

AN ABSTRACT OF THE THESIS OF

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ACTIVITIES ON THE READING ABILITY OF ELEMENTARY
SCHOOL CHILDREN

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The purpose of this study was to determine whether or not there was any change in reading achievement level of elementary school children during the summer vacation, and whether or not identifiable factors existed that may have accounted for these changes.

Children in the first through fifth grades in three elementary schools in Corvallis, Oregon were given the Word Reading and Paragraph Meaning sub-tests of the Stanford Achievement Test during the week prior to the last week of school in the spring. Another form of the same test was administered to these same students during the second week of school in the fall. Scores from the two tests for 383 children were then analyzed to compare gain in reading achievement during the summer vacation in terms of the total group tested, boys

as compared to girls, grade levels, reading ability (as indicated by pre-test score), and summer reading activities.

A matched-pair study was conducted using the children who attended summer school as the experimental group and children who did not attend summer school as the control group. The scores obtained by these two groups were then analyzed to determine if there was a significant difference in reading gain or loss during the summer.

A questionnaire was completed in the fall by the children regarding their participation in summer activities. The responses of the children making the most gain in reading achievement during the summer vacation were compared with the responses of the children who made the least gain to determine if there was a relationship between summer activity and reading achievement.

Findings and Conclusions

Application of the t statistic to the mean differences between pre-test and post-test reading scores showed that a statistically significant loss at the .05 level of about one-tenth of a year in reading achievement occurred during the summer. No significant difference was found between the mean scores of the boys and the girls. Analysis of the mean difference scores for each of the five grade levels using the one-way F-ratio indicated no significant difference between grades.

Students receiving the lowest scores on the pre-test appeared to make more gains than the students making the highest scores when the results of a chi-square test of independence were analyzed in all grade levels and both sub-tests except for grades two and three on the Word Reading sub-test.

The chi-square test of independence that was applied to the responses on the questionnaire by the group making the most gains when compared to the group making the least gains indicated that more high-gain students had read more than ten books during the summer than the low-gain group. The low-gain group had taken more extended trips than the high-gain group.

The t statistic for small correlated samples used with the matched-pair study showed that there was no significant difference between the summer reading achievement loss of the experimental group that attended summer school and a control group that did not attend.

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Activities on the Reading Ability of
Elementary School Children

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A STUDY OF THE EFFECTS OF SUMMER VACATION ACTIVITIES ON THE READING ABILITY OF ELEMENTARY SCHOOL CHILDREN

I. INTRODUCTION

One of the major goals for education in the 1970's is a total commitment to end reading failures in the United States, according to the United States Commissioner of Education, Dr. James E. Allen. (3) Since each child develops at his own individual rate, it is imperative that teachers carefully assess each child's reading level and be prepared to provide material and instruction that is suitable to his level of reading growth. (8:43) To accomplish this task as quickly as possible when school starts in the fall, the classroom teacher looks at the children's records of reading achievement, particularly those from the previous spring, and then proceeds with her planning. She is not certain, however, whether or not the summer vacation will have changed the reading achievement of her pupils. There are many opportunities within our American culture for children to utilize the reading skills they have learned. Labels, advertisements, signs, and many printed materials are available everywhere. (7)

There is a wide variety of activities available to children during the summer vacation. Some of these activities might have a direct influence on a child's reading growth. One of the most obvious possibilities is the summer school reading program. Summer or vacation

schools can be traced back in the United States to 1866 when such a school was administered by the First Church of Boston. (38:viii) In 1897 a summer school program was started in New York City that was probably the first one under city authority. (52:23) By 1900 the movement was fairly well underway. By 1925, summer school programs reached a peak with an estimated 29 per cent of districts in many states participating. The number of summer schools declined during the next five years due to a change of educational concepts and an economic depression. (38:viii)

A survey of elementary education fifteen years ago ignored elementary school summer sessions altogether because there were so few of them. In the past ten years there has been a resurgence of these programs. (42) In 1962 the National Education Association sponsored a study of summer school programs. A random sampling of 247 school systems with more than 12, 000 students enrolled in summer school programs led to this conclusion:

There is adequate evidence to prove what educators, writers and speakers have been surmising -- that many new summer school programs are being set up and that programs which have been in operation for years are being greatly expanded. More than one-fifth of the 247 school systems cooperating in this study had no summer schools prior to 1958. (35:44)

A nationwide survey conducted by the National Education Association of the summer schools in operation during the summer of 1966 estimated that there were a million elementary pupils in summer

school. (42) Notley attributes this growth to current socio-economic conditions where there is a tremendous growth in suburban residential communities allowing little opportunities for children to pursue special interests and playground activities except in the community school. (38:viii)

The availability of federal funds for summer school programs has been one factor in their expansion. During the summer of 1966, consultants visited a sampling of 86 school districts in 43 states evaluating summer school programs involving Title I funding under the Elementary and Secondary Education Act. The value of summer school programs was emphasized by a conclusion in the report of this study:

The important advantages of summer school lead the Council to believe that dollars thoughtfully expended on summer schools may be among the most productive dollars spent by Title I. Their full potential will be realized when successful practices discovered in summer are transplanted to "regular" school as year round practices. (51:5)

In appraising summer school programs, Holmes and Seawell state:

It is predicted that within the immediate future there will be a very rapid growth in summer school programs. It is incumbent upon professional educators and school board members to give guidance and direction to this growth. (21:11)

Many educators are questioning the advisability of a summer vacation at all. The length of the school year has gone through a

certain amount of change. Before 1840, city schools were conducted nearly all year. Rural communities had shorter sessions to allow children to help with the farming. After 1840, cities gradually shortened the school year while the rural communities school session gradually lengthened. By 1915, most of the nation's schools operated on the familiar nine month pattern. (22)

Concern over the advisability of continuing the traditional nine-month school year was expressed in a report by the American Association of School Administrators in 1960:

The almost universal practice of leaving school plants and teaching personnel idle at a time in our history when every available education resource is needed should be carefully reexamined in the light of present circumstances and existing needs. (4:1)

There have been various plans to lengthen the school year or utilize school facilities more advantageously. Bluffton, Indiana, adopted a four-quarter plan of staggered attendance in 1904. The school year was divided into four quarters and the students could decide which three of these quarters they wanted to attend. (50) Similar programs operated in Newark, New Jersey, from 1912 to 1931 and in Nashville, Tennessee, from 1924 to 1932. (4:12) These programs have been discontinued because they were considered too expensive and if a child elected to attend all four quarters he would graduate from high school too young for college or adult employment. Also, in a study of the all-year school at Nashville, Tennessee, it was

reported that the elementary pupils who had attended summer quarters in Nashville did not do proportionately as well as children who did not attend summer school quarters. The more the children were behind in their school work the less they profited by summer school attendance. Withdrawals were twice as great in summer quarters. (19:54-55)

When administrators responded to a questionnaire prepared by the California Elementary School Administrators Association regarding the movement toward a longer regular school year or the 12-month year-around school, 63 per cent said they were not in favor of either one. They felt that summer school on an optional basis was a highly desirable alternative to lengthening the regular school term. (38:19)

The National Education Association Research Bulletin in 1968 discusses various methods of utilizing school facilities and concluded that more research is needed in this area. (34)

There is controversy regarding the value of a longer school year on children's scholastic achievement. Holmes and Seawell (21) emphasize that not all education takes place in the school room. The possibility for travel, the accessibility of much reading material, and the increased viewing of television could all have an impact on a child's reading growth without the need for formalized instruction.

It has been emphasized by many educators and writers that reading is a developmental process. (8:22)(15:23)(53:46) This consistent and continuous growth would indicate that a student's reading achievement

should be maintained or possibly improved through the summer months.

Sister Bergin (7) suggests, however, that growth may not take place during the vacation time as pupils are without careful guidance by a teacher in providing motivation and stimulation of interest in reading, nor are the students provided with specific reading material needed for the practice of particular skills.

The problem of how much gain or loss in reading achievement occurs over summer vacation has been of concern to educators for many years. In 1926, Patterson (41) stated: "The subject (achievement change over the summer vacation) is one worth the study of many educators, who wish to economize the time of pupils and in school expenses." (41:222)

In 1928, Bruene (10) asked:

Do children lose in achievement during the summer vacation? Is it necessary that teachers spend time on review in the fall? Do all subjects require the same amount of review? When school closes it becomes necessary to advise with parents and pupils in regard to attending summer school. Would it be advisable to send the children who are a little below norm or just on the borderline in June to summer school? (10:309)

This problem is still of concern. The organization of schools is much more complex and the questions must be answered not only by individual teachers but also by curriculum advisers. Decisions regarding the curriculum in the fall following the summer vacation must be

based on a knowledge of the effect of the vacation on the student and on the curriculum.

In 1962, Parsley and Powell (40) asked the following questions:

Is there summer loss in all subject matter areas? Is the amount equal in each? Are all groups affected in the same way regardless of grade level or sex, or are such factors as differences between the sexes and the grade levels to be considered in curriculum planning? (40:288)

There have been few recent studies regarding the question of summer vacation's effect on reading achievement change and the results are inconclusive.

Purpose of the Study

The purpose of this study is to determine whether or not there is any change in reading achievement level of elementary school children during the summer vacation and whether or not identifiable factors exist that may account for these changes.

Hypotheses

H₁: Reading achievement of the total group of children tested in grades one through five will be higher in the fall than it was the previous spring.

H₂: The gain or loss in reading achievement of boys will be the same as that of the girls.

H₃: The amount of change in reading achievement will be the same in each of the five grade levels being tested.

H₄: Students whose scores are in the upper twenty-seven per cent of the group taking the test in May will show greater gains in reading achievement than those whose scores are in the lower twenty-seven per cent.

H₅: A student's involvement in summer reading activities will be related to a gain in reading achievement.

Limitations of the Study

The measurement of reading ability was determined by the use of the reading section of the Stanford Achievement Test, 1964 edition, which included a Word Reading and Paragraph Meaning sub-test.

The information regarding summer activities was limited to the nine categories in the questionnaire devised by the researcher.

The study was conducted in one geographical region which could limit its use for the general population. Also, the schools utilized in the study contain pupils from a slightly lower economic level than the general population of Corvallis.

Implications of the Study

The information obtained from analyzing the data provided in this study should form a basis from which teachers can anticipate

whether or not to expect their classes to be reading at levels different from that in which they were reading the previous year. By looking at a child's reading score of the previous year, the teacher should be able to predict whether or not the pupil is more apt to have gained or lost in reading ability. Also, teachers can better advise parents as to the kinds of summer activities that appear to be associated with pupil gains or losses in reading achievement.

The results of the data accumulated in this study can provide a basis for school districts to plan future summer reading programs. Information obtained regarding the grade level or levels in which the pupils show the most gains or losses in reading ability during the summer months could be utilized in determining which age children should be encouraged to participate in summer reading programs.

The effectiveness of the 1970 summer reading program in the Corvallis School System can also be evaluated. The scores of the pupils attending this program can be analyzed in comparison to a control group that did not attend summer school.

Definition of Terms

The following definitions will be used throughout this study:

Grade Score. The grade score norm attempts to specify the approximate level of achievement of a given pupil with reference to the achievement of pupils across a wide educational span, generally from grades one to ten or 12.
(25:10)

Summer Vacation. This denotes the period intervening between the administration of the initial reading test and administration of the retest in reading (7:9) This includes a 15 week period from May 29, 1970 to September 14, 1970.

II. REVIEW OF THE LITERATURE

Some early studies evaluating amount of summer reading achievement gain or loss yielded quite conflicting conclusions. In 1924, authors Bruechner and Distad (9) investigated 12 classes of first grade children and found the median scores on the Minneapolis Primary Reading Test and the Haggerty Reading Examination were somewhat lower in September than in June.

The following year, Patterson (41) tested 149 children in a representative city school in New York State in grades four to eight using the Thorndike-McCall Silent Reading Test. The first test was given in the middle of June and the second test was given in the middle of September. The median score for each test was calculated and a change in median scores was reported. In the group of children whose intelligence quotient ranged in the average of 90 to 110, she found a loss of about two months in reading achievement over the summer vacation.

Two year's later, in 1927, Elder (16) studied the results of Monroe's Standardized Silent Reading Test that had been administered to third through sixth grade children. Of the 203 children tested, 56 per cent improved their reading over the summer, 27 per cent lost, and 15 per cent scored the same. He found an average gain of .45 of a school grade. He concluded:

1. Ability in silent reading changes whether children are attending school or not.
2. Although many pupils read voluntarily to cause a growth in reading ability, a large percentage of the children in the intermediate grades do not read voluntarily a sufficient amount of material to prevent a decline in reading ability during the summer vacation.
3. A considerable amount of teaching power and of the taxpayer's money must be expended at the opening of each school year in restoring reading habits and skills lost during the summer vacation. (16:546)

Bruene (10) also found a slight gain in reading achievement over the summer in her study of 69 children in the fourth, fifth, and sixth grades. The Stanford Achievement Test, Form A, was administered at the University Training School of the University of California at Los Angeles in May, 1927. In September of the same year, Form B was given to the same children. An average gain of .13 of a school year was calculated. From her observations, she asked:

Did those who gained go to summer school? What activities, if any, did these children engage in during the summer which called for exercise of reading and arithmetic abilities? If any, to what extent? Such information would help much in educational guidance. (10:312)

Schrepel and Laslett (45) used the New Stanford Achievement Test in 1936 to measure the reading ability change of 172 pupils in grades eight and nine. They found a gain in mean reading achievement and concluded that strenuous reviews in the fall do not seem to be warranted. Keys and Lawson (30) agreed with this conclusion in

their study in 1937 of 164 pupils in grades four through eight of the Gilbert, Minnesota, schools. They recorded a summer reading gain of two months.

Cook (12) reported that research done over a period of four years prior to 1942 in the primary grades of the laboratory school at Mankato State Teachers College indicated a loss of .31 of a school year in reading achievement over the summer vacation when measured by the Gates Primary Reading Test. Analyzing results of the Primary Reading test of the Metropolitan Achievement Test showed a loss of .43 of a school year.

Sex Differences in Reading Achievement

There have been several studies reported that consider possible variation between boys and girls in reading development. Gates (18) and Clark (11) arrive at opposite conclusions in their respective studies comparing test scores of boys and girls during the academic year.

In the spring of 1957 Gates (18) conducted a study of sex differences in reading ability based on the test scores of 13,114 pupils in 12 school systems in ten states. The study included 6,646 boys and 6,468 girls in grades two through eight. Each child took all three of Gates Reading Survey Tests, which tested speed of reading, reading vocabulary and level of comprehension. The mean raw scores of the

girls were compared to those of the boys to ascertain if there was a difference. In speed and vocabulary, girls received scores about .2 reading grade above the boys in grades three and four, .3 in grades five and six, and .4 in grades seven and eight. The girls' scores in reading comprehension was .2, .3, and .2 higher than the boys for the corresponding grade levels. There was more variability in scores among the boys and they tended to make the highest and the lowest scores. Gates attributed the superiority of the girls in reading achievement more to environmental factors than to hereditary ones.

Clark (11) took a sample from 69,354 pupils in 341 school systems in 48 states, selecting at random 75 boys and 75 girls each from grades three, five and eight. He used the results obtained from the administration of the California Achievement Test upon which to base his conclusions. He found no significant differences between performances of boys and girls for reading vocabulary or reading comprehension.

Anderson, Hughes and Dixon (5) found significant differences favoring the girls over the boys in age of learning to read but found no such differences in the rates of reading development in their longitudinal study of first through sixth grade children conducted in 1957.

The conflicting information regarding sex difference in reading development led Bergin (7) and Parsley and Powell (40) to investigate possible differences in summer vacation reading ability changes.

In 1962, Sister Loretta Bergin of Fordham University (7) analyzed the change in reading achievement of 4243 finishing first grade children in New York City when classified according to membership in ethnic groups, socio-economic levels, sex, intelligence levels, and end-term (test taken at the end of May) reading levels. She found more groups of boys than of girls had actual reading loss over the summer vacation.

Parsley and Powell (40) analyzed the results of scores obtained on the California Achievement Test Battery before and after summer vacation by 90 girls and 90 boys at each of the second through seventh grade levels. These children were selected at random from the group of pupils who scored between 90 and 110 on the California Test of Mental Maturity in a sample of 1080 boys and girls in the Willoughby-Eastlake public schools in Ohio. In reading vocabulary they found no significant differences between sexes at any grade level, but in reading comprehension they found indications that boys gain less during the summer at the early grade levels and girls gain less at the sixth and seventh grades.

In 1965 and 1966, Beggs and Hieronymus (6) conducted a study of reading growth during the summer vacation of 603 fifth and sixth grade students in eight school systems in Iowa. This was done in connection with the annual Iowa Basic Skills Testing Program in Iowa. They hypothesized that nine grade equivalent months of growth would

occur during the school year, and a tenth during the summer. Their data were variable enough from sub-test to sub-test, and from samples studied for school year growth to the samples studied for summer growth, that they could not identify a common pattern. On the Vocabulary and Reading Comprehension sub-tests there did appear to be about one-tenth of a year gain over the summer vacation.

Grade Level Differences

In three studies conducted in the 1920's by Elder (16), Patterson (41) and Bruene (10) that were discussed on pages 11 and 12 of this paper, considerable variation in amount of reading ability change over the summer vacation was reported among the grade levels investigated.

In Elder's study (16), the third grade gained .47 of a school grade, the fourth grade .84, the fifth grade .22, and the sixth grade .36.

Bruene (10) found that in the fourth grade six children out of 15 tested lost in reading ability over the summer, six children gained, and three remained the same. In the fifth grade 13 children lost, ten gained, and three remained constant. In the sixth grade, nine children lost in reading ability, 17 gained, and two stayed the same.

Patterson (41) discovered an average loss in reading achievement in grades four, five and seven, a gain in grade six, and no change in grade eight.

Parsley and Powell (40) analyzed reading vocabulary and reading comprehension separately in their study of the summer's effect on reading achievement reported in 1962. They found a general gain in increasing amounts from grades two through five in reading vocabulary. In reading comprehension there was a significant drop in gain by the third grade children, and a gradual gain in grades four through seven.

Reading Ability Differences

The question as to whether or not students who score highest on a reading pre-test given in the spring will continue to progress at a faster rate than the lower scoring children during the summer vacation has concerned two researchers previously discussed in this paper.

Elder (16) found in his study of third through sixth grade children that there was an insignificant relationship between initial standing and summer gain or loss of reading ability. The children who scored the highest on the test given before summer vacation did not make more average gain than the children who scored the lowest on the test. He concludes that because of increases in ability of some of the better readers and decreases in ability on the part of some of the poorer readers the September group was more homogeneous, though.

Bergin (7) concluded in her study of first grade children that the initial test score was a better indicator than intelligence scores in predicting reading gain or loss over the summer vacation. Children

whose scores were in the low average and low range in reading made more loss in reading achievement than children in the other groups.

Summer Activities

Cook (12) tried to control the amount of summer reading ability loss of first and second grade students by providing work envelopes with daily assignments to be completed by each child during the summer. In September, she classified the children into three groups: (1) did little work; (2) worked until around the fourth of July; (3) worked all summer. All the children in groups one and two showed some loss in reading ability. All the children in group three either retained their reading scores or showed some gain.

Aasen (2) also reported an attempt to avoid summertime loss of 96 fourth grade pupils in Minneapolis. Sixty-four children were provided incentives to continue reading during the summer. During the last week of school, favorite books were discussed as well as ways to keep reading records, and ways to check out books. Each child was individually assessed of his reading level and possible titles for summer reading were reviewed with him. Visits were made to the library and bookmobile. The results of the retest scores in September indicated a mean gain of .7 grade point for the experimental group. The control group who had no special incentives stayed the same.

In 1969, Soar and Soar (47) reported a two-year longitudinal study of 189 pupils in three elementary schools in a metropolitan area in central South Carolina to determine the relationship of pupil summer academic growth to teacher-pupil classroom behavior. The Iowa Tests of Basic Skills was administered to the fifth grade classrooms in the fall and the spring, and again in the spring when these students were in the sixth grade. Classrooms with extremes in extent of teacher control and emotional climate were compared. Neither of these factors was found to be significant to summer growth in reading achievement.

Summary of Investigations

There have been very few recent studies assessing change in reading achievement during the summer months, and practically no attempt has been made to determine the factors which might be responsible for a difference in achievement among children. The results from previous research are very conflicting and inconclusive. All the studies indicated a definite need to establish some of the reasons for the effect of summer vacation on the scholastic achievement of pupils.

When various summer programs have been evaluated (1) (43), the pupils in attendance are tested at the beginning and at the end of the summer instructional period. No follow-up has been done to show

how these children compare at the beginning of the school year with pupils who had similar problems but did not attend any summer reading program.

III. METHODOLOGY AND PROCEDURES

In this study the scores of a pre-test before summer vacation and a post-test in the fall were analyzed to determine whether or not there was a mean change in reading ability. Data obtained from a questionnaire were utilized to decide which summer activities were related to a gain in reading improvement.

Subjects

Three elementary schools in the Corvallis Public Schools, Corvallis, Oregon, participated in this study. These schools draw their population from a varied strata of socio-economic levels. Many of the parents are college students attending Oregon State University. The majority are skilled and semi-skilled workers, as well as some college and public school faculty members and a few transient workers.

All the children in the first through fifth grade classes were subjects in this study. Five hundred thirty-eight students were tested initially. A total of 383 of these same children were available for post-tests given the following fall. This group consisted of 72 first grade children, 70 second grade, 86 third grade, 82 fourth grade, and 73 fifth grade pupils. The information obtained from the testing of the total group was used to answer the questions regarding mean change in reading ability.

For purposes of evaluating the summer school program, twenty children from this group who attended summer reading classes were matched on the basis of age, grade, sex, I. Q. scores, and pre-test scores with twenty children who did not attend summer school. The changes in reading achievement of these two groups were compared statistically.

Preparation of Instructors

An individual conference was held with each of the twenty-five classroom teachers participating in the testing program prior to the testing. The purpose of this study was explained, as well as the general procedures for giving the test and the necessity for following exactly the instructions of the test manual which was distributed to each teacher. They were informed that the scoring of the tests would be done by the researcher and the scores returned to them within a week.

A detailed instruction sheet was sent with the test booklets to each teacher the week before the testing. A proposed schedule for giving the sub-tests was included as well as the page numbers in the administration manual that applied to each sub-test, and the date on which the completed tests would be collected by the writer.

On the dates the testing was to take place, each building was visited by the researcher to answer any questions regarding the testing

procedure of the classroom teachers giving the test.

Instruments

Two instruments were used in this study. The Stanford Achievement Test, Forms W and X, was used to determine the reading achievement level of each pupil in word reading and paragraph meaning.

An informal questionnaire was prepared by the researcher to determine the extent to which various reading related activities were pursued by the pupils in the study.

Stanford Achievement Test

The Stanford Achievement Test, 1964 edition, published by Harcourt, Brace, and World, Incorporated, New York City, New York, was administered to determine the reading ability level of the subjects participating in the study. Form W was used as the pre-test and Form X as the post-test. Four batteries were included; Primary I for the first grades, Primary II for the second grades, Intermediate I for the third and fourth grades, and Intermediate II for the fifth grades. Two sub-tests, Word Reading and Paragraph Meaning provided the data to be analyzed.

The Word Reading Test is described in the Directions for Administering Manual, Primary I Battery as:

The Word Reading Test consists of 35 items, graduated in difficulty, which measure the ability of a pupil to analyze a word without the aid of context. The test employs a multiple-choice type of item in which the pupils are required to look at a picture and then select the word which stands for the picture from a group of four words. (23:4)

The Word Meaning Test for the Primary II Battery is described

as:

The Word Meaning Test consists of 36 multiple-choice items, graduated in difficulty, which measure the ability of a pupil to read a sentence and to select a correct word to complete the sentence. The test thus requires, at this level, the ability to read. (24:4)

In the Intermediate I manual the same test is described as:

The Word Meaning Test consists of 38 multiple-choice items. In addition to items measuring knowledge of synonyms, of simple definitions, and of ready associations, there are included items designed to measure higher-level comprehension of the concepts represented by words, and fullness of understanding of terms. (22:4)

The Intermediate II manual describes the test as:

The Word Meaning Test consists of 48 multiple-choice items. In addition to items measuring knowledge of synonyms, of simple definitions, and of ready associations, there are included items designed to measure higher-level comprehension of the concepts represented by words, and fullness of understanding of terms. (23:5)

The Paragraph Meaning Test is described in the Primary I and

Primary II manual as:

The Paragraph Meaning Test consists of a series of paragraphs, graduated in difficulty, from each of which one or more words have been omitted. The pupil's task is to demonstrate his comprehension of the paragraph by selecting the proper word for each omission from four choices that are afforded him. The test thus provides a

functional measure of the child's ability to comprehend connected discourse ranging in length from single sentences to paragraphs of six sentences and involving levels of comprehension varying from extremely simple recognition to the making of inferences from several related sentences. (23:4)

The Intermediate I and Intermediate II manual describes the Paragraph Meaning Test as:

The Paragraph Meaning Test consists of a series of paragraphs, graduated in difficulty. One or more words have been omitted from each paragraph. The pupil's task is to demonstrate his comprehension of the paragraph by selecting from four choices that are afforded him the proper word for each omission. It also includes complete paragraphs about which questions are asked, to be answered by selecting one of four possible choices. The test provides a functional measure of the pupil's ability to comprehend connected discourse involving levels of comprehension varying from extremely simple recognition to the making of inferences from what is stated in several related sentences. (21:4)

The raw scores obtained by each child were converted to grade score norms as indicated by the publisher. The standardization program for these norms included 264 school systems drawn from 50 states, which consisted of more than 850,000 pupils. The odd-even split half reliability coefficients on the Word Reading Test ranged from .85 in the Primary I Battery to .90 in the Intermediate II Battery. Form W was equated to Form X in May, 1963. Eleven school systems participated in the equating process. (25:9, 14).

Questionnaire

A questionnaire (Appendix A) was devised to obtain information related to reading activities of the pupils in the study. The questionnaire included nine questions requiring a "yes" or "no" response. The queries covered five possible summer activities that might influence reading ability; television viewing, book reading, periodical reading, extensive trips, and summer school classes. The degree of involvement was determined by asking two questions about each activity, one asking whether or not the student participated in the activity to a limited degree, and the other question denoting an excessive amount.

Summer School Reading Program

The summer vacation reading program conducted by the Corvallis Public School System was a four-week session, meeting four days per week. Each session lasted 75 minutes. Children from all the elementary schools in the district were eligible to enroll for these classes. The total enrollment was 147 pupils. Twenty-six of the children in the summer classes were from the schools participating in this research.

Procedures

The appropriate battery of the Stanford Achievement Test, Word Reading and Paragraph Meaning sub-tests, Form W, was administered by 25 classroom teachers to all the children in the first through fifth grades in three elementary schools during the week of May 25-29, 1970. This was the last full week of school before summer vacation. An alternate form, Form X, was administered during the week of September 14-18, 1970, the second week of school in the fall. The completed tests from both testing periods were scored by the researcher and checked for accuracy by selected qualified teachers. The scores were then analyzed to determine any changes in reading ability.

Questionnaires requiring answers regarding summer vacation activities were then distributed to the students in each of the classrooms. The questions were presented orally by the researcher to the pupils with an explanation of how to answer them. The children responded by circling the "yes" or the "no" answer which applied to them. A ten percent sampling of the pupils selected at random was individually interviewed by the researcher and the responses on the questionnaire were discussed. This was done to insure that the student understood what he was answering. Also, the parents of the sampling group were contacted by telephone to verify the accuracy of the responses obtained from the children, at least from the parent's

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viewpoint. The responses were tabulated and compared with the reading gain or loss of each child.

The teachers who instructed the pupils in the summer school reading programs were contacted to ascertain these students' regularity of attendance. Twenty-six students met the criteria of regular attendance and participation in the pre-testing and post-testing program. It was then possible to match twenty of these students with twenty children who did not attend summer school. The remaining six students attending summer school could not be matched. The control group was matched on the basis of same sex, grade, age within three months, I. Q. scores within the same range, and pre-test scores within one standard error of measurement on each sub-set. The reading tests scores of these two groups were then compared to determine if the change in reading ability was the same for each group.

IV. FINDINGS

This study was conducted to determine whether or not there is any change in reading achievement level of elementary school children during summer vacation, and whether or not identifiable factors exist that may account for these changes.

Analysis Procedures

Hypothesis One

H_1 : Reading achievement of the total group of children tested in grades one through five will be higher in the fall than it was the previous spring.

This hypothesis was rejected. Scores from each of the sub-tests, Word Reading and Paragraph Meaning, were analyzed. Student's t test was used to calculate whether or not the mean differences between pre-test and post-test reading scores were significantly different from zero. The formula used in the calculations was: (20:155)

$$t = \frac{\bar{X} - \mu}{\sqrt{S_g^2/n}}$$

where: t is Student's t .

\bar{X} is the mean of the pre-test and post-test difference scores for the group.

μ is the expected mean difference, which is zero.

S_g^2 is the sample variation of the difference scores.

n is the number of pupils who were tested.

The calculations used to test this first hypothesis are shown in Table 1. This analysis required a two-tailed test as the result could either be a gain or loss. The hypothesis was rejected that there was no significant difference in reading achievement at the five per cent significance level. Approximately a one-tenth of a year loss in reading achievement was noted.

Table 1. Comparison between pre-test and post-test mean difference scores.

Sub-test	\bar{X}	S^2	n	t
Word Reading	-.81	41.7	383	2.44*
Paragraph Reading	-1.19	63.0	383	2.95*

*Significant. Tabular t value for the .05 significance level with 382 degrees of freedom is approximately 1.97.

Hypothesis Two

H_2 : The gain or loss in reading achievement of boys will be the same as that of the girls.

This hypothesis was accepted. The scores for the pre-test and post-test of the girls were compared to the scores for the boys. The formula for a two-sample t -test to determine if the means of the difference scores for the boys and girls are significantly different is: (20: 157)

$$t = \frac{(\bar{X}_b - \bar{X}_g) - (\mu_b - \mu_g)}{\sqrt{\frac{nS_b^2 + mS_g^2}{n+m-2} \left(\frac{1}{n} + \frac{1}{m}\right)}}$$

where: \bar{X}_b is the boys' mean difference score between the pre-test and post-test.

\bar{X}_g is the girls' mean difference score between the pre-test and post-test.

n is the number of boys tested.

m is the number of girls tested.

S_b^2 is the sample variance for the boys' scores.

S_g^2 is the sample variance for the girls' scores.

The calculations used to test this second hypothesis are shown in Table 2. The analysis required a two-tailed test as the mean of the difference scores of the boys could be either higher or lower than the girls. There was no significant statistical difference between the scores of the boys and girls.

Table 2. Comparison of mean difference scores between boys and girls.

	\bar{X}_b	\bar{X}_g	S_b^2	S_g^2	n	m	t
Word Reading	-.48	-1.14	34.4	49.1	193	190	1.00*
Paragraph Reading	-1.04	-1.33	69.4	56.8	193	190	.36*

*Not significant. The tabular t value for the .05 significance level with 381 degrees of freedom is above 1.96.

Hypothesis Three

H₃: The amount of change in reading achievement will be the same for each of the five grade levels.

This hypothesis was accepted. To test this hypothesis a one-way F-test was used to analyze the difference scores for each of the subtests. A summary of the difference scores for each grade level is found in Appendix B, pages 61 and 62. The formula for the F-ratio is as follows: (24:13)

$$F = \frac{\text{Between Group Mean Square}}{\text{Within Group Mean Square}}$$

The Between Group Mean Square is calculated by the following formula: (24:11)

$$\frac{1}{K-1} \left[\sum_{t=1}^K \frac{1}{n_t} \left(\sum_{i=1}^{n_t} x_{ti} \right)^2 - \frac{1}{N} \left(\sum_{t=1}^K \sum_{i=1}^{n_t} x_{ti} \right)^2 \right]$$

The Within Group Mean Square is calculated by the following formula: (24:11)

$$\frac{1}{N-K} \left[\sum_{t=1}^K \sum_{i=1}^{n_t} x_{ti}^2 - \sum_{t=1}^K \frac{1}{n_t} \left(\sum_{i=1}^{n_t} x_{ti} \right)^2 \right]$$

where: K is the number of groups or grades.

n_t is the number of students in Tth grade.

N is the number of students in all grades.

X_{ti} is the difference score for the i th student in T th grade.

The calculations for this hypothesis are found in Tables 3 and 4.

The F -ratio calculated with four and 379 degrees of freedom for each of the sub-tests indicate there is not a significant difference in reading achievement between grades at the five per cent level.

Table 3. Analysis of variance for grade level differences in word reading sub-test.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Between Grades	4	329	82.3	2.00*
Within Grades	379	15607	41.2	

*Not significant. Tabular F value for .05 significance level with 4 and 379 degrees of freedom is above 2.37.

Table 4. Analysis of variance for grade level differences in paragraph meaning sub-test.

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Square	F Ratio
Between Grades	4	283.5	71.0	1.09*
Within Grades	379	24787	65.4	

*Not significant. Tabular F value for .05 significance level with 4 and 379 degrees of freedom is above 2.37.

Hypothesis Four

H_4 : Students whose scores are in the upper twenty-seven per cent of the group taking the test in May will show greater gain in reading achievement than those whose scores are in the lower twenty-seven per cent.

The hypothesis was rejected. To test this hypothesis it was necessary to consider the effects of regression to the mean. Pupils whose scores are at either extreme of a distribution tend to obtain scores more toward the average on a second testing. This is discussed by Lord (32:21-38) and Davis (14:241-245). The estimated true gain was computed by the following formula: (14:243)

$$g = W_B B + W_A A + K$$

where: A = individual's pre-test score.

B = individual's post-test score.

$$K = \bar{B} - \bar{A} - W_B \bar{B} - W_A \bar{A}$$

$$W_A = \frac{S_B r_{AB} (1 - r_{BB'}) - S_A (r_{AA'} - r_{AB}^2)}{S_A (1 - r_{AB}^2)}$$

$$W_B = \frac{S_B (r_{BB'} - r_{AB}^2) - S_A r_{AB} (1 - r_{AA'})}{S_B (1 - r_{AB}^2)}$$

where in K , W_A , and W_B :

\bar{A} is the group mean score on the pre-test.

\bar{B} is the group mean score on the post-test.

S_A is the standard deviation on the pre-test.

S_B is the standard deviation on the post-test.

r_{AB} is the correlation of forms W and X.

$r_{AA'}$ is the reliability coefficient of the pre-test.

$r_{BB'}$ is the reliability coefficient of the post-test.

A summary of the data used in this computation is found in Appendix B, pages 63 and 64.

To determine the relationship of the amount of gain or loss to the pre-test score, a chi-square test for independence was applied, using the two-by-two contingency table. The median score for each grade level was calculated and then the amount of change for each pupil whose pre-test score was in the upper 27 per cent was tabulated according to whether or not his difference score was above or below the median score. The results of this tabulation were compared to the results of the same procedure for the scores of pupils in the lowest 27 per cent. The data for this calculation are found in Tables 5 and 7. The formula for the chi-square test is: (46:129)

$$\chi^2 = \frac{(ad-bc)^2 T}{(a+b)(c+d)(a+c)(b+d)}$$

where: a, b, c, and d are the observed frequencies and T is their sum.

The result of the chi-square test for the Word Reading sub-test indicated that the amount of gain or loss for the total group is independent

of pre-test score. Observation of the data for individual grade levels as shown in Table 6 suggests that the amount of gain or loss is dependent on the pre-test score for grade levels one through four. In grades one and four the students in the lower group tended to make more gains than the higher group. In grades two and three the higher group made more gains. The results of the chi-square test for grade five did not indicate a dependence of amount of gain or loss on pre-test score.

Table 5. Chi-square test of independence applied to the relationship of initial scores to amount of change in the word reading sub-test.

Group	Grade	Median	Number Above Median	Number Below Median	χ^2
Lowest 27%	1	-.75	13	6	
	2	+.85	5	14	
	3	-2.05	5	18	
	4	-.80	18	4	
	5	-.15	10	10	
	Total		51	52	
Highest 27%	1	-.75	5	14	.02*
	2	+.85	13	6	
	3	-2.05	17	6	
	4	-.80	4	18	
	5	-.15	13	7	
	Total		52	51	

*Not significant. Tabular P value at .05 level with one degree of freedom is 3.841.

Table 6. Chi-square test of independence applied to the relationship of initial scores to amount of change in the word reading sub-test for the individual grade levels.

Grade	Group	Number Above Median	Number Below Median	χ^2
1	Lowest 27%	13	6	6.75*
	Highest 27%	5	14	
2	Lowest 27%	5	14	6.75*
	Highest 27%	13	6	
3	Lowest 27%	5	18	12.55*
	Highest 27%	17	6	
4	Lowest 27%	18	4	18.00*
	Highest 27%	13	7	
5	Lowest 27%	10	10	.92
	Highest 27%	13	7	

*Significant. Tabular P value at .05 level with one degree of freedom is 3.841.

The results of the Paragraph Meaning sub-test indicated there is some relationship between initial test score and amount of gain or loss. Observation of the data in Table 7 suggests that the students in the lower group tended to make more gain than the higher group. In both sub-tests the original hypothesis that the pupils in the higher scoring group would make the most gain during the summer vacation is rejected with the exception of grades two and three on the word reading test.

Table 7. Chi-square test of independence applied to the relationship of initial scores to amount of change in the paragraph meaning sub-test.

Group	Grade	Median	Number Above Median	Number Below Median	χ^2
Lowest 27%	1	-.28	16	3	
	2	+.06	14	5	
	3	-1.70	14	9	
	4	-.75	17	5	
	5	-2.30	13	7	
	Total		74	29	
Highest 27%	1	-.28	9	10	20.42*
	2	+.06	8	11	
	3	-1.70	7	16	
	4	-.75	8	14	
	5	-2.30	7	13	
	Total		39	64	

*Significant. Tabular P value at .05 level with one degree of freedom is 3.841.

Hypothesis Five

H₅: A student's involvement in summer reading activities will be related to a gain in reading achievement.

This hypothesis was accepted to the extent that the reading of books seems to be related to a gain in reading ability. Two sources of information were utilized to provide data regarding this hypothesis. A matched-pair study was conducted using the children who attended summer school as the experimental group and a group of children who

did not attend summer school as the control group. The children were matched on the basis of grade, sex, intelligence scores, age, and sub-test scores on the Stanford Reading Test. The results of this study are shown in Table 8. A t-test for small correlated samples was used to test the hypothesis that the means of the experimental group and control group are the same. The formula is: (46:86)

$$t = \frac{\bar{D}}{S_{\bar{D}}}$$

where: \bar{D} is the mean of the differences between the performance of the two groups.

$S_{\bar{D}}$ is the standard error of the mean, \bar{D} .

There were no significant differences in either sub-test.

Table 8. Comparison of means of the differences between pre-test and post-test scores of the matched pairs.

Sub-test	Pupils	\bar{D}	$S_{\bar{D}}$	t
Word Reading	20	.1	1.32	.076*
Paragraph Meaning	20	.2	1.99	.101*

*Not significant. Fisher's table t value at .05 probability level with 19 degrees of freedom is 2.093.

The second source of information regarding summer activities was the questionnaire completed by all the students in the total study. The responses of the children who made the most estimated true gain were compared to the responses of the children who made the least

estimated true gain. The computation for estimated true gain is found in hypothesis four.

The chi-square test of independence was applied to test the hypothesis that the response was independent of the amount of reading gain during the summer. The chi-square test is: (46:129)

$$\chi^2 = \frac{(ad-bc)^2 T}{(a+b)(c+d)(a+c)(b+d)}$$

where: a, b, c, and d are the observed frequencies and T is their sum.

The data and results are found in Tables 9 and 10. A sample of the questionnaire can be found in Appendix A, page 58.

The results of the chi-square test on question four of the Word Reading sub-test indicate there is a relationship between the responses and the amount of summer reading gain. The direction of the responses suggests that those who made the most gain during the summer answered "yes" to the question of reading more than ten books significantly more often than those who made the least gain. The responses on the remainder of the questions on the word reading test do not indicate a relationship between response and amount of reading achievement gain.

Table 9. Chi-square test of independence between questionnaire responses and amount of summer reading gain in word reading sub-test.

Question	Low Gain Group		High Gain Group		χ^2
	Yes	No	Yes	No	
1. Did you usually watch television less than an hour a day?	30	73	35	68	.56
2. Did you usually watch television more than an hour a day?	38	65	35	68	.19
3. Did you read less than three books this summer?	43	60	39	64	.32
4. Did you read more than ten books this summer?	23	80	39	64	5.91*
5. Did you read less than three magazines, comic books, or newspapers?	33	70	25	78	1.54
6. Did you read more than ten magazines, comic books, or newspapers?	52	51	57	46	.49
7. Did you take any extensive trips during the summer?	18	85	15	88	.32
8. Did you attend any summer classes?	17	86	12	91	1.00

*Significant. Fisher's table value for P at the .02 level with one degree of freedom is 5.412.

The results of the chi-square test on questions number seven and eight in the Paragraph Meaning sub-test in Table 10 indicate that

response is related to amount of summer reading gain. Observation of the data shows that those who made the least gain in reading during the summer vacation answered "yes" the most often to taking extended trips during the summer vacation.

Table 10. Chi-square test of independence between questionnaire responses and amount of summer reading gain in paragraph meaning sub-test.

Question	Low Gain Group		High Gain Group		χ^2
	Yes	No	Yes	No	
1. Did you usually watch television less than an hour a day?	31	72	34	69	.20
2. Did you usually watch television more than an hour a day?	36	67	39	64	.19
3. Did you read less than three books this summer?	36	67	45	58	1.65
4. Did you read more than ten books this summer?	38	65	29	74	1.77
5. Did you read less than three magazines, comic books, or newspapers?	33	70	42	61	1.70
6. Did you read more than ten magazines, comic books, or newspapers?	60	43	49	54	2.36
7. Did you take any extensive trips during the summer?	17	86	6	97	5.92*
9. Did you attend any summer classes?	16	87	22	81	1.16

*Significant. Fisher's table value for P at the .02 level with one degree of freedom is 5.412.

The original hypothesis that children who participate in reading activities during the summer will be the ones who make the most gains in reading was accepted only in regard to those who read the most books. It was rejected on the basis of attending summer school, watching television, reading periodicals, and taking extended trips.

Summary of Findings

The data collected from fall and spring scores on two reading sub-tests obtained by children from three elementary schools were analyzed. The t statistic was used to compare the mean difference scores of the total group on the two testings. A significant difference indicating approximately one-tenth of a year loss in reading achievement during the summer vacation was noted.

A two-sample t -test to be utilized when comparing two independent samples was used to compare the mean difference scores of the boys and the girls. No significant differences were found on either sub-test.

A one-way F -test was used to analyze the mean difference scores among the five grade levels. There was no significant difference noted.

A chi-square test of independence was used to test the relationship of the pre-test score to the amount of estimated true gain in reading achievement during the summer. When comparing the estimated

true gain of students obtaining the highest 27 per cent of pre-test scores with those of students obtaining the lowest 27 per cent, it was found that on the Word Reading sub-test the amount of gain was independent of pre-test score when considering the group as a whole. Analysis of individual grade levels showed a dependence on initial standing for grades one through four. Students in the lowest group in grades one and four made more gains than the high group. Students in the highest group in grades two and three made more gains than the low group. On the Paragraph Meaning sub-test, a high likelihood of dependence was noted with indications that the lowest group made more gain than the group having the highest pre-test score. This seemed to be true for all grade levels.

In using the t statistic for comparing the means of small correlated samples, a matched-pair study for children attending summer school was compared to a control group that did not attend. There was no significant difference in reading loss between the two groups.

On the questionnaire requiring "yes" or "no" responses regarding summer activity involvement, a chi-square test of independence was applied. Responses of students who made the most estimated true gain were compared to the responses of the students making the least gain. A high chi-square value indicated that responses of "yes" to the reading of more than ten books during the summer was related to the amount of gain on the Word Reading sub-test. The data showed

that the high-gain group made more "yes" responses than the low-gain group.

On the Paragraph Meaning sub-test, the chi-square test of independence indicated that extensive trips taken during the summer were related to the amount of estimated true gain. A study of the data suggests that the lower-gain group took more trips than the others.

V. SUMMARY AND CONCLUSIONS

Summary

The purpose of this study was to determine whether or not there is any change in reading achievement level of elementary school children during the summer vacation, and whether or not identifiable factors exist that may account for these changes.

Children in the first through fifth grades in three elementary schools in Corvallis, Oregon, were given the Word Reading and Paragraph Meaning sub-tests of the Stanford Achievement Test during the week prior to the last week of school in the spring. Another form of the same test was given to these same students during the second week of school in the fall. Scores from the two tests for 383 children were then analyzed to compare gain or loss in reading achievement during the summer vacation.

A questionnaire was completed in the fall by the children in these schools regarding their summer activities. The responses of the children making the most gain in reading achievement during the summer vacation were compared with the responses of the children who made the least gain to determine if there was a relationship between summer activity and reading achievement.

A matched-pair study was conducted using the children who attended summer school as the experimental group and children who

did not attend summer school as the control group. The scores obtained by these two groups on the pre-test and post-test were then analyzed to determine if there was a significant difference in reading gain or loss.

Findings

H_1 : Reading achievement of the total group of children tested in grades one through five will be higher in the fall than it was the previous spring.

The t statistic was applied to the mean differences between pre-test and post-test reading scores on each sub-test and a statistically significant loss of about one-tenth of a year was found for each sub-test. Hypothesis one was rejected.

H_2 : The gain or loss in reading achievement of boys will be the same as that of the girls.

The two-sample t -test was calculated for the difference between mean difference scores of the boys and girls and no significant difference was noted. Hypothesis two was accepted.

H_3 : The amount of change in reading achievement will be the same for each of the five grade levels.

A one-way F -ratio was used to analyze the mean difference scores for each of the grade levels and no significant difference between grades was found. Hypothesis three was accepted.

H_4 : Students whose scores are in the upper twenty-seven per cent of the group taking the test in May will show greater gain in reading achievement than those whose scores are in the lower twenty-seven per cent.

A chi-square test of independence was applied to the number of students with high pre-test scores who made gains above the median for the group and the number of students with low pre-test scores who made gains above the median. The results from the Word Reading sub-test scores showed that a dependency did exist between the two for grades one through four. More students in the low group made gains in grades one and four, and more students in the high group made gains in grades two and three. The results of the Paragraph Meaning sub-test indicated that the low group had more students in the above-median gain group than the high scoring students at all grade levels. Hypothesis four was rejected except for grades two and three in Word Reading.

H_5 : A student's involvement in summer reading activities will be related to a gain in reading achievement.

The chi-square test of independence that was applied to the responses on the questionnaire by the high-gain group when compared to the low-gain group indicated that more high-gain students on the Word Reading sub-test had read more than ten books during the summer than the low-gain group. The low-gain group had taken more

extended trips than the high-gain group.

The t statistic for small correlated samples used with the matched-pair study showed that there was no significant difference between the summer reading achievement loss of the experimental group that attended summer school and a control group that did not attend. Hypothesis five was accepted in respect to total number of books read only.

Conclusions

The findings of this study indicate that there was a significant loss in reading achievement during the summer vacation of about one-tenth of a year, and this loss was about the same for girls and boys and for each grade level. This supports the research of Bruechner and Distad (9), Patterson (41) and Cook (12) and adds credence to the contention that many children do not do sufficient reading during the summer vacation to maintain or gain in reading achievement. Teachers seem warranted to do some reteaching when school starts in the fall. However, since there was considerable variation among individuals, it would appear necessary for teachers to test the reading achievement of each student in the fall to ascertain his actual reading level.

The summer school program did not seem to be effective in changing the pattern of loss in reading achievement. Perhaps, the

short duration of the summer program was a factor. Since the program was early in the summer and consisted of only sixteen sessions, perhaps the children did improve but were not able to maintain their skills until fall. Also, these children may have gained in some reading skills that the test administered did not measure.

The students who would be considered the better readers on the basis of the pre-test scores did not maintain or improve their reading ability as a group as much as did those of lower reading ability. This suggests that the better reading students need to be encouraged to use their reading skills during the summer as much as are the children of lower achievement.

In this study, the children who read more than ten books were the ones who made the most gains in reading achievement. This further emphasizes the contention of most reading specialists that the best way to improve reading is to read. Children should be encouraged to read as many books as possible during the summer. Participation in library programs is one method for getting children to read more extensively. These kinds of programs should be encouraged by school personnel and parents, as well as librarians.

Taking trips during the summer was not a contributing factor to gains in reading achievement. Perhaps, the apparent adverse effects could be due to lack of suitable reading material or the time to read.

Recommendations for Further Research

1. An investigation of various types of summer school programs should be made to ascertain which kinds are most effective in increasing reading achievement.
2. Conducting studies similar to this one in different locales and socio-economic levels may broaden the application of the results.
3. Attempts should be made to determine procedures teachers should follow during the school year to stimulate summer reading by the pupils.
4. A comparison of directed reading activities with non-directed reading activities and their effects on reading achievement during the summer would be of value.
5. Various summer library programs should be investigated to determine which kinds attract the most children.

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APPENDICES

APPENDIX A

Sample Questionnaire Regarding Summer Activities

Name _____ Grade: 2 3 4 5 6 School: Lincoln
 Phone _____ Roosevelt
 Washington

1. Did you usually watch television less than an hour
a day this summer? 1. yes no
2. Did you usually watch television more than 4 hours
a day this summer? 2. yes no
3. Did you read less than 3 books this summer? 3. yes no
4. Did you read more than 10 books this summer? 4. yes no
5. Did you read less than 3 magazines, comic books,
or newspapers this summer? 5. yes no
6. Did you read more than 10 magazines, comic
books, or newspapers this summer? 6. yes no
7. Did you take any trips that required more than a
day to get there? (by car, train, bus, or boat) 7. yes no
 - a. Where did you go? _____
 - b. How long were you gone? _____
8. Did you take any trips by plane? 8. yes no
 - a. Where did you go? _____
 - b. How long were you gone? _____
9. Did you attend any summer classes? 9. yes no
 - a. Did you go to a reading class at Roosevelt
School? a. yes no
 - b. Did you take any other reading class? b. yes no
 - aa. Where? _____
 - bb. How long? _____

- c. Did you attend some other class besides reading during the summer?

c. yes no

Which one? _____

- d. Did you miss more than 4 lessons during summer school?

d. yes no

APPENDIX B

1. Summary of Differences Between Pre-Test and Post-Test Scores by Grade Level and Sex.
2. Data Used in the Estimation of True Gain.

SUMMARY OF DIFFERENCES BETWEEN PRE-TEST AND
POST-TEST SCORES BY GRADE LEVEL AND SEX

Word Reading Sub-Test

Grade	Sum of Differences	Sum of Differences Squared	Number	Mean
Girls				
1	-13	507	27	-.48
2	+25	1021	43	+.58
3	-97	1931	43	-2.26
4	-91	3239	40	-2.28
5	-41	2831	37	-1.11
Boys				
1	-46	386	45	-1.02
2	+32	714	27	+1.19
3	-70	2138	43	-1.62
4	-17	2265	42	-.40
5	+9	1153	36	+.25
Total Group				
1	-59	893	72	-.82
2	+57	1735	70	-.81
3	-167	4069	86	-1.94
4	-108	5504	82	+1.32
5	-32	3984	73	-.44
All	-309	16185	383	-.81

SUMMARY OF DIFFERENCES BETWEEN PRE-TEST AND
POST-TEST SCORES BY GRADE LEVEL AND SEX

Paragraph Meaning Sub-Test

Grade	Sum of Differences	Sum of Differences Squared	Number	Mean
Girls				
1	-1	335	27	-.04
2	-15	985	43	-.35
3	-92	2670	43	-2.14
4	+9	2471	40	+.23
5	-155	4617	37	-4.19
Boys				
1	-41	721	45	-.91
2	+11	1181	27	+.41
3	-50	2584	43	-1.16
4	-89	4195	42	-2.12
5	-33	4851	36	-.92
Total Group				
1	-42	1056	72	-.58
2	-4	2166	70	-.06
3	-142	5254	86	-1.65
4	-80	6666	82	-.98
5	-188	9468	73	-2.57
All	-456	24610	383	-1.19

DATA USED IN THE ESTIMATION OF TRUE GAIN

Data Sub-Test	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
Word Reading					
\bar{A}^*	20.14	30.84	42.17	52.07	58.00
\bar{B}	19.32	31.66	40.23	50.76	57.56
S_A	5.60	8.78	14.85	15.91	15.78
S_B	5.04	10.13	15.42	14.67	16.40
$r_{AA'}$	.928	.919	.908	.920	.919
$r_{BB'}$	.911	.939	.915	.906	.925
r_{AB}	.798	.875	.906	.863	.896
r_{AB}^2	.637	.766	.821	.745	.803
W_A	-.626	-.391	-.039	-.393	-.234
W_B	.579	.477	.077	.338	.265
K	.60	-2.22	-3.39	2.00	-2.12

*Symbols explained on page 34 of text.

DATA USED IN THE ESTIMATION OF TRUE GAIN

Data Sub-Test	Grade One	Grade Two	Grade Three	Grade Four	Grade Five
Paragraph Meaning					
\bar{A}^*	19.36	30.39	38.92	46.84	56.78
\bar{B}	18.78	30.33	37.27	45.87	54.20
S_{A^*}	7.19	9.14	14.29	15.29	19.37
S_B	7.00	9.44	14.12	14.41	18.79
r_{AA^*}	.995	.953	.922	.931	.957
r_{BB^*}	.995	.955	.920	.923	.955
r_{AB}	.858	.821	.855	.819	.831
r_{AB}^2	.736	.674	.731	.671	.691
W_A	-.965	-.739	-.459	-.610	-.744
W_B	.964	.747	.452	.584	.735
K	-.002	-.260	-.640	.810	-.170

*Symbols explained on page 34 of text.