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The effectiveness of a summer remedial reading program on one group of Stockton Elementary pupils

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THE EFFECTIVENESS OF A SUMMER REMEDIAL
READING PROGRAM ON ONE GROUP OF
STOCKTON ELEMENTARY PUPILS

A Thesis
Presented to
the Faculty of the School of Education
The University of Pacific

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

by
Wing Jew
July 1963

This thesis, written and submitted by

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Dated 7-15-63

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CHAPTER I

INTRODUCTION

The inability to read is not a problem peculiar to twentieth century society. It is viewed with greater concern today because of our increasing reliance on reading skills. Gray¹ reported that since 1920 there has been steadily increasing attention given to the problems faced by retarded and seriously handicapped readers.

The correlation of reading with the other school subjects and with personality development makes the problem of reading inadequacy an important area for educational and psychological research. Remedial reading programs are often employed to assist children to raise their performance in reading through concentrated attention to skill improvement.

However, it should not be assumed that every child, even if given sufficient attention and instruction, will eventually become an adequate reader. Some distinction can be made between the pupil with low intelligence who might be performing to his maximum ability level, which is well below average, and the student who is obviously not functioning to his estimated ability.² To deal with both types

¹William S. Gray, Encyclopedia of Educational Research (New York: The Macmillan Company, 1960), p. 1128.

²Arthur W. Heilman, Principles and Practices of Teaching Reading (Columbus, Ohio: Charles & Merrill Books, Inc., 1961), p. 369.

in the same manner would be to suggest that methodology or techniques can compensate for the lack of ability.

Youngsters fail to achieve at their expected rate because of many variables, some of which are susceptible to remediation and some of which are not. In order to produce successful results it is necessary to diagnose individual needs and deal with each one accordingly. The teacher's task is to do the most effective job possible with the facilities and practical skill currently available. To attain this goal it is necessary to examine and evaluate the program at frequent intervals.

I. THE PROBLEM

Statement of the problem. This study was designed to discover if results from the summer remedial reading program carry over into the following school year. The design intended (1) to show whether skills taught in the summer classes are retained, and (2) to measure the amounts and some of the kinds of retention throughout the following school year.

Importance of the study. The progress of the students enrolled in one summer remedial reading class was followed in the succeeding school year to measure and observe changes in achievement which might be attributable to summer instruction. The gains made at the end of a

concentrated session of reading emphasis can be considerable, but unless it is lasting, the value of the efforts expended is questionable. Follow-up studies of this type are necessary to determine the effectiveness of such educational programs. It is hoped that the data gathered for this study will be of use in future planning or evaluating of remedial reading programs.

Statement of the hypothesis. Average ability children of the fifth, sixth, and seventh grades from a low to low middle socio-economic level population will have (1) higher achievement and (2) more lasting improvement in reading skills after a five week summer remedial reading class than children of similar ability who did not attend summer school.

II. DEFINITION OF TERMS USED

Average ability children are defined as pupils with no noticeable emotional disturbances and with an I. Q. range from 90 to 120 as measured by the California Test of Mental Maturity administered in the regular testing program of the Stockton Unified School District.

Higher achievement is interpreted in this study as higher scores on reading comprehension, oral reading, and word attack skills according to tests administered during the summer of 1962, October, 1962, and March, 1963.

More lasting improvement is defined as a test score that does not diminish, or which improves, between fall and spring of the 1962-63 school year.

Reading skills are interpreted as the ability to sound letter combinations, to read orally, and to understand reading materials as measured by the Iowa and S.T.E.P. reading comprehension tests, the Gray oral reading test, and the S.U.S.D. test of word analysis skills.

Remedial reading is defined in this study as a program of reading improvement which was used by the researcher with a class of children at the new Monroe School during the summer of 1962. An attempt was made to devise a program aimed at discovering each pupil's individual strengths and weaknesses, and to encourage self-improvement in an environment conducive to learning. Specific aspects of the program are discussed in detail in a later chapter.

CHAPTER II

REVIEW OF RELATED LITERATURE

A review of the literature on remedial reading reveals that there are considerable numbers of published reports relating to the etiology, diagnosis, and remediation of reading retardation. Some of the information pertinent to this study will be summarized in this chapter.

I. THE RETARDED READER

The plight of the retarded reader is of real concern to teachers and parents. Few schools, if any, are entirely free of retarded readers. According to Monroe and Backus¹ a remedial reading program is justified in public schools because of the large number of children needing help. They furthermore point out that reading disabilities hinder subsequent school progress and have a direct relationship to personality and character development.

Although the terms remedial reading and remedial students are loosely used to describe a wide range of reading activities and problems, there is some general agreement as to what constitutes a remedial case. Kottmeyer feels that

¹Marion Monroe and Bertie Backus, Remedial Reading (New York: Houghton Mifflin Company, 1937), p. 3.

a pupil becomes a remedial case "when he cannot participate profitably in classroom learning activities which involve the use of textbooks."² Woolf and Woolf reported that:

The retarded reader is often described as any student whose scores on standardized reading tests rank him one or more years below the national average for his age and grade. This definition of reading disability fails to distinguish between the individual who is reading as well as his ability will permit and the student whose reading skills are decidedly inferior to his level of ability.³

Heilman⁴ also maintained that students of low ability working up to capacity are not remedial cases. A pupil reading at least one year below grade level and not lacking in mental ability can be properly considered a remedial case.

II. ELEMENTS IN READING RETARDATION

Most authorities subscribe to the theory that there are many forces involved in reading retardation and that they are present in various combinations and amounts. This makes the diagnosis of reading disabilities difficult.

²William Kottmeyer, Teacher's Guide for Remedial Reading (St. Louis: Webster Publishing Co., 1959), p. 1.

³Maurice D. Woolf and Jeanne A. Woolf, Remedial Reading Teaching and Treatment (New York: McGraw-Hill Book Company, Inc., 1957), p. 1.

⁴Arthur W. Heilman, Principles and Practices of Teaching Reading (Columbus, Ohio: Charles & Merrill Books, Inc., 1961), p. 369.

Most authorities cite one or more of the following forces as summarized by Monroe and Backus:⁵

1. Constitutional factors (visual, auditory, or motor defects and debilitating physical conditions)
2. Intellectual factors (general intelligence, verbal ability, and other intellectual abilities)
3. Emotional factors (primary factors antedating reading failure, secondary factors resulting from reading failure, and associated or "conditioned" emotional responses)
4. Educational factors (deficiencies in early preparation, poor adjustment of reading materials or methods to individual ability of the child, poor methods of motivation and interest, and inadequate provision in school for children with reading disabilities)
5. Environmental factors (little or no encouragement from home, poor rapport between parents and the child, frequent moving, and other distracting conditions in the environment)

WoOLF and WoOLF hold a similar opinion:

Multicausal factors in reading are receiving increasing attention. Investigations have brought to light various related problems such as visual anomalies, hearing defects, limitations in eye span, impoverished vocabulary, irregularities in eye fixations, phonetic weaknesses, and a host of others.⁶

In order to illustrate the numerous forces entering into the acquisition of reading ability Figure 1 has been reproduced from Heilman.⁷ A lack in one or more of the areas shown could hamper a pupil's progress in reading. It should also be pointed out that many variables are

⁵ Monroe and Backus, op. cit., pp. 17-33.

⁶ WoOLF and WoOLF, loc. cit.

⁷ Heilman, op. cit., p. 377.

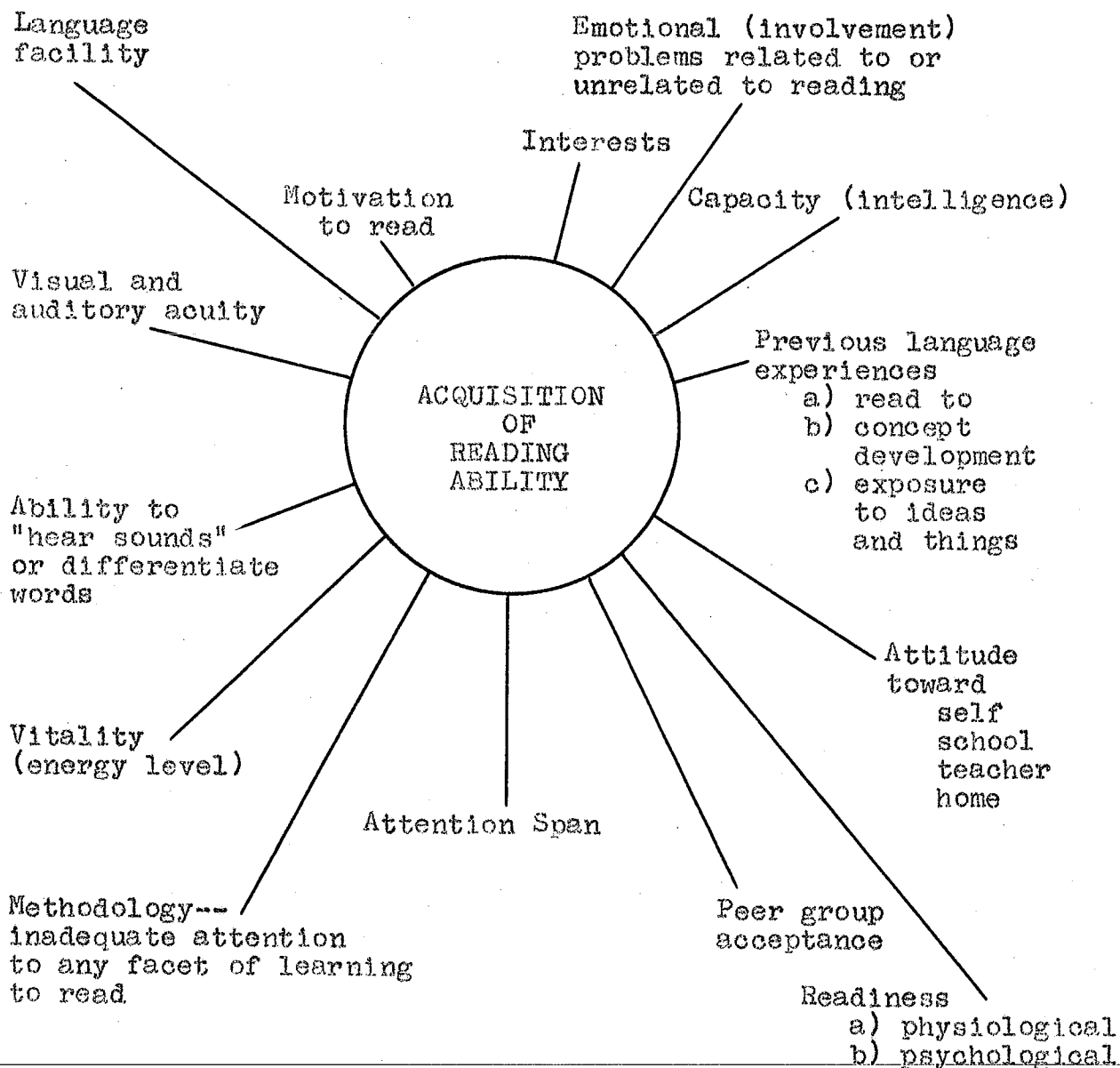


FIGURE 1

FACTORS INVOLVED IN THE ACQUISITION
OF READING ABILITY
(FROM HEILMAN, PRINCIPLES AND PRACTICES OF
TEACHING READING, p. 377)

interrelated. This means that a weakness in one area might lead to failure in another area; likewise, an improvement in one could result in improvement in other areas.

Additional interesting and more radical theories have been investigated by researchers in recent years. Among these are Smith and Carrigan's theory that all reading disability can be attributed to the balance and level of acetylcholine and cholinesterase at the junctions of the neurons. They prescribed the use of medicine plus tutoring.⁸ Because of a limited sample their results were not conclusive.

Delacato⁹ theorized that establishing dominance in one hand and one foot and one eye helps to improve reading ability. This theory has also not been adequately researched.

Believing that pre-birth variables were involved in reading retardation, Kawi and Pasamanick studied the records of prenatal and postnatal histories of 205 male reading clinic cases and reported that retarded readers had a greater incidence of prenatal abnormalities.¹⁰

⁸Donald E. P. Smith and Patricia M. Carrigan, The Nature of Reading Disability (New York: Harcourt, Brace & Co., 1959), p. 109.

⁹Carl H. Delecato, The Treatment and Prevention of Reading Problems: The Neuro-psychological Approach (Springfield, Illinois: Charles C. Thomas, 1959), p. 15.

¹⁰Ali A. Kawi and Benjamin Pasamanick, Prenatal and Paranatal Factors in the Development of Childhood Reading Disorders, monograph of the Society for Research in Child Development, Vol. XXIV, No. 4 (Lafayette, Indiana: Purdue University Child Development Publications, 1959).

The reports of researchers and opinions of authorities on reading clearly indicate that no one element has universal acceptance as the prime basis for reading disability. Some of the more universally accepted variables have been reviewed plus a few of the more unusual theories. It does, however, seem to be the consensus that without some skillful diagnosis of underlying forces remediation is difficult to accomplish.

III. METHODS OF DIAGNOSIS

No uniform diagnostic procedure has been devised which can be effective in all cases. The steps in diagnosis of the specific nature and extent of deficiencies are determined by (1) the nature of the case, (2) the point of view and training of the diagnostician, and (3) the number of specialists and the facilities available.¹¹

The most common approach is to test a child with a diagnostic reading test to determine his present level of reading performance. Critical appraisals of the various general and specialized reading tests found in Buros¹² give information helpful in the selection of a suitable measurement tool for a particular case.

¹¹ William S. Gray, Encyclopedia of Educational Research (New York: The Macmillan Company, 1960), p. 1130.

¹² ~~Oscar~~ Oscar Krisen Buros (ed.), The Fifth Mental Measurements Yearbook (Highland Park, New Jersey: The Gryphon Press, 1959), pp. 616-707.

Teacher judgment can be valuable as a possible means of assessment. Day to day observations made by a teacher often provide clues to causes of reading disability. Informal tests of various kinds have been used successfully also. A combination of diagnostic tools and techniques usually gives the best picture of the problems involved in each remedial case.

Some specific approaches suggested by Bond and Tinker¹³ include the following tests:

1. Durrell Analysis of Reading Difficulty--provides a checklist of errors to help diagnose reading difficulty
2. Monroe Diagnostic Reading Examination--this uses Gray's Oral Reading Examination, Monroe's Iota Word Test, and Monroe's Word Discrimination Test
3. Gates Reading Diagnostic Tests
4. Bond, Clymer, and Hoyt Technique--uses a series of 11 tests

Robinson advocates certain specialized tests and diagnostic procedures other than reading tests. These include visual screening tests, such as the Ortho-Rater and the Keystone Visual Survey Test; hand-eye coordination tests, such as the Wirt Stereotest; and personality inventories.¹⁴

Brueckner and Bond point out that there are three levels of diagnosis. The first level is termed general

¹³Guy L. Bond and Miles A. Tinker, Reading Difficulties: Their Diagnosis and Correction (New York: Appleton-Century-Crofts, Inc., 1957), pp. 178-98.

¹⁴Helen M. Robinson, Clinical Studies in Reading II (Chicago: University of Chicago, 1953), pp. 171-2.

diagnosis which is the recognition of a need for reading help. Next comes the stage of analytical diagnosis which attempts to discover the specific area for remediation. Finally, the third level involves the use of case-study procedures to determine how and when to begin a program of correction.¹⁵ A good diagnostician attempts to identify each possible variable and determines "its chronology, strength or severity, causal importance, and amenability to treatment."¹⁶

IV. APPROACHES TO REMEDIATION

Having made an adequate diagnosis, the next consideration is the type of remedial program to apply. Some guidelines and the more commonly used techniques follow.

The initial stages of planning a remedial program include:

1. Determination of the proper level of difficulty of the material to be used in remediation
2. Estimation of what material is suitable in interest and format
3. Selection of means for showing progress

¹⁵ Leo J. Brueckner and Guy L. Bond, The Diagnosis and Treatment of Learning Difficulties (New York: Appleton-Century-Crofts, Inc., 1955), pp. 63-5.

¹⁶ Albert J. Harris and Florence G. Roswell, "Clinical Diagnosis of Reading Disability," Journal of Psychology, 36:323, 1953.

4. Estimation of the desirable length and frequency of remedial lessons

5. Planning for independent work

The above outline listed by Bond and Tinker¹⁷ corresponds closely with other general plans for remedial reading. Monroe and Backus¹⁸ present other elements which need to be taken into account. They recommend that for optimum effectiveness remedial reading be taught (1) in small groups or on an individual basis, (2) at a favorable time of the day at systematic and regular hours, and (3) with interesting and varied reading materials suited to the child's needs and reading level. Any teacher involved in remedial work should possess some specific training or else work under the supervision of a qualified person.

The foregoing summary merely sets up an operating framework for the remedial teacher. A number of handbooks and teacher's guides are available giving specific techniques. One of the best organized and usable texts is Kottmeyer's Teacher's Guide for Remedial Reading.¹⁹ The book has illustrations of many available commercially made materials, teaching techniques, and machines which can be effectively

¹⁷Bond and Tinker, op. cit., pp. 150-55.

¹⁸Monroe and Backus, op. cit., pp. 39-44.

¹⁹Kottmeyer, op. cit., pp. 113-252.

used for remediation. A careful study of this book provides a good understanding of the nature and methods of remedial reading.

V. EVALUATION OF PROGRESS

Both the student and the teacher profit from evaluations of the progress being made. It not only offers encouragement, but gives direction to the program. There are many ways to detect improvement in the student's reading ability. One of the most obvious indicators is better oral reading. Another promising sign is increased silent reading speed. The fact that the student exhibits more interest in reading or demonstrates enthusiasm in class could also be of importance. A most important measurement is improved scores in reading comprehension on teacher-made as well as standardized tests. It is not difficult to recognize that progress has been made when the gains are large, which is not uncommon if diagnosis and remediation have been skillfully done. On the other hand, it is equally important to recognize small gains as they appear.

Test scores used in evaluating remedial reading progress should be viewed differently from scores made by average students. One would not necessarily expect to see a full year's gain in a school year. Nor would it be expected that the gains be gradual and steady. A remedial

pupil might experience only limited success in the earlier stages, but he could make sizable gains after he reaches a certain level of proficiency.

Brueckner and Bond²⁰ considered the following relationships in interpreting test scores. First, the I.Q., or intelligence quotient, which is already widely used in testing, within limits, is quite useful. Next, the E.Q. or educational quotient which purports to show the level of educability is derived by dividing the reading age by the chronological age. Third, the A.Q. or achievement quotient, which is found by dividing the M.A. (mental age) by the educational quotient, indicates the student's level of achievement in a particular area. A concept developed from the preceding relationships, the level of expectancy, expresses whether the student is operating at his best. If the A.Q. is 100, the pupil would be at expectancy. A value of less or more than 100 (1.00) means the student is working below or above his level of expectancy.

To obtain more meaningful appraisals of progress made by pupils, Bliesmer recommends the use of two methods besides the usual one of determining the difference between the before and after reading test scores.²¹ One of the methods

²⁰ Brueckner and Bond, op. cit., pp. 25-7.

²¹ Emery P. Bliesmer, "Evaluating Progress in Remedial Reading Programs," The Reading Teacher, 15:344-50, March, 1962.

is to compare the remedial year gains with the average year gains before enrolling in the remedial program. The other method is to find the difference between the potential reading level and the actual reading level at the beginning of the remedial program and then compare it with the difference at the end of the remedial program. If this gap between the potential and the achievement levels has lessened, progress has been made.

VI. RESULTS OF VARIOUS PROGRAMS

In summarizing the findings of a large number of studies made on remedial reading programs Blair²² stated that the reported gains indicate that such programs do help. He cited one New York school that recorded an average of 14 months gain in an eight month period for one remedial group. Another experiment involving 2,202 pupils showed an average gain of 13 reading months in four calendar months. Individual gains were sometimes spectacular, but these were balanced by individual cases with little or no gain.

The community sponsored Junior League Reading Center of Chattanooga, Tennessee, established in 1951, offers testing services, provides consultation for teachers and parents, and gives special remedial instruction at the center for

²²Glenn Myers Blair, Diagnostic and Remedial Teaching (New York: The Macmillan Company, 1956), pp. 8-11.

remedial cases in the schools. In its summer program classes of not more than six pupils meet one hour five days a week for a four week period. A small fee is charged. Cases with serious physical or emotional difficulties are discouraged since these could not respond to correction in such a short time. In one summer the reported achievement for a group of 72 pupils ages six to seventeen was a 3 to 36 month gain in reading. The median gain in reading rate and comprehension was 10.2 months as shown by improvement in S.R.A. materials.²³

Clark and Karp reported on the results of a summer remedial program involving youngsters under psychiatric care. Recommendation of remedial reading was made in order to help these children overcome the frustration of not being able to do daily school work. The test data revealed that the average gain was 8 months during a four week program. Out of 104 cases 8 made no gains. The procedure was to meet for one half of an hour individually or one hour in group sessions daily. Only regular attenders and those who were making progress were kept in the program.²⁴

²³Jane S. Still, "Evaluation of a Community Sponsored Summer Remedial Reading Program," Elementary English, 38:342-43, May, 1961.

²⁴Mamie Phipps Clark and Jeanne Karp, "A Summer Remedial Program," Elementary School Journal, 61:137-42, December, 1960.

VII. SUMMARY

In essence the remedial program is not appreciably different from the regular developmental reading program. The fundamentals of learning to read remain the same, but the techniques are modified to meet individual needs. Removing the obstacles to normal learning is part of reading remediation. With skillful diagnosis and the proper remedial program improvement is quite possible and probable except with the most difficult cases.

CHAPTER III

MATERIALS USED AND GROUPS STUDIED

After reviewing the literature, a plan for teaching a remedial summer school class was developed. The basic approach was that listed by Dolch:¹

1. Go back to where the student is
2. Build up a sight vocabulary and speed up word recognition
3. Teach self-help sounding techniques
4. Develop reading comprehension
5. Provide the child with much interesting reading materials at his present reading level

Children were referred because of reading problems, so reading instruction was primary. However, it was also recognized that an excessive concentration on this subject could have adverse effects and produce a decline in enthusiasm. An effort was made to allow for flexibility in the daily program while at the same time including enough routine for the student to feel a sense of security. Another concern was to provide for individual differences. The following daily schedule was adopted for the five week summer session:

8:25 - Opening activities (flag salute and announcements followed by a short "warm up" reading lesson)

¹Edward William Dolch, A Manual for Remedial Reading (second edition; Champaign, Illinois: The Garrard Press Publishers, 1945), p. 24.

- 8:45 - Individualized directed reading using S.R.A. materials
- 9:50 - Relief period
- 9:55 - Art activities (non-verbal self-expression)
- 10:35 - Physical education
- 11:00 - Arithmetic and language arts
- 11:45 - Nutrition
- 11:55 - Group remedial activities
- 12:15 - Individual study (pleasure reading, studying sight words, testing, working with teacher on individual needs, storytime, and other related activities)
- 12:45 - Dismissal time

I. THE MATERIALS AND PROCEDURES USED

Standard Test Lessons in Reading² consists of a series of reading workbooks for developing reading comprehension. The series contains five booklets in soft cover form usable from grade two through twelve. Book A for grades 2-4 and Book B for grades 3-5 were used to start each morning. Each book contains seventy-odd exercises consisting of a short reading selection of from 100 to 200 words followed by some multiple choice questions over the content. Pupils kept their own progress sheet showing grade score equivalents

²W. A. McCall and L. M. Crabbs, Standard Test Lessons in Reading (New York: Bureau of Publications, Teachers College, Columbia University, 1926, 1950).

for each exercise. Checking of the tests was done by the teacher immediately after the lesson was completed.

The Reading Laboratory³ published by Science Research Associates is a kit of reading materials designed for rate and comprehension improvement. There are 150 pamphlets of graduated levels of difficulty and the same number of rate drills in each box. The student reads the selection and answers a number of comprehension questions. He keeps his own record of the number of pamphlets read and the scores achieved after each one.

Dolch's 220 Basic Sight Words in flash card form were used for short periods of drill in word recognition.⁴ These words have been identified by Dolch as the ones that are encountered in about 50 per cent of all reading material.

An alphabet sound chart with accompanying cards for teaching phonics was used in the summer school. This set of instructional materials was produced by Stockton Unified School District with permission of Kottmeyer, a recognized authority in the field. Some of the materials were modifications of the author's work. The material was developed to help children in the fourth grade and above, who are still having trouble with word recognition.

³ Don H. Parker, Reading Laboratory (Chicago: Science Research Associates, Inc., 1957).

⁴ E. W. Dolch, Basic Sight Vocabulary Cards (Champaign, Illinois: Garrard Press, 1949).

Remedial textbooks and story books were available at each reading level in sufficient quantity to give the pupils a good selection for individual supplementary reading. Free reading time was allowed each day to encourage students to do more reading.

The Standardized Oral Reading Paragraphs⁵ by William S. Gray was selected to measure oral reading ability. This test is relatively easy to administer and score. Kottmeyer⁶ stated that this test usually rates pupils at least a full year below more recently standardized silent reading tests. The test consists of twelve paragraphs of increasing difficulty covering a range from 1.4 to 8.0.

The reading comprehension portions of the Iowa Tests of Basic Skills and the Sequential Tests of Educational Progress (S.T.E.P.) were used in this study to measure improvements in fall and spring.

A test to discover a pupil's ability to attack words by sounding out letters was devised by the Stockton Unified School District in 1960. The Test of Word Analysis Skills-Diagnosis of Difficulty is divided into 10 parts covering: (1) initial sounds, (2) initial blends, (3) final consonants

⁵William S. Gray, The Standardized Oral Reading Paragraphs (Cincinnati: Public School Publishing Co.).

⁶William Kottmeyer, Teacher's Guide for Remedial Reading (St. Louis: Webster Publishing Co., 1959), pp. 82-3.

and blends, (4) rhyming words, (5) short vowels, (6) long vowels, (7) final e and 2 vowels, (8) diphthongs, (9) prefixes, and (10) suffixes. This test was used during the summer session to locate pupil weaknesses. In the follow-up testing it was used to measure the amount of retention from summer school and the gains throughout the year.

Fifty words from Dolch's list of 220 sight words were randomly selected and used as a test of word recognition ability through recall of some of the most commonly used words in reading material.

II. THE GROUPS SELECTED

The Experimental Group

The experimental group used in this study was made up of the pupils enrolled in the 1962 summer remedial reading class at the new Monroe School in Stockton. This school is situated at the southeastern outskirts of Stockton in an area that is quite neglected and unattractive in parts and very new and improving in others. In recent years new tract homes in the \$15,000 price bracket have been built in the area, but only a few blocks away are delapidated houses. Adding to the contrast is the absence of sidewalks along many of the streets.

Children were admitted to the remedial reading program on these bases:

1. Pupils should have an I.Q. score of 90 or above.
2. There should be at least a two year retardation in reading.
3. Students entering fifth, sixth, and seventh grades in the fall of 1962 were eligible.

Maximum class size for these classes was set at 23 pupils. In the Monroe class 24 students were accepted. Of this number 21 actually attended one or more days of school. The group consisted of fourteen boys and seven girls. Daily attendance averaged 14, and the attendance records show that two of the pupils attended all 25 days, eight had attended between 20-24 days, five attended between 13-19 days, and six attended less than 12 days. Only the 15 pupils who attended at least 50 per cent of the session were used in the experimental group in this study.

The Control Group

In order to find a matching group of students to serve as a control for the study, the cumulative folders of all pupils of all selected grade levels attending the five elementary schools feeding into the Monroe summer program were reviewed. Great care was taken to locate other students as closely like the subjects in the experimental group as possible. The factors of age, sex, intelligence, achievement record in prior years, present grade level, and general behavior were considered. A tolerance of six months in

chronological age and 10 points in I.Q. score was allowed. With the help of teachers and principals every pupil in one group was matched with another in the same school and wherever possible in the same classroom. Table I presents the data upon which the two groups were finally matched. It may be noted that a few minor deviations had to be made in some instances, because it was impossible to find anyone more comparable. Inasmuch as no two human beings are exactly alike, it was felt that the two groups were adequately matched for the purpose intended. The average I.Q. scores for the experimental and the control groups were 92.8 and 90.8 respectively. The average chronological age was identical for both groups. The average reading stanine for the experimental group was 2.2, compared to 2.0 for the control.

TABLE I
BASIS FOR MATCHING SUBJECTS IN ADDITION
TO SEX, GRADE, AND SCHOOL

Subject No.	C. age	Experimental		Control	
		Reading stanine	C.T.M.M. I.Q.	Reading stanine	C.T.M.M. I.Q.
1	11-8	2	95	1	91
2	9-10	4	101	4	92
3	11-3	3	87	1/2	86
4	11-2	3	97	3	99
5	11-4	4	109	3/4	105
6	10-5	2/3	93	2/3	89
7	11-5	1/2	91	1/2	90
8	12-3	1	86	1/2	93
9	10-10	1/2	86	2	86
10	12-3	1	90	1	77
11	10-2	1	101	2	85
12	11-0	4	85	2	94
13	11-7	1/2	96	1	98
14	12-3	-	-	-	-
15	13-8	1	82	1	86
Averages	11-5	2.2	92.8	2.0	90.8

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

At the beginning and the end of the five week summer session the experimental group was tested with the Gray oral reading test and the Stockton word analysis skills test. The scores from these tests have been compared, and the changes in performance between the pretest and the post-test shown on two of the following tables. A further comparison was made of the changes that took place between the conclusion of the summer program and the fall term.

During the months of October, 1962, and March, 1963, another battery of tests were administered to the experimental group along with another group of equal number selected as the control. The subjects were tested for (1) reading comprehension, (2) oral reading, (3) sight vocabulary, and (4) word analysis skills.

The same test was used in all testing sessions for oral reading and sight vocabulary. Different forms of the word analysis test were used for each testing period. Reading comprehension for the sixth graders was measured by the Iowa Reading Comprehension Test. Because of the fact that the California state testing program for fifth graders coincided with the fall testing schedule planned for this study, it was decided that the state prescribed S.T.E.P. test

of reading comprehension should be used for this study also. Subsequent tests for the fifth graders in March employed an alternate form of the same test. The scores from both tests were converted to stanine scores for comparison and analysis.

Despite the precautions taken to maintain consistent standards of objectivity and reliability in the data gathering process, it is conceivable that some uncontrolled elements have been introduced into the final data.

Such elements as environmental changes, physical problems of poor nutrition or illness, or temporary emotional disturbance, could have influenced a child's test performance and thereby not reveal his true ability. Furthermore, with retarded readers the usual group achievement test can be somewhat inaccurate. When dealing with human subjects, it is very difficult to collect data under the more fully controlled conditions usually found in a laboratory. However, this obstacle need not invalidate research as long as variables are recognized and minimized as much as possible.

The following data are presented with the assumption that they are reasonably accurate and sufficiently valid for drawing certain conclusions. A further refinement of the techniques and procedures with a resultant increase in accuracy would have been possible with more time and funds.

It can be seen from the various tables that several of the pupils involved in this study left the area during

the course of the school year, thus making it impossible to have complete test data on each subject. The loss by transfer to other school districts ranged from 20 per cent to 40 per cent for the various tests. Transiency is a phenomenon common to the schools located in the attendance area under consideration, so it was not unexpected, but, nevertheless, it was undesirable. It would seem highly probable that this frequent changing of residences has a direct relationship to reading disability. Time lost each time the child must adjust to a new situation and a new teacher could easily intensify an existing reading problem.

Summer school results. The frequency distribution shown in Table II indicates a mean gain of .74 year in oral reading after five calendar weeks. Using thirty-six weeks as the average school year results in a ratio of 5.3 weeks gain to each week of instruction. The largest gain was 2.1 years, and the lowest gain was .2 year. One pupil out of fourteen did not show a gain, but all of the other pupils made some gain. The median gain was .7 year with several making substantial improvements.

The data with regard to improvement in word analysis skills are presented in Table III. While it points out that nine pupils out of thirteen either maintained the same level or increased in these skills at the end of summer, the table also shows that four students registered a loss. The largest

TABLE II

GAINS IN ORAL READING BETWEEN JUNE 26, 1962,
AND JULY 26, 1962, AS MEASURED BY THE
GRAY ORAL READING PARAGRAPHS,
FOR EXPERIMENTAL GROUP

Gains in Years	No. of Cases
2.1	1
1.3	1
1.0	2
.8	1
.7	3
.6	1
.5	1
.4	1
.3	1
.2	1
.0	1
Total cases	14
Median gain	.7
Mean gain	.736

TABLE III
CHANGES IN WORD ANALYSIS SKILLS BETWEEN
JUNE 26, 1962, AND JULY 26, 1962,
FOR EXPERIMENTAL GROUP*

Subject identi- fication	No. of correct responses out of 100 items		
	June	July	Change
E 1	43	50	+ 7
E 2	91	88	- 3
E 3	60	67	+ 7
E 4	57	52	- 5
E 5	87	95	+ 8
E 6	58	61	+ 3
E 7	-	-	-
E 8	41	43	+ 2
E 9	58	47	-11
E10	46	47	+ 1
E11	63	64	+ 1
E12	84	81	- 3
E13	57	68	+11
E14	-	-	-
E15	53	59	+ 6
Mean scores	61.4	63.2	
Mean change			+ 1.84

*As measured by Stockton Test of Word Analysis Skills

drop came from a student who had an I.Q. of 86. However, no generalization can be made at this point to suggest that the reason for not improving was because of low intelligence, because two others with I.Q. scores slightly below 90 did make noticeable gains. In fact, the small average gain for the total group suggests that there was obviously no significant improvement for the total group, but it would seem valid to conclude that the majority of the pupils, having made small gains, had improved.

Having looked at Tables II and III, one might conclude that summer school did help the pupils in oral reading to a larger extent and in word attack skills to a lesser extent.

Losses between July and October. A common hypothesis is that the retention of skills and knowledge that have been well-learned is usually high. Therefore, the extent of retention after an interval of two months was considered to be an indicator of the effectiveness of the summer instruction. Upon returning to school in the fall the pupils in the experimental group, shown on Table IV, had registered a slight overall loss in oral reading ability. The average amount of loss was .064 of a year, or 2.3 weeks. It can be observed that six dropped from .2 to .8 of a year; three made gains of from .4 to .6 of a year; and five did not gain or lose. It would appear that the slight amount of forgetting

TABLE IV
CHANGES IN ORAL READING BETWEEN
JULY, 1962, AND OCTOBER, 1962,
FOR EXPERIMENTAL GROUP*

Subject identi- fication	Grade Level Scores		Change
	July	October	
E 1	1.8	1.6	-.2
E 2	5.7	4.9	-.8
E 3	3.9	3.9	0
E 4	3.6	3.1	-.5
E 5	3.9	3.9	0
E 6	1.8	2.3	+.5
E 7	2.3	1.9	-.4
E 8	1.8	2.4	+.6
E 9	2.4	2.8	+.4
E10	2.1	1.8	-.3
E11	3.6	3.6	0
E12	4.2	4.2	0
E13	3.9	3.9	0
E14	4.2	-	-
E15	3.1	2.9	-.2
Mean scores	3.22	3.09	
Mean change			-.064

*As measured by Gray Oral Reading Paragraphs

which took place between July and October indicates that the summer instruction had a lasting effect.

Table V shows an average gain of 2.85 correct responses in word analysis skills for the experimental group. Only four out of thirteen failed to do as well or better on the October evaluation than they did on their ending score in July. The gains ranged from one to eleven correct answers out of one hundred, while the losses ran from one to seven. Although this gain was not large enough to be considered significant, it does lend credence to the contention that the learning did last.

Experimental group and control group compared. As an additional check on the comparability of the two groups the subsequent autumn scores of both groups were analyzed and compared. It can be observed in Table VI that after the October tests the control group scored higher than the experimental one in ten cases out of thirteen in oral reading. In two cases the advantage held by the control amounted to a full year, but in most cases the advantage was much smaller. The mean difference in oral reading was .25 of a year which proved not to be significant with a "t" test, but it should, nevertheless, be recognized that a slight edge was held by the control group.

From the standpoint of reading comprehension, Table VII indicates that the control group had a higher stanine

TABLE V
CHANGES IN WORD ANALYSIS SKILLS BETWEEN
JULY, 1962, AND OCTOBER, 1962,
FOR EXPERIMENTAL GROUP*

Subject identi- fication	No. of correct responses out of 100 items		
	July	October	Change
E 1	50	51	+ 1
E 2	88	99	+11
E 3	67	69	+ 2
E 4	52	62	+10
E 5	95	92	- 3
E 6	61	54	- 7
E 7	-	58	-
E 8	43	51	+ 8
E 9	47	54	+ 7
E10	47	53	+ 6
E11	64	63	- 1
E12	81	87	+ 6
E13	68	69	+ 1
E14	-	-	-
E15	59	55	- 4
Mean scores	63.2	65.5	
Mean change			+2.85

* As measured by Stockton Test of Word Analysis Skills

TABLE VI

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
OCTOBER, 1962, ORAL READING SCORES AS MEASURED BY
GRAY ORAL READING PARAGRAPHS

Subject No.	Grade Level Scores		Difference*
	Experimental	Control	
1	-	1.4	-
2	4.9	5.9	-1.0
3	3.9	3.2	+ .7
4	3.1	3.2	- .1
5	3.9	4.0	- .1
6	2.3	2.8	- .5
7	1.9	2.1	- .2
8	2.4	3.4	-1.0
9	2.8	3.7	- .9
10	1.8	2.3	- .5
11	3.6	3.2	+ .4
12	4.2	4.5	- .3
13	3.9	3.2	+ .7
14	-	-	-
15	2.9	3.4	- .5
Mean scores	3.2	3.3	
Mean difference			- .254**

* A positive difference indicates an advantage by experimental group, and a negative difference indicates an advantage by the control group.

** Insignificant difference (computed in Appendix)

average than the experimental group. The mean difference, .8 of a year, was not large enough to be significant, but again gives the control group an advantage. Only four of the experimentals scored better than the controls in this test.

In the area of word analysis skills the control group held a 5.5 correct responses advantage over the experimental group. Ten of the controls did better than the experimentals. Despite the higher scores of the former group, Table VIII reveals that neither one performed very well considering the fact that there were a hundred items in the test, and the mean difference proved to be insignificant.

A fourth comparison indicated that the experimental group made twice as many errors in recognizing sight words. They made a total of one hundred errors compared with fifty for the control group. The difference between the means for both groups was not significant. A closer scrutiny of Table IX shows that 62 per cent of the total errors could be attributed to four of the subjects in the experimental group, while errors were more evenly distributed among the control group.

As a group the controls seemed to be somewhat superior to the experimental group in all four of the reading skills measured. No explanation can be offered at this point as to why such a gap resulted between two supposedly matched groups.

TABLE VII

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
OCTOBER, 1962, READING COMPREHENSION AS MEASURED BY
IOWA AND S.T.E.P. READING COMPREHENSION TESTS

Subject No.	Reading Stanines		Difference*
	Experimental	Control	
1	-	3	-
2	3/4	5	-1.5
3	2/3	1	+1.5
4	3	5/6	-2.5
5	5	4/5	+ .5
6	3	5/6	-2.5
7	2/3	2/3	0
8	2/3	3/4	-1.0
9	2/3	5	-2.5
10	3	2/3	+ .5
11	3/4	1	+2.5
12	3	7	-4.0
13	3/4	4	- .5
14	-	-	-
15	2/3	3/4	-1.0
Mean stanine	3.08	3.88	
Mean difference			- .8**

* A positive difference indicates an advantage by the experimental group and a negative difference indicates an advantage by the control group.

** Insignificant difference (computed in Appendix)

TABLE VIII

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
OCTOBER, 1962, AS MEASURED BY STOCKTON TEST OF
WORD ANALYSIS SKILLS

Subject No.	No. correct out of 100 items		Difference*
	Experimental	Control	
1	51	42	+ 9
2	99	81	+18
3	69	89	-20
4	62	67	- 5
5	92	80	+12
6	54	74	-20
7	58	59	- 1
8	51	66	-15
9	54	79	-25
10	53	62	- 9
11	63	66	- 3
12	87	78	+ 9
13	69	73	- 4
14	-	-	-
15	55	78	-23
Mean scores	65.5	71	
Mean difference			- 5.5**

* A positive difference indicates an advantage by the experimental group, and a negative difference indicates an advantage by the control group.

** Insignificant difference (computed in Appendix)

TABLE IX

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP
OCTOBER, 1962, SIGHT WORD VOCABULARY TEST
COMPOSED OF FIFTY DOLCH WORDS

Subject No.	Errors out of 50 words		Difference*
	Experimental	Control	
1	16	16	0
2	1	0	+ 1
3	2	0	+ 2
4	7	4	+ 3
5	0	1	- 1
6	8	0	+ 8
7	12	8	+ 4
8	18	4	+14
9	6	0	+ 6
10	16	9	+ 7
11	6	3	+ 3
12	1	0	+ 1
13	3	3	0
14	-	-	-
15	4	2	+ 2
Mean	7.14	3.57	
Mean difference			+ 3.57**

* A positive difference indicates an advantage by the control group, and a negative difference indicates an advantage by the experimental group.

** Insignificant difference (computed in Appendix)

However, this advantage by the control group might be desirable in this study. The comparisons would be more valid and would lend strength to the findings should the experimental group outperform the controls.

Spring results. Table X presents the net change for each subject in reading comprehension between October, 1962, and March, 1963. A drop was recorded for one student, and two others showed no change. The remaining eight members of the experimental group made gains. In the control group, four made no gain; four registered a decline; and only three made improvements. The mean gain for the experimental group was .63 of a stanine, and the mean gain for the control was .18 of a stanine. In this study a .05 level of probability was considered significant and a .01 level was considered very significant. The difference between the two means shows a significant difference beyond the .05 level in favor of the experimental group.

The control group scored higher in oral reading in March, but neither group averaged a full year's gain. The mean difference was only beyond the .10 level in favor of the controls. Table XI shows that all but one in the experimental group and all but two in the control group made some gain. The range of individual gains for the students who had summer help was .2 to 2.2 years, while the students who did not attend had a range of from .2 to 2.4. It is obvious

TABLE X

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
MARCH, 1963, READING COMPREHENSION AS MEASURED BY
IOWA AND S.T.E.P. READING COMPREHENSION TESTS

Subject No.	Reading stanine net changes	
	Experimental	Control
1	-	-
2	+ .5	- .5
3	+2.0	+3.0
4	+1.0	0
5	+1.0	0
6	+2.0	-
7	-	+ .5
8	0	- .5
9	+1.0	0
10	-1.5	-
11	+ .5	+2.5
12	+ .5	-2.0
13	0	0
14	-	-
15	-	-1.0
Mean gain	.63	.18
Mean difference	.45*	

* Significant difference beyond .05 level in favor of
E (computed in Appendix).

TABLE XI

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
MARCH, 1963, ORAL READING AS MEASURED
BY GRAY ORAL READING PARAGRAPHS

Subject No.	Reading years change	
	Experimental	Control
1	--	--
2	+ .2	+ .5
3	+ .3	+ .4
4	+ .9	+2.2
5	+2.2	+2.4
6	+ .8	--
7	--	+ .7
8	-- .1	-- .6
9	+ .9	0
10	+1.0	--
11	+ .3	+1.0
12	+ .3	+1.2
13	+ .3	--
14	--	--
15	--	-- .2
Mean change (over-all)	+ .65	+ .76
Mean change (matched)	+ .625	+ .888
Mean difference	.263*	

* Significant difference beyond .10 level in favor of
C (computed in Appendix).

that both groups had shown improvement, but the experimental group gained at a lower rate. Without valid data as to the rates of growth experienced by these students in prior years it was not possible to compare the current gains with previous ones.

Table XII compares improvements in ability to recognize sight words. The experimental group had a tendency to make more improvement, but the mean difference was not sufficient to be significant. On the average the experimental group scored one more correct response out of fifty words, which is approximately 2 per cent higher than the control group.

According to Table XIII, there were still six pupils in the experimental and three in the control group who did not know all of the fifty words in the sight word test. Table XIV lists the words with which the students had difficulty. The purpose for the inclusion of these two tables was to convey the fact that many of the pupils found it difficult to learn some of the most commonly used words in the English language.

The mean difference in word analysis skills was so small it is obvious that neither group made much improvement nor was either group decidedly better than the other. The data presented in Table XV indicates that the control group was more consistent than the experimental group. The same

TABLE XII

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
MARCH, 1963, SIGHT VOCABULARY TEST
COMPOSED OF FIFTY DOLCH WORDS

Subject No.	Loss or gain on 50 words	
	Experimental	Control
1	-	-
2	+ 1	0
3	+ 2	-3
4	+ 7	+4
5	0	+1
6	+ 4	-
7	-	+3
8	+13	+4
9	+ 2	0
10	+10	-
11	+ 3	+3
12	+ 1	0
13	0	+3
14	-	-
15	-	-2
Mean change (over-all)	3.9	1.2
Mean change (matches)	3.22	1.33
Mean difference	.93*	

* Insignificant difference (computed in Appendix).

TABLE XIII
 EXTENT OF MASTERY OF SIGHT WORDS*
 MARCH, 1963

Subject No.	Errors out of 50 words	
	Experimental	Control
1	-	-
2	0	0
3	0	3
4	0	0
5	0	0
6	4	-
7	-	5
8	5	0
9	4	0
10	6	-
11	3	0
12	0	0
13	3	0
14	-	-
15	-	4
Total errors	25	12

* Fifty randomly selected Dolch words

TABLE XIV
 COMPILATION OF ALL WORDS MISSED
 OUT OF THE 50 WORDS USED
 IN SIGHT WORD TEST

Words	Frequency of errors	
	Experimental	Control
ate	1	1
buy		3
can	1	
don't	4	1
draw	3	
every	2	
found	3	1
green		1
laugh	4	
live		1
must	1	
now		1
own	1	
please		1
ride	1	
round	1	
three		1
what		1
wish	3	
Total errors	25	12

TABLE XV

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP,
MARCH, 1963, AS MEASURED BY STOCKTON TEST OF
WORD ANALYSIS SKILLS

Subject No.	Gain or loss out of 100 items	
	Experimental	Control
1	-	+2
2	- 1	+5
3	- 6	-1
4	-10	+4
5	+ 2	+7
6	+ 9	-
7	-	+6
8	- 3	-3
9	0	+2
10	+ 3	-
11	-	-6
12	0	-3
13	+46	+2
14	-	-
15	-	+2
Mean change (over-all)	0	+1.4

number of students in both groups fell below their earlier scores, but the larger number in the control making gains caused that group to score slightly higher. It should also be pointed out that a large number of errors was attributed to one experimental subject thereby affecting the average for the total group.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

After a five week summer remedial reading program it was discovered that the pupils had made an average gain of .74 of a year in oral reading. A very small gain was suggested in word analysis skills. Other reading skills were not evaluated during the summer, but the instructional program included oral reading, phonics, sight vocabulary drills, reading comprehension, listening skills, and speed improvement practice.

The oral reading gains measured at the end of five weeks were retained in eight cases, but in six cases losses resulted when the experimental group was tested in October. A slight loss occurred between July and October. Nine out of fourteen had retained or improved on word analysis skills, with four showing a loss. The net result was a small gain for the group.

The control group, which was selected on the basis of spring scores prior to the fall semester, was compared with the experimental group in October. The results indicated that the control group was slightly superior to the experimental group in all four of the areas measured. There was approximately .25 of a year advantage in oral reading, a

5.5 per cent advantage in word analysis skills, a 7 per cent better performance in sight word recall, and .8 of a stanine advantage in reading comprehension. Although the above mentioned differences were found to be insignificant, it leads one to wonder whether these differences were the result of pure chance, incorrect measurement, or improper matching techniques. However, since the scope of this study did not offer any answers to this question, these differences were considered not important enough to disqualify the use of the two groups for comparison.

Having somewhat of an advantage over the experimental group, it might follow that the control group would do better than the experimental throughout the remainder of the school year, but the spring results indicated otherwise. In reading comprehension, a significant increase at the .05 level was reported for the experimental group. The experimental students gained an average of .45 of a year more than the controls. The control group did only slightly better than the experimental in oral reading. In the sight vocabulary tests the experimental group made a gain that was twice as large as the control. Less than a 2 per cent higher average gain was recorded by the control group in word analysis skills.

II. CONCLUSIONS

It would appear that the experimental group, with the odds slightly against them, because the control group outperformed them in the October test, performed as well in most instances and had surpassed the control group in others by March. It also seems logical to conclude that the data support the hypothesis that those who attended the summer remedial classes would do better than those who did not. Although the amount of gain and the final scores were not always larger for the experimental subjects, the rates of gain seemed to be higher. It would be reasonable to attribute this, at least in part, to the summer program. It could have raised the performance level of students to make it possible for them to progress at a faster rate.

No definite explanation can be offered for scores which were considerably lower in some follow-up tests than in first tests, but it might be that the student had not learned sufficiently well for adequate retention. It could also lead one to consider re-examining the test instruments in terms of reliability and validity.

Another variable which might conceivably have an influence on the gains is the part which improved attitudes toward reading through experiencing success may have played. This is difficult to measure and was not attempted in this study.

III. RECOMMENDATIONS

Inasmuch as the findings of this study concur with those of other investigators, they tend to corroborate further the generalization that remedial reading classes are helpful to children with reading problems and should be recognized as a necessary part of the curriculum. However, many school districts do not meet remediation needs because of budget or staff limitations. Educational concept and practices are not always one and the same.

Taking variables into consideration, it seems essential that educators set up criteria which will assure the most effective use of the time available for remediation. Obviously, there should be solid budget provision for remediation time, materials, facilities, and staff, on a regular basis if remediation is to occur. Furthermore, remedial instruction should make full utilization of the many newer materials, devices, and techniques available today.

The following recommendations for further study are suggestive of the types of research which might contribute to the improvement of remedial reading:

1. Conduct actuarial studies to determine whether remedial reading is relatively more effective in the primary grades, or whether it is better to wait until the intermediate grades.

2. Follow up those remedial students who do not make gains to see if there is a continuation of the pattern, or whether some students will show improvement later on.

3. Discover if there are sufficient common characteristics of reading disability around which a basic kit of materials can be developed for use in regular classrooms of Stockton Unified School District where the teacher does not have adequate time to devote to remedial work.

4. Test poor readers individually as early in the year as possible to diagnose areas which are most urgently in need of remediation or other service.

5. Establish cut-off points for acceptance of pupils into remedial reading classes which are flexible enough to include some pupils with lower than average I.Q.'s who seem to respond well to instruction, but avoid such leeway that practically all cases could be considered exceptions.

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APPENDIX

TEST OF SIGNIFICANCE FOR TABLE VI
OBAL READING SCORES

Experi- mental	X ²	Control	X ²
4.9	24.01	5.9	34.81
3.9	15.21	3.2	10.24
3.1	9.61	3.2	10.24
3.9	15.21	4.0	16.00
2.3	5.29	2.8	7.84
1.9	3.61	2.1	4.41
2.4	5.76	3.4	11.56
2.8	7.84	3.7	13.69
1.8	3.24	2.3	5.29
3.6	12.96	3.2	10.24
4.2	17.64	4.5	20.25
3.9	15.21	3.2	10.24
2.9	8.41	3.4	11.56
13)41.6	144.00	13)44.9	166.37
M _e = 3.20		M _c = 3.45	

$$t = M_1 - M_2 = 3.45 - 3.20$$

$$\sqrt{\frac{\sum X_1^2}{(N)} + \frac{\sum X_2^2}{(N-1)}} \sqrt{\frac{166.37 + 144.00}{(13)(12)}}$$

$$t = \frac{.25}{1.41} = .17^*$$

*
t = insignificant

df = twenty-six

TEST OF SIGNIFICANCE FOR TABLE VII
READING COMPREHENSION SCORES

Experi- mental	x^2	Control	x^2
3.5	12.25	5.0	25.00
2.5	6.25	1.0	1.00
3.0	9.00	5.5	30.25
5.0	25.00	4.5	20.25
3.0	9.00	5.5	30.25
2.5	6.25	2.5	6.25
2.5	6.25	3.5	12.25
2.5	6.25	5.0	25.00
3.0	9.00	2.5	6.25
3.5	12.25	1.0	1.00
3.0	9.00	7.0	49.00
3.5	12.25	4.0	16.00
<u>2.5</u>	<u>6.25</u>	<u>3.5</u>	<u>12.25</u>
13)40.0	129.00	13)50.5	234.75
$M_e = 3.08$		$M_c = 3.88$	

$$t = M_1 - M_2 = 3.88 - 3.08$$

$$\sqrt{\frac{\sum x_1^2 + \sum x_2^2}{(N)(N-1)}} \sqrt{\frac{234.75 + 129}{(13)(12)}}$$

$$t = \frac{.80}{1.52} = .52^*$$

* t = insignificant

df = twenty-four

TEST OF SIGNIFICANCE FOR TABLE VIII
WORD ANALYSIS SKILLS SCORES

Experi- mental	ΣX^2	Control	ΣX^2
51	2,601	42	1,764
99	9,801	81	6,561
69	4,761	89	7,921
62	3,844	67	4,489
92	8,464	80	6,400
54	2,916	74	5,476
58	3,364	59	3,481
51	2,601	66	4,356
54	2,916	79	6,241
53	2,809	62	3,844
63	3,969	66	4,356
87	7,569	78	6,084
69	4,761	73	5,329
<u>55</u>	<u>3,025</u>	<u>78</u>	<u>6,084</u>
14) 917	63,401	14) 994	72,286
$M_e = 65.5$		$M_c = 71$	

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\Sigma X_1^2 + \Sigma X_2^2}{(N)(N-1)}}} = \frac{71 - 65.5}{\sqrt{\frac{63,401 + 72,286}{(14)(13)}}}$$

$$t = \frac{5.5}{27.1} = .203^*$$

* t = insignificant

df = twenty-eight

TEST OF SIGNIFICANCE FOR TABLE IX
SIGHT WORD VOCABULARY SCORES

Experi- mental	X ²	Control	X ²
16	256	16	256
1	1	0	0
2	4	0	0
7	49	4	16
0	0	1	1
8	64	0	0
12	144	8	64
18	1,224	4	16
6	36	0	0
16	256	9	81
6	36	3	9
1	1	0	0
3	9	3	9
<u>4</u>	<u>16</u>	<u>2</u>	<u>4</u>
14)100 M _e =7.14	2,096	14)50 M _e =3.57	456

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sum X_1^2 + \sum X_2^2}{14.13} \sqrt{\frac{2552}{182} \sqrt{14}}}} = \frac{3.57}{3.7} = .965^*$$

$$t = \frac{3.57}{3.7} = .965^*$$

* t = insignificant

df = twenty-eight

TEST OF SIGNIFICANCE FOR TABLE X
READING COMPREHENSION SCORES

Experi- mental	X ²	Control	X ²
.5	.25	- .5	.25
2.0	4.0	+3.0	9.0
1.0	1.0	0	0
1.0	1.0	0	0
0	0	- .5	.25
1.0	1.0	0	0
.5	.25	+2.5	6.25
.5	.25	-2.0	4.0
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
9)6.5 M _e = .72	7.75	9)2.5 M _e = .28	19.75

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sum X_1^2}{(N)} + \frac{\sum X_2^2}{(N-1)}}} = \frac{.72 - .28}{\sqrt{\frac{7.75}{(9)} + \frac{19.75}{(8)}}} = \frac{.44}{\sqrt{\frac{27.50}{72}}}$$

$$t = \frac{.44}{.20} = 2.2^*$$

* t = significant beyond .05 level in favor of E

df = sixteen

TEST OF SIGNIFICANCE FOR TABLE XI
ORAL READING SCORES

Experi- mental	χ^2	Control	χ^2
.2	.04	.5	.25
.3	.09	.4	.16
.9	.81	2.2	4.84
2.2	4.84	2.4	5.76
- .1	.01	- .6	.36
.9	.81	0	0
.3	.09	1.0	1.00
<u>.3</u>	<u>.09</u>	<u>1.2</u>	<u>1.44</u>
8)5.0 $M_e = .625$	6.78	8)7.1 $M_c = .888$	13.81

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sum X_1^2}{(N)} + \frac{\sum X_2^2}{(N-1)}}} = \frac{.888 - .625}{\sqrt{\frac{6.78}{(8)} + \frac{13.81}{(7)}}} = \frac{.263}{\sqrt{.368}}$$

$$t = 1.92^*$$

* t = significant beyond .10 level in favor of C

df = sixteen

TEST OF SIGNIFICANCE FOR TABLE XII
SIGHT WORD VOCABULARY SCORES

Experi- mental	χ^2	Control	χ^2
1	1	0	0
2	4	- 3	9
7	49	4	16
0	0	1	1
13	169	4	16
2	4	0	0
3	9	3	9
1	1	0	0
<u>0</u>	<u>0</u>	<u>3</u>	<u>9</u>
9)29 $M_e = 3.22$	237	9)12 $M_o = 1.33$	60

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sum X_1^2}{(N)(N-1)} + \frac{\sum X_2^2}{(N)(N-1)}}} = \frac{3.22 - 1.33}{\sqrt{\frac{237}{(9)(8)} + \frac{60}{(8)(7)}}} = \frac{1.89}{\sqrt{4.12}} = .93^*$$

* t = insignificant

df = eighteen