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An Experimental Study of the Effect of Specialized Reading Treatment on the Reading Achievement of Second Grade Students

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AN EXPERIMENTAL STUDY OF THE EFFECT OF SPECIALIZED READING TREATMENT ON THE READING ACHIEVEMENT OF SECOND GRADE STUDENTS

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The emphasis in reading instruction is rapidly changing from remedial to developmental. Teachers are more concerned about prevention of difficulties through excellent classroom teaching. The reading consultant who helps the teacher with slow learners, is rapidly replacing the remedial teacher working with children who have already failed. (9:v)

I. THE PROBLEM

Statement of the Problem. The problem of this study was the investigation of the general theory concerning the effect of using the Sullivan Programmed Reading materials in addition to multi-sensory phonics techniques and their effect on achievement of selected second graders who had not achieved success in reading by the traditional instruction. The following hypothesis was investigated: "That pupils taught with Sullivan's programmed decoding materials combined with multi-sensory phonics techniques would show significant word analysis and comprehension gains as compared to students taught by a basal reader - sight word approach."

Importance of the Study. Many pupils do not achieve success in reading by the traditional instruction. A few can be helped by remedial classes offering individual children help for specific difficulties. In this study a method was explored that suggests a plan that can be used in a regular classroom to benefit all low-achieving students.

II. DEFINITIONS OF TERMS USED

For the purpose of this paper, the following definitions are used:

Low-achieving pupil. Child who is achieving below grade level and is in the low, one-third of his class. The reasons why he is a low-achiever are not diagnosed to warrant his selection.

Multi-sensory phonics techniques. Method used by Gillingham, a research associate of Orton, to teach phonics, writing and spelling through auditory, visual, and kinesthetic avenues.

Traditional instruction. Methods of teaching reading used in schools today usually utilizing a basal reader and accompanying workbooks plus supplementary equipment. Teachers' Guides are provided which provide detailed description of instruction on skills being taught.

Basal reader - sight word approach. The method of teaching outlined in the Scott, Foresman Teacher's Edition. This is not a pure sight word approach as word analysis and word attack skills are taught, but the kinesthetic element is not introduced. (See: Teaching Procedure for Control Group.)

Sullivan. Sullivan is one of the pioneers of programmed instruction and is the president of Sullivan Associates which prepares a variety of programmed materials for school use.

Programmed Reading. For the purpose of this study, the investigator means Sullivan's Programmed Reading, sequential learning based on Skinner's reinforcement theory. Programmed Reading materials include workbook, tests, supplementary books, and deplicated worksheets.

Operant behavior. Behavior whose rate or form is affected by its consequences.

III. LIMITATIONS OF THE STUDY

This study was limited to a comparison of ten matched pairs selected from three control groups with a total of seventeen children and five experimental groups totaling fifty-three pupils. The children in all groups were selected on the same criteria. They were low-achievers from second grade classes. The pupils were chosen in the fall of the 1968-69 school year. The experimental groups were selected from four public and one parochial school in Wenatchee, Washington, and the control groups were taken from two East Wenatchee public schools.

One factor which could have affected the outcome of this study was that the investigator could only find three second grade classrooms whose teachers were using basal readers and no Gillingham multi-sensory phonics techniques. This limited the population that could be used in this investigation.

Uncontrolled variables which could have influenced the ratings of the groups were such immeasurable factors as quality of teaching, home background, health, personal experience, schoolroom conditions, and emotional stability of the groups.

The comprehension scores used for comparison in this study were obtained by averaging the pupils' test scores

in comprehending significant ideas and comprehending specific instructions. This may not be a valid measure of a child's comprehension.

Increased familiarity with the tests during the experimental period could have been reflected in the results.

This study sampled a small segment of the population of low-achieving second grade students. The limitations of its results and recommendations should be considered with this fact in mind.

The teaching procedures used and the weekly progress of the students in the experimental group was closely observed and evaluated by the writer. This assistance and encouragement was not given to the control group.

IV. ORGANIZATION OF THE REMAINDER OF THE THESIS

This experimental study was organized into five major divisions. The present chapter identified and stated the problem, and reviewed the limitations of the study. Chapter II contained the review of literature written by authorities concerning teaching low-achieving children. Chapter III reported the effect of specialized reading treatment on the reading achievement of second grade pupils. Chapter IV contained the specific technique used and the results obtained. Chapter V reports a summary with conclusions and recommendations suggested by the study.

CHAPTER II

REVIEW OF THE LITERATURE

I. TEACHING LOW-ACHIEVERS

Causes of Reading Failure

There is no one cause of reading disability. The general result of the large number of investigations that have attempted to find the causes of reading difficulties is that there are many handicaps which are found more frequently in poor readers than in good readers. None of these handicaps will of themselves necessarily prevent a child from becoming a normal reader, but any of them may, in an individual case, interfere seriously with the child's learning. When one investigates a case thoroughly, one usually finds evidence of a number of factors, each of which may have been important in the creation of his disability. The most important of these factors are:

1. Lack of Reading Readiness
2. Mental Retardation
3. Physical Handicaps
4. Directional Confusion
5. Special Brain Defects
6. Emotional Handicaps
7. Accidental Interference with Learning
8. Poor Teaching (14:19-21)

Jeanne Chall says, "When I asked why some children fail to read, I received replies that reminded me of the fable of the blind men and the elephant." The basal

reader authors gave long lists of combinations of causes of reading failure involving the child himself, his family, our culture, and the school situation. Most often cited were overcrowded classes; poor instruction, unprepared teachers; sociological changes; lack of good reading materials; and emotional, psychological, and physical handicaps in the child. The only reference to methods came from one of the basal-reader authors, who stated that if the same method were used for all children, some might develop problems.

The phonics proponents invariably named "wrong method"--the prevailing one, as the primary cause of reading failure. As a group, they were convinced that a "phonics-first" method would eliminate most reading failures. Most of the phonics proponents acknowledged that some children have personal handicaps that prevent them from learning, even with a phonic method. However, they believed that a stronger phonic emphasis can prevent many of these failures.

As a group, the linguistic proponents also believed that a change in the prevailing methods would reduce the number of reading failures and a change to a linguistic approach would eleviate the problems.

The alphabet reformers held that the irregularity of English spelling was responsible for reading failures (4:73).

In every classroom at every grade level, there is a wide range of abilities manifested in the various individuals

being taught. This has been reported over and over in the literature and is pointedly emphasized by Horn in the Yearbook of the National Society for the Study of Education:

"A single textbook is commonly provided for a grade, in spite of the incontestable evidence of the wide range of knowledge and ability in that grade. The range in reading ability, expressed in grade norms, is almost invariably at least five years, and often seven. Investigations have repeatedly pointed to the fact that the typical textbook, even within the limits of its potential usefulness, is much too difficult for the median child in the grade for which it is designed, and it is hopelessly difficult for the children in the lowest quarter in reading ability."[1]

Hildreth says, "A typical second grade needs the full range, from picture-books to advanced primary-level reading."[2]

Zintz says that in view of recognized principles of human growth and development, one must accept the thesis

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[1]Ernest Horn, "Language and Meaning," The Forty-First Yearbook of the National Society for the Study of Education, Part II, The Psychology of Learning (Chicago: The University of Chicago Press, 1942), p. 390.

[2]Gertrude Hildreth, "Reading Programs in the Early Primary Periods," Forty-Eighth Yearbook of the National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1949), p. 102.

that not only do boys and girls grow at different rates, but that they all arrive at different destinations in varying lengths of time. It logically follows that all children will not learn the same lessons in the same amount of time with the same amount of practice. It is a most important concept for teachers that follows: The range of differences in a given class will increase through the year and from year to year as the class progresses through school. If the range of reading ability in second grade is four years on standardized reading tests, it is to be expected that, with good teaching, by the eighth grade this range will be about ten years. Teachers who feel a strong compulsion to work especially hard with the slowest group in the class, hoping to get them to achieve at grade level, are not only attempting the impossible, but may be neglecting the other groups who have greater capacity.

The range of abilities that have a direct effect upon learning include areas other than intelligence and acquired reading abilities. These include physical factors, social and emotional factors, and environment factors. Shortcomings here will hamper the child's successful adjustment to the school situation.

Probably the best way to help children with reading troubles is to combine a reteaching of "how to read" with a treatment of whatever social or emotional problem exists

concurrently with the reading failure. This attacks the so-called "blocks to learning" that may lie behind the inability to learn, and as the child's mind becomes "free" to learn, he is successfully retaught "how to read." The problems of cause and effect go together and are often inseparable (27:14-17).

According to Smith, the causes of reading disabilities in terms of the psychology of reading which have attracted special attention of research workers, and the interrelationships of those aspects list the following components necessary for the reading process.

1. Reading as a sensory process
2. Reading as a perceptual process
3. Reading as a response
4. Reading as a learned process
5. Reading as a growth process
6. Reading as a tool for learning
7. Reading as a developmental task

Although each facet has its own identity, it can never be isolated from the others. Information concerning each is dependent on research which may be pertinent to many or all of the other facets. For the teacher to utilize information from all of the areas, he must be able to see them as an entirety.

For research findings to be most helpful, general principles must be identified, abstracted, and organized. As a basic postulate, it seems clear that "reading is a perceptual process." Whatever has been found true of

perception in general should be found to hold true for reading. With this in mind, we proceed to identify a number of the principles or rules of perception (24:436-450).

Perceptual Training

Kephart stated that in periodicals and in textbooks, there is a distinction between input (sensory or perceptual activities) and output (motor or muscular activities.) The implication is that these are two separate activities which can be studied one apart from the other and which are only very tenuously connected. Such a division of thinking is impossible and can only lead to error.

Just as in our thinking we cannot separate what part of the child's activity in any task, such as copying a figure, is motor and what part is perceptual, in our teaching we cannot separate what parts of the activity are perceptual and what parts are motor. Many successful teaching programs have recognized this fact and have trained all aspects of the perceptual process at one time (18:62-63).

Perhaps the most important characteristic of reading is that it is a perception of graphic symbols. Meaning is the essence of reading and graphic symbols are meaningful to us only if our fund of experience makes them meaningful. (24:44). Dechant stresses that meaning at least partly comes from within the reader. Thus, Lange notes that "we

see and hear not only with the eye and ear, but quite as much with the help of our present knowledge, with the apperceiving content of the mind." (7:493)

Harris lists the following as basic to success in reading: (a) sufficiently clear visual perception to be able to distinguish the printed form of a word from other word forms; (b) sufficiently clear auditory perception to be able to distinguish a spoken word from similar sounding words; (c) simultaneous attention to the printed and spoken word, allowing the formation of a learned association; (d) increasingly clear perception of letters and letter groups within the total word configuration; (e) increasingly clear perception of the sound elements within the spoken word; (f) association of the sound elements with their printed equivalents; and (g) functional use of the perceived parts as aids in the perception of the words, either in immediate recognition or through a combination of analysis and synthesis (13:50).

Orton-Gillingham Method

Paul Broca, writing in France in 1861, formulated his statement that language is controlled by the hemisphere of the brain opposite the more skilled hand. Orton was the first neurologist to apply this knowledge to a special field of education and to connect it with specific language

disability. Orton claimed the degree to which the language function of an individual is controlled by one hemisphere determines the degree of language or disability in that individual. In the long range of language skills a conservative estimate of ten percent of the school population experience sufficient difficulty in reading and spelling to seriously impede their school progress. We are not considering here children with low mentality or sensory defects. This discussion has to do solely with confusion in language function. That is the reason for saying that they have a "Specific Language Disability" (12:15). The practical value of Orton's contribution is questioned by some reading authorities today.

The Gillingham Method is a multisensory approach emphasizing the linguistic and graphic regularities of English words. It is termed an alpha-phonetic method and begins by teaching the child a few short vowels and consonants that have only one sound. It does not use letters that, if reversed, become new letters. Thus initially it steers clear of letters such as "b" and "d." It is a combination method, using the auditory, visual, and kinesthetic sense avenues. It is a synthetic phonics system rather than an analytical phonics approach. The teaching processes that result in the association of the visual, auditory, and kinesthetic process are called linkages.

Linkage 1. The name of the letter is associated with the printed symbol; then the sound of the letter is associated with the symbol.

Linkage 2. The teacher makes the letter and explains its form. The pupil traces it, copies it, and writes it from memory. The teacher directs the pupil to move in the right direction and to begin in the right place when making the letters.

Linkage 3. The phonogram is shown to the pupil and he names it. The child learns to associate the letter with its "look" and its "feel." He learns to form the symbol without looking at the paper as he writes.

Linkage 4. The teacher says the phoneme and the child writes it.

Linkage 5. The child is shown the letter and asked to sound it. The teacher moves the child's hand to form the letter and the child sounds it.

Linkage 6. The teacher gives the name of the phonogram and the pupil gives the sound.

Linkage 7. The teacher makes the sound and the pupil gives the name of the letter.

Linkage 8. The teacher makes the sound and the pupil writes the phonogram. Sometimes the pupil writes without looking at the paper, and also names the letter.

Using the multisensory approach, the Gillingham Method introduces the linguistic and graphically regular words first. Only gradually is the pupil introduced to exceptions (6:189-190).

Money states that training for simultaneous association of visual, auditory, and kinesthetic language stimuli, in reading cases, tracing and sounding the visually

presented word and maintaining consistent direction by following the letters with the fingers during the sound synthesis of syllables and words was a most useful principle. Finding such units as the child can use without difficulty in the field of his particular disability and directing the training toward developing the process of fusing these smaller units into larger and more complex wholes followed. Applying these principles, the retraining of the child with a reading disability usually starts with the teaching of the basic language units (individual letters and phonemes,) clarifying the visual and the auditory patterns, and strengthening their linkage by introducing the motor elements of speech and writing at the same time (21:130-145).

Programmed Reading and Operant Behavior

A skeptic could refer to programmed learning as a method "for the birds," and not be facetious. Skinner's theory of reinforcement upon which Programmed Reading is based received impetus from his experiments involving behavior of pigeons.

Describing Skinner's systematic research, Money says that one implication is we may apply to the maintenance of human behavior some powerful techniques developed in the laboratory.

> In the variable schedules, reinforcement is presented somewhat randomly, but on the average after a certain number of responses or time dictated by the schedule.

> An example of this schedule is where the reinforcement is presented, on the average, every three minutes, sometimes being presented after five seconds, sometimes after ten minutes. Behavior programmed in this manner has proven extremely difficult to extinguish; a pigeon was put on such a schedule for a short time, the reinforcement was shut off, and he was then observed to peck five hundred thousand times without reinforcement! One might state that the pigeon had character and perseverance and was proceeding despite disappointments. Someone unfamiliar with the procedures might argue that the pigeon was working for internalized or intrinsic reinforcers, since none were being presented. Be the interpretation as it may, such internal control was not present initially and is the product of explicit procedures which produce similar results wherever they are applied. There would seem to be considerable promise in the application of this technology to human reading behavior; its principles have long been applied to slot machines, which, in contrast to the gum dispenser, maintain extended behavior without continual reinforcement.

According to Money, the program of the responsive environment may not only occasion writing when pictures are presented, but writing from dictation, as when orally dictated words and sentences are presented. Reading and writing can be intrinsically related: our own reading is normally a critical feedback for our own writing. Stated otherwise, our reading is contingent upon our writing and will maintain or alter it. The teaching of the interwoven behaviors of reading and writing is related to the fact that writing involves the acquisition of complex muscular coordination and must be part of a separate program for young children.

A well-organized educational system will capitalize on both chaining sequences and systematic sequences.

Programmed instruction makes use of both, and a particular unit may be taught by a chaining procedure; the learning of this unit now makes it possible to build others upon it. Appropriate programming requires appraisal of the child's current repertoire and the changes that can be made in it. (21:93-105).

Opinions of a classroom teacher, Sister Gerald, concerning Programmed Reading are the following: Programmed instruction has been accepted slowly. Educators have experimented gingerly with it. St. Mary's Child Center, for two years, has used successfully the three series of Sullivan's Programmed Reading materials. It is a promising new device, particularly for slow learners.

There is little doubt that this program is therapeutic in nature. From personal observations, Programmed Reading is, and promises to remain more effective with mentally handicapped youngsters than any other materials now available. The children are not competing with one another as is natural with traditional materials--they are competing only with themselves. Anxieties are reduced. Each student is assured that he can learn and is learning. As may be expected, low I.Q. children will proceed at a much slower pace than a normal group, but the fact that they are reading, and thus experiencing success, makes the programmed approach more effective than traditional materials.

The traditional class situation permits neither the teacher nor the child to tell whether or not a given concept has been understood. Programmed Learning, with its reinforcement, is an immediate check on their reading comprehension. There is logic and progression in word learning. The children look more carefully at the sequence of letters composing words. They are associating sounds with specific words and letters. Programmed Reading provides repetition in a more meaningful and less monotonous way than the basal series. There is a definite carry-over of word-attack procedures in other subject areas.

The change from one book to another is psychologically rewarding and makes for a deeper sense of achievement.

The child using programmed materials is actively engaged every minute of the reading time selecting and organizing those meanings which are in line with his purpose in reading. This is active rather than passive learning; before a child can respond, he must think, and then he acts. He writes in his text, thus demanding concentration and participation. This program is not memorization of words. There is meaning to be acquired before the frames can be correctly answered. Programmed approach to reading does a better job than other traditional methods, especially with the slow learners (11:1-2).

Factors influencing teaching the low-achiever to read that are advocated in Programmed Reading are supported by the following statements:

> The code-cracking, mechanical skills are logically prior to the gross experience of meaningful reading. Writing words gives the children needed practice in applying the word rules they have learned. If a child understands how to build words, he will understand how sounds work in words (10:82,114).

> Do not assume that all children need the same amount or emphasis upon a particular skill. Some children appear to gain a thorough knowledge of word-attack skills without formal training; others will need constant guidance and repetition in order to see the reasonableness and application of the skill to actual reading (5:150).

> Adaptability to the pupil's needs is far more important than devotion to a particular plan of procedure. (14:393).

> Sound blending, to unlock unfamiliar word symbols, is particularly useful for pupils who have difficulty in retaining sight vocabulary. A fairly simple pattern of relationships between symbols and sounds can be taught to a remedial pupil to provide him with a word perception tool that can compensate for his poor visual memory (19:115).

According to McKee, contexts in which new words are presented (a) must be composed only of words which the pupils already know well in spoken form if not in print, (b) should be constructed in such a way that in a number of word introductions the new words appear in different positions in the contexts, (c) must be natural language, and (d) must be weak enough so that in any given case the context itself suggests at least two possibilities for the new

word and makes it necessary for pupils to use letter sounds in unlocking it (20:150).

A teacher's assessment of Programmed Reading was that a pupil must progress individually, moving at a pace suitable to him rather than one suitable to a group, and as fast or slow as he can effectively learn. Except for staying within certain teacher guidelines, this pace is, and must be determined by his capacities and his capabilities. This progress must be assessed daily, individually, specifically, and continuously as he performs.

Maximum success in relation to his own capability must be realized by the least talented as well as the most talented without being segregated or in any other way dramatically pointed out as being different, such as being a permanent member of a slow group. He must be praised whether he has covered the most or the least, and must never be pushed to catch up, or held back and made to follow. (22:1-3).

Summary

The causes of reading failure are many. Some of the most important factors are:Lack of reading readiness, mental retardation, physical handicaps, directional confusion, special brain defects, emotional handicaps, accidental interference with learning, and poor teaching.

Psychologically, the causes of reading disabilities stem from the interrelationships of the components necessary for the reading process.

Reading is a perceptual process. Many successful teaching programs have recognized this fact and have trained all aspects of the perceptual process at one time.

The Gillingham Method is a multisensory approach emphasizing the linguistic and graphic regularities of English words. It is a combination method, using the auditory, visual, and kinesthetic sense avenues.

Programmed Reading is a method of teaching using Skinner's reinforcement theory of operant conditioning. The procedure followed in teaching Programmed Reading will be outlined in the next chapter.

CHAPTER III

GROUPS STUDIED AND MATERIALS USED

I. GROUPS STUDIED

For the purpose of testing the effect of specialized reading treatment on the reading progress of low-achieving second-grade students, seventy children were pre-tested in the fall. In all instances, students chosen were about one-third of a teacher's class and were the lowest achievers.

Fifty-three second grade students from four public and one parochial elementary school in Wenatchee, Washington became the pupils from which the experimental group was chosen. Seventeen pupils from three second grade classrooms in two elementary schools in East Wenatchee, Washington were the children from which the control group was selected.

The experimental group was chosen from 37 boys and 16 girls, and the control group was selected from 11 boys and 6 girls. These two made up ten matched pairs which were investigated for this experimental study.

The chronological age range was from seven years, one month to eight years, five months; a range of one year, four months. Intelligence quotients ranged from 76 to 118 in the control group, and from 81 to 116 in the experimental group.

TABLE I

MATCHED PAIRS

EXPERIMENTAL GROUP

Number	Sex	I.Q.	Word Analysis	Comprehension
1	F	94	2.0	1.8
2	M	100	1.9	1.9
3	M	95	1.5	1.7
4	M	93	2.0	1.7
5	M	81	1.9	1.4
6	M	103	2.5	2.6
7	M	116	2.7	2.7
8	F	96	2.9	2.7
9	M	114	2.1	1.3
10	F	110	2.3	2.6

CONTROL GROUP

1	F	94	2.3	2.0
2	M	100	2.0	1.6
3	M	97	2.1	1.5
4	M	94	2.1	1.5
5	M	76	2.0	1.7
6	M	109	2.5	2.9
7	M	118	2.4	2.9
8	F	110	2.3	2.7
9	M	114	2.2	2.2
10	F	110	3.2	2.6

II. MATERIALS USED

The Pintner-Cunningham Primary Test was given in September of the 1968-69 school year as one means of determining I.Q.

The New Developmental Reading Tests- Bond-Balow-Hoyt, Lower Primary Reading (for Grade 1 and First Half of Grade 2) were given in October of the 1968-69 school year to measure Word Analysis, Comprehension of Significant Ideas, and Comprehension of Specific Instructions.

Random selection of 116 words from Bucks County Word List, grade levels 1-3 was given in October and again as a post test. These results were not used in the study.

Sullivan's Programmed Reading Placement Test was given to pupils of experimental group in October.

The New Developmental Reading Tests- Bond-Balow-Hoyt, Upper Primary Reading (from Middle of Grade 2 through Grade 3) were given in June of the 1968-69 school year to experimental and control groups as a post test.

The t-Test of Significance developed by R. A. Fisher was used in analysis of the descriptive data, because the t-Test can be used with any sample size, and is considered a general technique for testing the significance of differences between means either independent or correlated. (25:75).

Programmed Reading materials used by teachers of the experimental group were the Teachers' Guides to Series I, II, and III, Teachers' Guides to the tests for Series I, II, and III, sound-symbol cards, Series I, II, and III Programmed Reading books, supplementary worksheets, teacher-made reward records and games.

Materials used by the experimental group to teach Gillingham technique were Remedial Training book by Anna Gillingham, key word cards, duplicated supplementary materials distributed by the investigator.

The control group used Scott Forsman's The New Basic Readers with Teacher's Guide and accompanying workbooks.

IV. INVESTIGATION

I. PROCEDURES

For the purposes of this study, the investigator tested pupils of the experimental and control groups in October of the 1968-69 school year. I.Q. tests were given. Pretreatment tests for Word Analysis, Comprehending Significant Ideas, and Comprehending Specific Instructions were administered. The comprehension score was determined by taking an average of the student's scores on Comprehending Significant Ideas and Comprehending Specific Instructions.

Ten pairs were matched according to sex, I.Q. and pretreatment test scores in Word Analysis and Comprehension. The I.Q.s were closely matched--the greatest variance being six points (favoring control group.) In all but one instance the I.Q.s were higher in the control pupils'. In matching the Word Analysis and Comprehension scores, the higher pretreatment score often favored the control group. (Table I)

Teaching Procedure for Experimental Group

Classes were conducted by the Coordinator of Reading Services of the Wenatchee School District in which teachers of the experimental group were given a definite plan to follow in their teaching. They were taught the Gillingham technique and trained in the use of Programmed Reading materials.

Programmed Reading Teaching. Before beginning Programmed Reading Book 1, the child should be taught the following things:

1. The names of the letters of the alphabet (capital and small).
2. How to print all the capital and small letters.
3. That letters stand for sounds
4. What sounds to associate with the letters a, f, m, n, p, t, th, and i, which are used as the points of departure for the programmed readers
5. That letters are read from left to right
6. That groups of letters form words
7. The words yes and no by sight, how to discriminate the words ant, man, and mat from one another, and how to read the sentence, I am an ant.

The course objectives of Series I are for the child to learn to read, write, and spell, with a basic vocabulary of 400 words. His knowledge of the English sound-symbol relationships permits him to generalize to hundreds of other phonetically regular words.

The programmed readers are numbered 1 through 7. The student opens his book on the side marked with a large "1." He reads through the right-hand pages, writing his response to each frame. He then turns the book over to the side marked "2," and works back through it, again reading only right-hand pages. A cardboard slider covers an answer column on the left side of each page.

When the child finishes Programmed Reading Book 1, he reads Storybook 1. He then takes Test 1 in his test booklet. He progresses through the series in this manner.

The programming techniques are described fully in the Teacher's Guide to Programmed Reading:

> The child reads a selection, makes his response, and checks his own answer. He starts by answering "yes" or "no" to a question about a picture. On an increasing level of difficulty, he then proceeds to select the appropriate word to complete a sentence about a picture. When he has encountered a word a sufficient number of times, he completes it by adding a missing letter. Through the use of minimal pairs, which contain only one contrasting element, he learns to discriminate each individual letter in a word. This permits him to sound out precisely, and to spell them according to regular rules. Soon he is able to add missing letters to several words in a sentence, or to add several letters to a word. (2:1-4).

Orton-Gillingham Technique. The experimental group was taught the basic principles of retraining of the Orton-Gillingham approach by introducing the kinesthetic element to reinforce the visual-auditory language associations and to establish left-to-right habits of progression. The plan by which these various linkages were taught follows:

Linkage Five (Reading-Blending)

1. Child sees letter
2. He names the letter, writing it in the air while he is naming it
3. Child gives the guide word--apple
4. He gives the letter sound as taken from the guide word--a

Linkage Five (Blending Words or Syllables) Because the vowel is the most difficult part of the word, the child is taught to locate the vowel and determine its sound first.

1. Child sees the word--man
2. He names the vowel, writing it in the air as he names it
3. He gives the guide word--apple

4. He gives the sound taken from apple--a
5. The same pattern is applied to the initial consonant--m
6. The two sounds are blended into one--ma
7. The pattern is applied to the final consonant
8. The word is now synthesized--ma-n, never m-an

Linkage Seven (Oral Spelling)

1. The teacher pronounces the letter sound--a
2. The child repeats the letter sound
3. Child gives the letter name, writing it in the air
4. Child gives guide word, and sound of letter matching it to see he is correct

Linkage Seven (Applies to Words or Syllables)

1. Teacher pronounces the word
2. Child repeats the word
3. Child locates the vowel sound by feeling his throat and listening for the sound that opens his throat and lips
4. Child gives the vowel sound in isolation
5. He names the vowel writing it in the air as he names it
6. Child repeats the word, identifying the initial sound, and names it, writing it in the air
7. He names the vowel, and continues through the word

Linkage Eight (Written Spelling)

1. Teacher pronounces the word
2. Child repeats the word
3. Child listens and feels for the vowel sound
4. He gives the vowel sound
5. He names the vowel, writing it in the air
6. He repeats the word, identifying beginning sound, names it, writing it in the air
7. He names the vowel, writing it in the air
8. He identifies the final sound, and names that letter, writing it in the air
9. He is now ready to write the word on the board or paper

When following the Gillingham Technique, oral spell- always precedes written spelling. As two syllable words are mastered, each syllable is spelled as a unit.

Gillingham says the linkage patterns quickly become automatic to the child, and he is then able to read and blend words as quickly as he masters the name, guide word, sound and shape of the letters (12:187-191).

Reinforcement. When the pupils checked their answers to their daily work in Programmed Reading they were rewarded for correct responses or learned what their responses should have been immediately. Records were kept of the pupil's progress in individual folders. For example; a small star was awarded for each ten pages of Programmed Reading completed, a gold star for one test page correctly done, a larger star for completion of one-half book, and a giant star or special seal when the student finished the entire book. Verbal praise and encouragement was given when it was earned and needed.

As Heilman states, in some situations it may be necessary to use extrinsic motivations. Librarians and teachers have found that some children are favorably influenced by keeping a record of the books or stories read. This extrinsic motivation is educationally justifiable, but it can work for only a limited time. While it is being used and

while it is serving as an ego satisfaction for the child, the real aim is to have the child develop a love for reading which in time becomes the reward itself (17:144-145).

Teaching Procedure for Control Group

Teachers of the control group used Scott Forsman's The New Basic Readers and Think and Do workbooks for Grade II. Teachers followed their guidebooks for the series. A typical lesson plan follows:

1. Establishing background - Focus attention on the new words and see whether children can use context clues to identify

   In all activities at this level that involve reading, children often encounter printed words that cannot be identified by using the word-analysis skills developed thus far, but a number of these words can be identified through the use of clues contained in pictures and in printed text. If pupils are to develop competence in using context to identify words, they should be encouraged to do so whenever the opportunity occurs--during presentation of new vocabulary for a story, guided interpretation of a story, development of skills and abilities in a group situation, use of the Think and Do Book, participation in personal reading activities--at any time during the school day.

2. Guiding interpretation - Application of word-analysis skills while reading the story

3. Extending competence and interests (1:32-36).

   Pupils identify endings, suffixes and roots; discuss spelling changes in root words before endings; identify inflected and derived forms in Think and Do Book exercise; note that letter "v" is followed by "silent e" at the end of words; use context and phonetic analysis to identify new words.

Post-testing

The final testing of all students was completed during the first week in June, 1969. The achievement tests were completed in two sessions for each group tested.

II. RESULTS

From the results of the comparisons of the pretreatment with the post-treatment scores of pupils in the experimental and control groups, tables were constructed to indicate the improvement of both groups in word analysis and comprehension.

Table II shows that the experimental group excelled the control group in Word Analysis.

TABLE II

COMPARISON OF WORD ANALYSIS MEAN SCORES

Group	N	Obtained Mean	S.D.	Obtained t	Required t
Experimental	10	1.61	.396	3.134	2.878*
Control	10	.72	.805		

*Significant at the .01 level of confidence.

The mean of the experimental group excelled the mean of the control group. The difference is significant at the .01 level. (See Table I of Appendix for individual scores.)

Comparison of the mean scores of the experimental and control groups are shown in Table III.

TABLE III

COMPARISON OF COMPREHENSION MEAN SCORES

Group	N	Obtained Mean	S.D.	Obtained t	Required t
Experimental	10	1.28	.692	2.03	1.73*
Control	10	.76	.419		

*Significant at the .10 level of confidence.

The mean of the experimental group excelled the mean of the control group. The difference is significant at the .10 level of confidence. (See Table II of Appendix for individual scores.)

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A review of the study may enable the reader to assess the effect a treatment of Sullivan Programmed Reading materials with the addition of multi-sensory phonics techniques had upon achievement of second graders who had not achieved success in reading.

I. SUMMARY

Considering the varied causes of reading disabilities and the large numbers of low-achieving students in classrooms today, proven methods and techniques of teaching are needed that can be beneficial to most students.

To learn to read, the child must have sufficiently clear visual perception to distinguish the printed form of a word; clear auditory perception to be able to distinguish a spoken word from similar sounding words; simultaneous attention to the printed and spoken word; clear perception of letters and letter groups within the total word configuration; clear perception of the sound elements within the spoken word; association of the sound elements with their printed equivalents; and functional use of the perceived parts as aids in the perception of the words.

The multi-sensory approach used in the study to aid the low-achieving students in perception was the Gillingham method. This synthetic phonics system using auditory, visual, and kinesthetic sense avenues was correlated with Sullivan's Programmed Reading, a reinforcement system, and phonetically regular supplementary reading books in teaching the experimental group of students. The control group used a basal reader with a sight word approach.

The hypothesis tested was: Low-Achieving students taught with Sullivan's Programmed decoding materials combined with multi-sensory phonics techniques would show significant word analysis and comprehension gains when compared to pupils taught by a basal reader - sight word approach.

II. CONCLUSIONS

The experimental group of low-achieving second grade students did show significant word analysis and comprehension gains. The average improvement in word analysis was 1.61 months opposed to .72 months of the control group. A t Test shows this difference is real at the .01 level.

The average improvement in comprehension was 1.28 months for the experimental group compared to .76 months for the control group. A t Test shows this difference is real at the .10 level.

III. IMPLICATIONS

On the basis of the findings of the study, the following implications are drawn:

(1) Programmed Reading with the addition of multi-sensory phonics techniques could be used successfully to teach the low-achieving second grade student.

(2) The system of linkages advocated by the Gillingham method seems to be a beneficial way in which to teach the multi-sensory phonics techniques.

(3) Immediate reinforcement for achievement could be a factor in motivating the low-achiever.

(4) From the teacher's point of view, success in teaching by this method could depend upon correct diagnosis of her students' problems, proper placement in Programmed Reading, integration of the multi-sensory phonics techniques, patient and understanding teaching, re-diagnosis, repetition, encouragement, searching for material, reteaching, making teaching aids, being concerned about the failure of some pupils and gaining inspiration from the success of many.

IV. RECOMMENDATIONS

The validity of this study would be enhanced if the population from which the experimental and control groups

were selected would have been larger. It is recommended that further research consider chosing from a greater number of pupils.

It would be desirable to have future studies run for a longer period of time.

Evidence of value of teaching Programmed Reading with addition of multi-sensory techniques would be aided by future research controlling different variables.

If comprehension gains are used to indicate achievement in later studies, perhaps a more valid measurement of that skill score could be ascertained.

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APPENDIX

TABLE I

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP IN WORD ANALYSIS

Experimental Student	Word Analysis Improvement	Deviation From Mean	Deviation Squared
1	1.6	-.01	.0001
2	1.6	-.01	.0001
3	1.5	-.11	.0121
4	2.0	.39	.1521
5	2.1	.49	.2401
6	2.0	.39	.1521
7	1.2	-.41	.1681
8	0.9	-.71	.5041
9	1.3	-.31	.0961
10	1.9	.29	.0841
			1.4090

$S^2_{\bar{x}} = 1.4090/9 = .15655$ $\quad S = .3957$

$S^2_{\bar{x}} = .15655/10 = .015655$ $\quad S_{\bar{x}} = .1251$

Control Student	Word Analysis Improvement	Deviation From Mean	Deviation Squared
1	0.2	-.52	.2704
2	-0.5	-1.22	1.4884
3	0.9	.18	.0324
4	0.1	- .62	.3844
5	-0.2	- .92	.8464
6	1.5	.78	.6084
7	1.8	1.08	1.1664
8	1.7	.98	.9604
9	1.0	.28	.0784
10	0.7	.02	.0004
			5.8360

$S^2_{\bar{x}} = 5.8360/9 = .64844$ $\quad S = .805$

$S^2_{\bar{x}} = .64844/10 = .064844$ $\quad S_{\bar{x}} = .255$

TABLE II

COMPARISON OF EXPERIMENTAL GROUP WITH CONTROL GROUP IN COMPREHENSION

Experimental Student	Comprehension Improvement	Deviation From Mean
1	1.8	.52
2	2.0	.82
3	0.2	-1.08
4	1.9	.62
5	0.9	- .38
6	1.0	- .28
7	0.5	- .78
8	0.7	-0.58
9	1.8	.52
10	1.9	.62

$S^2 = 4.3160/9 = .47955$ $S = .692$

Control Student	Comprehension Improvement	Deviation From Mean
1	0.5	- .26
2	0.7	- .06
3	0.9	.14
4	0.9	.14
5	-0.3	-1.06
6	0.5	- .26
7	1.2	.44
8	1.1	.34
9	0.8	.04
10	0.7	- .06

$S^2 = 1.6160/9 = .17955$ $S = .424$