the interaction occurring

among these difficulties. Their study noted that children with reading problems may also show severe emotional difficulty early in life while others' emotional problems may not be discovered until later. However, " . . . all children with reading disabilities manifest some disequilibrium in their lives" (Roswell and Natchez, 1977, p. 5).

In order to understand the reading process and the reading disabled or disadvantaged, one should note the hemispheric specializations of the brain. As Matthews (1984) explained, the left hemisphere is more specialized in ordering the sequence of stimuli and, thus, in the handling of language while the right hemisphere is more specialized in nonverbal processing; such as, spatial processing and music. According to Beech (1985) examinations of computerized tomograms of the brains of reading disabled persons may reveal abnormalities in the left hemisphere of the brain. Such screening of students for potential reading problems at a younger age could result in earlier remediation and assistance in teaching them to read with comprehension.

Learning may be affected by many different factors. Lavin (1965) warned that failure of a researcher to control these extraneous variables could lead to many difficulties and misleading conclusions. He reported that sex, ability, and socioeconomic status are the 3 basic factors which correlate most consistently with academic performance.

Beech (1985) reported on research that showed the effects of parental environment in determining the extent to which children feel positive about reading, stating that children who observe their parents reading are more likely to be better readers than those whose parents rarely read in the home.

In their study of "Relations of Parents, Home and Certain Developmental Characteristics to Children's Reading Ability," Sheldon and Carrillo (1952) found that a parent's occupation has a positive correlation to their children's reading skills and achievement. This finding intensified this writer's concern for the intervening factors in the lives of the disadvantaged underachievers who often have unemployed or missing parents. Occupational choices of parents, their attitudes about their work, and their own interests have tremendous influence on the child's willingness and motivation to learn.

Some of the interacting independent variables relating to reading scores were indicated in the VIP or disadvantaged status of the population being studied. The VIP program in Tennessee was designed for vocational students who require special service, assistance or programs (Tennessee State Department of Vocational-Technical Education, 1983). This status does not, however, prohibit benefits from serving as the tutor or the tutee. Wittenberg (1971) studied poorly educated, unemployed youth who provided mental health services while at the same time vastly improving their own social adjustment.

Not very much literature or research was available in the areas relating to process factors during tutoring activities. Ehly (1975) reported that only a combination of process factors was a significant predictor of learning outcomes in his peer-tutoring program. Studies reported various methods for the structuring of content and for the procedure for presenting content. In general, more structured approaches produced greater gains in learning by tutored students (Ehly and Larsen, 1980). Gartner, Kohler, and Riessman (1971) determined that positive results were possible from informal and less programmed procedures as well as from highly formalized and specific materials.

Tutorial assignments are most often made without regard to sex. However, 1 exception was reported by Dahlen (1973), showing that opposite sex pairings, dyadic relationships, were more successful than same-sex pairings. He also found that tutors of the same sex as the tutee have greater influence on posttest scores in reading than do tutors of the opposite sex of the tutee (Dahlen, 1973).

Ehly and Larsen (1980) stated that the sex of the tutorial partner apparently affects learning outcomes only under certain conditions. In an earlier study, they found that sex of the tutor, sex of the tutee, the sex pairings, peer acceptance, and peer rejection of the 2, the tutor liking the tutee, and the tutee liking the tutor did not affect at a significant level the posttest achievement scores (Ehly and Larsen, 1976). It was also noted that

none of the factors predicted the speed at which the pair completed their daily assignments.

Cross-age tutoring was the focus of early research and tutorial projects. Lippitt and Lohman (1965) involved junior and senior high school students with elementary students. In another project they assigned sixth graders to work with kindergarten students. These settings were based on the value of support systems and the opportunity for affecting and attitudinal modeling. Increased scores on academic tests as well as interest and motivation were noted in tutees and tutors who also increased in ability to work with others and attitudes toward school.

Research was very limited on programs where tutors were the classmates of tutees. Oakland and Williams (1975) noted gains in reading when students were taught solely by tutors. However, these gains were not particularly different from those of students taught by the classroom teacher. They stated that the psychological power of democratic partners the same age that comes from peer pairings may promote learning. Fowle, the early European researcher promoted this concept early in his educational style stating that children were more considerate than the adults were of other children's feelings and capacities (Fowle, 1866).

Sabatino and Mann (1982) stated that interacting variables such as age or occupation do not block the need for success before taking the next step forward in the tutoring process. In tutoring, this amounts to a cycle of 1 success being built upon another.

The psychological advantage of peer tutoring is indicated by the relaxed learning climate between the peers which promotes ability to concentrate on the learning materials. This was supported in studies by Geiser (1969), by Hassinger and Via (1969), by Bouchillon and Bouchillon (1972), by Fleming (1969), Landrum and Martin (1970), and by Lippitt and Lohman (1955):

Geiser (1969) stated that 1 benefit of tutoring results from the tutors' positive role of being the teacher and conducting themselves in a responsible manner. Improved behavior carried over into other classes; better attitudes about homework and improved self-esteem were observed. When the child served as tutor and encountered another student who was unmotivated and would not learn, as often occurs after many unsuccessful attempts at learning have been experienced, the tutor became more dedicated to learning. The tutoring experience drew the teacher and students closer together. The harmonious relationships and positive attitudes that resulted made the children become more eager to learn in other subjects as well.

By the second week of the tutorial "One to One" program, Hassinger and Via (1969) noted tremendous improvement in personal grooming, attire, and attitudes of the tutors. Improved self-esteem was also observed in the tutees in this project. Thus, the disadvantaged tutors who were nearing the casualty list in the educational process--with poor grades, low self-esteem, low-level income, and poor school attendance--showed tremendous improvement

through adult encouragement and the acceptance of a responsible role coupled with a relaxed atmosphere of working with other disadvantaged students (Landrum and Martin, 1970). Bouchillon and Bouchillon (1972) stated that when the students from lower socioeconomic levels realize that people care and want them to do better, they put forth greater effort.

Fleming's (1969) "Student Team Action" project presented learning challenges for both tutors and tutees and was used to bring about greater parental involvement in the students' education. Those students who were noted troublemakers as well as those who were under the care of social workers, psychiatrists, and juvenile authorities showed tremendous improvements from this project.

Since the motivation to learn is so important in developing reading skills, which, in turn, determine so much of the students' ability to learn in other areas, Lippitt and Lohman (1955) advised early experiences in tutoring to give students early responsibilities in serving others and in taking initiative and accepting responsibility. They reported that helping others to learn and developing skills in presenting materials to others helps to develop reading skills (Lippitt and Lohman, 1955).

After conducting both cross-age and same-age tutorial projects, Newmark and Melargno (1969) argued for a tutorial community where all students would serve as both students and learners.

Gartner, Kohler, and Riessman (1971) stated that, in general, transfers of gains of children being tutored are expected in the

regular classroom. They reported that these transfers of gains may be from specific skill development or as a result of gains in self-concept experienced by the tutee and the tutor. Ross (1972) found that both disadvantaged tutors and disadvantaged tutees showed gains in reading scores and self-concepts after 1 semester of peer tutoring. He noted that the greatest gains were found among the tutors who had been tutees the previous semester and by the tutees of these former tutees who now served as tutors. Overall, greater gains were made when the student was the tutor than when the same student was the tutee.

The psychological value of tutoring for disadvantaged students was implied as Gartner, Kohler, and Riessman (1971) noted that students who benefited most from tutorial programs were previously identified as failures, or were either the "baby" or the oldest child in the family, or children with no experiences in working with others on an equal footing, or with students who had never worked with an older same-sex child. He identified the common element lacking as extensive and successful contacts with peers.

Tutors often become hooked into the tutor role and thrive on the feeling of personal worth even more than if they were paid for the tutoring activity. Ehly and Larsen (1980) noted that in addition to and perhaps more important than gains in reading scores, the tutors experienced increased interest levels for academic tasks.

In summary, both the tutors and tutees were found to benefit from participation in tutorial programs; and these benefits

transferred to improved regular classroom work. Research showed that tutorial partners benefited regardless of the intervening factors of age, sex, racial-ethnic status, and intelligence level.

The study of peer tutoring in the VIP program at Campbell County High School was an attempt to identify the impact, if any, of several of the intervening variables either described or referenced in the studies herein reviewed.

III. Related Studies as They Contribute to This Study

There are several research studies available which deal with the use of peer tutoring to determine its effectiveness on reading improvement; yet, only 1 such study was found by this researcher specifically in the field of vocational education.

Connie Dabbs reported the results of an experiment in vocational commercial arts at Hume-Fogg Comprehensive High School in Nashville, Tennessee, where high-level achievers were paired with lower level achievers; and the students were " . . . directed to help each other. . . ." (Dabbs, 1977, p. 18). This study found that, based upon the results of pretests and posttests using the Gates-MacGinitie Reading Tests, both the tutees with lower achieving scores and the tutors with higher scores involved in this peer tutoring research study showed significant gains in reading skills.

From the Dabbs (1977) study, this researcher found a much more reliable and valid reading achievement test to use in the Campbell

County tutoring program than was originally selected and reviewed. The results of Dabbs' study gave this researcher increased motivation and encouragement to complete the experimental tutoring treatments.

Careful review of other studies in general, non-vocational curriculum areas contributed much to this researcher in preparing for her own tutoring project:

Cloward (1976) reported that studies of the impact of tutoring on both the tutor and tutee have shown improvement in reading achievement for both. He conducted 2 such studies to ascertain the impact of tutoring on both tutors and tutees. Both of these studies were structured as classical experiments, with random assignment of eligible subjects to experimental and control situations. Control groups received no tutoring treatment in each case and served as a standard for comparing the achievement of the experimental subjects. Pre- and post-standardized reading tests were administered.

Both Hassinger and Via (1969) and Landrum and Martin (1970) reported on the "One to One" tutorial program conducted in Los Angeles County. This program involved both elementary and secondary students, with reading disabled fourth, fifth, and sixth graders being tutored by either high school students, recent unemployed graduates, or high school dropouts who were at least 2 to 3 years behind in reading, with poor school marks and poor school attendance. These children typify those students enrolled in the Campbell County Vocational Improvement Program who were involved in this tutorial study.

Cloward's (1967) study considered the variables of sex, ethnicity, school grade, access to school reading remediation programs, and reading ability. The tutor in this study was reported to be the major beneficiary of the tutorial experience; the tutor improved his own reading ability to a significantly greater degree than did the tutee or the control group.

Chiang, Thorp, and Dorch's (1980) study involved learning disabled tutors and tutees who had a history of reading difficulty. Both the tutors and tutees showed gains in word recognition and reading skills. The responsibility of the tutorial role required the tutors to practice and apply themselves to the skills and materials; they began to realize their need to improve their own skills in order to be able to successfully instruct their peers. Although there was no attempt to study attitudinal changes, informal observations were made; and teachers reported improved classroom behavior and improved attitudes toward reading. Since the disadvantaged student usually displays low self-esteem, and the disadvantaged reader usually lacks enthusiasm and motivation about reading, this researcher was excited about the tutorial project as an attempt to explore another method of instruction in search of ways to improve attitudes and increase motivation among disadvantaged learners.

The "Baker's Dozen" project provided a good example of inverse gains. It assigned poorly educated, unemployed youth to provide mental health services to their community with the results that the helpers showed improvements in their own social adjustments

(Wittenberg, 1971). This study, conducted by Clarissa Wittenberg at the Institute for Youth Studies at Howard University in Washington, D. C., served as the rationale for a study of inverse peer tutoring in remedial reading in British Columbia, Canada: Catherine Mae Stanbrook (1980) reported the results of "An Exploratory Case Study to Determine the Potential Usefulness of 'Inverse' Student Tutoring in the Remediation of Reading Disability," completed at Simon Fraser University in British Columbia, Canada. This experiment explored the benefit of a 10-week tutoring assignment to a ninth grade student tutor in improving his own reading disability. Remedial assistance and tutoring provided to this student had been unsuccessful in helping him improve his reading performance.

Through the tutor's increased responsibilities and regular concentration on reading practice through his provision of cross-age tutoring to a younger student, he himself showed improvement in those skills he had been teaching in the tutoring sessions. The tutor was further observed by his teachers as having "greater perseverance" in his own classroom learning situations (Stanbrook, 1980, p. 51). Since the tutee in this study also showed significant reading improvement, Stanbrook concluded that " . . . inverse student tutoring may be a viable procedure in providing the context in which both tutor and tutee benefit in terms of improved reading performance (Stanbrook, 1980, p. 52).

Another example of inverse gains was reported by Davis (1967) in the 30-week experimental pupil-to-pupil traditional tutoring

research program he conducted in selected English skills at the Island Trees Junior High School in Levittown, New York. His study found that there were significant improvements in measured skills of the tutors involved in the experiment. Davis concluded that the tutors had " . . . more motivation to improve their skills through the responsibilities given to them" (Davis, 1967, p. 52). He also stated that " . . . tutoring may be . . . an important step toward maturity . . . and a chance to raise . . . self-esteem" (Davis, 1967, p. 61).

In a study of "The Effectiveness of Emphasizing Reading Skills in an English Class for Underachievers" conducted at West Bend High School in West Bend, Wisconsin, the underachieving students were given corrective reading classes as part of their adjusted English curriculum while 2 other control groups of students did not receive any reading emphasis. Posttest scores revealed significantly greater gains in reading scores for these experimental students than for the control groups. Other areas of English tested and taught only to the control groups included grammar and essay writing. Posttest scores showed no significant differences among the 3 groups in these areas of grammar and essay writing, even though the experimental groups did not receive the instruction. The author concluded from his study that the implications were that the English curriculum for underachievers could be changed to emphasize reading skills without being detrimental to other areas of English (Emans, 1966). This West Bend study used an adapted English curriculum rearranged to allow for

reading emphasis, reading practice, and the tutorial program to be conducted in the English class (Emans, 1966).

Gartner, Kohler, and Riessman (1971) surveyed many tutoring programs. In their research about the use of materials in tutorial programs, they discovered that positive results are shown in either the use of highly formalized and specific materials and assignments or in more informal and less programmed situations. This researcher's tutorial program employed the latter approach to the use of the materials and assignments in order to share and rotate the use of many available materials and resources and in order to maintain the comfortable yet motivational atmosphere evident from observation of the Campbell County VIP classrooms.

Oakland and Williams (1975) reported the results of an elementary same-age tutoring situation conducted at the University of Texas and involving 2 elementary schools. Their study reported gains in word knowledge and reading comprehension for both the tutees and tutors. The regular classroom teachers provided daily supervision and maintained tutor motivation for their tutoring project. The VIP teachers at Campbell County High School assumed this same role in this writer's tutorial research program.

In a similar study, Ross (1972) reported that peer tutoring among disadvantaged community college freshmen at Tarrant County College District in Fort Worth, Texas, resulted in improvements in reading for both tutors and tutees.

An ex-post-facto study in "Youth Tutoring Youth--It Worked," conducted in Washington, D. C., to determine the degree of success a youth tutoring program had in improving the reading achievement score of the tutor, indicated benefits for the tutor as well as for the tutee, with 1 particular tutor showing more than a year's improvement in only 4 months' study (National Commission on Resources for Youth, 1968). Though this study was completed after the tutorial arrangement had already been ongoing, and though there was no indication as to which group had a greater gain in reading scores, it did add to the growing body of support of the great benefits which may be gained from a peer-tutoring arrangement for all who are involved in the experiment.

Ehly (1975) suggested the need for controls for possible teacher interaction, explaining that teacher warmth and feedback affect learner outcomes. Dunkin and Biddle (1974) explained that the classroom climate is the result of teacher warmth, praise, acceptance, and criticism and that the teacher expectations play a tremendous role in determining student effort and learning outcomes. Ehly (1975) further stated that the classroom climate represents the collective sum of all the individual interactions between the teachers and students and between the students with each other. Since research showed the effects of the teacher on learner outcome, and since there were 3 different teachers participating in this experiment, this researcher exercised control in the random assignment of intact classes to assure that each of these teachers

worked with at least 1 class of students in each of the treatments and control groups.

In summary, research studies revealed that learning through teaching is effective. This researcher utilized all the knowledge gained from the indepth study of the foregoing research reports to assist her in her tutorial experiment.

IV. Summary

Research studies clearly revealed that learning through teaching is effective for both tutors and tutees. This effectiveness is due to both cognitive and emotional reasons (Gartner, Kohler, and Riessman, 1971).

Under the mandate of Public Law 94-142, many teachers began utilizing peer tutoring in order to deliver the required individualized instruction prescribed in the special needs student's IEP, individualized education plan.

Students must be permitted to learn in the least restrictive environment appropriate to their needs (Grzynkowicz, Wirtz, and Marling, 1977). Under the law, students with disabilities are to learn in regular classrooms; they are to be mainstreamed if feasible in order to feel as normal as possible and to help the regular student to be able to view disabilities as normal. The demands for individual time and attention require the teacher to carefully plan as well as to effectively utilize available resources. Thus, the

student tutors may indeed be the most effective resource available (Koskinen and Wilson, 1982, p. 98).

If one could determine which of the intervening variables or factors, or combinations thereof, has greater impact or effect on learning and achievement, controls could be exercised by the teachers as they utilize peer tutoring in order to maximize its potential.

Tutoring is used in the classroom more naturally and even more often than is recognized by most teachers. Often the teacher today will assign 1 student to work with or assist another. The reverse will also be true. The student will be sent to another for extra assistance, or the teacher will employ teams with student leaders (Ehly and Larsen, 1980). Even though this use is subtle, often unrealized, and unstructured, with its effectiveness many times unmeasured, peer tutoring is being effectively utilized in today's classrooms across the nation.

Exploring and determining the effectiveness of peer tutoring and finding ways to utilize tutoring to maximize learning is greatly needed. This research experiment provides 1 more examination of this method of teaching reading in an attempt to add to this growing body of literature.

CHAPTER III

METHODOLOGY AND PROCEDURES

This research project was conducted in order to investigate 2 methods of instruction to ascertain the effects, if any, of inverse tutoring and traditional tutoring in improving the reading competencies of secondary vocational improvement program (VIP) students at Campbell County Comprehensive High School in Jacksboro, Tennessee. The foregoing review of literature and related research provided a foundation and direction for completing this research.

The procedures used in this experimental tutorial research project are presented in the following subsections: population and sample, design, data and instrumentation, special procedures, and method of data analysis.

I. Population and Sample

A sample of 178 academically and socioeconomically disadvantaged Campbell County High School vocational students in grade levels 9 through 12 enrolled in 1984-85 in 13 different intact VIP classes were the experimentally accessible population of this study. These 178 students in 13 different intact VIP classes were randomly selected from the population of VIP students at Campbell County High School in Jacksboro, located in East Tennessee. A table of random numbers was used to assign them to the treatment and

control groups. Of these 178 students, 118 completed all 10 weeks of the study completing the pretest, 50 days of treatment, posttest, and had IQ and Tennessee State Proficiency Test scores available for inclusion in this study.

Of the 13 intact classes selected, there were 5 intact groups of students each receiving the inverse tutoring treatment (N = 21 tutors + 21 tutees) with the remedial students in each class tutoring their peers; one-half of them were randomly assigned as tutors, while one-half of them were randomly assigned as tutees. There were 4 intact groups of students receiving traditional tutoring (N = 42); and 4 intact groups (N = 34) that were randomly assigned to receive the same instruction and assignment in reading but without the benefit of any tutoring.

Each student participating in the VIP programs had parental permission to enroll in the special program. In addition, a letter was sent to each of the parents of the participants in this study explaining the purpose of the study and that the students' individual data would be kept in confidence. (See Appendix A.)

II. Design

A modified/adapted experimental design No. 4 from Campbell and Stanley (1963, p. 25), the Pretest-Posttest Control Group Design, was used in this study. This powerful design controls for all 7 internal validity factors (Baker and Schultz, 1972). Random assignment of entire intact classes was made since random assignment of individual

subjects was not feasible. The following variables are incorporated into the design:

- A. The dependent variable is the reading achievement as measured by the Gates-MacGinitie Reading Test administered at the beginning and end of the 10-week tutoring treatment period.
- B. The independent variables selected by this researcher are IQ as measured by a standardized mental ability test administered within the past 2 years and past reading achievement as measured by the Tennessee State Proficiency Test. Other secondary independent variables which will be statistically considered are:
 1. Sex (male and female).
 2. Age.
 3. Parents' occupational status.

A graphic presentation of this design, as modified for this particular study, follows:

Treatment #1	R	O_1	X_1	O_2
(Inverse Tutoring)				
Treatment #2	R	O_1	X_2	O_2
Comparison Group				
(Traditional Tutoring)				
Control Group	R	O_1		O_2
(No Tutoring)				

R: indicates random selection and assignment of intact classes to separate treatments.

X: indicates the exposure of the intact classes to an experimental variable or event. Measurement of the effects of this treatment was made using the Gates-MacGinitie Reading Test, Level E, Forms 1 and 2.

O: refers to the process of measuring (observing) the effects of the treatment. In this study the pretest and posttest were administered to the control group receiving neither of the forms of tutoring treatment in order to compare the mean scores of all 3 groups.

III. Data and Instrumentation

The mean achievement scores on the reading pretest and posttest are interval level data. IQ, past reading ability of participants as measured by the Tennessee State Proficiency Test, and age are also treated in this study as interval data. Parents' occupational status and sex of the participants are nominal level data.

The instrument used to measure reading achievement on the pretest and posttest was the Gates-MacGinitie Reading Test, Survey Level E, Forms 1 and 2, for grades 7-9 with out-of-level norms charts provided in the manuals and used to adjust the scores back up to grades 10-12 (Gates and MacGinitie, 1965). This lower level of the test was utilized since all students enrolled in VIP are at least 2 grade levels behind in reading comprehension and vocabulary. The

knowledge and skills measured by these tests are common to most school reading curricula, and Gates-MacGinitie Reading Test norms were developed by administering the tests to a nationwide sample of approximately 40,000 pupils in 38 different communities. There is a well-written manual and technical supplement for the Gates-MacGinitie tests; it is written with clarity and competence and alerts the user to possible interpretive dangers. Norming procedures, samples, procedures followed in equating forms and levels, data on standardization, reliability, and validity are fully described in the Technical Manual (Gates and MacGinitie, 1969).

Buros (1972) verifies the validity and reliability of this instrument. The comprehension test has a high alternative-form reliability of .88. The vocabulary test has a .90 alternative-form reliability with a high correlation between the comprehension and vocabulary scores (about .88) and between these tests and the Lorge Thorndike verbal IQ scores (.79). The speed and accuracy section of the test has an alternative-form reliability of about .72 (Buros, 1972). For the purpose of this study, only the reading comprehension scores will be examined and statistically treated.

The reading materials used during the 10 weeks of study consisted of the SRA Reading Kits (Parker, 1973) and the "Critical Reading Kits: Hi-A through Hi-L" (Taylor and White, 1978). These 12 CRL kits consist of cassettes and filmstrips for each story, story booklet to read, and questions to answer to test comprehension. The "Today" (Sherman and DiNapoli, 1977) magazines/activity pamphlets

with filmstrips were used to teach reading comprehension and vocabulary improvement. "Troubleshooter" Books 1-8 were used to teach reading comprehension and to further develop reading skill (Benner and Law, 1977). In addition, each student was asked to select a book from the "Benefic Press Library Series . . . " of high-interest, low reading level books (Benefic Press, 1976). Further study of vocabulary included terminology related to the vocational programs within Campbell County High School. This terminology consists of a growing list of vocabulary words compiled and updated annually by vocational instructors in the school.

IV. Special Procedures

In addition to the internal validity controls available and provided by the experimental design, this researcher used the following additional controls in order to insure that the study will have maximum validity:

1. Since there were 3 different teachers participating in this research, each of them worked with at least 1 class of students in each of the treatments and control groups. This control was exercised in the random assignment of the intact classes in order to control for possible interaction between instructor and tutoring or instructional method.
2. Each teacher attended a brief orientation session in June, 1984, and discussed an overview of the study

and the plans for organizing the tutorial treatments. In September, 1984, and again in January, 1985, the teachers attended the second and third orientation sessions to review objectives, methodology, procedures, and to plan the assignments.

3. A rotation plan was agreed upon for sharing reading kits and materials so that all students had access to the same materials but at different times.
4. Each teacher was asked to handle each class with the same amount of teacher involvement. They were asked to restrict/avoid any type of tutoring arrangement in the control classes.
5. The researcher monitored the classes weekly with assistance and additional monitoring visits provided each week by the Special Vocational Programs Coordinator and Vocational Media Center Specialist.
6. The 42 traditional volunteer tutors included in the study were recruited by the Guidance Department as has been true of past tutoring arrangements in this school. They were then assigned to the class periods based upon their scheduling availability and were then given orientation and instructions by the teachers.
7. To insure that traditional tutors gave equal tutoring to this treatment group, they were assigned to tutor

the VIP students during the same classtime setting as was true for the inverse tutoring groups and for the control groups who worked on reading improvement assignments nontutored during classtime.

8. The 21 inverse tutors were also given orientation and instructions by the teachers. The researcher directed all orientation, training, and instructions.
9. To eliminate researcher bias, all materials as well as the pretest and posttest were administered by the county's Special Vocational Programs Coordinator and Vocational Media Specialist.
10. In order to prevent any teaching specifically designed to include posttest tip off, 2 forms of the Gates-MacGinitie Reading Test were used. These tests were not delivered to the teachers until time for administration. The posttest was not delivered until the tutoring treatments were completed.
11. In order to control for interaction of subjects and possible maturation effects, the posttest was administered to all subjects after 50 instructional days of 50 minutes each had elapsed. The test was administered to every subject during either the second or third periods of the same 2 school days: between the hours of 9:30 and 11:30 a.m.

12. In order to assure that the identity of specific students involved in the study will remain confidential, each subject was assigned an identification code number. This number is for use in reporting data outside the school setting.

V. Method of Data Analysis

Data were gathered on the subjects of this study through the assistance of the Coordinator of Special Vocational Programs, the Vocational Media Center Specialist, and Guidance Department of Campbell County High School. A researcher-developed instrument was used to record this information. Since the original instrument included both the students' and the parents' names and addresses, the form was changed before statistical analysis was begun in order to protect the confidentiality of the information. (Appendix B includes this instrument in its revised form.)

A one-way analysis of variance (ANOVA) was applied to the pretest scores; a separate one-way ANOVA was applied to the posttest scores; and a separate one-way ANOVA was applied to the gain scores to compare the mean scores of each of the 4 groups: the traditional tutees, the inverse tutees, the inverse tutors, and the nontutored, with post hoc analysis as follows: If a significant F distribution at the .05 level of significance resulted, then Scheffe's Multiple Comparison test was to be applied to locate which groups were significantly different (Ferguson, 1981). If a significant F score

resulted from the Scheffe test, then an analysis of covariance (ANCOVA) was to be applied to correct any initial differences.

A Pearson's product-moment correlation coefficient test was run on the 2 measures of reading achievement: the scores on the Tennessee State Proficiency Test (TSPT) and the scores on the pretest; and a separate Pearson correlation test was run on the TSPT and the posttest. Correlation coefficients of .7 or higher were to be entered into the ANCOVA for any groups with significant differences in mean scores when tested as above described.

Multiple linear regression was applied to the data to identify the independent variables having the most significant impact on the achievement test scores at the end of the tutoring experiments. In building this regression model, each possible independent variable was compared on the basis of the posttest gain score. The extraneous variables having the highest Beta weight were to be used in further statistical analysis in the multiple classification analysis of covariance (ANCOVA) test.

In case the multiple analysis of covariance revealed a statistically significant difference at the .05 level, Duncan's New Multiple-Range Test was to be used to analyze these differences (Campbell and Stanley, 1963).

Data analyses and statistical calculations were processed at the computing facilities available to the Department of Technological and Adult Education, The University of Tennessee, Knoxville. The

results of these analyses and calculations are summarized and discussed in Chapter IV.

CHAPTER IV

ANALYSES OF THE DATA

This research study was conducted to determine the effects, if any, of inverse tutoring versus traditional tutoring in improving the reading competencies of secondary vocational improvement program (VIP) students at Campbell County High School in Jacksboro, Tennessee. The study also sought to assess the interactive effect of such intervening variables as reading ability and/or achievement, IQ, sex, and parents' occupational status with the main effect of these 2 different tutoring methods. In addition, the relationship between the 2 measures of reading achievement, the Tennessee State Proficiency Test (TSPT) and the Gates-MacGinitie Reading Tests, Survey Level E, Form 1 (pretest) and Form 2 (posttest), were investigated.

The population of the study, after eliminating incomplete data for those who failed to complete the experiment, was comprised of 118 students in grades 9 through 12 enrolled in 1984-85 in 13 different intact VIP classes at Campbell County High School. Of these 118 students, there were 77 males and 41 females, all ranging between 15 and 18 years of age. Table I gives a breakdown of the group by age and sex. Each of these students completed the 10-week study, the pretest, 50 days (sessions) of treatment, the posttest, and had IQ and Tennessee State Proficiency Test scores available for inclusion in this experiment. The treatment consisted of intact assignment of

classes to 1 of 4 experimental groups: inverse tutor, inverse tutee, traditional tutee, or nontutored.

TABLE I
SUMMARY OF EXPERIMENTAL POPULATION--1984-85 CAMPBELL
COUNTY SECONDARY VOCATIONAL IMPROVEMENT PROGRAM
STUDENTS--BY AGE AND SEX

Age	Number of Males	Number of Females	Total
15	24	15	39
16	10	11	21
17	29	8	37
18	14	7	21
TOTAL	77	41	118

Initial data were gathered on the subjects of this study from the students' permanent records in the Guidance Office of the school. These data were then recorded on a researcher-developed instrument (See Appendix B). Each subject was assigned a project identification code to assure anonymity and confidentiality.

The parents' occupations were recorded, and their occupational status was summarized using a code. A code of 1 was used if the subject had 1 parent employed and 1 parent unemployed. A 2 was used if both parents were employed; a 3 indicated both parents were in the

home, but neither was employed. A code of 4 meant only 1 parent was in the home, and that parent was employed. A 5 was used when there was only 1 parent in the home, and that parent was not employed. A code of 6 was assigned if the subject had no parent in the home. None of the 118 students who completed the study fit into this last category.

Summaries of the experimental population are recorded in Tables II through VI. The average age and mean IQ scores by sex and parents' occupational status are provided. In Table II information for experimental group 1 is provided. In group 1, the nontutored, the average age was 16.20; and the average IQ score was 72.91. Table III summarizes information for group 2. In group 2, the inverse tutors, the average age was 16.66; and the mean IQ score was 80.33. In Table IV, information is summarized for group 3. The inverse tutees in group 3 had an average age of 16.90 and a mean IQ score of 78.24. Table V summarizes group 4. The traditional tutees in group 4 had an average age of 15.92 and an average IQ of 76.90. Table VI gives a summary of the entire experimental group, $N = 118$. The mean age for the males of the study was 16.42; and their average IQ score was 78.44. The average age of the females in the study was 15.68; their average IQ score was 73.15. For the total group, the average age was 16.35; and the average IQ score was 76.60.

Additional data were collected from reading achievement tests, the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2, administered at the beginning and end of the experiment.

TABLE II

SUMMARY OF 1984-85 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL POPULATION GROUP #1, THE NONTUTORED,
INDICATING AVERAGE AGE AND MEAN IQ SCORES
BY SEX AND PARENTS' OCCUPATIONAL STATUS^a

Parents' Occupational Status	Male Population			Female Population			Total Group		
	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score
1	17	16.58	76.47	4	15.50	70.25	21	16.38	75.29
2	6	16.00	74.17	1	16.00	60.00	7	16.00	72.14
3	1	17.00	73.00	2	15.50	66.00	3	16.00	68.33
4	2	15.50	67.50	0	---	---	2	15.50	67.50
5	0	---	---	1	16.00	53.00	1	16.00	53.00
Total	26	16.38	75.12	8	15.62	65.75	34	16.20	72.91

^aParents' Occupational Status: 1 = 1 Parent Employed; 1 Not Employed
2 = 2 Parents Employed
3 = Neither Parent Employed
4 = 1 Parent in Home and Employed
5 = 1 Parent in Home and Not Employed

TABLE III

SUMMARY OF 1984-85 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL POPULATION GROUP #2, THE INVERSE TUTORS,
INDICATING AVERAGE AGE AND MEAN IQ SCORES^a
BY SEX AND PARENTS' OCCUPATIONAL STATUS^a

Parents' Occupational Status	Male Population			Female Population			Total Group		
	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score
1	8	16.62	80.13	1	15.00	54.00	9	16.44	77.22
2	6	16.66	85.17	1	15.00	101.00	7	16.72	87.43
3	2	17.50	89.50	2	17.00	60.00	4	17.25	74.75
4	0	---	---	0	---	---	0	---	---
5	0	---	---	1	17.00	81.00	1	17.00	81.00
Total	16	16.75	83.19	5	16.20	71.20	21	16.66	80.33

^aParents' Occupational Status: 1 = 1 Parent Employed; 1 Not Employed
2 = 2 Parents Employed
3 = Neither Parent Employed
4 = 1 Parent in Home and Employed
5 = 1 Parent in Home and Not Employed

TABLE IV

SUMMARY OF 1984-85 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL POPULATION GROUP #3, THE INVERSE TUTTEES,
INDICATING AVERAGE AGE AND MEAN IQ SCORES
BY SEX AND PARENTS' OCCUPATIONAL STATUS^a

Parents' Occupational Status	Male Population			Female Population			Total Group		
	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score
1	9	16.66	76.56	0	---	---	9	16.66	76.56
2	1	17.00	80.00	4	17.75	75.75	5	17.60	76.60
3	3	17.33	81.33	1	15.00	71.00	4	16.75	78.75
4	1	17.00	80.00	0	---	---	1	17.00	80.00
5	1	17.00	95.00	1	16.00	81.00	2	16.50	88.00
Total	15	16.86	79.20	6	17.00	75.83	21	16.90	78.24

^aParents' Occupational Status: 1 = 1 Parent Employed; 1 Not Employed
2 = 2 Parents Employed
3 = Neither Parent Employed
4 = 1 Parent in Home and Employed
5 = 1 Parent in Home and Not Employed

TABLE V

SUMMARY OF 1984-85 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL POPULATION GROUP #4, THE TRADITIONAL TUTTEES,
INDICATING AVERAGE AGE AND MEAN IQ SCORES
BY SEX AND PARENTS' OCCUPATIONAL STATUS^a

Parents' Occupational Status	Male Population			Female Population			Total Group		
	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score
1	5	15.20	80.00	7	16.28	76.86	12	15.83	78.17
2	10	15.70	82.70	2	15.00	80.50	12	15.58	82.33
3	2	17.50	61.50	7	16.00	73.00	9	16.33	70.44
4	2	16.00	69.00	3	15.66	84.67	5	15.80	78.40
5	1	18.00	80.00	3	16.00	66.00	4	16.50	69.50
Total	20	15.90	78.40	22	15.95	75.55	42	15.92	76.90

^aParents' Occupational Status: 1 = 1 Parent Employed; 1 Not Employed
2 = 2 Parents Employed
3 = Neither Parent Employed
4 = 1 Parent in Home and Employed
5 = 1 Parent in Home and Not Employed

TABLE VI

SUMMARY OF 1984-85 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL POPULATION GROUP (N = 118)
INDICATING AVERAGE AGE AND MEAN IQ SCORES
BY SEX AND PARENTS' OCCUPATIONAL STATUS^a

Parents' Occupational Status	Male Population			Female Population			Total Group		
	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score	N	Average Age	Mean IQ Score
1	39	16.43	77.69	12	15.91	72.75	51	16.31	76.53
2	23	16.86	81.00	8	16.50	78.13	31	16.19	80.26
3	8	17.37	77.38	12	16.00	69.50	20	16.55	72.65
4	5	16.00	70.60	3	15.66	84.67	8	15.87	75.88
5	2	17.50	87.50	6	16.16	68.83	8	16.50	73.50
Total	77	16.42	78.44	41	15.68	73.15	118	16.35	76.60

^aParents' Occupational Status: 1 = 1 Parent Employed; 1 Not Employed
2 = 2 Parents Employed
3 = Neither Parent Employed
4 = 1 Parent in Home and Employed
5 = 1 Parent in Home and Not Employed

Mean scores on the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2, for each of the 4 experimental groups are recorded in Table VII. This table includes mean and standard deviation scores for the pretest and posttest, as well as the gain scores for each of the 4 treatment groups.

The overall mean score on the pretest, Gates-MacGinitie Reading Tests, Survey Level E, Form 1, was 6.77 with a standard deviation of 1.99. The overall mean score on the posttest, Gates-MacGinitie Reading Tests, Survey Level E, Form 2, was 6.94 with a standard deviation of 2.09 and a total posttest mean gain of +.17. The highest mean score on the pretest was recorded in the inverse tutee group, a score of 6.94. The highest mean score on the posttest was found in the inverse tutor group; this score was 7.39. This same group, the inverse tutors, also showed the greatest posttest gain, a gain of +.61. There was little variance noted in standard deviation scores.

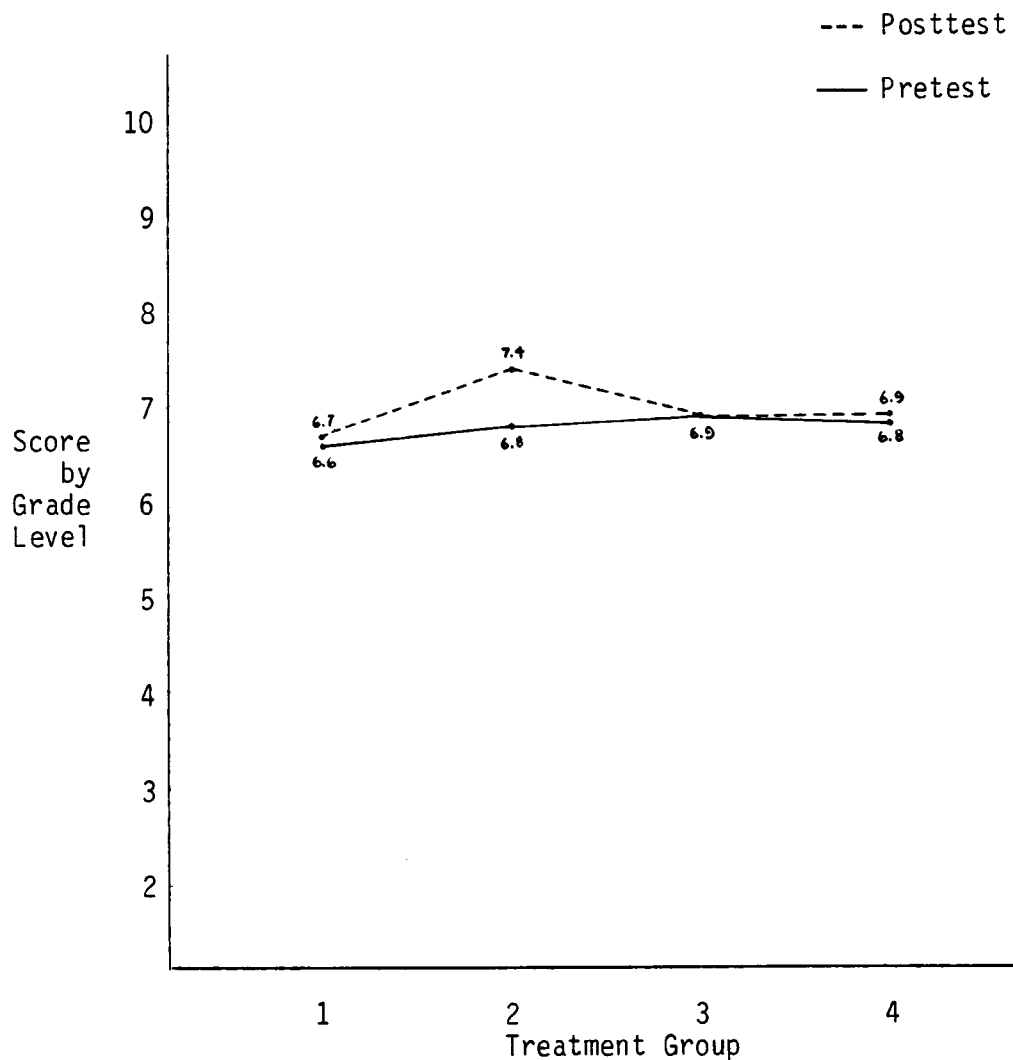
Differences in pretest and posttest scores for each of the 4 treatment groups is further illustrated in graphic form in Figure I. Group 2, the inverse tutors, showed the greatest gain on the posttest. Group 3, the inverse tutees, showed a decrease on the posttest. The other 2 groups, group 1, the nontutored, and group 4, the traditional tutees, showed slight gains on their posttests.

The hypotheses of the study were tested using appropriate statistical tests. The first null hypotheses that there would be no significant differences in the reading scores among students in the 4

TABLE VII

PRETEST AND POSTTEST MEAN SCORES, POSTTEST GAIN SCORES, AND STANDARD DEVIATIONS
 FOR THE GATES-MACGINITIE READING TESTS, SURVEY LEVEL E, FORM 1
 (PRETEST) AND FORM 2 (POSTTEST), FOR THE 1984-85
 CAMPBELL COUNTY VOCATIONAL IMPROVEMENT
 PROGRAM STUDENTS IN THE
 EXPERIMENTAL POPULATION

Treatment Group	N	Pretest Mean Score	Pretest Standard Deviation	Posttest Mean Score	Posttest Standard Deviation	Posttest Gain Score
1. No Tutoring	34	6.60	2.10	6.70	2.19	+ .10
2. Inverse Tutor	21	6.78	1.77	7.39	2.01	+ .61
3. Inverse Tutee	21	6.94	2.24	6.88	2.26	- .06
4. Traditional Tutee	42	6.83	1.92	6.93	1.99	+ .10
Total Group	118	6.77	1.99	6.94	2.09	+ .17



^aTreatment Group: 1 = No Tutoring
 2 = Inverse Tutor
 3 = Inverse Tutee
 4 = Traditional Tutee

FIGURE I
 GATES-MACGINITIE PRETEST AND POSTTEST MEAN SCORES
 FOR THE 1984-85 CAMPBELL COUNTY VOCATIONAL
 IMPROVEMENT PROGRAM STUDENTS IN THE
 EXPERIMENTAL POPULATION--BY
 TREATMENT GROUP^a

treatment groups was formulated and disposed of according to the probability associated with the F value obtained.

A one-way analysis of variance (ANOVA) was applied to the pretest mean scores for each treatment group, with a separate one-way ANOVA on the posttest mean scores and a separate one-way ANOVA on the posttest gain scores for each treatment group. The post-hoc analyses were planned for significant F distributions at the .05 level of significance. If F values are greater than those required at the .05 level of significance chosen for this study, post-hoc analyses will be conducted; and the hypotheses will be rejected.

The second null hypothesis that there would be no significant relationships between reading achievement scores and such independent variables as IQ, sex, reading abilities, and parents' occupational status was tested and disposed of through a multiple linear regression analysis utilizing both backward-elimination and forward-selection procedures. A rejection of the hypothesis requires the regression model to produce significant Beta weights for any of the extraneous variables at the .05 level of significance. If no significant Beta weights at the .05 level of significance are found, then the hypothesis will be retained.

I. Findings

Each hypothesis is stated followed by findings from the statistical analysis. If there was a relationship between the scores and the treatment groups, the hypotheses were retained. A rejection

of the hypotheses would indicate that significant differences or relationships existed.

H₀₁: There are no significant differences in the mean achievement scores on a standardized reading test among students conducting inverse tutoring, those receiving inverse tutoring, those receiving traditional tutoring, and those who receive no tutoring.

To reject this hypothesis at the .05 level of significance, the F score must equal or exceed 2.69 on each of the one-way ANOVA tests: the one-way ANOVA of pretest mean scores, posttest mean scores, and posttest gain scores.

Analysis of the data from the ANOVA of pretest mean scores indicated the F value of .15, as shown in Table VIII. Since this F of .15 is less than 2.69, the hypothesis was retained. Students who conducted inverse tutoring and those who received inverse and/or traditional tutoring did not score higher on the reading achievement pretest, Gates-MacGinitie Reading Tests--Survey Level E, Form 1, than those students who received no tutoring.

From the one-way ANOVA of posttest mean scores, the F value of .47 was obtained, as summarized in Table IX. Since this score of .47 is less than 2.69, the hypothesis is again retained. Students who conducted inverse tutoring, those who received inverse tutoring, and those who received traditional tutoring did not score higher on the reading achievement posttest, the Gates-MacGinitie Reading

TABLE VIII

SUMMARY OF ONE-WAY ANALYSIS OF VARIANCE (ANOVA) OF PRETEST
 MEAN SCORES ON GATES-MACGINITIE READING TESTS--SURVEY
 LEVEL E, FORM 1, FOR 1984-85 CAMPBELL COUNTY
 VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
 IN THE EXPERIMENTAL POPULATION

Source of Variation	Sum of Squares	Degrees of Freedom	Variance Estimate	F Value
Model (Between Treatments)	1.81	3	.60	.15*
Error (Within Treatments)	461.95	114	4.05	
Totals	463.76	117		

*Not statistically significant, $p > .05$.

An F ratio of 2.69 is required for significance at the $p < .05$
 level for 3 and 114 degrees of freedom.

TABLE IX

SUMMARY OF ONE-WAY ANALYSIS OF VARIANCE (ANOVA) OF POSTTEST
 MEAN SCORES ON GATES-MACGINITIE READING TESTS--SURVEY
 LEVEL E, FORM 2, FOR 1984-85 CAMPBELL COUNTY
 VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
 IN THE EXPERIMENTAL POPULATION

Source of Variation	Sum of Squares	Degrees of Freedom	Variance Estimate	F Value
Model (Between Treatments)	6.32	3	2.10	.47*
Error (Within Treatments)	507.26	114	4.45	
Totals	513.58	117		

*Not statistically significant, $p > .05$.

An F ratio of 2.69 is required for significance at the $p < .05$ level for 3 and 114 degrees of freedom.

Tests--Survey Level E, Form 2, than those students who received no tutoring.

The ANOVA of the posttest gain scores indicated an F value of .69, as shown in Table X. Again, this F value is less than 2.69, and the hypothesis is again retained. Those students who conducted inverse tutoring, those who received inverse tutoring, and those who received traditional tutoring did not show any greater gains when their pretest and posttest scores on the Gates-MacGinitie Reading Tests--Survey Level E, Forms 1 and 2, were compared than did those students who received no tutoring.

While not a major hypothesis of this study, it was important to test the validity of the Tennessee State Proficiency Test, TSPT, to see if there was a significant relationship between the TSPT reading scores and the pretests and posttests, the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2.

A series of Pearson's product-moment correlation coefficient tests were made to test this secondary hypothesis:

There is no significant relationship between the Tennessee State Proficiency Test (TSPT) scores and the pretest, posttest, and posttest gain scores as measured by the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2, for students conducting inverse tutoring, receiving inverse tutoring, receiving traditional tutoring, or receiving no tutoring.

TABLE X

SUMMARY OF ONE-WAY ANALYSIS OF VARIANCE (ANOVA) OF POSTTEST GAIN
 SCORES ON GATES-MACGINITIE READING TESTS--SURVEY LEVEL E,
 FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
 VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
 IN THE EXPERIMENTAL POPULATION

Source of Variation	Sum of Squares	Degrees of Freedom	Variance Estimate	F Value
Model (Between Treatments)	5.54	3	1.84	.69*
Error (Within Treatments)	302.84	114	2.66	
Totals	308.38	117		

*Not statistically significant, $p > .05$.

An F ratio of 2.69 is required for significance at the $p < .05$ level for 3 and 114 degrees of freedom.

For group 1, the nontutored group, the correlation coefficient or calculated r for the pretest was .37. A table value of .33 is required at the .05 level. This portion of the hypothesis was rejected. There was a significant positive correlation between the TSPT and the pretest scores for this group, as is summarized in Table XI. There were, however, no positive relationships indicated for the posttest scores, with a calculated r score of .21, and a calculated r value of -.21 for the posttest gain scores for this nontutored group. This portion of the hypothesis was then retained.

TABLE XI
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR TSPT AND
GATES-MACGINITIE READING TESTS, SURVEY LEVEL E,
FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL NONTUTORED GROUP
(TREATMENT GROUP #1)

Variable	N	Mean Score	Standard Deviation	r^*
Pretest	34	6.60	2.11	.37
Posttest	34	6.70	2.20	.21
Gain	34	.10	1.54	-.21

* r = correlation coefficient score.

A critical value of $r = .33$ is required for significance at the $p < .05$ level for 32 ($n - 2$) degrees of freedom.

A comparison was made of the scores on the TSPT and the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2, for the inverse tutor group, as reported in Table XII. In testing for relationships between the tests in this group, the calculated r of .52 was found for the posttest gain scores. Since this score of .52 is greater than the table value of r , .433, it is significant at the .05 level. Therefore, a positive correlation is found between these posttest gain scores for this experimental group and their TSPT reading scores. In this instance, this portion of the secondary hypothesis of no significant relationships between these tests is again rejected.

Further analysis of the data for this group shown in Table XII indicates a calculated r value for the pretest of $-.30$, and an r value of $.177$ for the posttest. Since these values are not significant at the .05 level, these portions of the secondary hypothesis are retained.

For the third treatment group, the inverse tutees, there are no significant relationships found between the TSPT scores and the pretest, posttest, or posttest gain scores. An r of $.08$ was calculated for the pretest; for the posttest, the r value of $-.03$ was found; and for the posttest gain scores, an r value of $-.14$ was calculated, as shown in Table XIII. In this instance, the secondary hypothesis of no significant relationship between the TSPT and the pretest, posttest, or posttest gain scores is retained.

TABLE XII
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR TSPT AND
GATES-MACGINITIE READING TESTS, SURVEY LEVEL E,
FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL INVERSE TUTOR GROUP
(TREATMENT GROUP #2)

Variable	N	Mean Score	Standard Deviation	r*
Pretest	21	6.79	1.78	-.30
Posttest	21	7.40	2.02	.177
Gain	21	.61	1.73	.52

*r = correlation coefficient score.

A critical value of $r = .433$ is required for significance at the $p < .05$ level for 19 ($n - 2$) degrees of freedom.

TABLE XIII

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR TSPT AND
 GATES-MACGINITIE READING TESTS, SURVEY LEVEL E,
 FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
 VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
 IN THE EXPERIMENTAL INVERSE TUTEE GROUP
 (TREATMENT GROUP #3)

Variable	N	Mean Score	Standard Deviation	r*
Pretest	21	6.95	2.25	.08
Posttest	21	6.89	2.27	-.03
Gain	21	-.06	1.70	-.14

*r = correlation coefficient score.

A critical value of $r = .433$ is required for significance at the $p < .05$ level for 19 ($n - 2$) degrees of freedom.

For the traditional tutees, group 4, there was a positive correlation, and, thus, a significant relationship found between the TSPT scores and the Gates-MacGinitie Reading Tests, Survey Level E, Form 1, the pretest, and also between the TSPT scores and Form 2 of the Gates-MacGinitie Reading Tests, the posttest. Table XIV summarizes the results for group 4. The calculated r values for each of these groups of tests was .31, which is greater than the table value of .304 required for significance at the .05 level. This portion of the hypothesis stating that there is no significant correlation between these tests is rejected. However, there was no significant relationship found between the posttest gain scores for this group and their TSPT scores. The calculated r of .009 is less than .31; therefore, this portion of the hypothesis stating no significant relationship for the TSPT and the posttest gain scores is retained.

The correlation coefficients calculated for the total experimental group, $N = 118$, indicated in Table XV, showed a significant relationship between the TSPT scores and the posttest scores, Gates-MacGinitie Reading Tests, Survey Level E, Form 2, with a calculated r value of .20, which is greater than the table value of r of .195. This portion of the secondary hypothesis which states that there is no significant correlation is then rejected. The calculated r for the TSPT scores and the pretest scores, Gates-MacGinitie, Survey Level E, Form 1, was .19, which is slightly less than the table value of r of .195. For the TSPT scores and the posttest gain

TABLE XIV
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR TSPT AND
GATES-MACGINITIE READING TESTS, SURVEY LEVEL E,
FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE EXPERIMENTAL TRADITIONAL TUTEE
GROUP (TREATMENT GROUP #4)

Variable	N	Mean Score	Standard Deviation	r*
Pretest	42	6.83	1.92	.31
Posttest	42	6.93	2.00	.31
Gain	42	.10	1.62	.009

*r = correlation coefficient score.

A critical value of $r = .304$ is required for significance at the $p < .05$ level for 40 ($n - 2$) degrees of freedom.

TABLE XV
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR TSPT AND
GATES-MACGINITIE READING TESTS, SURVEY LEVEL E,
FORMS 1 AND 2, FOR 1984-85 CAMPBELL COUNTY
VOCATIONAL IMPROVEMENT PROGRAM STUDENTS
IN THE TOTAL EXPERIMENTAL GROUP

Variable	N	Mean Score	Standard Deviation	r*
Pretest	118	6.78	1.99	.19
Posttest	118	6.94	2.10	.20
Gain	118	.16	1.62	.02

*r = correlation coefficient score.

A critical value of $r = .195$ is required for significance at the $p < .05$ level for 116 ($n - 2$) degrees of freedom.

scores, the calculated r is .02, which is also less than the .195 table value of r . Thus, there is no significant relationship between these TSPT scores and the pretest scores or the posttest gain scores. These portions of the secondary null hypothesis are then retained.

In summary, the Pearson product-moment correlation coefficients calculated in Tables XI, XII, XIII, XIV and XV indicate significant relationships between the TSPT reading scores and pretest, posttest, and posttest gain scores for the treatment groups as specified. Thus, the secondary null hypothesis is rejected as was discussed.

The second null hypothesis stated:

Ho2: There are no significant relationships between achievement scores on a standardized reading test for students and their IQ scores, reading abilities, sex, and occupational status of their parents.

In order to test this hypothesis and to identify any major intervening variables affecting reading posttest gain scores, multiple linear regression analysis was applied. Table XVI presents the analysis using backward-elimination procedures, examining the relationship between the dependent variable of posttest gain scores and the researcher-selected independent variables of IQ, TSPT scores, sex, and parents' occupational status. There were no significant calculated Beta values or F values for any of the independent variables. An F ratio of 2.69 was required for significance at the .05 level. The variable with the highest Beta weight could not be

TABLE XVI

MULTIPLE REGRESSION MODEL USING BACKWARD-ELIMINATION PROCEDURE
AND SHOWING NO SIGNIFICANT POSITIVE RELATIONSHIP BETWEEN
INDEPENDENT VARIABLES AND POSTTEST GAIN SCORES
FOR THE 1984-85 CAMPBELL COUNTY VOCATIONAL
IMPROVEMENT PROGRAM STUDENTS IN THE
EXPERIMENTAL POPULATION^a

Dependent Variable	Independent Variable	Beta Value	F Value	R ² of Model	Overall F of Model
Posttest Gain Score	IQ	-.0001	.00		
	TSPT	.003	.05		
	Sex	.408	1.42		
	Parents' Occupational Status	-.052	.16	.036*	.71**

^aN = 118

*An r^2 value of .036 indicates that only 3.6% of the variance in posttest gain scores can be attributed to the independent variables in this regression model.

**An F ratio of 2.69 is required at the $p < .05$ level of significance for 3 and 114 degrees of freedom.

further statistically treated due to the low F ratio. The researcher must, therefore, fail to reject this null hypothesis.

Further information presented in Table XVI shows that this regression analysis resulted in an r^2 value of .036. This r^2 score is the coefficient of determination which explains the variance of 1 variable due to the variance of another variable. This model indicates that only 3.6% of the variance in posttest gain scores was attributed to these researcher-identified variables.

Further testing of the data using the forward-selection procedure also showed no significant Beta weights, with an r^2 value of only .01 and an overall F score of 1.32.

Even though the students' actual grade and their age were not identified as variables to be tested in this second null hypothesis, these 2 variables were entered into an additional regression analysis to be sure that no extraneous variable had been overlooked as having possible impact on the posttest gain scores. There were no significant Beta weights or F values for either of these variables. The Beta weights were .407 for age and .353 for grade, while the F values were 2.61 for age and 1.87 for grade. This additional analysis was used in order to feel more comfortable with the failure to reject this second hypothesis.

II. Summary of the Analyses of Data

As a result of the one-way analysis of variance tests, no significant differences were observed in the pretest and posttest

scores of the 4 treatment groups. The multiple linear regression analysis also indicated no significant relationships between the independent variables and the mean achievement scores. The researcher, therefore, failed to reject H_{01} and H_{02} .

The Pearson product-moment correlation coefficient was utilized in testing and establishing the relationship between the subjects' TSPT reading scores and the Gates-MacGinitie pretest and posttest reading scores. A significant relationship between these tests was indicated at the .05 level for the pretest for group 1, the nontutored; for group 4, the traditional tutees; and also for the posttest for group 4. For group 2, the inverse tutors, there was a significant relationship on the posttest gain scores only. For the inverse tutees, group 3, there was no significant relationship found. For the total group, there was a significant relationship between the TSPT scores and the posttest scores. There are no decisions to be made from this additional analysis, since this correlation testing was conducted for additional insight into the testing program of the subjects of this study, and since there was no post hoc analysis indicated from the testing of the 2 major hypotheses.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter includes a brief review of the study, the major findings resulting from the data analyses, and the more important conclusions based on the findings. Finally, recommendations for further research are given.

I. Summary of Study

The primary purpose of the study was to investigate 2 methods of instruction to determine the effects, if any, of inverse tutoring versus traditional tutoring in improving the reading competencies of disadvantaged vocational improvement program students enrolled in 1984-85 at Campbell County High School in Jacksboro, Tennessee. An investigation of the relationship of the independent variables was also conducted in order to ascertain any probable causal effect on gains in posttest scores of the subjects. Further exploration of the 2 different measures of reading achievement was carried out to determine the relationship, if any, of these testing instruments, the researcher-selected Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2, as compared with the Tennessee State Proficiency Test (TSPT) scores already recorded for these experimental subjects.

A review of literature was conducted to gather general information about tutoring and tutorial arrangements and to ascertain

information about the various intervening variables or factors affecting or impacting on learning and achievement. In addition, this review included a study of related research dealing with peer tutoring and tutorial arrangements as these related studies contributed to this experimental project. This review clearly revealed significant benefits of tutoring arrangements for both tutors and tutees. These tutorial partners were reported to make significant progress regardless of the intervening factors of age, sex, and intelligence level.

The subjects in this study consisted of 118 students who were both academically and socioeconomically disadvantaged and who were enrolled in 1984-85 in the vocational improvement programs (VIP) at Campbell County High School. These subjects were randomly assigned by intact classes to 1 of 4 treatment groups: traditional tutees, inverse tutors, inverse tutees, or nontutored. Pretests were administered using the Gates-MacGinitie Reading Tests, Survey Level E, Form 1. Following 50 classroom sessions of instructional activities within the 4 treatment groups, posttests were administered using the Gates-MacGinitie Reading Tests, Survey Level E, Form 2, in order to determine possible gain scores in any of the 4 treatment groups.

The data were tabulated and coded. Researcher-selected extraneous variables of IQ, reading ability on the TSPT, sex, and parents' occupational status were recorded. Identity of experimental subjects was coded to maintain their anonymity. Hypotheses were

tested using appropriate statistical tests. The one-way analysis of variance (ANOVA) tests were used to identify significant differences between mean achievement scores of the 4 treatment groups. The multiple linear regression tests were carried out to ascertain any significant relationships of independent variables to posttest gain scores. No significant differences were reported from the one-way ANOVA tests conducted. In addition, the regression analysis indicated no significant relationships between the achievement scores and the researcher-identified intervening variables. Further investigation of the tests used to describe students' reading abilities was made with the Pearson product-moment correlation tests, which indicated a significant correlation between the 2 tests for 3 of the 4 treatment groups.

II. Summary of Findings

The findings of this study are reported to coincide with the 2 major null hypotheses in Chapter IV.

H₀₁: There are no significant differences in the mean achievement scores on a standardized reading test among students conducting inverse tutoring, those receiving inverse tutoring, those receiving traditional tutoring, and those who receive no tutoring.

From the one-way analysis of variance (ANOVA) calculations, there were no significant differences observed. Therefore, this hypothesis was not rejected.

Ho2: There are no significant relationships between achievement scores on a standardized reading test for students and their IQ scores, reading abilities, sex, and occupational status of their parents.

This hypothesis was not rejected since the multiple linear regression analysis indicated no significant relationships.

Further correlation analysis was conducted on the 2 different measures of reading achievement, the Tennessee State Proficiency Test (TSPT) scores and the researcher-administered pretests and posttests, the Gates-MacGinitie Reading Tests, Survey Level E, Forms 1 and 2. Significant correlations were found between these tests in the areas of pretest scores for the traditional tutees and for the nontutored and for the posttest scores for the inverse tutors as well as for the total group. Since there was no post-hoc analysis indicated following the application of the one-way analysis of variance tests, these correlation coefficients received no further statistical treatment.

III. Conclusions

The following conclusions were drawn as a result of this study:

1. Students who have had long-term academic and socioeconomic disadvantages are not likely to

show significant reading improvement from involvement in short-term tutorial arrangements.

2. Reading achievement scores of students who are long-term academically and socioeconomically disadvantaged are not likely to be significantly affected by their roles as tutees or tutors.
3. Reading achievement scores of a homeogeneous grouping of long-term disadvantaged students are not likely to be significantly related to such intervening factors as their IQ scores, reading abilities, sex, age, or occupational status of their parents.
4. The Tennessee State Proficiency Test (TSPT) reading scores of high school students are likely to be valid and reliable measures of their reading achievement.

IV. Recommendations

The findings of this study and resulting conclusions form the basis of the following recommendations:

Recommendations for Future Study

1. Studies to determine the effects of various tutorial arrangements for reading improvement of academically and socioeconomically disadvantaged students should

be conducted at earlier grade levels than high school.

2. Studies to determine the effects of various tutorial arrangements for reading improvement of academically and socioeconomically disadvantaged students should be conducted for longer periods of instruction than 10 weeks or 50 class sessions.
3. Studies to determine the effects of inverse versus traditional tutoring for reading improvement should be conducted in traditional English classroom settings.
4. Studies to determine the effects of inverse versus traditional tutoring should be conducted in various academic subject areas.
5. Studies to determine the effects of inverse versus traditional tutoring for reading improvement should be conducted in various vocational and occupational programs.
6. Studies to determine the effects of various tutorial arrangements and the relationships between achievement scores and various intervening variables should be conducted involving larger and more heterogeneous groupings of students than was included in this research study.

Concluding Remarks

During the course of this study, there was an increasing awareness of the problems of academically disadvantaged students.

These disadvantages appeared to overwhelm the subjects in this experiment to the point that little effect is noted from any of the tutorial treatments administered. The long-term effects of socioeconomic deficiencies so encompassed these students that 10 weeks of treatment failed to break their "low-achievement syndrome."

Additional research is needed involving tutorial arrangements and procedures to determine the benefits of students teaching other students.

It is evident that assistance, support, and intervention must occur in the lives of this increasing number of disadvantaged youth in our nation's schools. Today's educational processes and teaching methods must become more sensitive to the needs of these disadvantaged, underachieving students.

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APPENDICES

APPENDIX A

LETTER SENT TO PARENTS OF SUBJECTS

KENNETH SMILEY MILLER
Superintendent
1115 Davis Chapel Road
LaFollette, TN 37766

WALTER GOWNS
Route 4 Box 349
LaFollette, TN 37766

EUGENE SHARP
Route 2
LaFollette, TN 37766

CARL BURTON DOUGLAS
Route 3
LaFollette, TN 37766

CAMPBELL COUNTY
Board of Education

POST OFFICE BOX 445
JACKSBORO, TENNESSEE 37757
PHONE 562-8377

January 10, 1985

ANN SMITH, Chairman
Box 139
Jacksboro, TN 37757

JAMES BAKER
South Main Street
Jellico, TN 37762

JERRY IRWIN
252 Imperial Heights Road
LaFollette, TN 37766

HOWARD ST. JOHN
1015 South 13th Street
LaFollette, TN 37766

Dear Parent:

As you are already aware, your daughter is enrolled this year in one of the special Vocational Improvement Program (VIP) English classes at Campbell County High School. In this program, we have been working together to help her improve her communication skills.

In VIP we use many different teaching methods, special materials, and projects, as was explained when you gave permission for your daughter to enroll in this program. We are really excited about the newest project we have planned. We will be starting a reading improvement program for each student. Some of the students will be assigned each day to work with other students in a special tutoring arrangement while other students will spend the same amount of reading time working independently. We hope that this special program will help us find better, more motivational ways of working with your daughter in becoming more proficient in reading. The results of this study will be reported outside the school system through the University of Tennessee in Knoxville. Each student's confidentiality will be protected through the assignment of identification numbers. Only these numbers will be used in reporting information.

We hope that you, too, will be excited with this new reading improvement project. If we may provide additional information to you, if you have any concerns about this study, or if we may be of any assistance to you, please feel free to call my office.

Sincerely yours,

Eunice Reynolds

Eunice Reynolds
Vocational Director

ER:bcd

cc: Lois Carroll, Coordinator, Special Vocational Programs
Don Marlow, VIP Instructor
Kathleen Martin, VIP Instructor
Ron Reynolds, VIP Instructor

KENNETH SMILEY MILLER
Superintendent
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Eunice Reynolds

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Vocational Director

ER:bcd

cc: Lois Carroll, Coordinator, Special Vocational Programs
Don Marlow, VIP Instructor
Kathleen Martin, VIP Instructor
Ron Reynolds, VIP Instructor

APPENDIX B

FORMS USED FOR DATA COLLECTION

VITA

Eunice Huddleston Reynolds, daughter of Everett and Evelyn Huddleston, of LaFollette, Tennessee, was born in January, 1946, at Royal Blue, Tennessee. She attended public schools in Campbell County, Tennessee, and was graduated from Wynn-Habersham High School in 1962. She received the Bachelor of Science degree in Business Administration with a minor in Education from Berea College in Berea, Kentucky, in 1966. She received the Master of Arts degree in Office Administration and Education in 1971 from Wayne State University in Detroit, Michigan.

She taught in the Roseville Public Schools in Roseville, Michigan, from 1967 to 1971; in Campbell County at Jacksboro High School in Jacksboro, Tennessee, from 1971 to 1973; and at Wynn-Habersham High School in Duff, Tennessee, in 1973-74. In January, 1974, she accepted the position of Vocational Director for Campbell County, where she continues to serve in that capacity. In addition, she was appointed to the new position of Finance Director and Business Manager for the school system in May, 1984. She currently serves in both of these positions.

During her graduate studies at the University of Tennessee in Knoxville, she has served as a graduate assistant in the microcomputer lab in the Technological and Adult Education Department. She has also been a graduate teaching assistant, having

taught "Microcomputer Applications in Education" and "Word Processing on the Microcomputer."

Other occupational experience includes an appointment to the position of Welfare Worker I in the Department of Public Welfare in 1966. She has worked in a family-owned business in retail grocery, fast foods, automotive industries, clothing, and business records management. Further work experience includes sales experience and management with Field Enterprises, Inc., and Personnel Manager of the Federal's Department Store in Hazel Park, Michigan.

She is a member of the American Vocational Association, Tennessee Vocational Association, National Council of Local Administrators, Tennessee State Council of Local Administrators, Tennessee State Council of Local Directors of Vocational-Technical Education, Tennessee Association of Supervisors of Curriculum Development, and Omicron Tau Theta. Honorary memberships include Delta Kappa Gamma, Phi Kappa Phi, Pi Lambda Theta, and Delta Pi Epsilon.

She is married to Ernest Lee (E. L.) Reynolds, a building contractor. They have 1 son, Eric, who is 10 and attends Jacksboro Elementary School. She is an active member of the Walnut Grove Baptist Church in LaFollette.