

1968

## A Study on the Effectiveness of the Neurological Impress Method as a Remedial Reading Technique

Anthony Cairl Embrey  
*Central Washington University*

Follow this and additional works at: <https://digitalcommons.cwu.edu/etd>



Part of the [Educational Methods Commons](#), and the [Elementary Education and Teaching Commons](#)

---

### Recommended Citation

Embrey, Anthony Cairl, "A Study on the Effectiveness of the Neurological Impress Method as a Remedial Reading Technique" (1968). *All Master's Theses*. 822.

<https://digitalcommons.cwu.edu/etd/822>

This Thesis is brought to you for free and open access by the Master's Theses at ScholarWorks@CWU. It has been accepted for inclusion in All Master's Theses by an authorized administrator of ScholarWorks@CWU. For more information, please contact [scholarworks@cwu.edu](mailto:scholarworks@cwu.edu).

A STUDY ON THE EFFECTIVENESS OF THE NEUROLOGICAL  
IMPRESS METHOD AS A REMEDIAL READING TECHNIQUE

---

A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College

---

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

---

by  
Anthony Cairl Embrey  
May, 1968

LD  
5771.3  
E53st  
SPECIAL  
COLLECTION

~~SWDC~~  
~~ANOTHER~~

170963

Library  
Central Washington  
State College  
Ellensburg, Washington

APPROVED FOR THE GRADUATE FACULTY

---

Lillian L. Rickels, COMMITTEE CHAIRMAN

---

John E. Davis

---

Richard J. L. Covington

### ACKNOWLEDGMENTS

Sincere appreciation is extended to Dr. Lillian Rickels for her encouragement and guidance throughout the study; to Dr. John Davis and Dr. Richard Covington for their helpful suggestions; and to the staff at Hebel Elementary School for their cooperation.

To Lawana, my wife and typist, I owe a special debt of gratitude.

## TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION . . . . .	1
The Problem . . . . .	1
Statement of the problem . . . . .	1
Hypotheses . . . . .	2
Importance of the Study . . . . .	2
Limitations of the Study . . . . .	2
Definition of Terms Used . . . . .	3
Comprehension . . . . .	3
Disabled reader . . . . .	3
Eclectic remedial reading program . . . . .	3
Intelligence quotient . . . . .	4
Mental age . . . . .	4
Reading age . . . . .	4
Reading grade . . . . .	5
Reading vocabulary . . . . .	5
Remedial reader . . . . .	5
Organization of the Remainder of the Thesis .	5
II. REVIEW OF THE LITERATURE . . . . .	7
A Survey of Well-known Remedial Programs . . .	8
Kinesthetic method . . . . .	8
Phonic method . . . . .	12
Visual method . . . . .	14
Experience method . . . . .	16

CHAPTER	PAGE
Words in Color . . . . .	19
Initial Teaching Alphabet . . . . .	22
Individualized reading . . . . .	25
Literature on the Neurological Impress	
Method . . . . .	30
Origin of the method . . . . .	30
Description of the method . . . . .	31
Theoretical rationale for the method . . . . .	33
Research of the method . . . . .	34
III. PLAN OF RESEARCH . . . . .	39
Basic Design . . . . .	39
Sample Selection . . . . .	39
Experimental Procedure . . . . .	41
Variable Measurement . . . . .	44
Statistical Analysis . . . . .	46
IV. RESULTS . . . . .	47
Analysis of Comprehension Data . . . . .	47
Analysis of Reading Vocabulary Data . . . . .	51
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . . . .	55
Summary . . . . .	55
Conclusions . . . . .	56
Recommendations . . . . .	58
BIBLIOGRAPHY . . . . .	60

LIST OF TABLES

TABLE	PAGE
I. Intelligence Quotients, Mental Ages, and Reading Ages of the Experimental- Group Subjects . . . . .	42
II. Form 2, Form 3, and Average Grade-level Scores on the Pretest and Posttest Administration of the Level of Comprehension Subtest of the Gates Basic Reading Test . . .	49
III. Comparison of Pretest and Posttest Grade- level Averages on the Level of Comprehension Subtest of the Gates Basic Reading Test . . .	50
IV. Form 2, Form 3, and Average Grade-level Scores on the Pretest and Posttest Administration of the Reading Vocabulary Subtest of the Gates Basic Reading Test . . .	52
V. Comparison of Pretest and Posttest Grade- level Averages on the Reading Vocabulary Subtest of the Gates Basic Reading Test . . .	54



## CHAPTER I

### INTRODUCTION

Reading is one of the most essential tools for learning in the educational systems of the civilized world. Success in reading is a prerequisite to success in any of the academic areas. Unfortunately, not all learners progress satisfactorily in mastering the skills of reading. An alarming percentage of the poor readers and even non-readers have the intellectual capacity to read. Concerned educators have developed various techniques to help these individuals; however, it seems that the deterrents to reading, other than ability, are so complex and so varied that present techniques do not provide effective help in many instances.

#### I. THE PROBLEM

Statement of the problem. There are many students who have quite serious reading problems which are not attributable to below normal intelligence. The task of this research was to determine the effectiveness of the Neurological Impress Method of reading instruction with these kinds of students. The method was evaluated in terms of its effect on the students' reading comprehension and reading vocabulary.

Hypotheses. The null hypotheses tested in this study were: (1) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading comprehension of the remedial readers in the experimental group; and (2) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading vocabulary of the remedial readers in the experimental group.

## II. IMPORTANCE OF THE STUDY

The techniques employed by remedial reading teachers are usually effective with some remedial reading cases, but no one technique seems to be effective with all cases. The Neurological Impress Method is a reading technique which may be effective when others are not. This is not to say that it could be used effectively in all remedial cases, but it may be a worthwhile component of an eclectic approach to remedial reading problems.

The research done on the Neurological Impress Method has been extremely limited and, in some cases, poorly designed. This study should provide added information on which to base a more objective evaluation about the effectiveness of the experimental technique.

## III. LIMITATIONS OF THE STUDY

There was no control group in the study. It would

have been impossible for the investigator to meet, on a one-to-one basis, the number of students necessary to make an experimental-control group study.

The experimental group for the study contained eight subjects. It should be recognized that these eight students did not represent an adequate cross-section of the types of problems which may cause reading disabilities.

No attempt was made in this study to measure retention of reading gain. The posttests were administered immediately after the eight-week period of experimentation.

#### IV. DEFINITION OF TERMS USED

Comprehension. Reading authorities disagree about the exact nature of comprehension. For the purposes of this study, comprehension refers to the subjects' ability to read and understand the literal meaning of the paragraphs in the Level of Comprehension subtest of the Gates Basic Reading Test (8:6).

Disabled reader. A reader who is not performing to his intellectual potential in reading, regardless of the reason, has been referred to as a disabled reader (22:35-36).

Eclectic remedial reading program. An eclectic remedial reading program is a program designed so that any of several techniques of remediation may be used, depending

upon the lack of skills and other needs of the individual reader.

Intelligence quotient. The intelligence quotient is a measure of the rate of mental growth, computed from average growth at a particular age. For example, if a child's performance on a particular intelligence test shows that he has grown 1.33 times as fast as the average child having the same chronological age, his intelligence quotient is 133 (the decimal point is removed for convenience) (25:87-88).

Mental age. Mental age is a measurement which reflects the level of mental growth that an individual has achieved. To illustrate, if an individual scores the same as the average score for six-year-old children on a particular intelligence test, he is assigned a mental age of six even though his chronological age may be above or below six (25:87).

Reading age. An individual's reading age is determined by equating his performance on a particular standardized reading test with the average performance of students at a certain age. For example, if an individual has a reading age of ten, he has performed on a particular test at the level of the average ten-year-old child (8:14).

Reading grade. The reading grade is determined by equating an individual's performance on a particular standardized reading test with the ability of the average student at a certain grade level (8:14).

Reading vocabulary. Reading vocabulary has been described in the manual for the Gates Basic Reading Test as the ". . . ability to recognize and work out the meaning of words without any context clues from a sentence or paragraph" (8:21). This definition was used for the purposes of this study.

Remedial reader. For the purposes of this study, a remedial reader has been defined as having: (1) an intelligence quotient of ninety or above on the Wechsler Intelligence Scale for Children, (2) a reading age, as determined by the Reading Vocabulary and Level of Comprehension subtests of the Gates Basic Reading Test, at least one and one-half years below mental age, (3) no previously diagnosed organic brain damage reported in the student files.

## V. ORGANIZATION OF THE REMAINDER OF THE THESIS

Chapter II serves two distinct purposes. The first is to review the more important remedial reading techniques that are currently in widespread use; the second is to review the literature and related research that has been

done using the Neurological Impress Method of reading instruction. Reported in Chapter III is the research design of this thesis. Chapter IV gives the investigator's analysis of the research data. An attempt has been made, in Chapter V, to summarize the study and make appropriate conclusions and recommendations based on the analysis of the data in the preceding chapter.

## CHAPTER II

### REVIEW OF THE LITERATURE

Remedial reading techniques are not esoteric cures known only to reading specialists. The processes involved in a good remedial program are very much the same as those to be found in an effective classroom presentation at almost any level of instruction (27:93). There are, however, some special considerations to be made. Many teachers have assumed that their pupils need drill, drill, and more drill over the same material that they have been exposed to in the classroom without results. These teachers usually have little success with their remedial programs (12:276).

A remedial teacher must realize that the disabled reader has probably failed with more than one technique in the past. There are countless factors involved in determining why certain techniques have been ineffective with an individual, not the least of which might be ineffective teaching. Regardless of the reasons for failure, the child has quite possibly developed a strong aversion to these techniques and should not be re-exposed to them, at least until his reading and, or his attitudes about reading have improved. The remedial teacher would be wise to ascertain what particular techniques have been used in the past with

an individual; then, after diagnostic procedures, the teacher should be able to select an untried method that fits the child's needs (22:165).

The literature abounds with various methods of remediation. Most of these have proven effective with certain types of disability cases. It is the purpose of this chapter to: (1) review the literature concerning the more well-known remedial programs, and (2) review the literature and related research available on the experimental technique researched in this study, the Neurological Impress Method of teaching reading.

It would be advisable, in the opinion of the investigator, for the remedial reading teacher to become thoroughly familiar with the programs discussed in this chapter. The various programs are not entirely unique; in fact, some have several elements in common. Only a few of the programs were developed specifically for the teaching of remedial reading, but any one of them may prove effective with a specific remedial case.

#### I. A SURVEY OF WELL-KNOWN REMEDIAL PROGRAMS

Kinesthetic Method. In 1921, Grace M. Fernald and Helen B. Keller developed a kinesthetic reading method aimed at the correction of severe reading disabilities (12:384). Certain elements of the kinesthetic method were



used as far back as Plato; however, Fernald and Keller are credited with its development as a sequential remedial technique (5:3).

The genesis of the technique was Fernald's research on imagery. She postulated that imagery had three forms: visual imagery, auditory imagery, and kinesthetic imagery. The problem with traditional reading methods, she hypothesized, was that they stressed only the use of visual and auditory imagery. Fernald believed that some students were weak in those two but quite effective learners when given a chance to utilize kinesthetic imagery (20:317).

Fernald explains the general plan of procedure for the kinesthetic method as follows:

We start by telling the child that we have a new way of learning words, which we want him to try. We explain to him that many bright people have had the same difficulty he has had in learning to read and have learned easily by this method, which is really just as good as any other way. We let him select any word he wants to learn, regardless of length and teach it to him (5:33).

The actual teaching of words begins at stage one for the severely disabled reader. Stage one is the first of four distinct stages. In this beginning stage the child selects words at random that he would like to know. The teacher writes each word on a piece of paper using at least black-board size script. The student's preference is the deciding factor in whether the word is written in cursive or manuscript form. After each word is written, the child traces

over it using his index finger. He may use two fingers if he likes. Good strong contact with the paper as the fingers trace the word is important. The child says each part of the word as he traces it. The process is repeated over and over until he can write the word from memory. Now the student is ready to include his new word in a creative story. Later the teacher types the story and gives it back to the student for him to read. After each new word has been learned and used in a story, it is stored in an alphabetical file for later reference.

After a certain time period, usually from two to eight months, the student will not need to trace new words. At this point stage two begins. In stage two the child learns the words by merely studying the copy provided by the teacher until he can reproduce it without looking at the copy. He pronounces each part of the word as he writes it. Occasionally, especially on difficult words, a bit of tracing may be necessary. It is important that the student continues to write stories. Fernald observes that the stories usually become longer and more complicated during this stage.

Stage three is similar to stage two except that it is no longer necessary for the teacher to write the word for the child. Each time a new word confronts the student in his reading, he asks the teacher what it is and studies

it directly from the book. After studying and saying it to himself, he writes it without referring to the book. At this stage the student usually begins to exhibit a desire to read books. He is encouraged to read whatever he wants.

At the beginning of stage four the child retains new words better if he pronounces and writes them after the teacher has told him what they are. He has begun, however, to notice similarities which new words have with others he has learned. A skillful teacher now has the child in a position where he is extremely eager to read. It is important that no one reads to the student at this stage. If the student needs additional help with words, he is permitted to use a syllabication approach, but no phonic sounding of individual letters is permitted (5:33-55).

Harris evaluates the kinesthetic method as follows:

It has several desirable features: (1) It enforces careful and systematic observation and study of words. (2) It makes necessary a consistent left-to-right direction in reading. (3) It provides adequate repetition. (4) Errors are immediately noted and corrected. (5) Progress can be noted by the child at practically every lesson. (6) The sensory impressions from tracing, writing, and saying the words reinforce the visual impressions and seem to be of definite value to children whose visual memory is very poor (12:386).

Limitations to the method are as follows: It is best suited to a clinical one-to-one type of situation; it cannot be used at all in large groups; it requires a great deal of teacher and student time (12:386).

Most of the research utilizing the kinesthetic method suggests that it is an effective technique with certain reading disability cases. A typical study done by Roberts and Coleman report the following conclusion: As a group, reading disability cases were significantly better able to learn new materials by methods which included kinesthetic components than those which employed visual stimuli only (23:450).

Phonic method. Several authorities in the field of reading have suggested a purely phonetic method for working with severe reading disabilities. Among those authorities are Marion Monroe, Margaret Stanger and Ellen Donohue. This is not a new method; in fact, it was being used over thirty years ago (12:387).

The basic approach of the method is a letter-for-letter system of sounding individual letters, and then moving to the point where the individual sounds of letters are blended to form words. Words having only two or three letters are taught first (22:169). This process is explained by Stranger and Donohue as follows:

The letters m a t are put before the child. He is asked the sound of the first letter, then the sound of the second, and then of the third. Then he is told to make the sound of the first letter, and to hold onto it till he joins it to the sound of the second letter. It sometimes aids this blending process if the first letter can actually be moved close to the second letter,

and then those two moved up to the third letter. This process of holding on to each sound till it joins the next sound is repeated each time a little faster until mat comes as a whole word. In the very early stages of this work, the wise teacher will not let the beginner become too discouraged or impatient. If he has given the individual sounds correctly, she may help him with the final blending into an actual word (22:129).

When the child is ready, longer phonetic words can be introduced. It is very important for the words which do not follow a phonetic pattern to be taught as whole words recognized by sight. After the student masters the consonants, he is taught long and short vowel sounds and a few of the longer phonemes.

When the consonant and vowel sounds are mastered, the child is ready to begin easy books. At this point he is also ready to be introduced to certain three, four, and five-letter combinations such as ing, ight, and ought; however, most new words are studied as wholes. When the child comes upon words in his reading that he cannot sound out phonetically, kinesthetic tracing techniques may be used as a supplement. During the last stages of this technique, flash cards are used in an attempt to speed up the process of sounding words. Also, at this point, added stress is put on reading stories for comprehension (12:388).

Several criticisms have been offered for the phonetic method. Some authorities do not approve of its rigid drill-type procedures. Very little is done to motivate the child

to read in the initial stages; all of his time is spent in blending drills. Other methods attempt to introduce the student to meaningful reading material much sooner. Another criticism is that the students often become very slow readers with an excessive amount of lip movement (7:448).

It should be pointed out that the remedial teacher need not be overly concerned about the limitations of such an intensive phonetic procedure of teaching reading. This method has been designed for use mainly with severely disabled readers, and it has sometimes produced results when other techniques have failed. In Otto and McMenemy's words, "Usually, pupils with whom the method is used have been exposed to more conventional methods that didn't "take"; an intensive phonics method is sometimes precisely what is needed" (22:169).

Visual method. Arthur I. Gates described the visual method of teaching reading in his book, The Improvement of Reading, published in 1935. As the name of the method implies, visualization is the important process for learning new words. Pictures are first used to introduce new words. When a word has been introduced by the teacher, the child is told to close his eyes and visualize the parts of the word in left-to-right sequence, and then he is told to visualize the whole word. After this has been practiced, each student

writes the word and pronounces each part softly as he writes. Gates uses some phonetic work and workbook material as supplementary material if the child is not making adequate progress (12:389). Gates summarizes his program as follows:

Words are introduced gradually and reused extensively. At first, the pupils recognize the words on the basis of general configuration and the more obvious component features. Gradually, assisted and directed by the teacher, the children learn to observe more details and more subtle features, to perceive them more quickly and accurately, to work out the recognition of unfamiliar words, and to acquire familiarity with new words in terms of these visual elements.

This program produces excellent results with certain disability cases . . . . In certain rare cases, however, it has shown limitations. In these cases, the introduction of writing in some form or some direct phonetic instruction, or both for a preliminary orientation proved to be advantageous (7:450).

The visual method is essentially the same as the most usual methods taught in basal reader approaches to reading. The main difference in the purely visual method for disabled readers is that it is more carefully supervised, and each child is given more individual attention to see that he actually learns each new word (12:390).

Most of the criticism for the visual approach to remedial problems centers around the fact that it is essentially the same approach that has failed with the child in the past. This would not be the case, of course, if the child has first been exposed to methods different from the typical approach offered by basal readers.

Harris believes that if a student has become a remedial case because of factors having nothing to do with visualization, even though he has previously failed in a basal reader, he may still be able to succeed using the visual approach (12:390). Otto and McMenemy elaborate on this point:

. . . it may be especially useful for teaching children who have not learned in the regular classroom because of immaturity, absence, inadequate teaching, or other reasons not connected with inability to learn through a visual approach (22:170).

Experience method. In 1943, Lillian Lamoreaux and Doris Lee described a reading method which has been called the experience or language-experience approach to teaching reading. The method has been used with students in the first few grades as well as with disability cases. The method grew from the philosophy that follows:

Reading is primarily a process of gaining meanings. Comprehension in reading consists of the interpretation of mental images. Experience is the only tool with which we can interpret anything (17:121).

In light of the importance of experience in the reading process, Lamoreaux and Lee say the build-up of a wealth of first-hand experiences is a necessary prerequisite to reading. After the child has been exposed to a variety of experiences, he should be given an opportunity to use these experiences for the meaningful interpretation of printed material (17:121-122).



The experience approach is an attempt to integrate the reading process as a natural component of the child's communicative skills. Reading instruction is not given the artificial stigma created by basal readers and other skills programs. The basic idea of the program is to communicate to the child that his oral expression can be translated into words. The child must come to realize that a page of writing is merely talk written down. To come to this realization, however, the child cannot be exposed to written material outside of his experiential realm. Progress in reading is, therefore, entirely dependent upon the child's growth in experiences. Only as his experiences grow, can he talk about them and subsequently see his ideas written as words (26:134).

The general procedure for the experience method revolves around the construction of experience charts. These charts are stories composed by the children as a result of discussing common experiences. The construction of the charts proceeds in five steps.

In step one, the teacher must be sure that the children choose a topic with which all are quite familiar. The topic can be almost anything, providing that it interests the group and that each member of the group has had some experience with it.

The students and teacher spend a great amount of time

discussing the chosen topic during step two. The main purpose is for the teacher to guide the students in developing ideas and clarifying concepts about the topic.

During step three, the teacher looks for common ideas expressed by the group. If they have picked a topic in which the students have rich experiences, the teacher will be able to find more common ideas from which to construct a chart.

At the beginning of step four, the teacher obtains oral expressions from the group concerning ideas which they had in common. As the ideas are given orally by the students, the teacher writes them on the chalkboard. The students get an opportunity to see how their ideas are written in sentences and combined to form an integrated story.

The fifth step is the last in the preparation of the experience chart. The teacher writes the story once on chart paper and again on tagboard. The tagboard copy is cut into phrases so that the children can practice putting it together (17:122-124).

Another form of the experience chart which might be more applicable to remedial cases is the type constructed by individual children. The procedure is much the same as outlined above except that each child has his own stories which are illustrated and bound into book form.

Several reading authorities feel that the ideas behind the experience method are good ones. Research tends

to support the strong connection between experience and success in reading (26:134-135). Hildreth feels that the method has a lot to offer because the children can observe the stories being made from their own experiences (15:16). The language-experience approach is summarized by Van Allen as follows:

The language-experience approach features children as authors with unique language abilities, with wide interests, and with individual vocabulary control built in. In the process of dictating and writing their own ideas, children learn to recognize enough words that they can read what other people have written with little or no systematic instruction (29:63).

Spache finds reason to be critical of the method. Though he is aware of the connection between experience and reading, he is not so sure that the child can move from the former to the latter as easily as this method suggests. To quote Spache:

According to this thinking, what a child hears and can think and talk about, he can write. What he can write he then can read, and from this reading experience he can read the written thoughts of others. This line of thinking is tantamount to saying that a child can transfer most of what he learns by ear into speech, then into writing, which he can then read. Research on listening does not completely support a belief in this degree of interrelatedness among these language skills (26:141).

Words in Color. In 1959, Dr. Caleb Gattegno introduced Words in Color, a new technique of learning to read (11:62). Gattegno developed the technique because he was greatly disturbed with the poor correlation between sound

and spelling in the English language. Words in Color was his attempt to simplify, for the beginning reader, the complicated, inconsistent way in which the twenty-six letters of our alphabet are used to represent words.

Gattegno realized that the English language could be completely phonetic, and thus simplified, if we had a separate letter for each sound; this would mean ten times as many letters in our alphabet. To add letters to the alphabet, however, would be tremendously upsetting. Everyone who writes and reads English would have to be retaught, and everything written in English would have to be rewritten. Realizing these problems Gattegno stated the objective which led to Words in Color as follows:

. . . we attempted to devise a procedure whereby we could transform written English into as close correspondence with spoken English as possible (make English a phonetic language) without touching the deeply rooted reading and writing habits and traditions of the English language (9:37).

Words in Color is able to meet the preceding objective by using colors to help discriminate sounds. Color charts are used to aid the children in associating the colors and sounds. Each color stands for a certain sound. If two or more letters stand for the same sound, they are assigned the same color. For example, the i as in it, the o and e as in women, the u as in busy, and the ee as in been are all in the pink column of the color chart because they all have

the same short i sound. The child learns that any of these letters associated with pink has the short i sound (15:62). Many times individual letters appear in several different columns on the color chart. For example, each of the several different sounds of a is assigned a different color (2:517).

The color charts are used during a group presentation to familiarize the students with the possible sounds a letter or combination of letters can make. The teacher uses a pointer to tap different letters on the chart. As the teacher taps various letters in the colored columns, the children blend the letters together to form words. It is a simple process because each letter tapped has one and only one sound, denoted by its color.

The children do not develop total dependency on color. From the very beginning, they do their workbook pages and other activities in black and white. The colors function only as mental references after the child has thoroughly acquainted himself with the colored word charts.

Though the addition of color is the prime innovation of this system, Gattegno feels that it has other advantages. He feels that his system of "visual dictation" (teacher tapping the chart under various colored letters to form words), workbook exercises, and various word games gives the proper balance to make Words in Color extremely motivating (11:62).

Words in Color has been used successfully in many classrooms. Paul McKee is convinced that the technique is an effective one for kindergarten and first-grade students to learn to read. He is not convinced, though, that such a purely phonetic, sound-by-sound analysis of words is necessary for most children. A child who relies on this technique may become an unnecessarily slow, laborious reader (19:133).

McKee's criticism may be a valid one, but Words in Color should not be discounted as a technique for severely disabled readers. A consistent phonetic approach may be the only way certain severe cases can learn to read. On the other hand, a remedial reader who has had intensive exposure to phonetic approaches in the past may not be helped in the least by the addition of color to discriminate sounds.

Initial Teaching Alphabet. Experimentation leading to the development of the Initial Teaching Alphabet extended over a period of three generations. Sir Isaac Pitman, the Englishman who invented shorthand, did some rudimentary work on a new alphabet approximately one-hundred years ago. Sir Isaac Pitman's grandson, Sir James Pitman, culminated the work with what first was labeled the augmented Roman alphabet. In 1963, the name was changed to the Initial Teaching Alphabet (31:109).

The new alphabet was first implemented in 1960 in England to teach beginning reading to young children. Today it is used in more than half of the states in the United States to teach beginners. Several states have also established remedial and adult education classes using the technique.

The Initial Teaching Alphabet is an orthographic device which purports to simplify reading for beginners by supplying a symbol for each individual sound (19:132). John Downing gives one case in support of the simplification of the alphabet for beginners as follows:

. . . in T.O. (traditional orthography) that phoneme which makes up the whole of each of the words "i," "eye," and "aye" and which occurs at the end of the words "die," "my," "high," and "buy" can be spelt in at least forty different ways (3:330).

The new alphabet uses a letter-by-letter phonics approach along with a type of blending to synthesize individual sounds into words (21:375). The alphabet consists of twenty-four of the letters in our conventional alphabet plus twenty added symbols. Fourteen of the added symbols look like two of our conventional letters joined together; the other six have original shapes. With this total of forty-four symbols, it is possible to represent the sounds of the English language consistently (19:132).

The Initial Teaching Alphabet has another distinguishing characteristic. All of the letters are lower case;

even capital letters are formed by simply making the lower case letters larger. This helps to eliminate some confusion over word forms. For instance, the word and always appears as and, but in the traditional alphabet it might appear as and, And, AND, or & (3:325).

Children are transferred to the conventional alphabet as soon as they are ready. Most children have gained adequate facility in the Initial Teaching Alphabet to be transferred at or near the beginning of the second school year. Advocates of the system say that the transfer to conventional English reading material is really quite easy. The reason for this, they say, is that most of the letters of the Initial Teaching Alphabet are similar to conventional letters, and that there is very little difference between the top half of the letters in the two alphabets (3:330).

Many teachers who have used the new alphabet feel that it has advantages. One of the most important is that it gives the student a concrete, reliable background of letter-sound associations so that he can attack strange words with confidence. A related advantage is that children are motivated to read independently at an early age because of their ability to correctly analyze new words.

The new alphabet does not have unanimous support. Paul McKee has commented that, although children may learn to read faster at first, the sound-by-sound analysis of words



will produce slow, word-by-word readers (19:133). Others feel that the alphabet is no more effective in teaching the initial stages of reading than traditional programs; and, as a negative side effect, the children become extremely poor spellers (10:550).

The research that has been done so far is of little help in objectively evaluating the technique in comparison with more traditional techniques. A considerable amount of research has been done, but the findings have been inconsistent. The fact has been established, however, that children can learn the beginning stages of reading quite effectively using the Initial Teaching Alphabet. It is, then, the opinion of this investigator that a remedial teacher would be completely justified in trying the approach with certain severe disability cases. The consistent symbol-sound relationship may be what is needed for a specific individual to break his failure pattern in reading.

Individualized reading. Individualized reading is not a specific technique of teaching the skills of reading. Various techniques can be used at the same time in an individualized program. It has been included in this chapter because it outlines an organizational procedure which could, in the opinion of the investigator, become an effective model for an eclectic remedial program.

The concepts involved in individualizing learning experiences are certainly not new. The very earliest types of instruction were individual. England attempted to individualize group instruction in the eighteenth century by a procedure called the monitorial system. Washburn relied on individual methods in his Winnetka plan of the 1920's. The present re-emphasis on individualized reading programs began in the United States in the 1950's (1:8-9).

There is no structured set of procedures for developing an individualized reading program. Because emphasis is on the individual, each program will be somewhat different, depending upon the individuals to be provided for. There are, though, certain prime characteristics in common. These are, according to Jeanette Veatch:

- (1) self-selection of material by pupils for their own instruction,
- (2) individual conferences between each pupil and teacher, and
- (3) groups organized for other than reasons of ability or proficiency in reading (29:ix).

Veatch expresses the rationale for these prime characteristics rather concisely, "Seldom are two children ready to be taught reading from the same material at the same time" (30:7).

Self-selection of reading material by the students places some demands on the teacher. She must be able to provide ample reading material for the individuals in her group. The children should be able to find a good selection

of books that they are able to read and that they want to read. If this situation does not exist, there are few advantages to individualized reading. The teacher may make a few suggestions about the selection of books to the children, but she shouldn't make so many that they are no longer free to choose. Choosing the wrong book a few times would probably help a child much more than being guided to the "right one" by the teacher (1:28-29).

The conference is the core of the individualized reading program. This is the aspect that distinguishes an individualized program from a good recreational reading program. There is some disagreement about whether the conference should be a planned or spontaneous arrangement; most teachers seem to prefer the voluntary arrangement (30:51). The length of the conference depends upon the needs of the student, but it usually lasts from five to fifteen minutes (1:32). There are three different activities to be carried on in the typical conference. First, the student and teacher discuss the student's chosen reading material and his reactions to it. Second, and most important for remedial cases, is the time spent on the mechanics of reading. It is sometimes necessary to make assignments or schedule the student to meet in a temporary group for specific skills instruction. Third, the student is given a chance to read a selected portion of his reading material

orally. More can be made of the conferences if the teacher will remember to ask open-ended questions rather than questions that can be answered with "yes" or "no" and if the teacher is sincerely interested in what the student has to say (30:51-55).

Grouping is an essential part of the individualized program. Groups are formed for specific skills presentations, but the group consists of only those pupils who have a common skill weakness. The group is disbanded as soon as the skill has been adequately learned by its members. Probably the most common type of group is the interest group. The teacher usually has little or no part in this group situation. Students gather to discuss common reading interests and to help each other select additional material to read (1:39-40).

To summarize, Veatch lists the following characteristics that distinguish the individualized program from traditional ability-grouped reading programs:

#### I. Reading Material

- A. Large number and variety of trade and textbooks used in instruction

#### II. Classroom Organization and Procedures

- A. Children choose what they read
- B. Motivation arises from child's interests
- C. Instruction on individual one-to-one basis
- D. Grouping is short term and for specific, immediate purpose
- E. Reading lesson prepared independently and seatwork

- has element of self-determination
- F. Remedial work integrated with other activities
- G. Planned sharing period
- H. Individual peak reading level checked and evaluated

### III. Effects on the Child and on His Reading

- A. Gifted child progresses at his own pace
- B. Slow reader not publicly stigmatized
- C. Close personal interaction with teacher serves child's psychological needs
- D. Reading at own interest and ability level fosters development of skills
- E. Acquiring skills only as needed assures normal development
- F. Oral reading promoted by genuine audience situation
- G. Reading becomes its own reward (30:12-13)

It should be pointed out that there are disadvantages to individualized reading. Research reveals the following as serious limitations:

1. The successful teaching of individualized reading requires especially competent teachers.
2. The lack of a planned sequential skills program makes teachers uneasy about a wholly individualized program.
3. Teachers using the wholly individualized approach are constantly pressed for time to provide the conferences that pupils need (24:519).

A review of the research does not seem to offer any consistent findings as to the superiority or inferiority of individualized programs over other techniques. However, a comment made by Sam Dukar in criticizing the research seems especially appropriate:

The desirability of an individualized approach to the teaching of reading cannot be established by showing that results obtained are as good as, or even better than they would be if obtained by some other method. The real question is whether individualization leads to accomplishment of the aims of reading instruction (4:220).

One aspect of the individualized program that is consistently recognized by researchers as a strong point is the high degree of student motivation. Creating motivation is possibly the one most difficult problem that remedial teachers are faced with. When the remedial child has been motivated, he can usually be helped. It would appear, then, that the individualized reading program could be a valuable approach with some remedial cases (4:224).

## II. LITERATURE ON THE NEUROLOGICAL IMPRESS METHOD

Origin of the method. The Neurological Impress Method was developed in 1952 by Dr. R.G. Heckelman. Dr. Heckelman was a psychologist associated with the Merced County School District in California at the time. One of his referrals was a teenage girl with severe reading problems. Tests indicated that she was barely able to read third-grade material. Her oral reading, even at this low level, was done in stumbling, word-by-word fashion. After diagnosing the problem, Dr. Heckelman decided to devise a technique which would attempt to suppress her faulty reading habits and replace them with his own correct ones, and thus, hopefully, affecting a permanent neurological change. After utilizing the technique, later labeled the Neurological Impress Method, for a total of twelve hours over a period of three months, Heckelman reported that the girl had

progressed three full grade levels in reading ability (13:2-3).

Description of the method. The simplicity of the Neurological Impress Method has caused many people to doubt its effectiveness. In essence, it is a system of unison reading involving the teacher and student in a one-to-one situation for approximately fifteen minutes per session.

The initial step is for the remedial student and teacher to select a book that the student would be capable of reading by himself. This is done so that the student can learn the mechanics of the technique without having his anxieties increased by difficult reading material. The teacher and student then sit next to each other with the teacher slightly behind. The student is situated on the left so that he holds the left side of the book; the teacher holds the right side. When the correct position is assumed, the teacher will find that he can easily read directly into the student's ear.

Beginning at the first session, the teacher and student read out loud together at a normal, smooth pace. The teacher usually reads louder and begins each word an infinitesimal amount of time ahead of the student. After the first few sessions, the teacher may occasionally lower his voice and lag slightly behind the student. Also, the

pace may be quickened after the beginning sessions.

As they read, the teacher and student take turns sliding their index finger smoothly along under the words. It is extremely important that the finger is located under each word as it is spoken. Some teachers unconsciously move their finger ahead of the spoken word. This, of course, totally confuses the student (14:235-236).

In the beginning sessions, it may be necessary to repeat sentences a few times until the student becomes accustomed to the technique. From this point the approach to the selected reading material is spontaneous, and no pauses are made to figure out strange words (13:3). Charles Gardner explains this aspect of the system as follows:

The goal is to cover as many pages of the reading material as can be done in the time available and without causing physical discomfort on the part of the student. At no time does the instructor attempt to teach sounds or word recognition; thus a complete break with past tradition must be made at this point (6:4).

After each reading session, the instructor should comment positively about the student's reading, but he should not ask the student to answer questions about the reading material. If the student shows a desire to discuss his reading, the teacher should accommodate him (13:4).

The difficulty of the reading material should be increased frequently after the first few sessions. The most common mistake that a teacher makes, according to



Heckelman, is spending too much time at or below the student's reading level. Heckelman feels that under-exposure to difficult words is more detrimental than over-exposure. However, the teacher should be careful that he does not frustrate the child by moving to a reading level that is beyond the student's mental capacity. Most of the words read should be in the student's speaking vocabulary (14:238).

Theoretical rationale for the method. The Neurological Impress Method was developed by R.G. Heckelman as a multi-sensory approach to solving certain types of severe reading disabilities. Heckelman believes that most past and present methods of learning to read require the learner to develop a complex network of neurological associations. Remedial readers have usually developed faulty associations which are extremely difficult to correct. The Neurological Impress Method frees the student from relying on his own faulty neurological associations; instead, the student simply follows along with the instructor's voice. In this way, after prolonged use of the method, the instructor's correct reading patterns are deeply impressed upon the child. As the child gains a considerable degree of facility in following the instructor's voice, the instructor begins to slow down a little so that, in time, the student and instructor are reading each word simultaneously. Later, the

student may even begin to read a little ahead of the instructor for short periods.

By this procedure, the child's incorrect reading habits are suppressed and eventually replaced by correct ones of his own (13:9). To use Heckelman's words:

This reading technique should be considered a part of an audio-neural conditioning process whereby the incorrect reading habits of the child are suppressed and then replaced with correct fluid reading habits (14:237).

Heckelman cites the successful experiences that "phonics-bound," word-by-word readers have had with the Neurological Impress Method as one example to support the theoretical rationale (13:8).

Research of the method. The research that has been done on the Neurological Impress Method is extremely limited. Through correspondence with individuals in California who have been involved with the method since it was developed, the investigator was able to ascertain that only three experimental studies have been made. Of these three studies, the results of two have never been published. The investigator has surveyed the material available and attempted to present a critical overview of the studies in this section.

In 1962, an experiment using the Neurological Impress Method was conducted in the Merced County Schools of California under the direction of Dr. R.G. Heckelman. A group

of twenty-four students was selected for the experimental group; there was no control group. The subjects ranged in grade placement from students about to enter seventh grade to those about to enter their sophomore year in high school. Each subject read at least three years below grade placement and scored a ninety or above on the performance section of the Wechsler Intelligence Scale for Children. No student was included who had known organic brain damage or severe personality disorders. The Gilmore Oral Reading Test was used for pretest-posttest data (13:5).

The experiment terminated after six weeks. A maximum time limit of seven hours and fifteen minutes had been spent with each student. Heckelman reported that the group had made substantial reading gains; 5.9 grade levels were gained in some cases. The mean gain of the group was 1.9 grade levels. Using the Sign Test of Dixon-Moud, the researcher found that the gains were significant at the .01 level of confidence (13:7-8).

The design of this research could be criticized for its lack of a control group or for its neglect of the Hawthorne effect; however, the investigator feels that the greatest weakness in the design was the selection of the Gilmore Oral Reading Test as the instrument to measure reading gain. The Gilmore test measures reading ability through the use of oral reading, which is precisely what

the students had been practicing in a most intensive manner. Since the final objective of the Neurological Impress Method is to improve silent reading ability, the results could have been more illuminating if a silent reading test would have been given.

In 1963, Charles Gardner conducted a pilot project using the Neurological Impress Method in the Sonoma County Schools of California. Six students were used as the experimental subjects. The details of the experimental design are extremely vague. A report of the study has never been published, but the study was briefly mentioned in a later article by R.G. Heckelman. Heckelman stated in his article that after six weeks and a total of five hours instruction, the students showed a growth of 1.6 years (14:235). The significance of this growth is difficult to assess because no mention was made of the testing instrument used or of the criteria used for selection of the subjects.

In 1965, Charles Gardner directed a research study using the Neurological Impress Method in the Sonoma County Schools of California. This is the only research on the Neurological Impress Method, to date, that has been reported in published literature. The study was supported by the Cooperative Research Program of the Office of Education, United States Department of Health, Education and Welfare (14:235).

Gardner described the selection of subjects to be included in the study as follows:

The criteria for inclusion in the special reading program will be:

1. An I.Q. of 85 and above as determined by Stanford-Binet, Form L-M.
2. Reading level 2 years below chronological age placement based on Gates Silent Reading Test, Forms 1, 2, and 3.
3. Child in grade 5 through 8.
4. No known gross neurological or emotional problems (6:5).

This study used the classical experimental and control group design; there were, in fact, two control groups. The groups were matched on such variables as sex, intelligence quotient, chronological age, and grade placement (6:1). Twenty children were experimental group subjects, twenty were control group subjects, and nine were prime control group subjects. All subjects were pretested with the Gates Silent Reading Test.

The experimental group received ten minutes of individual instruction daily using the Neurological Impress Method. The control group received the same individual attention as the experimental group, but they were exposed to more conventional reading techniques. The prime control group was simply given the tests; they were given no special instruction (6:3).

After six weeks and a total of five hours instruction for those subjects in the two groups receiving instruction,

all of the subjects were given the Gates Silent Reading Test for posttest data. Gardner reported the following results:

The experimental group showed a gain of 3.2 (months), the control group a gain of .2, and the prime control group a loss of .2. A statistical analysis showed it was beyond expectations that these scores would occur by chance (6:7).

The design of this study is superior in several aspects over the preceding studies. Control groups were used, a larger population was involved in the experiment, and a silent reading test was used to evaluate results. It is interesting to note that the results of this study do not bear out the "startling" results found in the prior studies. Though there was a significant gain of 3.2 months, it certainly does not compare with the gains of 1.9 and 1.6 years reported in the previous studies. The 1962 study did expose the subjects to a bit more total time with the method, but the difference was probably not enough to account for the significant difference between reading gains in the respective studies.

## CHAPTER III

### PLAN OF RESEARCH

The investigator has drawn from research, outlined in the preceding chapter, in an attempt to implement the Neurological Impress Method exactly as suggested by its originator, Dr. R.G. Heckelman. This study, however, is not a replication of any of the three previous studies done on the method. The present chapter describes the research design, sample selection, experimental technique, variable measurement, and statistical analysis used in this study.

#### I. BASIC DESIGN

Fred Kerlinger refers to the basic design of this research as the one-group repeated trials design. "In the one-group repeated trials design," Kerlinger explains, "one group is given different treatments at different times or is measured at different times" (16:339). In this particular study the pattern is: (1) pretest, (2) experimental manipulation, and (3) posttest. The experimental group acts as its own control group in this situation; each subject is matched against himself (16:339-340).

#### II. SAMPLE SELECTION

The sample selected for the experimental group

consisted of eight subjects. The subjects met the criteria, developed for the purposes of this study, for classification as remedial readers by having: (1) a full scale intelligence quotient of ninety or above on the Wechsler Intelligence Scale for Children, (2) a reading age on the Level of Comprehension and Reading Vocabulary subtests of the Gates Basic Reading Test of at least one and one-half years below mental age, and (3) no historical evidence of brain damage reported in the cumulative records.

The sample was selected from the intermediate grades (grades four, five, and six) at Hebel Elementary School, Central Washington State College. Hebel Elementary School students were used as the population for sample selection because of the willingness of the staff and director to cooperate in research activities. Also, the location was convenient for the investigator who was serving a graduate internship on the intermediate team.

Historical records from cumulative files and teacher referrals were used to isolate individuals who might meet the criteria established for remedial readers. Those individuals were then administered the Level of Comprehension and Reading Vocabulary subtests of the Gates Basic Reading Test, form 2, on February 27, 1968. Eight subjects were tentatively selected on the basis of having the following: (1) a reading age, as determined by the Level of Comprehension



and Reading Vocabulary subtests of the Gates Basic Reading Test, of at least one and one-half years below chronological age, (2) normal intellectual capacity as indicated by test scores in the cumulative records, and (3) no historical evidence of brain damage reported in the cumulative records.

The tentative subjects were then administered the Wechsler Intelligence Scale for Children. This was the only portion of the study that was not directly controlled by the investigator. Mr. Burr Beckwith, a graduate student of psychology and qualified examiner, administered the intelligence tests. The intelligence quotients were then converted to mental age scores and compared with the reading age scores taken from the Gates test. The data with regard to these scores has been presented in Table I. Although there is a fairly wide range in intelligence quotients, mental ages, and reading ages amongst the subjects, it can be seen from perusal of the table that the criteria involving these scores were satisfied. All eight tentative subjects were then accepted as members of the experimental group.

### III. EXPERIMENTAL PROCEDURE

Experimentation using the Neurological Impress Method covered the time period from March 4, 1968 to May 3, 1968. The staff of Hebel Elementary School planned so that it was possible for the investigator to meet with

TABLE I

INTELLIGENCE QUOTIENTS, MENTAL AGES AND READING  
AGES OF THE EXPERIMENTAL-GROUP SUBJECTS

Subjects	Intelligence Quotient	Mental Age Years-Months	Reading Age Comprehension Years-Months	Reading Age Reading Vocabulary Years-Months
1	93	11-7	7-3	8-3
2	112	11-10	9-1	9-4
3	115	12-2	9-7	9-4
4	107	10-8	8-1	8-0
5	107	10-5	7-7	8-6
6	103	11-0	8-7	8-7
7	115	12-0	8-6	7-10
8	112	10-7	8-1	8-0

each subject for a ten to fifteen minute reading session each Monday, Wednesday, and Friday morning. These regular meeting times were interrupted twice. The first interruption was for spring vacation which lasted from March 15, 1968 to March 22, 1968; the second was when all classes were cancelled because of the Central Washington State College Symposium, April 19, 1968. Absence caused two of the subjects to miss one of their scheduled meetings. In each case, arrangements were made to compensate by meeting on an unscheduled day.

Each subject was exposed to a total of five hours of instruction over an eight-week period. The individual sessions lasted for ten minutes during the first week. As the students began to get accustomed to the technique, it was possible to extend the time to fifteen minutes per session. This was done at the beginning of the second week and continued for the remainder of the experimental period.

The investigator met with each subject in the testing room of Hebel Elementary School, a room completely isolated from outside disturbances. The mechanics of implementing the Neurological Impress Method were patterned from the description given by R.G. Heckelman as reported in the preceding chapter. Each subject was given a short two or three minute introduction about the nature of what we were going to do. The investigator provided extremely easy

reading material to use during the first session. This was done so that the subject could concentrate on the mechanics of the technique rather than on reading. After the first session, each subject was provided with a large selection of books from which to read. Some of the books were basal readers containing short stories, and others were library books. The child also had the opportunity of choosing a book of his own from the school library, providing it was of the appropriate level of difficulty. The subjects were encouraged to move to more difficult reading material as quickly as they could without experiencing an undue amount of frustration.

All subjects were removed from regular reading classes for the duration of the study. This was arranged with the Hebel Elementary School staff so that reading growth or lack of growth occurring during the experimental period could be more directly attributable to the Neurological Impress Method.

#### IV. VARIABLE MEASUREMENT

Comprehension and reading vocabulary were selected as the dependent variables to be measured in this study. These two aspects of reading were chosen because both are vital areas in reading development, and both can be measured by using a silent rather than an oral reading test. A silent

reading test was preferred because the primary objective of the Neurological Impress Method is to improve silent reading skills through transfer of smooth oral reading patterns. This transfer from oral to silent reading could not be evaluated on an oral test.

The Level of Comprehension subtest and Reading Vocabulary subtest of the Gates Basic Reading Test were chosen as the testing instruments. Data was gathered and analyzed separately for comprehension and reading vocabulary.

Two forms of each subtest were given for pretest data during the week preceding the beginning of experimentation with the Neurological Impress Method. Form 2 of the Level of Comprehension and Reading Vocabulary subtests was given February 27, 1968; form 3 for these subtests was given February 29, 1968. Form 2 scores and form 3 scores were then averaged so that each subject had an average grade level score for comprehension and also for reading vocabulary. The same testing instruments and same procedures were used for gathering posttest data. Experimentation ended on April 29, 1968; the posttests were administered on April 30, 1968 and May 2, 1968.

Comprehension pretest scores were subtracted from posttest scores and reading vocabulary pretest scores were subtracted from posttest scores. The difference represented the gains that each subject had made in the

two areas. The gains were then combined and mean gains for both comprehension and reading vocabulary were computed for the group.

## V. STATISTICAL ANALYSIS

The effectiveness of the Neurological Impress Method with remedial readers was determined by using the t-ratio to test the significance of differences between the pretest and posttest means (18:139). Comprehension and reading vocabulary were treated separately in the analyses.

## CHAPTER IV

### RESULTS

The purpose of this study was to test the following null hypotheses: (1) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading comprehension of the remedial readers in the experimental group; and (2) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading vocabulary of the remedial readers in the experimental group. The Level of Comprehension and Reading Vocabulary subtests of the Gates Basic Reading Test were used to gather data for testing the hypotheses.

Data gathered from the Gates tests have been analyzed in this chapter. Separate analyses have been given for reading comprehension and reading vocabulary data.

#### I. ANALYSIS OF COMPREHENSION DATA

Comprehension is an extremely difficult term for authorities to describe or define with consistency; but, for the purposes of this study, comprehension was considered to be that reading ability which could be measured by the Level of Comprehension subtest of the Gates Basic Reading Test.

In Table II, comprehension data for the pretest and posttest has been reported. For both pretest and posttest, each subject has the following grade-level scores: (1) a grade-level score from form 2 of the Level of Comprehension subtest, (2) a grade-level score from form 3 of the Level of Comprehension subtest, and (3) an average grade-level score computed from the preceding two scores. The average scores were computed under the assumption that they would yield more valid results than scores from a single test. However, it can be seen from Table II that, in most cases, the differences between scores on the two test forms for the pretest and the posttest is quite small.

Table III shows the average pretest and posttest grade-level scores and the difference between these scores for each subject. The difference represents the reading comprehension gain (in grade levels) that each subject made during the pretest-posttest interval. The range of reading comprehension gains is from .4 grade levels to 1.75 grade levels. The mean comprehension gain of the experimental subjects was 1.05 grade levels.

A t-ratio was computed to determine the significance of the comprehension gains. The value of t was found to be 6.72. This value is well above the required 3.50 for significance at the .01 level of confidence (18:139). On this basis, then, the null hypothesis concerning silent reading



TABLE II

FORM 2, FORM 3, AND AVERAGE GRADE-LEVEL SCORES ON THE PRETEST  
AND POSTTEST ADMINISTRATION OF THE LEVEL OF COMPREHENSION  
SUBTEST OF THE GATES BASIC READING TEST

Subjects	PRETEST			POSTTEST		
	Level of Comp. (form 2)	Level of Comp. (form 3)	Average Level of Comp. (form 2 & 3)	Level of Comp. (form 2)	Level of Comp. (form 3)	Average Level of Comp. (form 2 & 3)
1	2.1	2.1	2.1	3.2	3.4	3.3
2	3.9	3.5	3.7	5.9	5.0	5.45
3	4.3	4.4	4.35	5.2	6.5	5.85
4	2.9	2.9	2.9	3.5	3.1	3.3
5	2.4	3.1	2.75	3.8	4.0	3.9
6	3.4	3.2	3.3	4.0	4.2	4.1
7	3.3	2.1	2.7	3.6	3.1	3.35
8	2.9	2.4	2.65	3.3	3.9	3.6

TABLE III

COMPARISON OF PRETEST AND POSTTEST GRADE-LEVEL AVERAGES ON  
THE LEVEL OF COMPREHENSION SUBTEST OF  
THE GATES BASIC READING TEST

Subjects	Pretest Level of Comprehension	Posttest Level of Comprehension	Difference (posttest score- pretest score)
1	2.1	3.3	1.2
2	3.7	5.45	1.75
3	4.35	5.85	1.5
4	2.9	3.3	.4
5	2.75	3.9	1.15
6	3.3	4.1	.8
7	2.7	3.35	.65
8	2.65	3.6	.95
Mean	3.06	4.11	1.05

comprehension was rejected. Apparently, from a statistical standpoint, the Neurological Impress Method effected a significant improvement in the reading comprehension abilities of the experimental subjects.

## II. ANALYSIS OF READING VOCABULARY DATA

The testing instrument used in collecting the reading vocabulary data was the Reading Vocabulary subtest of the Gates Basic Reading Test.

Pretest-posttest data has been presented in Table IV. As was the case with the reading comprehension test, two forms of the reading vocabulary test were given for both the pretest and the posttest. Scores on the two forms were then combined so that each subject was given an average pretest score and an average posttest score. Table IV reports these pretest and posttest scores as follows: (1) a grade-level score from form 2 of the Reading Vocabulary subtest, (2) a grade-level score from form 3 of the Reading Vocabulary subtest, and (3) an average grade-level score computed from the preceding two scores. It can be seen from Table IV that most of the subjects performed quite consistently on the two pretest forms and the two posttest forms; however, in a few cases, there was more variability than was apparent in the reading comprehension scores shown in Table II.

TABLE IV

FORM 2, FORM 3, AND AVERAGE GRADE-LEVEL SCORES ON THE PRETEST  
AND POSTTEST ADMINISTRATION OF THE READING VOCABULARY  
SUBTEST OF THE GATES BASIC READING TEST

Subjects	PRETEST			POSTTEST		
	Reading Vocabulary (form 2)	Reading Vocabulary (form 3)	Average Reading Vocabulary	Reading Vocabulary (form 2)	Reading Vocabulary (form 3)	Average Reading Vocabulary
1	3.1	2.6	2.85	2.8	2.9	2.85
2	4.2	4.2	4.2	5.4	5.7	5.55
3	4.2	3.6	3.9	5.6	5.0	5.3
4	2.8	3.1	2.95	4.2	3.4	3.8
5	3.3	3.6	3.45	4.7	4.3	4.5
6	3.4	2.7	3.05	4.3	3.4	3.85
7	2.6	2.6	2.6	4.3	3.4	3.85
8	2.8	2.8	2.8	4.2	3.8	4.0

In essence, Table V reports the reading vocabulary gains that the subjects made during the experimental period. The average grade-level pretest scores, the average grade-level posttest scores, and the differences between these two scores are shown. There was a wide range in reading vocabulary gains amongst the subjects; the range was from 0.0 to 1.4 grade levels. The mean reading vocabulary gain for the group was .99 grade levels.

The statistical significance of the gains made by the group was tested with the t-ratio. The t-value was found to be 6.17. This value is slightly less than the t-value computed from the comprehension data; however, it is still well over the required t of 3.50 for significance at the .01 level of confidence (18:139). Thus, the null hypothesis concerning silent reading vocabulary was rejected. The apparent conclusion was that the Neurological Impress Method had effected a significant improvement in the reading vocabularies of the experimental group.

TABLE V  
 COMPARISON OF PRETEST AND POSTTEST GRADE-LEVEL AVERAGES ON  
 THE READING VOCABULARY SUBTEST OF THE  
 GATES BASIC READING TEST

Subjects	Pretest Reading Vocabulary	Posttest Reading Vocabulary	Difference (posttest score- pretest score)
1	2.85	2.85	0.0
2	4.20	5.55	1.35
3	3.90	5.3	1.4
4	2.95	3.8	.85
5	3.45	4.5	1.05
6	3.05	3.85	.8
7	2.6	3.85	1.25
8	2.8	4.0	1.2
Mean	3.22	4.21	.99

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The present chapter provides a summary of the study and an interpretation of the results. Recommendations will also be given for implementing the Neurological Impress Method and for further research of the method.

#### I. SUMMARY

This study consisted of an experimental implementation of the Neurological Impress Method. The method is a type of oral, unison reading designed by R.G. Heckelman to help remedial readers. The null hypotheses tested in the study were: (1) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading comprehension of the remedial readers in the experimental group; and (2) The Neurological Impress Method of reading instruction will effect no significant improvement in the silent reading vocabulary of the remedial readers in the experimental group.

Eight remedial readers were selected as subjects for the study from the intermediate grades at Hebel Elementary School, Central Washington State College. A one-group repeated trials design was used with a pretest

before and a posttest after the eight-week experimental period. The Level of Comprehension and Reading Vocabulary subtests of the Gates Basic Reading Test were used for pretest and posttest evaluation.

The subjects met with the investigator on a one-to-one basis each Monday, Wednesday, and Friday during the eight-week period. The sessions lasted ten minutes during the first week and fifteen minutes thereafter. A total of five hours of instruction was given to each subject.

After the posttest data was collected t-ratios were computed to test the significance of the comprehension and reading vocabulary gains made by the experimental group. The statistical analysis provided t-values of 6.72 for the comprehension data and 6.17 for the reading vocabulary data. Both of these values were found to be significant at the .01 level of confidence. Thus, the null hypotheses were rejected.

## II. CONCLUSIONS

The results of this study tend to support the results of previous studies on the Neurological Impress Method, although the reading gains were substantially less than those reported in two of the three previous studies. It seems apparent that most of the subjects in this study made appreciable gains in reading comprehension and in reading



vocabulary; however, it would be untenable to state, on the basis of this study, that the Neurological Impress Method should be used with all remedial readers.

There was no attempt to compare the experimental method with other techniques. It can be concluded that the method effected gains in the reading comprehension and reading vocabulary of the subjects, but it cannot be concluded that the gains made by the subjects are greater than the gains that would have been made if some other technique had been used.

The possibility of contamination by the Hawthorne effect should not be overlooked in this type of study. It is possible that the positive results were due, in part, to the individual attention given to each of the subjects rather than the method itself. It should be pointed out, however, that all of the experimental-group subjects had previously been exposed to individual and small-group remedial reading instruction.

With due respect for the preceding limitations, it is the opinion of the investigator that the Neurological Impress Method can be a worthwhile component of an eclectic remedial reading program. The results of this study did not reveal incredible reading gains in all or any of the subjects, but most of them did make significant progress.

### III. RECOMMENDATIONS

On the basis of this and related studies, it is difficult to make decisions about using the Neurological Impress Method with remedial readers. The method appears to be quite effective in some cases but not in all cases. Thus far, research findings have not clearly indicated the specific types of cases with which the method is most useful, but a few recommendations can be made. First, the Neurological Impress Method should be used as a remedial reading technique, not as a technique for teaching the initial stages of reading; the student must already have an independent reading level to use as a base from which to begin instruction. Second, the method was designed for use in a one-to-one situation. If a teacher chooses to use the method, time should be available to give individual attention to the remedial reader during regularly scheduled sessions. A third recommendation is that another technique should probably be used if there is not definite signs of progress after about four hours of instruction with the Neurological Impress Method. The subjects in this study who made appreciable reading gains were showing evidence of those gains by the third or fourth hour of instruction.

There is a need for further research of the Neurological Impress Method; little is known, at this point, about two

vital areas. First, research needs to be designed so that the permanence of reading gains can be evaluated. For example, if an experimental group makes a mean reading comprehension gain of 2.0 grade levels during instruction with the Neurological Impress Method, what happens to that gain over a period of time? Does it remain constant, diminish, or continue to grow? Second, research needs to be designed so that a variable analysis can be made to identify the types of remedial reading problems that might be effectively overcome by using the Neurological Impress Method. At present, a trial-and-error procedure rather than a dependable set of criteria for prescribing the method must be relied upon.

## BIBLIOGRAPHY

## BIBLIOGRAPHY

1. Barbe, Walter B. Educator's Guide to Personalized Reading Instruction. Englewood Cliffs: Prentice-Hall, Inc., 1962.
2. Bentley, Harriet. "Words in Color," Elementary English, 43:515-17, May, 1966.
3. Downing, John A. "The Augmented Roman Alphabet for Learning to Read," The Reading Teacher, 16:325-36, March, 1963.
4. Duker, Sam. "Needed Research on Individualized Reading," Elementary English, 43:220-25, March, 1966.
5. Fernald, Grace M. Remedial Techniques in Basic School Subjects. New York: McGraw-Hill Book Company, Inc., 1943.
6. Gardner, Charles. "Impress Method of Reading Habilitation," Office of Education, U.S. Department of Health, Education, and Welfare, 1965.
7. Gates, Arthur I. The Improvement of Reading. New York: The MacMillan Co., 1935.
8. Gates, Arthur I. Manual for the Gates Basic Reading Tests. New York: Bureau of Publications, Teachers College, Columbia University, 1958.
9. Gattegno, Caleb. Words in Color. Chicago: Encyclopedia Britannica Press, 1962.
10. Gillooly, William B. "The Promise of i.t.a. Is a Delusion," PHI DELTA KAPPAN, 47:545-50, June, 1966.
11. Goodman, Harriet. "Words in Color," Wilson Library Bulletin, 40:62, September, 1965.
12. Harris, Albert J. How to Increase Reading Ability. New York: Longmans, Green and Co., 1961.
13. Heckelman, R.G. "A Neurological Impress Method of Reading Instruction," Merced County Schools Office, Merced, California, 1962. (unpublished)

14. Heckelman, R.G. "Using the Neurological Impress Remedial Reading Technique," Academic Therapy Quarterly, 1:235-39, 1966.
15. Hildreth, Gertrude. "Early Writing as an Aid to Reading," Elementary English, 40:15-20, January, 1963.
16. Kerlinger, Fred N. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc., 1967.
17. Lamoreaux, Lillian A. and Dorris May Lee. Learning to Read Through Experience. New York: Appleton-Century-Crofts, Inc., 1943.
18. Lien, Arnold J. Measurement and Evaluation of Learning. Dubuque: Wm. C. Brown Company Publishers, 1967.
19. McKee, Paul. Reading. Boston: Houghton-Mifflin Company, 1966.
20. Ofman, Morton S. "The Kinesthetic Method in Remedial Reading," Journal of Experimental Education, 21:317-20, March, 1963.
21. Ohanian, Vera. "Control Populations in i/t/a Experiments," Elementary English, 43:373-80, April, 1966.
22. Otto, Wayne and Richard A. McMenemy. Corrective and Remedial Teaching. Boston: Houghton Mifflin, 1966.
23. Roberts, Richard W. and James C. Coleman. "An Investigation of the Role of Visual and Kinesthetic Factors in Reading Failure," Journal of Educational Research, 51:445-51, April, 1958.
24. Sartain, Harry W. "Research on Individualized Reading," Education, 81:515-20, May, 1961.
25. Smith, Henry P. and Emerald Dechant. Psychology in Teaching Reading. Englewood Cliffs: Prentice-Hall, Inc., 1961.
26. Spache, George D. Reading in the Elementary School. Boston: Allyn and Bacon, Inc., 1964.

27. Stahl, Stanley S. The Teaching of Reading in the Intermediate Grades. Dubuque: Wm. C. Brown Co., Inc., 1965.
28. Stanger, Margaret A. and Ellen K. Donahue. Prediction and Prevention of Reading Difficulties. New York: Oxford University Press, 1937.
29. Van Allen, R. "The Language Experience Approach to Reading," Claremont Reading Conference, 25:59-61, 1961.
30. Veatch, Jeannette. Individualizing Your Reading Program. New York: G.P. Putman's Sons, 1959.
31. "Wuns Upon a Tiem," Wilson Library Bulletin, 38:109, October, 1963.