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AN EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF A
REMEDIAL READING PROGRAM WITH STUDENTS
AT UTAH STATE UNIVERSITY

by

Judith J. Ivarie

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Special Education

Learning Disabilities

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

1972

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For the patience and constant encouragement of her husband, Ted, this writer extends heartfelt gratitude. To her four sons, David, Daniel, Paul, and Phil, without whose cooperation this degree could not have been completed, a special note of appreciation.



Judith J. Ivarie

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
ABSTRACT	vii
Chapter	
I. INTRODUCTION	1
Importance of Study	1
Statement of Problem	3
Purpose of Study	3
Delimitations of Study	4
Definition of Terms	4
II. REVIEW OF RELATED LITERATURE	6
Literature Related to College Reading and Achievement	6
Literature Related to Motivation	14
Literature Related to Rate of Reading	20
Literature Related to Comprehension	28
Summary of Review of Related Literature	34
III. PROCEDURE	37
Selection of the Population	37
Instructional Design of the Reading Program	37
Instructional Design of the Vocabulary Program	39
Description of Materials	40
Explanation of Data Analysis	41
Summary of Procedures Used	42
IV. FINDINGS	43
American College Test	43
SRA Diagnostic Reading Test	45
California Phonics Survey	

TABLE OF CONTENTS (Continued)

	Page
Gray Oral Reading Test	49
Summary of Findings	51
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	55
Summary	55
Conclusions	56
Recommendations	57
SELECTED BIBLIOGRAPHY	58
VITA	62

LIST OF TABLES

Table		Page
1.	American College Test mean percentile scores . . .	44
2.	Distribution ACT percentile scores for experi- mental and control groups * * * * *	44
3.	Pre-test and post-test percentile scores on the SRA Diagnostic Reading Test, total score . . .	46
4.	Pre-test and post-test scores on the comprehension section of the SRA Diagnostic Reading Test, stated in percent . . . * * * * *	46
5.	Pre-test and post-test scores on the rate section of the SRA Diagnostic Reading Test, stated in wpm . . .	47
6.	Pre-test and post-test scores of effective reading rate based on data from the SRA Diagnostic Reading Test, stated in wpm * * * * *	48
7.	Application of T test to scores of the California Phonics Survey, experimental group only . . .	49
8.	Pre-test and post-test grade-level scores on the Gray Oral Reading Test, experimental group only . . .	50

LIST OF FIGURES

Figure	Page
1. Grade level increase on the Gray Oral Reading Test, experimental group only	52

ABSTRACT

An Experiment to Determine the Effectiveness of a
Remedial Reading Program with Students
at Utah State University

by

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Utah State University

Major Professor: Sara Lyon James
Department: Special Education

The purpose of this study is to determine the effectiveness of 20 hours of remedial reading instruction as compared with 20 hours of vocabulary instruction on a select group of university freshmen in the Remedial English Program. Three measures of effectiveness used were comprehension, rate, and effective reading rate. The effective reading rate was determined by computing the arithmetic product of level of comprehension and rate of reading. The results indicated that for this particular population, using the materials and instructional techniques described, neither group increased significantly in level of comprehension. The reading group increased reading rate at the .01 level of significance. The effective reading rate of the reading group increased significantly at the .05 level.

(76 pages)

CHAPTER I
INTRODUCTION

The process of learning to read is a continuous one, beginning even before formal training with the development of visual and auditory perception. Also constant effort and self-discipline are required to develop good reading ability. McCullough, Strang, and Traxler (1955) have supported this idea in the following statement:

Learning to read is a lifelong process. From birth to old age, each period of life makes its contribution to the development of reading abilities, interests, and attitudes... . Reading ability, as part of the individual's total development, increases with this growth in interests and general ability and with the challenge of increasingly complex and difficult reading tasks at each successive educational level. (McCullough, Strang, Traxler, 1955, pp. 82, 90)

University students, as well as elementary school pupils, can benefit from the continued effort to increase their reading ability. Studies will be presented which reveal a positive relationship between grade point average and reading ability (Anderson and Dearborn, 1941; Kilby, 1945; McDonald, 1957).

Importance of the Study

General importance

The ability to read effectively is an important skill for college students who must obtain much of their academic information from printed material. McDonald (1957, p. 177), studying students who completed the Cornell Reading Improvement Program, determined that in his study the

"experimental group significantly exceeded the control group in first semester grade-point averages; in cumulative grade-point average for two semesters; and in cumulative grade-point average for three semesters." Anderson and Dearborn (1941), in their study of 68 pair of Harvard College freshmen, matched in intelligence as measured by the Scholastic Aptitude Test, reported that even when intelligence is held constant, there is still a positive relationship between reading ability and college achievement.

Specific importance

Each year the English Department at Utah State University admits students with deficiencies in reading abilities, as measured by the American College Test (ACT) scores and the SRA Diagnostic Reading Test, Survey Section, into their Remedial English Program. With exception of 20 hours of vocabulary instruction, these students receive no special training in reading. Therefore, if 20 hours of reading instruction can effect a significant change in the student's level of comprehension, rate of reading, and effective reading rate, as compared to 20 hours of vocabulary instruction, it might be worthwhile to include reading instruction for these students either within the framework of the Remedial English Program or in another program at Utah State University.

A pilot study was conducted by the writer during Spring Quarter, 1971, at Utah State University. This study indicated that 20 hours of reading instruction does effect a positive change in the level of comprehension, rate of reading, and in the effective reading rate of the students.

Statement of Problem

The problem to be examined by this study is that of limited information concerning the effectiveness of remedial English programs being conducted at the undergraduate level in universities.

This lack of information restricts effective planning of instruction for students in need of remedial assistance at the collegiate level.

Purpose of Study

The purpose of this study was to compare the effectiveness of 20 hours of remedial reading instruction, group A, with 20 hours of vocabulary instruction, group B, on a select group on university freshmen at Utah State University. The following questions were asked:

1. Can 20 hours of remedial reading instruction during a 10-week period of time effect a significant change in the level of reading comprehension of the students in group A as compared with a similar group, group B, receiving 20 hours of vocabulary instruction during a 10-week period of time as measured by the SRA Diagnostic Reading Test, Survey Section?
2. Can 20 hours of remedial reading instruction during a 10-week period of time effect a significant change in the rate of reading of the students in group A as compared with 20 hours of vocabulary instruction for students in group B during a 10-week period of time as measured by the SRA Diagnostic Reading Test, Survey Section?
3. Can 20 hours of remedial reading instruction during a 10-week period of time effect a significant change in the effective reading

rate of students in group A as compared with 20 hours of vocabulary instruction for students in group B during a 10-week period of time as measured by the SRA Diagnostic Reading Test, Survey Section?

Delimitations of Study

The study was delimited to the three areas of reading previously named: level of reading comprehension, rate of reading, and effective reading rate. No attempt was made to determine the retention after the period of instruction.

Definition of Terms

The following terms are defined as they apply to this study.

Level of comprehension. Level of comprehension is the percentage of comprehension questions answered correctly by the student at the end of a given time reading. If a student answered eight out of ten questions correctly, for example, his level of comprehension of that reading would be 80 percent.

Rate of reading. Rate of reading is the number of words read by the student per minute. It was determined by dividing the number of words read by the number of minutes taken to read the selection. For example, if a student read 900 words in 3 minutes, his rate of reading would be 300 words-per-minute (wpm). The timed intervals were for 5 minutes.

Effective reading rate. Effective reading rate is the arithmetic product of level of comprehension and rate of reading given in wpm.

If a student's rate of reading for a given selection was 500 wpm and his level of comprehension as measured by questions based on the selection was 80 percent, then his effective reading rate would equal 400 wpm.

CHAPTER II
REVIEW OF RELATED LITERATURE

The purpose of this chapter is to review the related literature basic to this study. The sections included are: (a) literature related to college reading and achievement, (b) literature related to motivation, (c) literature related to rate of reading, and (d) literature related to comprehension.

Literature Related to College
Reading and Achievement

Considerable attention has been given to the question, "Is there a relationship between reading ability and college achievement as measured by grade point average?" The following review of research attempts to answer this question.

Anderson and Dearborn study

An early study by Anderson and Dearborn (1941, p. 395) supports the idea that there is a direct relationship between reading ability and college achievement. The subjects, 68 pairs of Harvard College freshmen, were matched for intelligence, as measured by the Scholastic Aptitude Test, but differed in scholarship, as measured by grades for the following courses: History 1, Government 1, Economics A, and English 1. All subjects were given a battery of reading tests to determine if a differentiation between the students with lower and higher

grades on the basis of the scores that they received on the tests given could be established, indicating a relationship between reading ability and scholastic achievement independent of intelligence which was held constant. The authors found a significance difference at the .01 level of confidence between the means of academically higher students and the academically lower students of the Nelson-Denny raw score and Nelson-Denny accuracy score. The authors concluded that there is a significant "positive relationship between reading ability and college achievement, even when only such differences as vary independently of intelligence are considered" (Anderson and Dearborn, 1941, p.).

Kilby study

Comparing 110 college students who enrolled and completed the first half of a reading course with the total freshman class from which they were drawn, based on a standardized reading test score, Kilby (1945, p. 515) attempted to answer the following questions:

(1) What is the value of a remedial reading program to improve grades in general? (2) What is the value of a remedial reading program to improve grades in particular subjects or groups of related subjects? (3) Which students improved scholastically as a result of the remedial instruction? (4) What kind of remedial reading program is valuable for improving grades? (Kilby, 1945, p. 515)

The results of the study revealed that the freshmen who received remedial reading instruction earned significantly higher final grade averages than did untrained students of equal predicted grade status and slightly higher initial reading status. This study did not provide answers to questions 2 and 3. A remedial reading program which emphasized skimming for the main idea benefited students most in regard to grades.

Barbe study

Barbe (1952) conducted a

study to determine: (1) the gains which can be made in remedial reading at the college, (2) the relative permanency of any such gains, and (3) the significance of any change which might occur in college grades following remedial reading work. (Barbe, 1952, p. 230)

Fifty subjects, ranging from college freshmen to seniors were selected from a volunteer group who expressed a desire to improve their reading ability. The 25 subjects in the experimental and the 25 subjects in the control group were tested for reading rate and comprehension using the Form Am of the Iowa Silent Reading Tests. After 12 weeks of individualized reading improvement work, both groups were retested using Form Bm of the Iowa Silent Reading Test. Both groups were tested 6 months later using Form Dm of the Iowa Silent Reading Test to determine if the results of the reading improvement work were still significant at that time. The data revealed the following results:

(1) significant gains were made in remedial reading work at the college level which should emphasize the value of such a program, (2) the gains which were made were still significant six months after the end of the remedial work, indicating relative permanency, and, (3) the grade-point average of the experimental groups showed an improvement significant at the .05 level, indicating some positive value of remedial reading work in improving students' grades. (Barbe, 1952, p. 236)

Mouly study

In an attempt to determine the validity of the claim that the successful completion of a remedial college reading course will be reflected in better grades (Mouly (1952, p. 466), randomly selected 319 students from 329 freshmen who scored so low on the reading section of the Cooperative English Test taken as a prerequisite for registration

that they were required to take remedial reading. He equated by means of analysis of covariance the experimental group of 155 students who took remedial reading for one semester with the control group of 164 students who were excused from the program for experimental reasons or who, in various ways, avoided the course. Although only slight differences were found between the adjusted average "honor-point" (his term) ratios of the total experimental and total control groups, significance at the .01 level was found when that part of the experimental group which had successfully completed the remedial reading course was compared with the total non-remedial reading group. Mouly concluded "that a remedial reading program can result in an improvement in academic grades for those students who take the course seriously" (Mouly, 1952, p. 466).

Kingston and George study

Kingston and George (1955), in their attempt to determine whether freshmen participating in a remedial reading program offered at Texas A & M would affect subsequent academic achievement as compared to non-participating students, found that non-participating students in two of the three groups divided by majors had higher grade point averages than did participating students. They also noted no significant difference between non-participating and participating student from the third group. Of interest is the fact that the students were placed in the program based on American College Entrance (ACE) scores and that the ACE scores of participating students were significantly lower than those of the non-participating students.

Smith and Wood study

Smith and Wood (1955), critical of the inadequate experimental design of previous studies which left factors such as motivation uncontrolled, designed a study to determine changes in reading performance, over a brief and over an extended interval, attempting to determine changes in academic status of students who either volunteered or were referred for a corrective reading course at a state university. Three groups were studied. The experimental group was composed of 74 freshmen students who came voluntarily or by referral. The control group of 21 freshman were those who attempted to register but could not due to lack of facilities. These two groups were considered equal in motivation and had equal ACE scores. A third group, composed of a representative sample of freshmen, was selected by choosing every fiftieth name from an alphabetized list of freshmen. No significant change occurred from the first to the second semester in the grade point averages of the Control and Representative freshmen groups; however, a significant increase at the .01 level occurred in the Experimental group. To determine retention of change made by the Experimental group, retesting was completed 60 weeks after the 10-week training period. Of the 30 students who were randomly selected from the original 74, only 27 were available. These students were retested in the following areas: vocabulary, level of comprehension, speed of comprehension, and rate. The changes in vocabulary were negligible while level of comprehension differed significantly at the .05 level between the initial and follow-up testing. Speed of comprehension was

the most sensitive skill to training, showing significance at the .01 level. The rate of reading on the follow-up testing revealed an increase over the initial rate significant at the .01 level.

King, Dellande, and Walter study

Stating that "A person's ability to read effectively should have a direct relationship to his ability to maintain an acceptable level of academic achievement," King, Dellande, and Walter (1969, p. 215) found that students matched by sex, grade in college, level of scholastic achievement, college of enrollment, and motivation, as measured by having each student pay a thirty dollar enrollment fee, did not all increase in grade point averages as a result of taking the reading improvement program. Specifically, the mean grade point for students with initial reading rates of 250 wpm and above or 250 wpm or below was not significant. However, it was discovered that students with initial reading rates of 200 to 250 wpm obtained an increase in grade point average which was significant at the .05 level.

McDonald study

McDonald (1957) compared the academic performance for three semesters of students who completed the Cornell Reading Improvement Program with the performance of a control group, noting the scholastic attrition during these semester periods of both groups. The controlled variables were as follows: age, Cooperative Speed of Comprehension score, Cooperative Vocabulary score, Scholastic Achievement Test verbal score, and Scholastic Achievement Test mathematics score. The independent variable was the participation in the Cornell Reading Improvement

Program for one semester. The dependent variables were grade point average and dropout rate. The findings indicated that the experimental groups significantly exceeded the control group in first semester grade point averages, in cumulative grade point for two semesters, and in cumulative grade point for three semesters. Significantly fewer students of the experimental group dropped out of Cornell during the period of the study than was the case for the control group. This last conclusion was also supported by another researcher who concluded that variables other than reading ability are affected by a college reading program (Bloomer, 1962).

Henderson and Masten study

Henderson and Masten (1959) considered the relative and combined validities of achievement data from high school transcript together with college aptitude and scholastic ability tests for predicting first year semester averages for a freshman class at Hofstra College. The following scores were collected and analyzed: ACE scores, Cooperative Effectiveness of Expression Test scores, Cooperative Reading Test scores, high school grades, and first semester averages. A relationship was found as $r = .712$ between the Cooperative Reading Test and academic achievement.

Vineyard and Bailey study

Vineyard and Bailey's study (1960) attempted to identify the coefficients of correlation between measures of reading ability, listening skill, intelligence, and scholastic achievement, and between specific pairs of these. The scores of the Cooperative English Test--

Reading, Listening Test of Sequential Test of Educational Progress, ACE, and grade point average for one year were used as measures of reading ability, listening skill, intelligence, and scholastic achievement, respectively. The results indicate that reading ability, listening skill, and intelligence are highly related to one another and each is substantially related to scholastic achievement; however, the authors were unable to find a significant relationship between reading and scholastic achievement.

Bloomer study

In a more recent study Bloomer (1962) attempted to determine the following: (1) if a college reading program without a selective sample could produce an increment in academic achievements, (2) if there is a relation between gains in reading ability and academic achievement, and (3) in what ways a college reading program affects the participating students. Although Bloomer (1962) could find no differences between the groups in his study in achieved grade point average at the end of a semester, he did report significant gains of the experimental group over the control group in number of wpm and level of comprehension. He concluded that variables other than reading ability are affected by a college reading program and that these variables result in superior academic achievement.

Summary of literature related to college reading and achievement

Of the 11 studies reviewed eight were treatment studies and three were correlation studies. In the treatment study category only two

studies found no significant correlation between reading ability and academic achievement. However, of the seven remaining studies reviewed, two found reading significantly related to achievement at the .01 level, two others found significance at the .05 level, and another two studies reported significance without stating the level.

One of the three correlation studies could find no significant correlation between reading ability and academic achievement; whereas, of the other two, one found a correlation between reading ability and academic achievement at .712 and the other found reading significantly related to academic achievement at the .01 level.

Literature Related to Motivation

Motivation is the prime determinant of learning and originates in external conditions as well as within the individual. It is probable, moreover, that most human acts are the result of more than one motivation ... (Jenkinson, 1964, p. 56)

The pilot study conducted with a similar population indicated that a lack of academic success had apparently diminished the motivational level of these students. In addition, many noted reading authorities, among them Witty (1969), Harris (1961), and Schubert and Torgerson (1970), stress motivation as a major concern and consideration in dealing with students with reading disabilities. The purpose of this section is to review selected research on motivation as it is related to reading and to look at articles concerning motivational principles and strategies.

Haring and Hauck study

Haring and Hauck (1969) programmed learning conditions individually in a group of elementary-aged boys labeled as "dyslexic," providing sequential arrangement of reading materials and a systematic presentation of reinforcement. The reinforcement schedule was designed first to accelerate performance rate and secondly to maintain the high rate. The results revealed that when learning conditions were individually appropriate the students made more correct responses, worked longer, and progressed in instructional reading levels from 1 1/2 to 4 years over 5 months of instruction.

Staats et al. study

Staats et al. (1964) conducted a study to determine the effects of schedules of reinforcement on the rate of verbal response to written material in children. Four multiple schedules were used in the study: multiple Continuous Reinforcement-Extinction, multiple Continuous Reinforcement-Variable Reinforcement, multiple Continuous Reinforcement-Variable Extinction, and multiple Variable Reinforcement-Variable Interval. The results revealed that rates under CRF were lower than under VR, and somewhat higher than under VI, and much higher than under extinction; whereas, multiple VR-VE showed little rate difference. The significance of the study is the implication that

the principles and techniques of operant conditioning apparently can be extended to the study of significant complex human behavior--specifically, to the acquisition of reading. (Staats et al., 1964, p. 146)

Hart report

To discover some general principles of motivation through reviewing writings of psychologists and reading authorities, Hart (1967) attempted in a seminar report to answer the following questions:

1. What are the basic principles of motivation as determined by psychologists and reading authorities?
 2. In what ways do these principles have special significance for the remedial reading teacher?
 3. What specific kinds of things may be done to stimulate and motivate children with reading difficulties?
- (Hart, 1967, p. 73)

In response to the first question, Hart described five basic principles of motivation: Haagard's motivational theory, guidance, achievement motivation, goals, and the hedonic (S-R-S) theory. In response to the second question, Hart indicated that knowledge of these principles, especially the hedonic theory, would help the reading teacher establish "a relationship of acceptance, confidence, trust and genuine mutual respect" (Hart, 1967, p. 76).

Harris article

In his article "Motivating the Poor Reader" Harris (1953) described the "poor reader" as one

... who not only reads poorly by objective standards, but also feels that his reading is unsatisfactory and reacts emotionally as though he is a failure in reading. (Harris, 1953, p. 566)

Harris continued by maintaining that remedial learning is basically a problem of arousing and sustaining motivation. He described a four-point program for arousing and motivating the poor reader. First, the teacher must communicate the feelings of acceptance, approval and understanding to the student. Secondly, the student must begin in the remedial work at a point at which success is insured. Third, methods

and materials should be used which will arouse and maintain the student's interest in reading. Finally, the student must be helped to feel that he is taking an active part in his own personal reading problems.

Jenkinson paper

In a paper entitled "The Roles of Motivation in Reading" presented to the Annual Conference on Reading held at the University of Chicago, Jenkinson (1964) examined five psychological motives of reading basic to the teaching of reading at any level: cognitive drive, socialization, need for achievement, interest incentive, and the individual nature of reading. First the cognitive drive, essential for mental growth, was described as "the desire to know and then hopefully to understand" (Jenkinson, 1964, p. 49). Jenkinson stated that the variation in strength of cognitive drive within individuals accounts for the need to differentiate reading instruction for students of varied levels of intelligence. Secondly, socialization comes to play upon reading because reading is considered a developmental task in our culture; the failure of reading interferes with adequate adjustment, sabotaging both self-esteem and esteem of others. Thirdly, the dominant theme in our culture of success is measured in terms of achievement. A feeling of success, following the achievement of a goal, usually disappears quickly, but quite often the level of aspiration is raised. Therefore, it is crucial that the student's long-term and short-term goals are attainable, facilitating success and raising aspirations. Fourthly, interest, a powerful motivational drive, is two-fold. Both the reading interests and the interest in reading need to be developed.

Finally, the individual nature of reading forces the reader to be an active, not passive, participant. The reader chooses reading materials that satisfy his individual needs.

Zimmerman questionnaire

Zimmerman (1956) conducted a survey of 287 students at Worcester Polytechnic Institute. Using a questionnaire, the researcher asked the student to indicate the three items that motivated them most and the three items they disliked most intensely. The students were requested to state their class, major, and approximate class standing (top, middle, or lower third), but not their name. Only the items marked by more than 10 percent of the students surveyed were reported in the survey. The results were as follows:

Positive

Practical value of the course in earning a living	36%
Instructor's knowledge of subject	30%
Well-defined course objectives	25%
Enthusiasm of the instructor	25%
Instructor's sympathy and understanding of students and their problems	24%
Knowledge of your progress	23%
Grades	23%
Emphasis on fundamentals rather than details	22%
Courteous treatment by instructor	14%

Negative

Instructor's use of sarcasm	66%
Instructor's use of fear	55%
Instructor's use of self-approval	45%
Personal cross-examination by instructor	26%
Grades	15%

(Zimmerman, 1956, p. 451)

Of special significance was the fact that no one item motivated all of the students. Zimmerman concluded that students are motivated by many things; therefore, instructors should adopt as many positive

techniques as possible while avoiding use of such negative techniques as sarcasm, fear, self-approval, and personal cross-examination as they tend to hamper learning by producing a negative reaction in students.

Beyer and Oetting study

Beyer and Oetting (1970) conducted a study to determine the effects of simple encouragement and reassurance on the students' performance in college remedial English as measured by final grades. All 40 students, randomly selected for the control and experimental groups, were individually interviewed for 10 minutes during the first 3 weeks of the quarter concerning their attitudes toward English requirements. The students in the experimental groups received encouragement and reassurance from the interviewer concerning their achievement potential in remedial English. Students in the control groups were merely thanked for their participation. The results, significant at the .01 level, revealed the students in the control performed in a superior manner, as measured by final grade. Beyer and Oetting suggested that encouragement and reassurance may have had the effect of reducing anxiety for some students to the point that poorer performance resulted.

Reed study

Critical of studies which attempted to evaluate reading improvement training given to college students without controlling the motivational level of the subjects, Reed (1956) matched 18 pairs taken from an entering class of freshmen nursing students of the basis of ACE Q score and on their performance on the vocabulary and comprehension

sections of the Diagnostic Survey Test, Form A. He maintained that by randomly assigning each member of each of the 18 pairs into an experimental or control group, the differential motivation associated with the use of volunteer subjects was precluded. Reed's hypothesis stated that

... under conditions of controlled motivation, intensive training in reading and study skills would yield significant gains in rate, vocabulary, comprehension, and honor point average. (Reed, 1956, p. 259)

After 17 hours of training, the only significance Reed could find was for the rate of reading which was significant beyond the .01 level of confidence. In delayed testing at the end of seven months the retention of the rate of reading was noted in the experimental group.

Summary of literature related to motivation

The overriding consensus of the research and articles surveyed indicated that motivation is sustained by implementing remedial reading programs which are individually appropriate to each student. Zimmerman (1956) found that the complexity of motivation requires that instructors have a variety of motivational techniques at their command. As many as possible of these motivational techniques were implemented in the 20 hours of remedial reading instruction on which this thesis was based.

Literature Related to Rate of Reading

A considerable amount of research and numerous articles have been written concerning the controversial subject of rate or speed of reading. The purpose of this section is to review selected research and articles

in an attempt to determine if others have been able to effect a positive change in the rate of reading and the consensus of the value of this increase to reading ability.

Letson study

Describing the controversy and confusion surrounding the matter of the interrelations of speed and comprehension, Letson (1958) conducted a study to measure reading rates according to (1) the difficulty of the materials being read, and (2) the purpose for which the material was being read. He obtained a coefficient of .82 as the relationship of speed of reading easy and difficult material. Further, he concluded that the relationship between speed and comprehension scores is high for easy material, but decreases as the difficulty of the material increases; and that a reader tends to maintain a reading rate independent of difficulty of material or of purpose.

Rankin study

Rankin (1968) conducted a study to determine the effects upon reading improvement of emphasizing speed versus emphasizing comprehension skills among students with poor comprehension skills participating in a college reading improvement program. Contrary to the research Rankin had previously conducted, this study resulted in the speed-emphasis group performing significantly better in rate of reading, with no difference between the speed-emphasis group and comprehension-emphasis group in comprehension because of factors such as better concentration, greater awareness of structure, and a more rapid rate of association, have a positive effect upon many poor readers among college students.

Glass study

Glass (1967) investigated seven variables and their relationship to the rate of reading. The seven variables were as follows: vocabulary, academic achievement, personality, compulsiveness, drive, rate of perception, speed of closure and flexibility of closure. The general plan of the investigation consisted of obtaining correlational data on a sample population and then testing, training, and retesting other subjects for a similar population. Thirty-four students, volunteers from the population of 208 undergraduate college students, submitted to a training program which included 12 sessions of approximately 30 minutes each. A control group statistically similar to the experimental group was used to measure the meaningfulness of the change due to training. The results indicated that four of seven variables were significantly correlated with reading at the .01 level of confidence: rate of perception, vocabulary level, compulsiveness, and grade point average. Two variables were significant at the .05 level of confidence: speed of closure and flexibility of closure. Further treatment of the results was conducted to determine the relationship between the variables and reading rate when the effect of another variable was partialled out. Partialing out of any of the variables resulted in negligible changes in the correlations. Glass (1967) concluded that with the college population he studied certain variables were related to rate of reading; however, the correlations found suggest that none of the relationships was of such magnitude that when one scored high in any of the variables he would necessarily score high or low in rate of reading.

The implication then being that more than one factor is involved when one attempts to read faster.

Thalberg study

Thalberg (1967) conducted a study to determine whether the relationship between reading rate and retention is invariable over a period of time. He randomly assigned 176 college students to an immediate treatment group (IR), who were tested immediately after reading a 1500-word passage, and into a delayed treatment group (DR), who were tested 24 hours after having read the 1500-word passage. The students were subdivided within the treatment groups into fast, average, and slow-rate groups. The results indicated that under IR conditions slow readers retained significantly more than both average and fast readers. Under conditions of DR, retention differences between rate-groups disappeared. Thalberg (1967) concluded that while more efficient readers remembered fewer of the details in a message immediately following the reading than did their slower counterparts, they did, in the long run, have as much functional information available to themselves from their reading as either the slow- or average-rate groups since retention of details was extinguished equally for all groups within 24 hours.

Rauch and Weinstein article

In the face of the emphasis on "speed reading" courses available to college students and adults, Rauch and Weinstein (1968) attempted to answer the question, "How fast should I read?" They recommended four speeds that are adequate for most college assignments: skimming, rapid

reading, intensive reading, and recreational reading. The authors defined "skimming" as the most rapid of all rates of reading in which the reader reads faster than 800 to 900 wpm while he skips with judgement extraneous materials. "Rapid reading" was described as the fastest rate at which virtually every word in the selection is read. "Intensive reading" was explained as the rate used by a lawyer reading a contract or a girl reading a love letter. In other words, it is the rate used for material that requires slow, careful reading and perhaps even re-reading. The final rate "recreational reading," could possibly include the rates previously described. The reader might skim long descriptive passages, read rapidly the intense, action-packed passages, while reading intensively key informational paragraphs that give vital information concerning the plot. However, the main objective of recreational reading is that of personal pleasure.

Next, Rauch and Weinstein (1968) state ten techniques to assist in increasing reading speed: (1) be certain that increased speed is worthwhile for your reading needs. (2) Read a great deal of interesting material in which the interest-pull is so great that you can break the word-by-word habit. (3) Practice reading from 30 to 60 minutes daily, listing main ideas or facts gained from each reading. (4) Build up a background of information. (5) Make a systematic effort to improve your vocabulary. (6) Use mechanical aids when available as motivational techniques while remembering to use adequate comprehension checks to assure that rate is really being improved. (7) Keep a record of your daily progress with 70 percent accuracy as a criterion for comprehension skills. (8) Keep your purpose for reading clearly formulated while being realistic but persistent. (9) Include many skimming exercises in your

program. When skimming, survey the article by reading the introductory and summary paragraphs. Next, read the first sentence of each paragraph, then look for signal words or main ideas. (10) Read often while keeping the above mentioned suggestions in mind as you practice.

Hanson survey study

In a historical survey of factors related to reading rates, Hanson (1968) listed 10 basic factors which have been isolated in studies as far back as 1804 which influence the rate at which an individual reads: visual perception, practice in reading, power of concentration, mental alertness, complex reaction-times, scholarly ability, amount of vocalization, habits of eye-movement, reaction time, and the desire to read rapidly. Next, Hanson found that the early investigations which found reading speed related to the nature of the material read and the reader's purpose were supported by later research. In conclusion, Hanson stated that his survey serves "... to illustrate the complexity of the reading act and shows that rates of reading are influenced by many different factors, some of which have probably not yet been accounted for. (Hanson, 1968, p. 660)

McLaughlin study

An informal exploratory investigation conducted by McLaughlin attempted to devise a theory which would account for the phenomenon of speed reading which he defined as "... gaining meaning from the printed page while inspecting more than 12000 wpm." (McLaughlin, 1969, p. 449). McLaughlin drew three conclusions from his investigation: (1) Speed reading has limited usefulness in that it is more useful for deciding which parts of a writing may be ignored and which should be gleaned further; (2) behavior in speed reading is similar in most respects to

that of a normal reader in regard to duration of fixations and subvocalizations; and (3) the essential objective difference between speed readers and other readers is in eye movement patterns. Whereas, a normal reader reads along a printed line, a speed reader follows a straight or "zig-zag" path, often moving from right to left and sometimes even going up the page. McLaughlin concluded that a theory which he termed "the theory of parallel processing" could explain the phenomenon of speed reading. He illustrated this theory by drawing an analogy of the reader's mind to electric circuits within a single computer which can perform different tasks simultaneously.

Witty study

Witty (1969) conducted a comprehensive review of research and theory concerning the current assumption about the value of speed reading and the relationship between rate and comprehension. From an historical view, Witty presented conclusions from reviews of studies by reading specialists, indicating briefly some of the results of investigations extending from the period of the nineteen-twenties to the present time. In the early studies it was clearly shown that the reading rates of individuals could be greatly increased in periods of a few weeks to a single semester. Concerning the trend which came next, the use of machines and devices for fostering improvement in reading rate, Witty concluded from the research that equally satisfactory results could be obtained in programs which did not employ pacing devices as in those which did. Concerning the maximum rates of reading, Witty found the preponderance of evidence supporting the fact that silent reading rates above 800 to 900 wpm were largely manifestations of various kinds of skimming.

Thompson and Whitehall study

Thompson and Whitehall (1970) conducted a study based on the hypothesis that there is a positive relationship between reading flexibility and speed gain. A versatility test was administered to 34 students randomly selected from students enrolled in a college reading program. Based on the versatility test the students were grouped into one of three groups: low flexibility, medium flexibility, and high flexibility. The results of the study support the hypothesis that the more flexible readers did achieve higher speed gains than the less flexible readers. Using the analysis of co-variance, the researchers found the results significant at the .10 level between the high flexibility and the other two groups, low flexibility and medium flexibility. A significance of .05 level was determined between the medium flexibility and high flexibility groups. The implications of this study indicate that flexibility must be considered as an important aspect in the teaching of reading.

Summary of literature related to rate of reading

Studying the relationship between reading flexibility and speed gain, Thompson and Whitehall (1970) concluded that flexibility must be considered as an important aspect in reading instruction. However, Letson (1958) found a coefficient of .82 between the speed of reading easy and difficult materials, and concluded that a reader tends to maintain a reading rate independent of difficulty of materials or purpose.

Hanson (1968) surveyed the variables related to the rate of reading and isolated ten factors, found in studies as far back as 1804, which influenced the rate at which individuals read. Taking Hanson's work a step farther, Glass (1967) conducted a similar study, determining seven variables, six of which were found significant in his research to the rate of reading.

In two independent studies, Rankin (1968) and Thalberg (1967) concluded that remedial college reading programs had the effect of assisting the students to adequate comprehension skills due to better concentration and retention skills equal to that of similar students without emphasis on speed.

The current emphasis on speed reading resulted in the three studies which attempted to investigate the "speed emphasis" approach. First, McLaughlin (1969) devised a theory of speed reading which he felt accounted for the speed reading phenomenon and which supported the effort of students to engage in speed reading activities. Witty maintained that rates above 800 to 900 wpm were not really reading but rather various forms of skimming. Rauch and Weinstein (1968) defined the various reading rates used by adults and college students, supporting Witty's findings that "speed reading" was actually a form of skimming, but including it as one of the four speeds necessary for effective reading.

Literature Related to Comprehension

Considerable research and thought has been given to the problem of determining what the basic factors of comprehension are and how they

can be increased. Since an exhaustive survey of literature concerning comprehension can be found elsewhere (Davis, 1968), the purpose of this section is to review selected research concerning reading comprehension.

Davis study

Davis (1944) conducted a survey of the literature to determine the skills included in reading comprehension according to noted authorities in the area of reading. He found that the skills determined by these authorities fell into nine groups or clusters:

1. Knowledge of word meanings
2. Ability to select the appropriate meaning for a word or phrase in the light of its particular contextual setting.
3. Ability to follow the organization of a passage and to identify antecedents and references in it.
4. Ability to select the main thought of a passage.
5. Ability to answer questions that are specifically answered in a passage.
6. Ability to answer questions that are answered in a passage but not in the words in which the question is asked.
7. Ability to draw inferences from a passage about its contents.
8. Ability to recognize the literary devices used in a passage and to determine its tone and mood.
9. Ability to determine a writer's purpose, intent, and point of view, i.e., to draw inferences about a writer. (Davis, 1944 p. 186)

After identifying these nine clusters, Davis constructed multiple-choice test items to measure each of the nine skills considered basic to comprehension. To obtain an intercorrelation of the scores in the nine skills, 240 multiple-choice items were administered to 421 freshmen in several teachers colleges. A range from .16 to .76 was found in the intercorrelations of the nine skills. Reliability coefficients of the scores ranged from .18 to .90. Skills numbered 1, 6, and 9 obtained the highest reliability coefficients of .90, .77, and .71, respectively.

The six of the nine clusters which were found to be statistically significant were 1, 2, 3, 4, 5, and 8.

The significance of this study is its suggestion that comprehension in reading can be objectively stated in terms of factors and that these factors can be reliably measured. The author concluded that his study also indicated the need for workbooks to be used as tools in developing good reading comprehension skills.

Hunt study

In an attempt to re-examine the six factors of reading comprehension found significant by Davis (1944), Hunt (1957), using a statistical technique of differential item analysis, sought to determine if, in fact, each item is a unique measure of its designated skill. To accomplish this, consultants classified items according to the particular skill each item was assigned to measure and not a measure of another comprehension skill. Hunt concluded that only the vocabulary items (cluster 1) were measuring a skill in comprehension (knowledge of word meanings) that was significantly different from the other skills listed.

Davis study

More recently Davis (1968), after a comprehensive survey of literature dating back to 1917, conducted a study to "... obtain estimates of the percentage of non-chance unique variance in the reliable variance of each of the most important measurable skills of comprehension among mature readers." (Davis, 1968, p. 510) The population consisted of 494 twelfth-grade pupils. The eight comprehension

skills measured were as follows: remembering word meanings; inferring word meanings from context; understanding content stated explicitly; weaving ideas in the content; making inferences about the content; recognizing the author's tone, mood, and purpose; identifying the author's literary techniques; and following the structure of the content. Using 400 twelfth-grade pupils, an experimental tryout was conducted in which two parallel forms, A and B, each containing 40 items, were administered to all students on successive mornings. The estimate of the reliability of each test was .96 for each form. Twenty-four test items were then selected from the 40 initial items. They were selected on the basis of having a higher average correlation with the total scores on that skill than with the total scores on the other seven skills.

The new forms, C and D, were administered to 484 twelfth-graders, leaving 1 or 2 days intervening. Davis (1968) reported an across-day reliability coefficient for the total scores on forms C and D of .93. A within-day reliability was found to be .96. Davis stated that a further indication of the close equivalence of total scores on forms C and D is indicated by differences of only .3 between their means.

The author (Davis, 1968) concluded that comprehension among mature readers is not a unitary mental skill or operation. Also, he stated that "... substantial parts of the mental abilities used in the eight skills judged to be of importance in comprehension are independent of one another." (Davis, 1968, p. 542) The implications of these findings suggest that systematic learning exercises of appropriate level of difficulty for each individual should be provided with emphasis on vocabulary development, making inferences, finding structure in passages

and recognizing author's attitude, tone, mood, and purpose.

This study has shown that part of the variance of these skills is unique; therefore, teaching one of them cannot be counted on to cause improvement in others. (Davis, 1968, p. 543)

Rankin study

In a study previously cited in this paper, Rankin (1963), attempting to determine the effects upon reading improvement of emphasizing speed versus emphasizing comprehension skills among students with poor comprehension skills, could find no difference between the speed-emphasis group and the comprehension-emphasis group in comprehension skills. Significant to the present study is the fact that although no increase was made in comprehension skills by either the speed-emphasis or comprehension-emphasis groups, there was no loss in comprehension skills by the increased emphasis on speed.

Braam and Berger study

Braam and Berger (1968) conducted a study to

... determine: (1) the effectiveness of four methods on increasing rate, comprehension, and flexibility; (2) retention of gains after a period of time (eight weeks) following completion of instruction; (3) differences in gains in rate, comprehension, and flexibility; (4) retention of these differences; (5) effect of increase on reading rate on the reading textbook-like materials; (6) whether increases in reading rate through a specific method result in an increased rate of reading both short and long passages. (Braam and Berger, 1968, p. 347)

The tachistoscope, controlled reader, controlled pacing, and paperback scanning were the four methods under consideration. The population of the study involved 179 college freshmen registered for a one-semester two-credit hour reading-study skills course. This group was divided into four groups each using one of the four methods stated above.

The authors (Braam and Berger, 1968) reported the following findings: (1) All of the methods of instruction resulted in significant gains in rate of reading. (2) Changes in comprehension level were not significant with any method. (3) All methods except the tachistoscope produced significant gains in flexibility. (4) A significance at the .01 level favored the paperback scanning method when comparing gains in reading rate resulting from the four methods of instruction. (5) The paperback scanning method was significantly superior to the other three methods in increasing reading rate on both long and short passages.

After an 8-week delay following the instructional period, the results were: (1) The rate of reading was retained by all the experimental groups with no significant difference between groups. (2) Gains in reading flexibility found in all four groups were maintained.

The implications of the study suggest that it is possible to obtain significant gains in the rate of reading without significant negative changes in the level of comprehension. The authors suggest that the current interest in "speed" reading might prove a psychological asset worth emphasizing in a reading improvement program. They also recommend that the emphasis on expensive machines for building rate of reading and level of comprehension should be reconsidered in the light of this study.

Summary of literature related to comprehension

Davis (1944) appears to have completed the most comprehensive research into the factors involved in reading comprehension skills. He found what he considered to be six highly reliable skills which he called factors of comprehension. Hunt (1957) concluded from his research that only one of Davis' (1944) factors of reading comprehension could be considered significantly different from the other five factors. Davis (1969) then, did further, more extensive research into eight of his originally-determined nine factors of reading comprehension. Davis (1969) tested the eight factors with two similar evaluation instruments and found a high reliability coefficient.

Rankin (1963) reported that the increase of reading rates among students with poor comprehension did not reduce comprehension further.

Braam and Berger (1968) compared four methods of instruction to increase reading rate, comprehension and flexibility. The methods studied included the tachistoscope, controlled reader, controlled pacing, and paperback scanning. All methods failed to change the level of comprehension significantly. Each of the methods effected significant changes in the rate of reading and in reading flexibility. These changes were retained in delayed testing.

Summary of Review of Related Literature

Although there was some evidence to the contrary, the preponderance of research favored an assumption basic to this present study, that is, there is a significant correlation between reading ability and academic achievement at the collegiate level.

Research was presented which indicated that the motivational level of readers, responding to operant conditioning techniques, can be increased. Some articles by reading authorities suggested instructional techniques which affect the motivational level of readers. For example, Harris (1953) suggested a four-point program for arousing and motivating the poor reader. He stated that, first, the teacher must communicate the feelings of acceptance, approval and understanding to the student. Second, the student must begin in the remedial work at a point in which success is insured. Third, methods and materials should be used which will arouse and maintain the student's interest in reading. Finally, the student must be helped to feel that he is taking an active part in his own personal reading problems.

The area of rate of reading provoked the most controversy of the research areas reviewed. The value of increasing rate of reading was questioned. In fact, the ability to increase the rate of reading to speeds above 800 to 900 was seriously questioned. The research indicated that rates in this range and above constituted a type of skimming activity as opposed to reading when reading was defined as the fastest rate at which virtually every word in a selection is read. Most significant to the present study were the studies by Rankin (1968), Glass (1967), and McLaughlin (1969) which concurred that the rate of reading can be increased. Rankin's research pointed out that this increase need not be at the expense of comprehension.

The review of literature dealing with comprehension skills produced factors which can be validly considered as aspects of the skill

of comprehension. The isolation of these factors and the resulting instructional and evaluative materials that were developed provided practical aids to the teaching of comprehension skills. Of great significance to the present study was Davis' (1968) work which gave evidence that reading comprehension can be measured in a reliable manner.

CHAPTER III

PROCEDURE

The purpose of this chapter is to provide the reader with an explanation of the procedures used in the study. The sections included are: (a) selection of the population, (b) instructional design of the reading program, (c) instructional design of the vocabulary program, (d) description of materials, and (e) explanation of data analysis.

Selection of the Population

The population consisted of 81 students from the Remedial English Program at Utah State University. These students qualified for the Remedial English Program by scoring below the standard 21 percentile on the ACT. Further selection was based on scores made by the students on the SRA Diagnostic Reading Test, Survey Section, Form A, namely, those in the lowest tenth percentile.

Group A consisted of 40 of those students who enrolled in the remedial reading course on a voluntary basis. Group B consisted of 41 students who were arbitrarily assigned to the vocabulary course in the regular Remedial English Program. English was the primary language of all of the students.

Instructional Design
of the Reading Program

The first and last week of the 10-week course were spent in pre- and post-testing. The 16 instructional periods of 50 minutes each were

divided as follows:

30 minutes (60%): Class Activities: Five minutes were spent on visual perception activities, 25 minutes were spent on timed reading activities.

1. Visual perception training consisted of word recognition and word meaning exercises used as a reading warm-up activity.
2. Timed reading, comprehension questions at college freshman level, and discussion was included in the timed reading activities.

20 minutes (40%): Laboratory Activities: The following self-directed activities were emphasized equally.

1. Syllabication pre-test with practice sheets and a post-test.
2. Word analysis pre-test with practice sheets and a post-test.
3. Vocabulary pre-tests with practice sheets and a post-test.
4. A worktest with readings and vocabulary activities.

To help in the evaluation of his progress for purposes of remediation, the student recorded his pre-test scores, practice activity scores, and post-test results on charts provided for individualized records.

In addition to evaluation, the charting performed a crucial role in maintaining motivation of the student. An occasional "bad" day was kept in proper perspective by the charting of the overall trend of growth.

Harris' (1953) four-point program for arousing and motivating the poor reader was used in the remedial reading program. First, the teacher must communicate the feeling of acceptance, approval and understanding to the student. Second, the student must begin in the remedial work at a point in which success is insured. Third, methods and materials should be used which will arouse and maintain the student's interest in reading. Finally, the student must be helped to feel that he is taking an active part in his own personal reading problem.

Instructional Design of the Vocabulary Program

One day at the beginning and another day at the end of the quarter were spent in pre-and post-testing. The 18 instructional periods of 50 minutes each were divided as follows:

30 to 35 minutes (60-70%): General discussion of readings from textbook. This included discussion of main ideas, vocabulary, and extensions of ideas from the text.

15 to 20 minutes (30-40%): Drill on vocabulary words taken from assigned readings. This included using the words correctly in writing situations with the correct spelling.

The student turned in the assignments completed and received either a "P" for passing or an "F" for failure. This grading system was the only consistent feedback and evaluation technique used by the instructors.

Description of Materials

The pre-test used for both group A and group B was the SRA Diagnostic Reading Test, Survey Section, Form A, grades 7 through 13. This is a standardized reading test, giving five scores: (1) Rate of Reading, (2) Story Comprehension, (3) Vocabulary, (4) Comprehension, and (5) Total Comprehension. This instrument was used by Reed (1956) in a similar study with freshmen students. In addition to this pre-test that both groups took, the reading group, group A, was given the California Phonics Survey, Form A; and the Gray Oral Reading Test, Form A.

The following instructional materials were used in the classwork of the reading group, group A. The visual perception exercises were taken from *Developing Reading Efficiency* by Miller (1965). The timed readings and comprehension questions were from *Guide to Effective Reading* by Brown (1966).

The syllabication pre-tests, practice sheets, the word analysis pre-tests and practice sheets were taken from *Trouble-Shooter: A Program in Basic English Skills* by Benner (1969). These materials, designed for secondary students and adults in need of remediation, were self-administered. They contained sections on syllabication and another on word analysis. The syllabication section included seven syllabication generalizations. The word analysis section included work with prefixes, roots, and suffixes.

The vocabulary pre-tests were taken from the graded word list of the *World Book Dictionary* (1970).

The worktext used in class and laboratory activities was *Successful Reading: Key to Our Dynamic Society* by Maxwell (1968). Some features of this worktext were as follows: vocabulary development, outlining for comprehension; and college-level, timed readings with comprehension questions. The student was expected to do five readings from this worktext weekly outside of class.

The readings used in the remedial reading program contained various forms but stressed information reading materials, based on the needs of the students to survive in such college classes as history, psychology, and biology.

In addition to a collegiate dictionary, the vocabulary group, group B, used *Rhetoric in a Modern Mode* by Bell and Cohn (1968). This book of critical literary readings, designed for remedial English, provided models for effective communications, including reading skills, vocabulary skills and writing skills.

The post-test was the SRA Diagnostic Reading Test, Survey Section, Form B, grades 7 through 13. In addition to this post-test that was administered to both groups, the remedial reading group, group A, was given the California Phonics Survey and the Gray Oral Reading Test, Form B.

Explanation of Data Analysis

The information provided below includes a description of the statistical procedures used to analyze the data collected. An analysis of covariance was applied to the data collected from the SRA Diagnostic Reading Test, Survey Section, both Form A and Form B with a reliability

of .973 between forms. A t-test was used to compare the pre- and post-test results of the California Phonics Tests taken by the remedial reading group, group A. The pre- and post-test results of the Gray Oral Reading Tests taken by the remedial reading group, group A, were averaged and compared.

Garrett and Woodworth (1964) report that the analysis of covariance, an extension of the analysis of variance, allows for the correlation between initial and final scores. By using the analysis of covariance, the researcher is able to effect adjustments in the final scores which will allow for the differences in an initial variable. In the present study the inequality of the scores of the groups, experimental and control, was adjusted by the use of the analysis of covariance.

Runyon and Haber (1968) describe the use of the t-test as an effective statistic using the before-after design. In such situations, as in this thesis, a reading on the same subject was taken both before and after the introduction of the experimental variable, the presumption being that the individual will remain relatively consistent with himself. This, then, provides a basis for the analysis of the data.

Summary of Procedures Used

The purpose of this chapter was to provide the reader with an overview of how the instruction time in the control and experimental programs was used. The instruments from which the data for analysis were collected and identified. The materials used in the study were also identified. The statistical procedures were explained and a rationale given for their selection.

CHAPTER IV

FINDINGS

The data of the study are presented in this chapter in the following four areas: (a) American College Test (ACT), (b) SRA Diagnostic Reading Test, (c) California Phonics Survey, and (d) The Gray Oral Reading Test. A summary of the findings follows the four sections.

American College Test

At the time this study took place, all entering freshmen at Utah State University were required to complete the ACT. The ACT percentile score functioned as the covariate in this study. This use of a covariate was necessitated by a selection procedure which yielded similar but unequal groups. Through covariance analysis the adjustment of final scores or post-test was effected which allowed for initial differences. Those scoring at the 21st percentile or below were required to enroll in the Remedial English Program. A correlation of the ACT scores and the level of comprehension, rate of reading, and effective reading rate were .388, .383, and .481, respectively.

The results of the ACT were treated with the F-statistic (Runyon and Haber, 1967) to determine if, in fact, the two groups, control and experimental, are similar in respect to this one measure. Table 1 shows that the means from the groups studied varied less than one-half percentile (.487). The F score of .161 is not significant at the .05 level of probability.

Table 1. American College Test mean percentile scores

Treatment Group	Unadjusted Means	Standard Error	F Score ^a
Experimental	5.025	.863	.161*
Control	5.512	.852	

^aF .05 for df 1, 79 is 3.96.

* not significant at the .05 probability level

Table 2 provides a visual picture of the distribution of the students from each group within the percentile range on the ACT.

Table 2. Distribution of ACT percentile scores for experimental and control groups

Percentile Range	Number of Students	
	Experimental	Control
1 - 5	27	23
6 - 10	4	12
11 - 15	6	3
16 - 20	3	3
Total	40	41

The ACT means, F score and distribution all indicate that the two groups, experimental and control, are very similar in respect to this one measure. However, the slight difference that does exist due to the

unequal means and the selection procedure was adjusted for by the use of this ACT score as a covariate in Tables 2 through 6. Each will be found in their respective sections. Each of the variables examined were first compared and stated in terms of unadjusted means. In conclusion, the variance was analyzed; then, each variable was stated as an adjusted mean.

SRA Diagnostic Reading Test

Total percentile score

The SRA Diagnostic Reading Test, Forms A and B, were administered to each group, experimental and control, at the beginning and end of the instructional period. The results of the statistical analysis of the pre-test and post-test scores has been stated in Table 3. Even before the element of the covariate was considered, the differences between the means of the experimental and control group was significant in favor of the control group at .05 probability level. The same probability level significance was noted on the post-test scores of both groups only this time the significance was in favor of the experimental group. At this point, the effect of the covariate became evident, adjusting the means and maintaining the significance in favor of the experimental group with an F score of 4.046.

Comprehension score

The analysis of variance was used to analyze differences between the comprehension scores of the experimental and control groups. The results of this analysis are presented in Table 4. The differences

Table 3. Pre-test and post-test percentile scores on the SRA Diagnostic Reading Test, total score

Treatment Group	Unadjusted Means		Adjusted Means
	Pre-test	Post-test	
Experimental	2.575	6.900	7.930
Control	3.951	5.609	4.604
F Score ^a	5.299*	4.935*	4.046*

^aF .05 for df 1, 79 is 3.96.

* significant at the .05 probability level

Table 4. Pre-test and post-test scores on the comprehension section of SRA Diagnostic Reading Test, stated in percent

Treatment Group	Unadjusted Means		Adjusted Means
	Pre-test	Post-test	
Experimental	51.6	65.2	65.2
Control	50.7	63.9	63.9
F Score	.005*	.177*	.180*

* not significant at the .05 level of probability

between the mean comprehension scores of the two groups is not significant. Even after the covariate has been taken into consideration, no significant differences can be found.

In this particular variable, the statistical analysis indicated there was greater difference within groups than existed between groups.

Rate of reading score

The analysis of variance was used to analyze the differences between the pre-test and post-test scores of the experimental and control groups. A significance at the .05 level was noted between the pre-test means of the two groups. The post-test significance was even greater (.01). The analysis of covariance found a significance of .01 probability level. The reader must be cautioned at this point. One of the fundamental assumptions underlying the use of this particular statistic is that of homogeneity of variance. For some reason unknown to the writer, the statistical analysis revealed a lack of homogeneity within this particular variable. In this situation, the best and most valid comparison is the unadjusted post-test mean comparison. As stated above, this comparison also yielded a significance at the .01 level of probability but with an F score of 7.59 rather than 12.21. As is noted in the following table (Table 5) an F score of at least 6.96 is needed for the .01 probability level. Therefore, even when the lack of homogeneity is compensated for, there is still a significant difference in the reading rate means of the experimental group as opposed to the control group.

Table 5. Pre-test and post-test scores on the rate section of the SRA Diagnostic Reading Test, stated in wpm

Treatment Group	Unadjusted Means		Adjusted Means
	Pre-test	Post-test	
Experimental	219	323	329
Control	248	271	264
F Score ^a	4.44 *	7.59 **	12.21 **

^aF .05 df 1, 79 is 3.96; F .01 df 1, 79 is 6.96.

* significant at the .05 level of probability; ** significant at the .01

Effective reading rate score

The effective reading rate score for each student was determined by obtaining the arithmetic product of the two previous variables reported, comprehension and rate of reading. An analysis of variance was used to analyze differences between the pre-test and post-test means of the experimental and control groups. The results of this analysis are shown in Table 6. It can be seen that there is no significant difference at the .05 level between the pre-test means of the two groups. The post-test means yield a significant difference at the .05 level of probability. As in the previous variable, the lack of homogeneity dictates that the adjusted mean be disregarded and that the conservative significance be given preference as valid measure in this variable. Therefore, the experimental group post-test mean still stands at a significant difference from the post-test mean of the control group.

Table 6. Pre-test and post-test scores of effective reading rate based on data from the SRA Diagnostic Reading Test, stated in wpm

Treatment Group	Unadjusted Means		Adjusted Means
	Pre-test	Post-test	
Experimental	111	203	207
Control	125	174	171
F Score	1.85*	4.40**	7.21***

* no significant difference at .05 level of probability

** significant difference at .05 level of probability

*** significant difference at .01 level of probability

California Phonics Survey

In addition to the ACT and the SRA Diagnostic Reading Test, two other instruments were administered to the experimental group for diagnostic and within-group comparison purposes. One of these instruments was the California Phonics Survey. The mean scores of the pre- and post-test was treated with the T statistic. The results of this analysis are summarized in Table 7. The 6.75 mean gain was significant at the .0005 level of probability. It should be noted that the possible score on this test was 75; therefore, a gain of 6.75 is proportionally greater in terms of increase in phonics skills than if the total possible score had been 100.

Table 7. Application of T test to scores of the California Phonics Survey, experimental group only

Pre-test	Post-test	Mean Gain	T Value
44.4	51.1	6.75	- 5.99*

*For .0005 probability level, df 39, T is -3.551

Gray Oral Reading Test

The second instrument administered to the experimental group for diagnostic and within-group comparison purposes was the Gray Oral Reading Test. The results of the test are reported in Table 8. The results were not treated statistically. Instead, the pre- and post-test

Table 8. Pre-test and post-test grade-level scores on the Gray Oral Reading Test, experimental group only

Student	Pre-test	Post-test	Gain
1	7.4	11.8	4.4
2	5.8	7.9	2.1
3	8.8	11.6	2.8
4	6.7	9.2	2.5
5	7.2	11.3	4.1
6	6.0	10.5	4.5
7	5.6	10.5	4.9
8	5.6	9.5	3.9
9	7.0	10.9	3.9
10	3.2	5.1	1.9
11	6.1	10.7	4.6
12	5.4	9.4	4.0
13	7.5	9.6	2.1
14	9.6	11.7	2.1
15	10.4	11.2	.8
16	9.1	11.0	1.9
17	6.6	8.9	2.3
18	4.5	5.4	.9
19	7.2	9.6	2.4
20	7.4	9.1	1.7
21	6.2	9.9	3.7
22	5.9	8.8	2.9
23	5.2	11.0	5.8
24	8.4	11.9	3.5
25	8.1	10.9	2.8
26	7.3	10.8	3.5
27	6.8	9.5	2.7
28	8.9	10.6	1.7
29	4.8	7.8	3.0
30	5.6	7.8	2.2
31	7.4	9.3	1.9
32	6.8	11.1	4.3
33	4.3	8.1	3.8
34	5.5	10.3	4.8
35	7.9	11.5	3.6
36	7.0	10.1	3.1
37	5.0	8.3	3.3
38	7.1	11.4	4.3
39	6.8	11.2	4.4
40	8.4	11.7	3.3
Mean Score	6.8	9.9	3.2
Low Score	3.2	5.1	.8
High Score	10.4	11.9	5.8

grade levels of each student were compared and a gain determined. To avoid unrealistically high grade levels, the grade level determined was treated in a similar manner to the effective reading rate components previously reported. For example, student 23 received a grade level of 6.8 on the pre-test with a comprehension score of 77 percent. This resulted in an effective reading rate of 5.2. The post-test grade level of 12.0 with a comprehension score of 92 percent resulted in an effective reading rate of 11.0 and a grade level gain of 5.8.

A mean grade level of 6.8 resulted from the pre-test with a low score of 3.2 and a high score of 10.4. The mean grade level of the post-test was 9.9 with 5.1 for the low and 11.9 for the high score. The mean gain for the total experimental group was 3.2 grade levels during the 8 weeks of instruction with the lowest gain of .8 and the highest gain of 5.8. The significance of these results lies in the fact that these freshmen students came into the reading program reading slightly under the seventh grade level but left the program 8 weeks later reading close to the tenth grade reading level. Figure 1 presents a graphic representation of the grade level gain made of the Gray Oral Reading Test.

Summary of Findings

Chapter IV has been devoted to a presentation of the findings related to the experiment. Data concerning the ACT, SRA Diagnostic Reading Test, California Phonics Survey, and the Gray Oral Reading Test were analyzed and presented in that order.

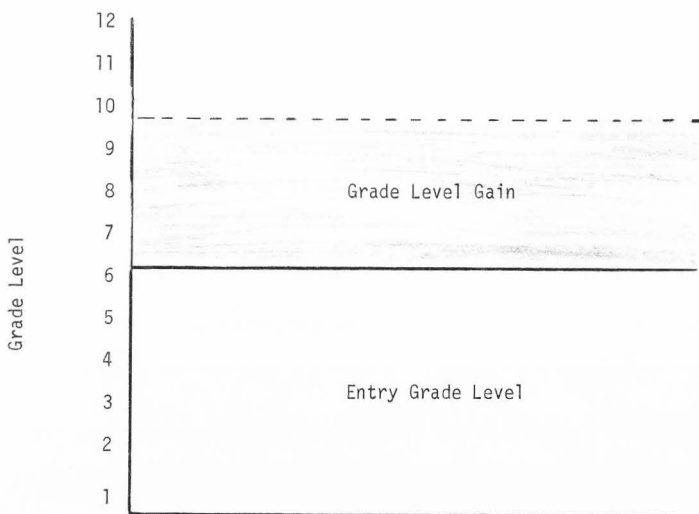


Figure 1. Grade level increase on the Gray Oral Reading Test, experimental group only.

There was no significant difference in the mean scores of the experimental and control group on ACT which functioned as the covariate in this experiment.

The SRA Diagnostic Reading Test yielded four different scores which were treated statistically with an analysis of covariance with the following results: Total score in percentile indicated a significance at the .05 level in favor of the control group in the pre-test

and significance at the .05 level in favor of the experimental group in the post-test. The adjusted mean maintained the .05 level of probability. There was no significance between pre-test means or post-test means of the two groups from the comprehension scores. The adjusted mean also revealed no significant difference. The Rate of Reading mean pre-test scores yielded a significant difference at the .05 level in favor of the control group; whereas, the experimental group mean scores on both the post-test and adjusted means were found to be significant at the .01 level of probability. The Effective Reading Rate means yielded similar results to the rate of reading section. The pre-test means were significant at the .05 level in favor of the control group; whereas, the post-test and adjusted means were significant at the .01 level of probability in favor of the experimental group.

The reader may have already noted the effect of using the covariate statistic in Tables 3, 5, and 6. In each case the covariate increased the unadjusted mean of the experimental group while reducing the unadjusted mean of the control group. This occurred due to the lower initial ACT scores of the experimental group.

Two additional measures were administered to the experimental group, group A, for diagnostic and within-group comparison purposes. The California Phonics Survey pre-test--post-test means were treated statistically with the t-test and resulted in significance at the .0005 probability level. The Gray Oral Reading Test was not treated statistically; rather, the results were stated in grade levels. The

mean of the pre-test was subtracted from the mean of the post-test and a mean gain was determined. In grade level terms the students grade level mean was 6.8 at pre-test time and 9.9 at the post-test time. This yielded a gain of 3.2. The special significance of this mean gain lies in the fact that it was made in a relatively short time, 8 weeks.

CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this experiment was to determine if there were any significant difference in reading ability between two groups of students, one group enrolled in a vocabulary improvement class and the other enrolled in a reading improvement class. Both of these classes were within the Remedial English Program at Utah State University.

Procedures

The study was conducted at Utah State University during the Fall Quarter of the 1971-1972 school year. The subjects were selected on the basis of ACT scores. Further selection was on a voluntary basis. The independent variable for the experiment was the instruction given in vocabulary and reading. The statistic used was the analysis of covariance due to the inequality of the groups based on selection procedures.

Findings

The students enrolled in the reading program improved in Total Percentile Score, Rate of Reading, and Effective Reading Score significantly more than did the students enrolled in the vocabulary program. The Comprehension Score means yielded no significant difference between the two groups.

Additional measures administered to the reading program participants only indicated that a significant difference in phonics skills was effected between the pre- and post-test times within the reading group. Also, the grade level reading ability of the reading group was increased an average of 3.2 years within the 8-week instructional period.

Conclusions

The findings of the investigation supported the hypothesis that remedial reading instruction during a 10-week period of time can effect a significant difference in the reading ability of students in the Remedial English Program at Utah State University.

On the basis of this study, the specific hypotheses stated at the beginning of this paper have been answered as follows for the population described, using the materials and instructional techniques stated.

1. Neither remedial reading instruction nor vocabulary instruction effected a significant change in the level of reading comprehension of the students in this study.

2. Remedial reading instruction can effect a significant change in the rate of reading of the students as compared with vocabulary instruction as measured by the same instrument.

3. Remedial reading instruction can effect a significant change in the effective reading rate of the students as compared with vocabulary instruction when measured by the same instrument.

Recommendations

The findings and conclusions of this study suggest recommendations for consideration. In addition, further research is suggested.

1. Students participating in the Remedial English Program could profit from remedial reading instruction.

2. The remedial reading instruction should be based on the individual's needs rather than based on the needs of a group of students.

3. The student should receive daily feedback from the instructor which stresses the positive accomplishments of the student while encouraging weak areas of the student's reading ability.

4. The student should be encouraged to keep records of his daily work, allowing him and the instructor to observe and evaluate the progress in its proper perspective.

5. Additional studies should be made to determine the extent to which the increased reading rate and effective reading rate are retained over a period of time.

6. Studies might also be undertaken which would conduct a follow-up on the students who did participate in the remedial reading program. This might include investigation into scholastic achievement as measured by the students' grade point averages after they leave the program.

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