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## A study of the Neurological Impress Method with Remedial Secondary Students

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A STUDY OF THE NEUROLOGICAL IMPRESS METHOD  
WITH REMEDIAL SECONDARY STUDENTS

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A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College

---

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

---

by  
Larry Reynolds  
August 1974

APPROVED FOR THE GRADUATE FACULTY

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Please note: Signatures on this page have been redacted due to privacy concerns.

A STUDY OF THE NEUROLOGICAL IMPRESS METHOD  
WITH REMEDIAL SECONDARY STUDENTS

by

Larry Reynolds

August 1974

This paper presents a study of the Neurological Impress Method, with junior high students two or more years behind their expected Reading Comprehension level. Thirty students were randomly selected and placed into control and experimental groups by a random number process. These S's received eighteen weeks of special treatment with either the N.I.M. or oral reading practice for the controls. Statistical analysis showed no significant difference between the Reading Comprehension gains of controls and experimentals. The gains of both controls and experimentals was, however, found to be of significance.

Conclusions and recommendations included suggestions for additional research and a discussion of the importance of teacher attention.

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# Chapter I

## INTRODUCTION

Reading instruction in the secondary schools is an area of the curriculum that has been passed over and wrongly neglected in the past. Far too many secondary programs are simply extensions of English courses with the aim of increasing enjoyment in reading or of analysis and study of books for a specific purpose. Reading classes are quite often taught by well-meaning literature teachers with little or no background in reading methods and techniques. Fortunately in the past few years, educators and the public alike have become aware of the fact that a significant minority of the secondary school population lack the skills necessary to function in a reading society. To meet this need many techniques, programs, and methods have been proposed to help build these needed reading skills. An examination of one of these techniques, with a controlled look at its effectiveness, is the purpose of this study.

### The Problem

#### Statement of the Problem

Many reading methods and techniques have been studied and examined with elementary age students. Unfortunately the results of these studies cannot be

generalized as to their effectiveness with the secondary school pupil. It is the purpose of this study to determine if the Neurological Impress Method would effect a significant improvement in the reading comprehension of remedial seventh grade students.

### Hypothesis

The null hypothesis tested in this study was: The Neurological Impress Method will effect no significant improvement in the reading comprehension of the S's in the experimental group.

### Importance of the Study

The need for data on specific techniques is great at the secondary level. The secondary school years present many challenges to the student. These challenges come at a time in his life that is usually full of change and uncertainty. In addition the amount and depth of reading he is required to do, both in formal schooling and outside the classroom, is increasing at a fast pace. The student who has had problems with reading all his school life is now in danger of being left completely behind as the pace and demands of education and society quicken for him. In far too many cases the student is on the verge of giving up in complete frustration after six years of continuous

failure. Methods both old and new should be examined as to their effectiveness with secondary remedial students.

This study was undertaken to explore a method that could be efficiently used with secondary remedial students as a solution to part of the secondary reading problem. A specific technique was examined as to its effectiveness with remedial reading secondary students. The Neurological Impress Method (N.I.M.) has been studied only sporadically since it was first developed, in the early 1950's. As with many remedial and developmental techniques the studies done involved elementary school students. This study was designed to examine the Neurological Impress Method as a technique with remedial reading secondary school students.

#### Limitations of the Study

The specific application of the Neurological Impress Method does not lend itself to the thorough and exhaustive evaluation by a single experimenter. The one-to-one tutorial relationship of N.I.M. limits the number of students a single instructor can work with. The investigator was assisted in this study by one teacher and a teacher aide. This allowed the number of individuals included in the study to be increased to 15 experimentals and 15 controls. It would have been better to have had more students; but

because of the nature of N.I.M., this was not possible with limited resources.

The investigator and the two instructors who assisted in this study made a strong effort to standardize their approach to the application of this technique as much as possible. But instructor difference in the application of the method may have been a factor in the results.

The post-test was administered directly after the study period was completed. Any retention of reading gain experienced by the experimentals was not evaluated.

#### Definition of Terms

Comprehension. The ability of an individual to interpret what he reads based on his background of experience, as measured by a standard reading test.

Neurological Impress Method (N.I.M.). A specific reading technique involving the teacher and student in a one-to-one unison reading situation, for approximately five to seven minutes at a time.

Modalities of Learning. The means of acquiring knowledge; specifically the visual and auditory channels of perception.

Remedial Reading Student. A student who is at least 2.0 years below his expected grade level comprehension scores, as measured by a standardized reading test.

Practitioners. Assisting teacher and teacher aide who participated in administering the N.I.M. for this study.

### Thesis Organization

Chapter II is a review of the literature and serves three purposes: a) to explain the added problems of the remedial secondary student over his peers; b) to discuss the two major modalities of academic learning and their importance in the process of reading; c) to explain the Neurological Impress and its background.

Chapter III deals with the procedure of the research. Chapter IV presents the data and an explanation of its meaning. Chapter V gives conclusions, a summary and recommendations for further study.

## Chapter II

### REVIEW OF THE LITERATURE

This chapter deals with these three major topics:

1) the secondary school remedial student; 2) the integration of audio-visual modalities as it applies to the task of reading; and 3) the background of the Neurological Impress Method.

#### Secondary School Remedial Student

Secondary school students with reading problems are often the last to receive formal help with their problems. Quite frequently they are lumped into the vast category of students with discipline or motivational problems. But these students do have significant potential, and could be helped, if a teacher had the time and a collection of effective instructional techniques. One investigator (Kline, 1972) believed adolescents with learning problems are often given little or no formal and trained help.

In a sense adolescents with learning problems are at the end of the learning disability gauntlet. Often undiagnosed or misdiagnosed, misunderstood, and ineffectually treated, they are already battered and bruised by the time they enter the stormy adolescent years. After years of frustrating underachievement and failure it is hardly surprising that they end up with serious personality or psychiatric symptoms, . . . (p. 262).

To meet this need head on, the teacher must call upon all the innovations at his disposal. Unruh and Alexander (1970) considered innovation "the necessary ingredient of the process of the educational change" (p. 1). They felt that relevant individualized programs are one positive way of reaching the frustrated and under-achieving secondary school student. The remedial student fights two continuing battles, one to learn new material as it is presented to all students, and also to catch up on all he has not learned. That feeling of fighting a losing war was explained in these terms by Grzynkowicz (1971).

If the underachieving child is in a high school where all the children are gifted and all are expected to attend college, then he has little chance of ever achieving his potential whatever it may be. He is compared to parents, siblings, and peers and made to believe that he is a great disappointment to the family and community. With continued unorganized persecution, he may become so confused that he will require his own psychiatrist, which is some sort of status symbol (p. 2).

The problems of remedial secondary students must be taken into account when developing any program to help meet their needs.

Too often, however, reading programs at the secondary school level are taught by English teachers with strong backgrounds in literature. As one recent study by Baranoff (1972) found:

English teachers were teaching most of the programs (Reading) to some extent in their classes; however,

systematic and deliberate methods of teaching reading were not practiced. Thus in the main the systematic and deliberate teaching of reading desired by reading authorities was not being given (p. 20).

Reading teachers must take the time to devise methods and programs that will fit the individual student. One researcher (Smith, 1971) explained his beliefs in this way: "The literature is replete with statements to the effect that there is no one 'best' method for teaching children to read, but only a best method for teaching a specific child" (p. 144).

#### Audio-Visual Modalities

In this process of determining the best method for each child the teacher needs to consider the total process of reading. Reading is often thought of as a completely perceptual process. However, recent studies (Deutsch, 1972; Rosner, 1971; Reilly, 1971; Otto, Barrett, Smith and Dulin, 1971) indicated that the modality of auditory performance should be integrated with that of visual for an effective reading program. As was found by Filmer in one study (1970), "Those students who perform best on auditory diagnosis seem to have a better chance of succeeding in the Remedial Reading Class" (p. 20). Further investigations revealed that same basic fact, a good reader needs both auditory, visual and combined auditory-visual



discrimination skills. It was also determined (Otto et. al., 1971) ". . . that lack of auditory discrimination may be a major contributor to the development of reading problems" (p. 247). As a further factor to consider (Linder and Filmer, 1970), "the auditory channel may be a better predictor of reading achievement than the visual, although most reading readiness tests are built on visual perception" (p. 22). From beginning reading instruction through secondary and adult reading programs emphasis appears to be based on the visual modality of learning. But it is quite possible that the auditory channel may be the best predictor of reading abilities at all levels.

In addition to this, it is thought that the auditory modeality is the best path of learning for some students. One study (Pick, 1970) recently determined that the "possibility remains open that there are 'auditory' learners and others are 'visual' learners in the sense that some learn most effectively in one modality than the other" (p. 166). With this in mind, the teacher should examine programs that involve both the auditory and visual channels of academic learning.

The combined modalities of audio-visual in the same program seem to offer a positive way to reach many remedial students. The integration of these two senses is a necessary ingredient to an effective remedial reading technique. One study (Reilly, 1971) determined that

visual-auditory integration is important to reading success. "Birch and Blemont, (1964), compared auditory-visual integration in good and poor readers. Their results indicated that good readers received higher auditory-visual integration scores than poor readers" (p. 484). The integration of these two modalities of learning was also found to be of importance in another study (Rosner, 1971). In this case it was determined that the correct sound should be correlated with the correct image, in any remedial reading program, but especially when working with culturally disadvantaged readers. The ability to use successfully the combined modalities of auditory-visual integration was found by Ford (1967) to correlate significantly with certain reading errors. Among those errors were omission of words, wrong endings, total reversals, and wrong in several parts. At this point, it became increasingly clear that a program that combined the two modalities could be of possible benefit to remedial students.

#### Neurological Impress Method

The Neurological Impress Method is a technique that combines the auditory-visual channels of learning. The method according to Hollingsworth (1970) is a unison reading process in which both the teacher and the child read aloud, simultaneously. The teacher is seated slightly

behind the child with the child holding the book. As the child and the teacher read aloud in unison, the teacher's voice is directed into the ear of the child. The child slides his finger below the words as they are spoken. In this method the child's visual, aural, oral and tactile senses are involved in the reading process.

This technique is one of the most economical and simplest methods of remedial reading instruction yet developed. Dr. Heckelman (1966) cautions about this feeling of simplicity. "The simplicity of this method makes people doubt its efficacy. However, it is . . . an effective program of remedial reading for many children" (p. 235). In the original work done by Dr. Heckelman in 1961, the students showed a mean reading gain of 2.2 years, with a total instruction time of only seven and one-half hours per student. Follow-up studies done in 1963 and 1965 showed similar gain or long term retention of this gain.

Other studies done with the Neurological Impress Method have met with varying degrees of success. Three studies (Embrey, 1968; Hollingsworth, 1970; Gawarkiewicz, 1972) found no significant difference between the subjects receiving the Impress Method and those not receiving it. But Gardner (1965) did find significant improvement in those students using the Neurological Impress Method, over those students not using it. The difference in these studies was twofold. The first was the reading ability of

the subjects involved. In the Embrey, Hollingsworth and Gawarkiewicz studies, the subjects were on the average only .5 to 1.5 years below expected grade level comprehension scores. The S's in the Gardner study were an average of 2.0 years below expected reading comprehension scores. The second difference was the number of subjects involved. The Gardner study involved 20 experimentals and 20 controls. The other studies involved from eight to ten experimental-control pairs.

All the studies showing positive results used subjects who scored at least 2.0 years below expected grade level on a reading comprehension test. Also, each of the successful studies had at least 20 experimental subjects. The N.I.M. technique seems to be limited in its value to severely remedial students with average or above intelligence who can benefit from a simultaneous audio-visual application.

Taking into account limitations of this technique identified by past studies, the basis of the Neurological Impress Method is the incorporation of varying techniques of learning. From the integration of audio-visual modalities of learning, which is a feature of N.I.M., to the use of the hand as a pacer considered by one study (Buckley, Berkley, 1970) to be of value in preventing regression, skipping of words, letters or lines, and as an aid in smoothness of the individual's reading process.

Added to this is the fact that a study by Brickner (1970) found a significant correlation between eye movement and reading success. Right down to the theory by Harden (1973) of the positive value of oral reading. With the simplicity and economy of application, and the opportunity to simply expose students to the correct reading process, and to correct word sounds. All of these factors are included in the Neurological Impress Method. From this evidence of the value of many different methods included in one technique, the Impress Method appears to have value in the remediation process.

The purpose of the study was to construct specific procedures that would overcome limitations of previous studies, while at the same time to explore the significance of the Neurological Impress Method. Chapter III deals with the procedures of this investigation and a detailed discussion of the specific variable measured.

## Chapter III

### PROCEDURE OF INVESTIGATION

Chapter III contains the basic design of the study, the sample selection, the specific experimental procedures employed, and an examination of the variable measured. An explanation of the statistical procedures as an introduction to Chapter IV is also included.

This study of the effectiveness of the Neurological Impress Method was conducted for a period of 18 school weeks beginning September 10, 1973, and ending January 18, 1974. The study was undertaken for two reasons: first, to further the amount of information that is available on secondary remedial reading students, a group that is frequently the last to receive effective diagnosis and treatment of their reading problems, and second, to explore the N.I.M., a technique developed in the 1950's but not widely used or evaluated until recent years.

Secondary remedial students are often lumped with elementary remedial pupils in diagnosis and the type of remedial programs administered. But secondary students have problems that are peculiar to their age group. Because of their increased maturational rate, increased peer pressures and the stresses and strains of a longer period of schooling--and possibly a longer period of school

failure--they react differently in the classroom and differently to individual teachers.

### Research Design

#### Experimental Procedure

The basic design of this study incorporated two randomly selected groups, experimental and control, who received three to five minutes a day of individual instruction in either the Neurological Impress Method, if they were a member of the experimental group, or oral reading practice, if they were a member of the control group.

Both experimentals and controls were treated in the same manner. They were all included in the regular developmental and remedial reading programs at Puget Sound Junior High. Once they had been randomly selected for the study and randomly placed in either experimental or control groups, they were scheduled to receive three to five minutes of oral reading practice each day. The setting in which the study took place was the reading room at this junior high school. Students were assigned to specific work each day of the week. When it was their turn to receive either the experimental method or the controlled oral reading skills, they would put down the work they were doing that day and go to the back corner of the

room in which a study carrol was located and receive the Neurological Impress Method or oral reading practice for a few minutes each day. They received this instruction four or five times a week for a total experimental period of 18 school weeks.

The experimental method utilized in this study was a variation on the standard application of the Neurological Impress Method. This technique is a one-to-one unison oral reading situation in which student and teacher sit side by side and read orally from material selected by the student. The teacher uses his hand as a pacer and directs his voice into the dominant ear of the student in an attempt to neurologically change the student's poor reading habits for those good reading habits of the teacher. The variation used in this study was to have the student and teacher use a pair of interconnected audio-active headphones so that they could clearly hear each other. This remedial technique could then be utilized in a self-contained classroom setting by eliminating the extraneous classroom noises that are part of any junior high school.

The controls received the same amount of attention as did the experimentals. When it was their turn to practice their oral reading skills, they would select a book from the materials provided and, utilizing the same audio-active headphones, read from their selection for a three to five



minute period. The aim of the experimenter and the practitioners who assisted in this study was to allow the controls to read whatever they wished and to simply correct their errors in pronunciation when they were made. There was no attempt to turn this into a remedial situation by specific skill instruction.

None of these students, either controls or experimentals, were publicly identified as receiving any particular kind of treatment. The time they spent in the reading carrol was simply called oral reading. None of them were ever aware that they were participating in a study. The controls and experimentals both received the identical amount of individual attention; that is, from three to five minutes a day for four or five days a week for a total study time of 18 school weeks. As far as possible all variables were controlled. Both groups read from the same material, read in the same area with the same teachers for the same amount of time. The uncontrolled variable was the Neurological Impress Method. The basic design of the study was set up to evaluate that variable.

#### Selection of Sample

The sample used in this study was selected from the total seventh grade enrollment of Puget Sound Junior High. The seventh graders in the developmental and remedial programs were administered the Gates-MacGinitie

Reading Tests, Survey E, Form 1M, 1967 Edition as part of the regular testing. From the three subtest scores received on this test, speed and accuracy, vocabulary, and comprehension, the comprehension score was chosen as the score by which the sample would be selected and the one by which the study would be evaluated. From the results of the comprehension test, all the students who scored at least two grade levels below their expected level at the time the test was taken were chosen as the population from which the sample was selected. At this time of the school year, an average seventh grade student can be expected to score on or about 7.0 grade level equivalency on reading comprehension. Therefore, all students who scored 5.0, grade level score, or below on the comprehension test were the population from which the sample was selected.

There were 74 students who scored below 5.0 on this standardized reading comprehension test from a total seventh grade enrollment of 220. These 74 students were listed alphabetically; then each was assigned a random number from a random number table. When a duplicate number occurred, that number was passed over and the next was chosen. When all students had received a random number, the lowest 15 odd and the lowest 15 even were chosen as the sample to be used in this study. Of these 30 students who had the lowest odd and the lowest even numbers, two were eliminated because they were not in the experimenter's

reading class. Then two additional students with the next lowest numbers, one odd and one even, were chosen and both of these students were in the experimenter's reading sections. The odd numbered students were designated as experimental subjects and the even numbered students were designated as controls. Once the sample had been selected, students were scheduled to work with a practitioner or the experimenter for a period of three to five minutes each day four or five times a week.

#### Population Variables

Because of the random selection of the S's, the number of students in each class varied. The number of controls and experimentals was not evenly distributed throughout the school day. Additionally due to the random selection of the subjects, the ability levels between controls and experimentals could not be controlled.

The sex distribution of these two randomly selected groups was what could possibly normally be expected from any group of remedial students. In the total sample of 30 subjects there were 21 boys and 9 girls. Because of the random selection process, the number of boys and girls in experimental and control was not proportional to the total number in the sample. The control group was comprised of 8 boys and 7 girls. The experimental group was comprised of 13 boys and 2 girls.

The controls comprised a total of 15 seventh grade students who in September of 1973 scored an average of 3.5 grade score on the standardized comprehension subtest of the Gates-MacGinitie, Survey E, Form 1M. The range of scores exhibited by these students were from a low of below 2.0 to a high of 4.8. The experimental group was similarly composed of 15 seventh grade students who scored below 5.0 on the comprehension subtest of the Gates-MacGinitie, Survey E, Form 1M. These students were spread throughout the day in an irregular pattern. Their scores ranged from a low of below 2.0 to a high of 4.8. The experimental S's additionally had a mean grade score of 3.3. The means of these two groups were within two months of each other at the beginning of this study.

### Experimental Variables

#### Specialized Technique

There was a variation to the specific procedure of the Neurological Impress Method in which this study differs from other studies done on this remedial technique. The usual technique for administering the N.I.M. has been described earlier, but deserves review. The teacher and the student sit down together at a double student desk with a reading book chosen by the student. The teacher sits slightly behind and to the right of the student. They

will orally unison read following the teacher's finger for a period of time that is comfortable to the student. The teacher attempts to direct his voice into the right ear of the student and to effect a neurological change of the student's poor reading habits with the good reading habits of the teacher.

In this study the typical application of the Neurological Impress Method was changed to utilize this technique in a self-contained classroom by use of interconnected audio-active headphones. The headphones were connected so that teacher and student would be able to hear only each other and to amplify the teacher's good habits to the student at the beginning of the study period. Then to slowly increase the student's own volume level so that he could eventually rely upon his own improved reading ability. Additionally, it was not necessary for the teacher to sit slightly behind the student and to read into the dominant ear of the student. Both the student and the teacher could sit in any position and comfortably and adequately hear each other. As the study progressed the student began to use his own finger as a pacer and locater. The teacher then read along with the student as opposed to the student reading along with the teacher. During the last four weeks of the period, the experimenter and the practitioners involved turned the volume so that the student's voice would clearly dominate the reading situation.

But the teacher was always there--his voice was always present--if the student needed the teacher's assistance.

This variation of the Neurological Impress Method was chosen for three reasons. One, as previously stated the N.I.M. could be more effectively applied in a busy classroom. It also allowed an increased emphasis on effecting neurological change of the student's poor reading habits. Additionally, it helped prevent the student from becoming dependent upon the good habits of the teacher. As the study drew to a close, the student was forced to rely more and more upon his own ability.

#### Standardized Administration

In administering the Neurological Impress Method, the experimenter and two practitioners attempted to standardize their approach to the application of the remedial technique. By first practicing on each other before commencement of the study, and standardizing any changes made in the application throughout the study. As a means of controlling the variable of experimenter/practitioners differences, a schedule was set up so that each would rotate among the students involved in the study and each of the students would receive some attention from the experimenter and both practitioners involved. These methods of controlling the variables of the experimenter/practitioners differences were used so that

the variable of the Neurological Impress Method itself could be more effectively isolated.

### Evaluation Procedures

In an evaluation of the effectiveness of the Neurological Impress Method, the variable of the technique was examined. This specific remedial reading technique was measured by analysis of the reading comprehension scores at the beginning of the study and at the end of the study. Chapter IV contains an explanation of the testing procedure and the test used; a presentation of the data obtained, and a statistical analysis of the significance of that data.

## Chapter IV

### RESULTS

The purpose of this study was to determine the effectiveness of the Neurological Impress Method, with remedial secondary students. A comparison of a control and an experimental group by means of reading comprehension improvement as measured by the Gates-MacGinitie Reading Test was the basis on which the null hypothesis was accepted.

The subjects in this study were given the Gates-MacGinitie Reading Test Survey E in September 1973 and again, 18 school weeks later, in January 1974. The comprehension scores were then statistically treated, in several different ways, to determine the significance of any change.

The raw comprehension scores were also converted to grade level scores as a further means of explaining group gains and control-experimental group differences. The raw scores, means, total gain and mean gain are presented in Table I. Grade level scores are listed in Table III. Table II details a comparison of means for control and experimental groups and lists t scores for the differences tested.



An examination of the raw scores listed in Table I shows that large gains were made by both experimental and control groups. The significance of this gain is displayed in Table II.

Table I  
Raw Testing Scores and Gains for Control  
and Experimental Groups

Control				Experimental			
Student	9-73 Pre	1-74 Post	Gain	Student	9-73 Pre	1-74 Post	Gain
A	8	13	5	A	8	18	10
B	5	35	30	B	10	16	6
C	11	21	10	C	3	WD*	--
D	11	16	5	D	9	19	10
E	14	16	2	E	6	18	12
F	19	30	11	F	20	29	9
G	18	22	4	G	12	18	6
H	17	23	6	H	12	22	10
I	18	28	10	I	17	22	5
J	9	WD*	--	J	16	21	5
K	19	20	1	K	17	25	8
L	20	28	8	L	6	12	6
M	12	18	6	M	13	34	21
N	14	26	12	N	16	22	6
O	14	15	<u>1</u>	O	18	25	<u>7</u>
Total Gain = 111				Total Gain = 121			
Mean = 7.93				Mean = 8.64			
Median = 6				Median = 7			

\*WD = withdrawn

A t test analysis of the raw scores revealed that there were no significant differences, at the .01 level, between controls and experimentals in pretest results. The differences that did occur were due to the chance factors of the random selection process. The control group started out slightly higher in total comprehension score than the experimentals, but the controls also had post-test results higher than the experimentals. A t test analysis was also done on post-test results to determine if there was a significant difference between controls and experimentals. It was determined that, at the .01 level of confidence, there was no significant difference.

Table II  
Comparison of the Pretest, Post-test and Gain Means  
of Experimental and Control Groups

	Pre Mean	Post Mean	Gain Mean	<u>t</u>
Experimental	12.86	21.50	8.64	7.72
Control	14.29	22.21	7.93	4.07
Difference	- 1.43	- .71	.72	
<u>t</u>	- .83	- .31	1.32	

The gain of the controls as contrasted to the gain of the experimentals was analyzed to determine the validity of the null hypothesis. A  $t$  test result of 1.32 led to the acceptance of the null hypothesis. There was not a significant difference in the gains of the experimentals over that of the controls at the .01 level.

The final  $t$  test comparisons were made within each group. The pre- and post-test results of controls were compared to determine if this group made a significant gain. The same  $t$  test analysis was also made for experimentals. It was determined that at the .01 level of confidence both groups made significant gains during the experimental period.

Table II additionally reveals that both experimental and control groups made a statistically significant gain at the .01 level. But the experimentals did not make a significantly greater gain than the controls.

Table III is designed to represent the raw scores converted to grade level scores for the purpose of explaining gain. These results indicate that both controls and experimentals did make substantial grade level gains. Students were labeled with a letter for the purpose of reference. The letters do not indicate matched pairs of S's. The range of growth in both experimental and control groups was significant with one student achieving over

eight years computed growth in five months. At the same time some students achieved only two months' growth during the period of the study.

Table III  
Grade Scores and Gains for Control  
and Experimental Groups

Control				Experimental			
Student	9-73 Pre	1-74 Post	Gain	Student	9-73 Pre	1-74 Post	Gain
A	2.8	3.6	0.8	A	2.8	4.5	1.7
B	-	8.2	8.2	B	3.1	4.1	1.0
C	3.2	5.1	1.9	C		WD	
D	3.2	4.1	0.9	D	2.9	4.6	1.7
E	3.7	4.1	0.4	E	2.6	4.5	1.9
F	4.6	7.2	2.6	F	4.8	7.0	2.2
G	4.5	5.3	0.8	G	3.4	4.5	1.1
H	4.3	5.5	1.2	H	3.4	5.3	1.9
I	4.5	6.7	2.2	I	4.3	5.3	1.0
J		WD		J	4.1	5.1	1.0
K	4.6	4.8	0.2	K	4.3	6.0	1.7
L	4.8	6.7	1.9	L	2.6	3.4	0.8
M	3.4	4.5	1.1	M	3.6	8.0	4.4
N	3.7	6.2	2.5	N	4.1	5.3	1.2
O	3.7	3.9	0.2	O	4.5	6.0	1.5
Median = 1.1*				Median = 1.5*			

\*Median used as only indicator of central tendency as it is not accurate to compute mean with grade scores.

The total grade level gains for each student were computed to demonstrate gains in understandable terms. The mean gain for both controls and experimentals was three times that which could normally be expected. During 18 school weeks of the study, an average gain on this norm referenced test is .5; the gain was an average of 1.72 years for both control and experimental subjects. These unusually large gains for both controls and experimentals deserves some additional attention, and will be discussed in Chapter V. It was determined that at the .01 level of confidence the total gains of both groups was significant.

This specific result and the other outcomes of this study will be summarized in Chapter V. Conclusions and recommendations for further research on the N.I.M. will also be discussed.

## Chapter V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter includes a summary of the study and an explanation of its results. Suggestions for incorporating the Neurological Impress Method into secondary reading programs and for additional study of this technique are also included.

#### Summary

This study was conducted for a total of 18 school weeks beginning September 1973, and ending January 1974. The S's were seventh grade students judged, by the results of a standardized reading test, to be 2.0 years or more below grade level in reading comprehension. These S's were placed in control and experimental groups by a random selection process, and given the same treatment. The only uncontrolled variable was that of the N.I.M.

This one-to-one oral unison reading method was examined as to its effectiveness with remedial secondary students. It was hypothesized that this technique would affect no significant improvement in the tested comprehension levels. The analyzed results bore out the null hypothesis, at the .01 level: there was not a significant amount of gain by the experimentals over that of the



controls. Further t test analysis revealed that the groups were as evenly matched as a random selection process would allow.

There was not a significant amount of difference in pretest scores at the .01 level of confidence, nor in post-test results. The gain of both controls and experimentals separately was, however, significant at the .01 level of confidence.

### Conclusions

Through an examination of the raw score data of this study and an analysis of the personal feelings of the experimenter, some conclusions can be drawn. This study sought to correct many of the self-judged limitations of previous studies on the Neurological Impress Method. Both the numbers of students and amount of time was increased. The type of student chosen was also more carefully controlled by using only those students who were judged to be 2.0 years or more below grade level.

Recommendations by Embrey, 1968, Hollingsworth, 1970, Gaworkiewicz, 1972, led to these changes. They each suggested that the lack of positive results from their studies was due to the limited number of students involved, only eight to ten control-experimental pairs, and using students who averaged .5 to 2.0 years behind expected grade level comprehension scores.

Gardner, 1968, did find significant improvement in the students working with N.I.M., over those students not receiving it. His 20 matched pairs were an average of 2.0 years below expected reading comprehension scores. Incorporating those recommendations in this study did not duplicate the significant amount of improvement Gardner found.

The results of this study does not support the use of the Neurological Impress Method as a specific remedial tool. This technique, however, does appear to achieve success but no more than oral reading for pleasure with the teacher.

The large amount of gain shown by both controls and experimentals can probably be explained by the amount of individual attention they were receiving. This is an outcome of the study that could be of significance to any teacher planning to develop a program in secondary reading. It was determined that all 30 S's in the study, both experimentals and controls, received ten times the amount of teacher attention as regular class members. The factor of individual attention is apparently a very significant determiner of reading comprehension growth. This, in addition to an individualized reading program in which students usually attain an average of 1.6 years growth in a year, could be the reason this large amount of growth was obtained by all S's.

### Recommendations

Additional studies on this technique should be undertaken to further increase the little information that is available on the Neurological Impress Method. Several differences in study procedure might be utilized that would lead to additional data. First, the number of subjects should be increased so that data obtained can be more easily generalized to the total school population. Second, a means of post-testing the gain at a significant time after completion of the study to evaluate retention would be a positive addition to information available on the N.I.M. Third, a design comparing the Neurological Impress Method to other remedial techniques would go a needed step further than this study did. Fourth, a means of pre- and post-testing that could more efficiently measure specific areas of reading gain would be of great value. An individual reading inventory or an individually administered Reading Mastery Test might be a better evaluative instrument. Fifth, a study of this technique with beginning readers could be of benefit. The N.I.M. appears to contain elements from which beginning readers could gain, including directionality, phrasing and context practice. Sixth, a placebo, or third group, in another study could also add information as to the significance of individual attention.

Individual attention, as a factor in a remedial technique, cannot be ignored. The results of this study point strongly to the positive benefits of attention in reading comprehension growth. The only observable common element between controls and experimentals in this study was the factor of attention. All the S's received at least ten times the amount of teacher attention as did regular class members. Both groups grew over one and one-half years in comprehension grade scores in the five month study period. The N.I.M. is a one-to-one technique, the factor of attention is apparently a strong point in its favor.

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