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An Investigation of the Effect of Intensive Clinical Instruction in Spelling Strategies on the Decoding Skills of Reading Disabled Students

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AN INVESTIGATION OF THE EFFECT OF INTENSIVE
CLINICAL INSTRUCTION IN SPELLING STRATEGIES
ON THE DECODING SKILLS OF READING DISABLED
STUDENTS

A Thesis

Presented to the

Department of Special Education and Counseling

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Nebraska at Omaha

by

Déirdre Breathnach

July 1983

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THESIS ACCEPTANCE

Accepted for the faculty of the Graduate College, University of Nebraska, in partial fulfillment of the requirements for the degree of Master of Arts, University of Nebraska at Omaha.

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CHAPTER I
INTRODUCTION

There appears to be a general agreement among educators that a close relationship exists between the skill of reading and the skill of spelling. Since both reading and spelling serve as major components of communication, parallels exist between factors necessary for success in spelling and reading (Chall, 1967; Wallace and Larsen, 1979). After observing methods employed by students in spelling unfamiliar words, Kottmeyer (1959) concluded that skills used in decoding words in reading are also used in attempts to spell correctly. Further, Gentry (1982) characterized a good speller as one who has the ability to demonstrate:

"extended knowledge of word structure, including accurate spelling of prefixes, suffixes, contractions, and compound words, and ability to distinguish homonyms".

On examination of Miller's criteria of an efficient reader, it was found that the sub-skills demonstrated by good readers coincide with the skills of efficient spellers who according to Hodges (1982) "appear to know words in many guises - visually, morphemically, phonetically and semantically - and use the most potent information needed in determining how to spell unfamiliar words".

The inconsistency of the English language is in many instances considered to be a reason for student low achievement of spelling skills. However, investigations have revealed that the deeper one goes into the language the greater the phoneme/grapheme relationship (Hanna, Hodges, Hanna, 1971; Otto, McMenemy and Smith, 1973). Further, Banton-Smith (1963), and Blair (1975) concluded from their research,

that there is ample evidence of the interrelationship and interdependence between word attack skills and spelling ability. Thus, it appears that there is more consistency than inconsistency in the language.

Researchers feel that it is possible to teach spelling to good readers who are careless in their application of spelling rules (Otto and Smith, 1980). Moreover in a study by Morsink, Cross and Strickler (1978), a common characteristic among disabled readers was found to be an inability to recall sequences of letters or shorten the recall task by "perceiving recognizable spelling patterns". Ekwall (1981) suggests that when dealing with disabled readers, it is necessary to identify their strongest mode of learning, and then adapt and use methods which will teach spelling strategies. These spelling skills, in turn, may then be transferred to their reading and writing skills.

A consensus of opinion is reached among researchers that to "find a child who can spell well and cannot read well is extremely rare" (Johnson, 1981; Lerner, 1981). Thus, the literature appears to demonstrate and agree with Leo Fay (1971) who concluded that good spellers are usually good readers, but good readers are not always good spellers; also that poor readers are usually poor spellers.

Statement of the Problem:

The purpose of this study was to examine the following question: Will intensive clinical instruction in spelling skills, help to increase the decoding skills of intermediate grade students who are identified as reading disabled?

Hypotheses:

Intermediate grade students who are identified as reading disabled, who improve their spelling skills by means of intensive clinical instruction in spelling strategies, will have a corresponding improvement in their decoding skills.

Significance of Research:

Many eminent educators have pursued research within the area of spelling and its relationship to reading ability. Through the results of their work they arrive at many conclusions concerning reading disabled students, and their deficiencies in spelling skills.

Despite this agreement among researchers on the correlation between spelling and reading abilities, there is a paucity of research in this area as it pertains to the disabled reader. According to Chandler (1981) in his research on spelling and reading:

"the articles about teaching spelling in special education situations were generalized from research done in "regular" education situations".

Few have studied the effect of specifically teaching spelling skills to reading disabled students, and observing and testing the effect of this on their reading abilities. This view was reinforced when a computer search of ERIC using the following descriptors - spelling, oral reading, spelling instruction and word recognition - failed to reveal pertinent data as it relates to reading disabled students and spelling strategies. Having failed to find relevant data in this manner, a search through the Current Index to Journals in Education was then initiated, which produced similar results.

Therefore, it is felt that this study should prove to be significant because it can add to the research within this area, which at present is lacking. It is perceived that the significance of this study will be to add to the literature a study of the relationship between disabled readers and a remedial approach that focuses on the teaching of spelling.

Procedures for the Collection of Data:

This investigation followed a single subject, multiple baseline design as a means for collecting data.

Selection of Subjects:

Four intermediate grade students who were attending a school in the Omaha Public School District were chosen for this investigation. In addition, each student had to meet the following criteria for inclusion in this study sample:

1. The student was being taught spelling through the Silver Burdett Spelling Series.
2. The student was reading disabled.

Procedure for meeting this criteria was:

- (a) Administration of the Gray Oral Reading Test to obtain a present reading grade level score.
- (b) Determination of the discrepancy between the present reading grade level score (obtained in (a)) and reading grade placement.
- (c) If the student demonstrated a discrepancy of two or more years between his/her present reading grade placement and

performance he/she was considered to be reading disabled.

3. The student has a significant spelling skill deficit. Procedure for meeting this criteria was:
 - (a) Administration of the Test of Written Spelling. A score of two or more years below present grade placement was considered significant.
 - (b) Supportive evidence from the student's teacher, and the results of both standardized and classroom tests.

Procedures for Implementation:

The study was implemented in the following manner:

1. Collection of baseline data:
 - (a) Each student's present level of reading was measured by testing on the Gray Oral Reading Test.
 - (b) Each student's present level of spelling was evaluated by testing on the Test of Written Spelling.
 - (c) Recording procedures were developed to illustrate the students' progress in the clinical setting.
2. Having established baseline data on each individual student's reading and spelling level, treatment was initiated in the following manner:
 - (a) Each student was taught an appropriate spelling list from the Silver Burdett Spelling Series using the following method:
 1. Teacher said the word and used it in a sentence, then spelled it.
 2. Student repeated the word, typed it on a computer key-

board (word appeared on screen). Student then repeated the word, spelled it orally, while the visual image was still on the screen.

3. Student then typed a sentence containing the word, while the word remained on the screen. (The correct spelling of this particular word was the important factor in this sentence.)
 4. Teacher directed student's attention to word family where appropriate.
 5. Each word was dealt with in similar fashion.
 6. At the end of each session, teacher dictated each word, student typed words on keyboard as each one was dictated.
3. Each treatment lasted 25 minutes four times a week, for a duration of five weeks.

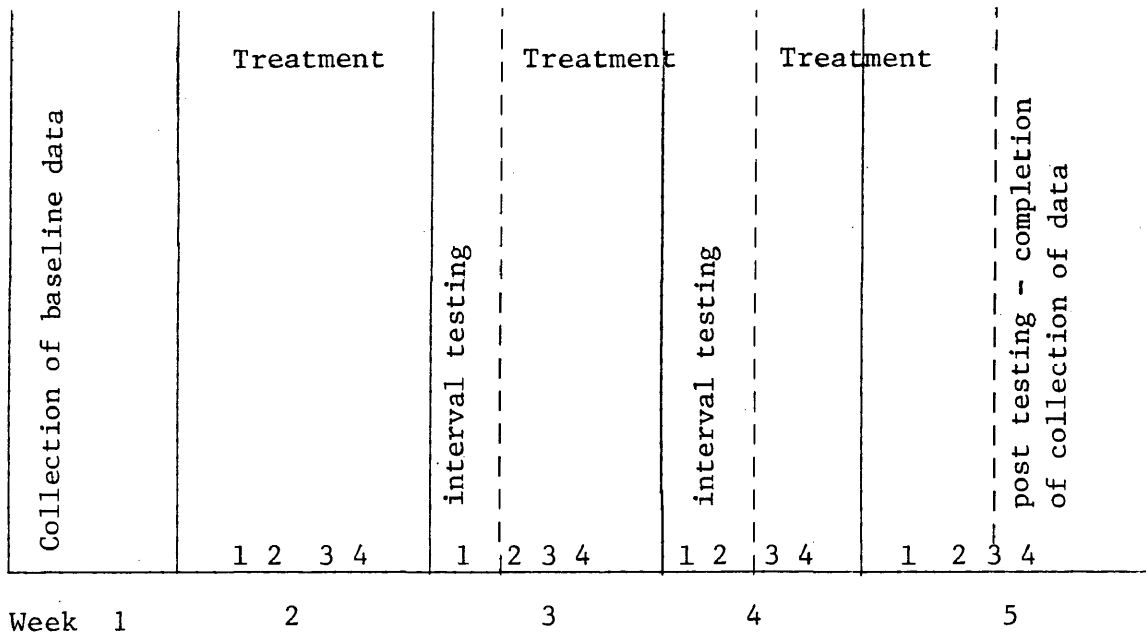
Week 1 - collection of baseline data.

Week 2 - session 1, 2, 3, 4 - treatment.

Week 3 - session 1 - testing.
- session 2, 3, 4 - treatment.

Week 4 - session 1 - treatment.
- session 2 - testing.
- session 3, 4 - treatment.

Week 5 - session 1, 2 - treatment.
- session 3, 4 - treatment.



The duration of this study, including the collection of baseline data, treatment and post-testing was five weeks.

- (a) Graphs were plotted of the students' clinical progress by recording the number of correct spellings achieved each session, and test results of oral reading tests administered throughout the implementation of the study.

Procedures for the Treatment of Data:

1. Each student's progress or lack of progress as indicated by the data of clinical setting was examined and commented upon. This was not done for the purpose of showing statistical relationships, but to indicate and comment upon any differences which occurred.

Definition of Terms:

1. For the purpose of this study a disabled reader was regarded as one who scored two years or more below his grade placement as measured by the Gray Oral Reading Test.
2. Determination of a spelling problem was one who scored two years or more below his grade placement as measured by the Test of Written Spelling.

Delimitations:

The following were considered the delimitations of this study:

1. The study was limited to multiple baseline single subject design, utilizing four intermediate grade students, who were identified as reading disabled, but indicated a potential to achieve in this area.
2. Although this study used a relatively new and unique approach to teaching spelling through the use of micro-computer, it was not the intent of this investigation to determine the relationship between teaching spelling by micro-computer method and teaching spelling by the traditional/handwriting method.

Organization of the remainder of the study:

The remainder of the study is divided into four chapters. These are - a review of related literature, a detailed description of the procedures that were used for the collection and treatment of the data, the results of the study, including a detailed discussion of the data, and a final chapter containing a summary, conclusions and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

Although research concerning the interrelationship between spelling and reading ability among learning disabled children is sparse, the literature concerning spelling ability and success in spelling abounds. Most of this research alludes to the fact that students who experience difficulty in spelling will inevitably experience difficulty in reading. For the purpose of this investigation the literature concerning studies of spelling ability and its relationship to reading was reviewed. Studies, research and other information selected from the literature, focused on the following: (1) information that attempts to review and update research on spelling, (2) authorities who discuss skills and abilities needed in order to be a successful speller, (3) studies which reported successful teaching methods, and (4) studies which discussed the interrelationship between reading and spelling.

There appeared to be agreement among authorities that the teaching of spelling and an understanding of the underlying processes involved is a long neglected area. A review of the studies pertaining to the history of spelling reform, spelling models, spelling ability, and the irregularity of the English language revealed interesting conclusions from different authorities. For example Groff (1976) engaged in a study of the attempts made since 1200 A.D. to reform and regularize the spelling of the English language, "so that each of our speech sounds is represented

by one, and only one grapheme". He expressed the belief that the lack of success by spelling reformers such as Pitman, the American Philological Association, The Modern Language Association, and the National Education Association lies in the fact that many feel that "the ability to spell well in the traditional manner is a sign of preferred social class status, of educational attainment and of academic diligence". Applying a linguistic viewpoint to spelling reform, Chomsky and Halle (1968) state that

"traditional spelling can preserve the identity of certain morphemes in words that would be obscured by the uniform and direct correspondence between the letter and the sounds of words that is required in reformed spelling".

In their investigation of the various methods used to teach spelling, Graham and Miller (1979) concluded that research supports only six methods that proved effective. These include (1) the test-study-test method, (2) learning spelling by a synthetic approach, (3) learning spelling presented in list form, (4) self-correction of spelling under teacher direction, (5) spelling games, and (6) an allotment of 60 to 75 minutes per week on spelling instruction. They also emphasized that it should be borne in mind that "children do not learn at the same rate, nor do they encounter the same difficulties in learning to spell" - a factor which is not considered by all educators.

Hodges (1982) believes that students who are involved in writing and reading are in a practical sense being taught spelling. Further, he feels that when spelling research is placed in its proper context with studies of language, not only will it reveal insights into the nature of spelling ability, but will also provide

insight into the nature of human behavior itself. Wiseman (1980) notes that observations conducted by researchers such as Read (1971) have demonstrated that children use their knowledge of letter names and sounds to consistently represent sounds. Chomsky (1976) also suggests that the ability of children to write is a "developmental precedent to reading". Geedy (1975) follows this line of thought concerning behavioral characteristics in spelling and states

"except in cases of severe physical disabilities the most frequent causes of lack of achievement in spelling are lack of motivation, low reading ability, defective speech, slow or illegible handwriting and disabling traits of personality."

From a somewhat different stance Peters (1979) indicated that it is of vital importance that children who need special education should be given the sub-skill most necessary to writing, namely spelling. However he pointed out that we should not depend on reading to improve a child's spelling.

There appears to be universal acceptance of the study conducted by Hanna, Hanna, Hodges and Rudolf (1966) concerning the regularity of the English language. It was concluded that "for 90% of the phonemes in the language, the orthography approaches the one-to-one ideal to the ratio of 77:52 when all phonological factors are considered", from which we can conclude that English is almost 68% phonetic. In a similar study Dewey (1970) found that the English language is phonetically regular. However, Mazukiewicz (1978) was in disagreement with the findings of both these studies. His contention was that the studies were too narrow and the size of the

samples too small. Therefore, the findings raised enough doubts to reject the conclusions of the authors summarily. Mazukiewicz suggested that since most spelling materials in current usage are based upon these findings, it is advisable for educators to redo and reexamine all word lists before utilization.

In posing the question - "what makes a good speller?", one may arrive at many conclusions supported by eminent researchers and yet may agree in principle with the conclusion of Marino (1980) that

"it would seem that good spellers would use prediction strategies which reflect their knowledge of the rules of frequency and redundancy, whereas the guesses of poor spellers would be more haphazard".

Marino endeavored to explore this conclusion by conducting an informal study using a paper and pencil version of Word Mastermind, which was administered to two groups of sixth graders who were divided by spelling ability. She found that while the affective responses did not distinguish the good from the poor spellers, the pattern of written responses differ. Therefore, Marino concluded that good spelling "like other psycholinguistic processes, involves the interplay between the structure of language and the linguistic knowledge which the learner brings to that structure". Whiting and Jerrico (1980) undertook a study to investigate Boder's (1971) contention that: (1) the dyslexic child spells correctly 50% or less of his sight vocabulary, whereas a normal reader performs at an accuracy level from 70% to 100% at grade level; and (2) the normal reader tends to make spelling errors that are both readable and good phonetic equivalents of the dictated word. The subjects for their study were 104 elementary school students, who

were assessed as being of average intelligence (I.Q. between 90 and 110). Each subject was given a list of 20 words at grade level which they first had to read, and then spell. The authors found that in both cases the results they obtained supported Boder's contention.

Valmont (1972) encourages teachers to allow students to learn for themselves in the area of spelling. Although no support was found in the literature to uphold the view that a relationship exists between spelling ability and personality traits, Valmont nevertheless, contends that it is contingent on teachers to provide "an atmosphere of pupil responsibility in spelling". However, he extended this responsibility to the students by proposing that without "spelling consciousness" success in spelling will be inhibited. Accordingly Valmont discusses spelling consciousness as related to "intelligence, overall academic achievement, and abilities such as visual discrimination, a functional knowledge of phonics, and correctness in homonyms". These views of Valmont received support from studies conducted by Grothe (1963), Tidyman (1924) and Pryor and Pittman (1921), all of whom agree that once a student has the ability to detect errors, he will develop a spelling consciousness, which will not allow him to pass by a word incorrectly spelled.

In order to develop spelling consciousness, Gentry (1981) points out that it is first necessary for a student to learn to spell developmentally by reshaping cognitive structures as one moves from simple to more complex activities. Thus, to develop spelling skills Gentry contends that each student must move through

the following stages - (1) the Deviant Stage which is in essence a random ordering of letters, (2) Prephonetic Stage in which the child renders one, two or three letter spellings that demonstrate letter-sound correspondence, (3) the Phonetic Stage in which there is a stabilization of the child's cognitive link of letter to sound, (4) the Transitional Stage between phonetic and correct spelling, in which the child while misspelling words, displays a knowledge of vowel patterns, (5) the Correct Stage, at which point the child is ready for formal spelling instruction. Gentry concluded that "good spellers are those who from the beginning form a spelling consciousnesswhich begins in the early stages in kindergarten and first grade". In addition, Gentry pointed out that without going through the Phonetic stage, formal instruction will inevitably lead to frustration and lack of success.

Currently, the evidence to support the contention that a phonetic approach to spelling as the most successful method is lacking. Manolakes (1975), in a pilot study on the teaching of spelling to sixth grade students, found that "the analysis of error patterns suggested the need for a reassessment of the prominent role of phonics in many of the available spelling programs". This view received support from Cronnell (1978) who noted that while reading instruction profits greatly from a knowledge of phonics, the same is not true of spelling. Reading accomodates itself to differences in dialect, but no such variations are accepted in spelling because the stimuli for spelling are speech sounds which, though quite real, are much less concrete than the stim-

uli of printed or written symbols. Most researchers tend to agree that a knowledge of phonics is essential in the development of spelling ability, but that it is not the most important factor in this development. Cramer (1969), in his investigation of the influence of phonic instruction on spelling achievement found that while phonic knowledge makes a substantial contribution to the development of spelling ability, this may be hampered in its effectiveness by a lack of good auditory and visual discrimination ability. In a study of the perceptual and psycholinguistic factors in retarded and advanced levels of reading and spelling skills, White and White (1970) found that immaturities in these areas have a considerable influence on the reading and spelling abilities of students. These immaturities included poor visual motor functioning, which occurred more often within the group of retarded readers.

McMullen (1973) undertook a study to test the effect of minimal contrast among word forms by varying only one unit in a word list so that the learner could concentrate on associating one phoneme or phoneme cluster with the respective grapheme(s). He found that no differences occurred between the minimal and maximum contrast conditions, and that subjects retained equally well recognition of maximum contrast words and minimum contrast words. This view was further substantiated by Stanovich, West and Pollack (1978) who investigated the effect of orthographic structure of the stimulus field on the visual search performance of third graders, sixth graders and adults. Their results demonstrated that the "children displayed more of an orthographic structure effect than did adults".

It may be concluded from this study that students at the elementary level are heavily dependent on the actual orthographic structure of a word rather than phonetic clusters.

In examining the role of sequencing as an aspect of short term memory in good and poor spellers, McLeod and Greenough (1980) found that "good spellers appear to have superior 'sequencing ability' to poor spellers". Tests such as Memory for Digits, Memory for Spoken Words, Memory for Pictures, and Memory for Letter Sequences were administered to 80 students, who were divided into good and poor spellers groups. They concluded that while poor spellers display inferior sequencing ability it must be remembered that "one cannot be expected to repeat five digits in correct sequence if one's gross memory extends only to four digits".

In summary the literature suggested that in order to be a successful speller one must possess some of the following competencies - (1) basic knowledge of phonics, (2) spelling consciousness, (3) good auditory and visual discrimination, and (4) knowledge of orthographic structure.

What then of the influence exerted upon students in their almost daily exposure to deliberate misspellings in their everyday life in the form of advertising, shop signs and package foods? Ayers and Ayers (1970) endeavored to determine the influence of purposefully misspelled words in advertising on the spelling ability of third and sixth grade students. The authors composed a list of 150 misspelled words by surveying product names and advertising in three food stores. A 50-item spelling test composed of these

words was then constructed and administered to 1,139 students in grades three through six. The results of the study showed that "the percentage of each misspelled word that was spelled as found in advertising or on the names of products ranges from zero to almost 53%". This led the authors to conclude that children in the study "did have difficulty in spelling words which were purposefully misspelled in advertising and on the names of products".

Johnson and Myklebust (1967) stated that "spelling requires more auditory and visual discrimination, memory, sequentialization, analysis, synthesis and integration than perhaps any other skills". Bearing this in mind that all of these components are essential to spelling success, and also the fact that only six teaching methods are actually supported by research, it was not surprising to find that there were but a few experimental studies available. However, there was a plethora of expository articles extolling the relative merits and demerits of teaching methods regarding the instruction in spelling. Rothschild (1982) in her discussion on instruction for the dyslexic child cited ten instructional areas which must be considered in spelling. Among the most important of these were (1) task analysis, (2) testing tryouts, (3) modalities manipulated, (4) error evaluation, (5) coordinate curriculum, (6) go for gimmick, (7) memory methods, (8) writing workouts, (9) modify materials, (10) interesting ideas. Her contention was that by tailoring to the needs of the child, dyslexic children can achieve spelling proficiency.

Christine and Hollingsworth (1966) conducted a study of fifth grade students to determine whether the "corrected-test", when used

as a teaching method, would give good or better results than a conventional spelling-teaching method. While no statistical differences were found between the control and experimental groups in spelling achievement, the authors concluded that the utilization of the corrected-test method was a more feasible method to use in terms of economy of time.

Gates (1926) stated that "word perception" in the form of visual perception was one of the most important components in learning to spell correctly. Glazzard (1982) recommended that teachers capitalize on the visual strengths of students in order to build their spelling skills. For a child to achieve spelling success Glazzard also proposed that teachers use pictures in place of the word to be spelled, and then guide students through stages which would lead them to eventual use of the word to be spelled. This strategy required that at all times picture clues, in the context of a sentence be utilized. Yudkovitz (1979) investigated the merits of a visual error-scanning approach in remediating spelling deficits. This approach was comprised of three therapy phases: (1) interpersonal scanning for errors, (2) intrapersonal scanning for errors, (3) correction. Because this strategy focused on the child's type of error but not on the child, it was felt that recognitory abilities are highlighted and rewarded, thus facilitation of correct spelling behavior could be achieved. This view was supported by Kauffman, Hallahan, Haas, Brame and Boren (1978), who undertook a study of the effect of imitating childrens' errors to improve their spelling performance. The design of the research

was single subject ABAB, in which the students were presented with phonetically irregular words from their reading materials. Errors on the daily test were corrected by demonstrating either the correct spelling which the child then copied, or the rewriting of a word in the misspelled form, then the correct form, which the child then copied. Results indicated that "imitation may have a special value primarily in cases where regular phonetic rules do not apply and the child must rely primarily on visual memory".

Considerable success in the use of the manual alphabet and finger spelling as remediation techniques have been reported. McKnight (1979) and Vernon, Coley and DuBois (1980) reported that the use of sign language not only proved to be a successful tool in remediation of reading problems, but also considerable carry-over into spelling. McKnight attributed the success of this method to the fact that "with signing the child is involved more actively". The use of finger spelling by children is credited by Stein (1982) to the improvement of childrens' "auditory sequencing, auditory discrimination and memory for sounds", thus enabling them to "make excellent progress in phonetic spelling".

While Hillerich (1979) does not agree that phonetic spelling is the objective of spelling instruction, he does agree that a knowledge of phonics is an essential foundation necessary to achieve spelling competency. However, Hillerich did recommend that spelling instruction go beyond this and other traditional methods, by preparing the student for educated guessing utilizing the dictionary. This in turn, would lead to improved writing skills. Following this

line of thinking, Durrell (1980) contended that a clear understanding of letter name values is of vital necessity in the acquisition of spelling and reading skills. He points out that in testing 240 primary grade children it was found that "spelling was more than twice as effective as sounding". Further, he stated that "observations in classrooms and clinics led us long ago to abandon 'sounding out' as a component of our phonics program".

Kaufman and Biren (1979) suggested that a natural interrelationship exists between reading, writing and spelling, and that they act as a reinforcement of each other. Thus, they were emphatic in their contention that the teaching of cursive writing in preference to manuscript, not only strengthens a child's spelling because of the distinction of each letter, but it also eliminates the tendency to reverse letters, and thus carries over and strengthens the area of reading. According to Greene (1975), the comprehension level of 50% to 75% can be achieved by using a typewriter as the instrument of instruction. While using the typewriter may seem innovative, Greene incorporated all traditional spelling methods with this use, and attributed success to the fact that deeper concentration on the part of the student was achieved, thus increasing their success rate.

While using innovative methods to stimulate students' interest in spelling may prove successful, Schoefer (1977) found that the use of dictation as a class exercise not only proved successful in improvement of spelling skills but also paralleled the instruction of new skills and then maintained them. Many would criticize Schoefer on the grounds that dictation is staid and old-fashioned, but she

anticipated her critics by stating that not only did it prove to be a valuable "evaluative, diagnostic strategy", it also proved to be an interesting and informative method enjoyed by the students.

Without doubt there exists among educators a general agreement that a close relationship exists between reading and spelling abilities. The extent to which this relationship exists and exerts influence on these abilities remains an area shadowed in controversy.

According to Gould (1976) the hypotheses offered by psycholinguists to educators to explain the relationship between reading and spelling, involves acknowledgement of the fact that both the separate acts of reading and spelling are considered "to be manifestations of a highly complex information processing system", and that while both processes share common characteristics, they are no longer thought to be reciprocal. Mason, McDaniel and Callaway (1974) endeavored to determine whether teaching spelling to first graders promoted growth in spelling, reading or composition. Secondary purposes of this study included (1) whether methods co-ordinated with reading were more effective or less effective than methods not co-ordinated with reading and (2) whether direct teaching of spelling was preferable to incidental teaching through composition. The results indicated that teaching children to compose stories that are related to their basal reader was more effective than any other method, and that incidental teaching of spelling during composition was more effective than direct teaching. It was recommended by Henderson (1978) that educators be aware of the developmental stages involved in both reading and spelling. His

contention was that phonic knowledge and letter knowledge are prerequisites for success in both areas, but that a fixation on either stage is bound to lead the student to failure.

It has long been felt by many researchers that "children who make persistent spatial errors after age seven will be poor readers, spellers and writers" (Kaufman and Biren, 1977). In order to test this hypothesis, Kaufman and Biren engaged in a study of 15 students, who were identified as "non-retarded exceptional children", eleven of whom fell between the ages of 7-0 and 8-0, and four of whom were aged between 13-6 and 15-10. Tests which measure spatial perception were administered. Results did not support the hypothesis that spatially disoriented children will necessarily be poor readers, but it did demonstrate that children with a "high percentage of spatial errors were poor spellers".

Bannantyne and Wichiarajote (1969) conducted a study of third grade students to investigate the relationships among spelling ability, motor functioning, balance, handedness, visual-spatial ability and various auditory and vocal skills. The results of this investigation indicated that balance, motor co-ordination, unlearned ambidexterity, visual motor co-ordination all had a positive correlation to spelling ability. Bannantyne felt that these results "seem to support those educators who claim that reading and spelling is best learned through an active motor writing and spelling curriculum".

In a study of error types in word recognition by retarded readers, Bennett (1942) concluded that while more errors may occur they "are governed by the context in which the stimuli are incorpor-

ated, and by unfortunate learning habits which the pupil has developed in the process of reading". Many educators and psychologists do not agree with this contention. One of those was Boder (1970), who claimed that analysis of spelling errors reveals three distinct classes of retarded readers. He goes even further to state that every child with a reading disorder exhibits reading spelling error patterns, and that these patterns remain "stable" even when the child's reading skills improve. Holmes and Peper (1977) undertook an investigation to study this claim, and found that while retarded readers make a higher proportion of errors on the WRAT spelling test, the type of errors proved to be similar to errors made by normal readers.

Channon (1969), in exploring the relationship between reading and spelling stated that for too long the teaching of spelling has been an "isolated compulsive ritual", and that it is imperative that we understand that "reading and spelling are simply skills needed to manipulate with some understanding the written symbols of the spoken language". He recommended a phonic approach to spelling, and rejected the validity of a frequency-approach as being so dubious that it is the least effective method of teaching a child to spell. The lack of efficiency in the frequency approach was further challenged by Groff (1982) who, despite an unproven hypothesis, stated that Horn's conclusion that word frequency is the best method of teaching spelling is invalid, because "by the time pupils reach the fourth grade they spell words in five different vowel spelling patterns with approximately the same accuracy".

As yet the wide spread use of the computer as a teaching in-

strument in spelling is not common, but presently is coming under consideration as an effective instructional tool. Mason recommended the use of a computer as a tool in the remediation of spelling and reading difficulties. He states that

"Interaction with the computer quickly makes apparent students' inattention to visual details such as sequence or shape. Students exhibiting such inattention are likely to have spelling problems and difficulty with word recognition. Fortunately, computer use seems to lead to dramatic improvement in pupils' visual attentiveness".

Yee, Shores and Baker (1973) attempted to produce a computer managed spelling program based upon the theoretical model of spelling behavior postulated by Personke and Yee (1968). While this system integrates the most important factors in selection of spelling words, such as frequency of occurrence, word difficulty etc., they pointed out that in the process of formulating their program, the lessons were increasingly becoming based "upon the pupil and his individual learning rather than upon grade level expectations and instructional schemes", and therein lies its success.

There was a lack of agreement among researchers on the precise relationship that exists between reading and spelling ability. Despite this, all acknowledged that it is possible to agree that a positive interrelationship and interdependence exists between these areas. Until this precise relationship is identified it may be best to accept the contention of Nelson and Warrington (1974) that "spelling and reading retardation are best regarded within the framework of developmental anomalies in different cognitive systems".

CHAPTER III

PROCEDURES FOR COLLECTION AND TREATMENT OF THE DATA

A discussion of the procedures and instruments used in this study are presented in this chapter. The design of the study and methods of selection of the subjects are given. A description of the instruments used in the selection of the subjects, and the methods employed in the application of treatment are presented here.

Design:

This investigation followed a single subject, multiple baseline design as a means for collecting data. Factors influencing the decision to utilize this method in preference to using experimental/control group design were as follows:

1. As part of the main purpose of this study was to provide individualized intensive instruction using subjects who were deemed to be reading disabled, it was necessary to test the hypotheses using a small number of subjects, who would meet all the established criteria. This would not have been possible using a large number of subjects, or without a large number of teachers.
2. By virtue of the fact that a micro-computer was utilized as the mode of instruction, individualization was necessary.
3. Kaufmann, Hallahan, Haas, Brame and Boren (1978) utilized single subject, ABAB design in their study of the effect of imitating childrens' errors to improve their spelling performance. However the literature shows that until recent

years, single subject research design was mainly used in behavior modification situations, therefore more research on the use of this method of behavioral investigation in the academic area is needed.

Selection of Subjects:

In consultation with the principal of Druid Hill School, a school within the Omaha Public School District, four intermediate grade students were chosen as subjects for this investigation. These subjects were chosen because they scored below the 50th Percentile on the California Achievement Test (CAT), which is the criterion set by Omaha Public Schools for a student to be eligible for participation in Chapter 1 - Merit remedial reading program.

Additional criteria used to identify subjects were:

1. Each student was currently being taught spelling through the Silver Burdett Spelling Series.
2. Each student was deemed reading disabled by demonstrating a discrepancy of two or more years between his/her present grade placement and performance. Procedure for meeting this criterion was:

(a) Each student's present level of reading was measured by testing on the Gray Oral Reading Test. This test was chosen as a valid instrument on the basis of Bliesner's review in Reading Tests and Reviews (1968). He stated that the suggestions in the manual are quite modest in regard to the fact that not only does it give good esti-

mates of oral reading ability, but also suggests ways of estimating difficulties needing further analysis.

The fact that this test is available in four different forms was another reason for choosing this particular test.

Pretest scores of the subjects are indicated in Table I.

TABLE I
DISCREPANCY BETWEEN PRESENT GRADE PLACEMENT
AND ORAL READING PRETEST

STUDENT	PRESENT GRADE LEVEL	ORAL READING GRADE SCORE	GRADE LEVEL DISCREPANCY
Teresa	6.8	Form A 2.8	-4.0
Tina	5.8	Form A 2.5	-3.3
Lamont	6.8	Form A 2.9	-3.9
Carleton	6.8	Form A 4.8	-2.0

Each student demonstrated a discrepancy of two or more years between his/her present reading grade placement and performance, and therefore met the criterion for scoring two or more years below grade placement as measured by the Gray Oral Reading Test.

3. Each student demonstrated a significant spelling skill deficit.

Procedures for meeting this criterion was:

(a) Each student's present level of spelling was measured by

testing with the Test of Written Spelling. According to Wallace and Larsen (1978) "the validity and reliability of the Test of Written Spelling (TWS) are amply demonstrated", and they further state that when compared to the reported reliability and validity of other achievement tests this feature of the instrument is quite impressive. Based upon this review, this test was deemed a suitable instrument for use in this study.

Pretest scores of the subjects on the TWS are indicated in Table II.

TABLE II
DISCREPANCY BETWEEN PRESENT GRADE PLACEMENT
AND GRADE SCORE ON TWS PRETEST

STUDENT	PRESENT GRADE LEVEL	TWS GRADE SCORE	GRADE LEVEL DISCREPANCY
Teresa	6.8	4.4	-2.4
Tina	5.8	3.8	-2.0
Lamont	6.8	4.9	-1.9
Carleton	6.8	4.6	-2.2

Each student with the exception of one, demonstrated a discrepancy of two or more years below his/her present grade placement on this test. Therefore they were considered to have a significant spelling deficit. The student who demonstrated a deficit level of -1.9 was included on the basis of his grade score in oral reading (2.9), and on the contention that .1 below the criterion set was not a considerable distance from the discrepancy requirement of 2.0 grades.

- (b) In consultation with each student's teacher it was decided to accept the results of the above tests as being characteristic of the oral reading and spelling behavior of these students.

Implementation:

Having established baseline data on each student's oral reading and spelling level, treatment was initiated in the following manner:

- (a) Based on the error analysis of each student's performance on the Gray Oral Reading Test - Form A, and the Test of Written Spelling, the student was taught appropriate spelling lists from the Silver Burdett Spelling Series in the following manner:
1. Teacher said the word, used it in a sentence, then spelled it orally.
 2. Student repeated the word, then typed it on the computer keyboard, (word appeared on screen). Student then repeated the word, and spelled it orally.
 3. Student then typed a sentence containing this word, while the word remained on the screen.
 4. Where appropriate the student's attention was directed to

word families.

5. Each word from the daily list was treated in similar fashion.
6. At the end of each session, teacher dictated each word, student retyped words on the keyboard.
7. A percentage score from each days' spelling list was then tabulated and recorded on a graph.
8. Twelve treatments of twenty five minutes each were administered to each student.
9. At the end of every four treatment sessions, an alternate form of the Gray Oral Reading Test was administered, the results were recorded with the pretest scores.

Schedule of Implementation:

Week	Session
1	1 - collection of baseline data. 2,3,4 - treatment
2	5 - treatment 6 - administration of Form B- <u>Gray Oral Reading Test</u> 7,8 - treatment
3	9, 10 - treatment 11 - administration of Form C- <u>Gray Oral Reading Test</u> 12 - treatment
4	13,14,15 - treatment 16 - administration of Form D- <u>Gray Oral Reading Test</u>
5	17 - administration of <u>Test of Written Spelling (Posttest)</u>

CHAPTER IV
RESULTS OF THE STUDY

The main purpose of this study was to determine if intensive clinical instruction in spelling skills help to increase the decoding skills of intermediate grade students who are identified as reading disabled.

Each subject who participated in this study had scored below the 50th Percentile on the California Achievement Test, which had been administered in the Fall of 1982, and were also participants in the Chapter 1 - Merit remedial reading program. In addition to being identified as reading disabled each student was considered to have a spelling deficit of at least two years below grade level.

In order to meet the criteria set for being considered both reading disabled and spelling disabled, each subject was administered a pretest - Gray Oral Reading Test (Form A), and the Test of Written Spelling. Interval testing on Form B and C of the Gray Oral Reading Test was administered after every four of the twelve treatment sessions of twenty five minutes each. At the end of the twelfth treatment session each subject was then administered a posttest - Form D of the Gray Oral Reading Test, and the Test of Written Spelling.

The results of the pre and posttesting of each subject indicated gains in both reading and spelling. Table III indicated the differences between pre and posttest scores of each subject.

TABLE III

DIFFERENCES BETWEEN PRE AND POSTTEST SCORES OF
EACH SUBJECT IN ORAL READING AND SPELLING

SUBJECT	PRESENT GRADE ENROLLED	PRETEST GRAY FORM A	POSTTEST GRAY FORM D	DIFFER- ENCES IN GRADE	PRETEST TWS	POSTTEST TWS	DIFFER- ENCES IN GRADE
Teresa	6.8	2.8	3.5	+ .7	4.4	6.1	+1.7
Tina	5.8	2.5	2.9	+ .4	3.8	4.2	+ .4
Lamont	6.8	2.9	4.5	+1.6	4.9	7.7	+2.8
Carleton	6.8	4.8	8.7	+3.9	4.6	9.0	+4.4

Results given in grade scores.

As indicated by these figures, each student, with the exception of one, increased their grade score on both reading and spelling posttests by at least +.4 of one grade level. The range of scores on oral reading was +.4 to +3.9, with the range of scores on spelling from +.4 to +4.4.

During the implementation of this study each student's score on the daily spelling list was computed and recorded on a graph. In addition to recording the daily score, each student's pretest scores, interval scores and posttest scores on the Gray Oral Reading Tests were also recorded on a graph, with the pre and posttest scores of the Test of Written Spelling.

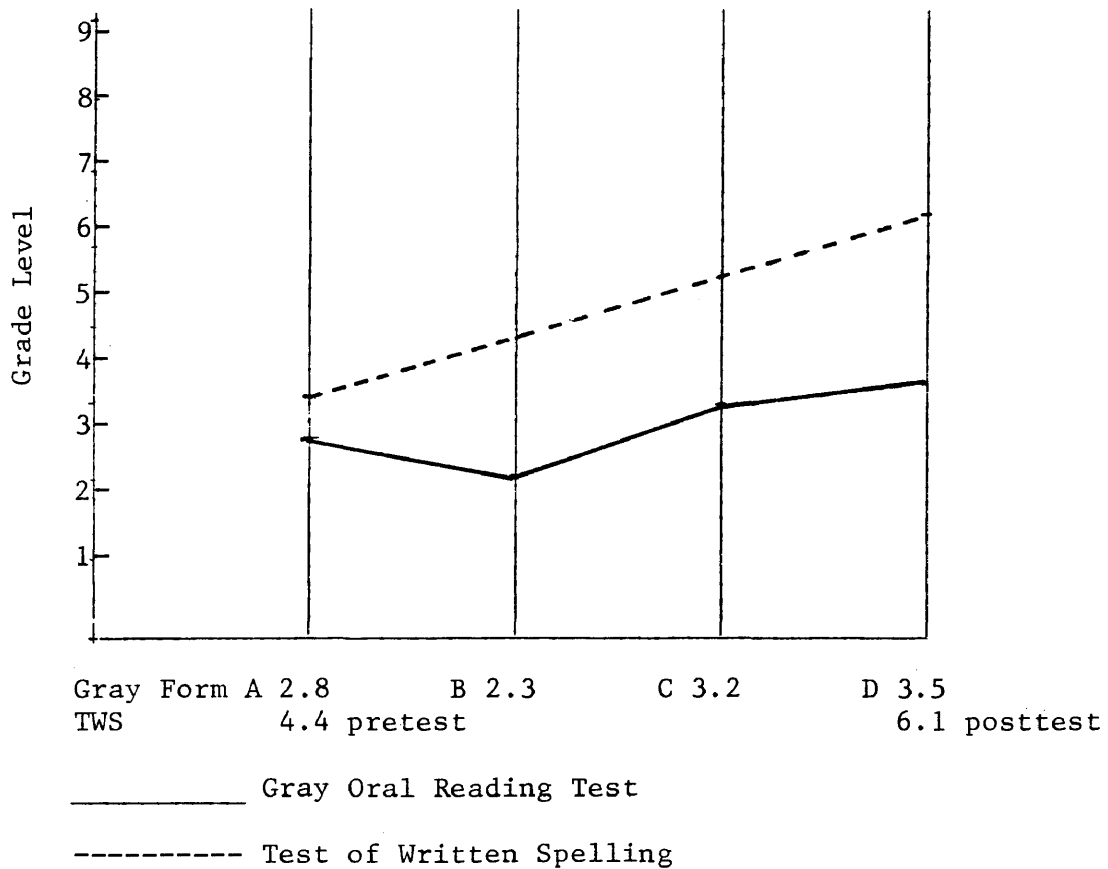
Individual Analysis of Results

Teresa:

Teresa's (6.8 grade placement) scores on the pre and post-testing on the Gray Oral Reading Test indicate a gain in reading of +.7 of one grade level. She also indicated gains in spelling by an increase of +1.7 grade level between pre and posttesting (see Figure 1).

FIGURE 1

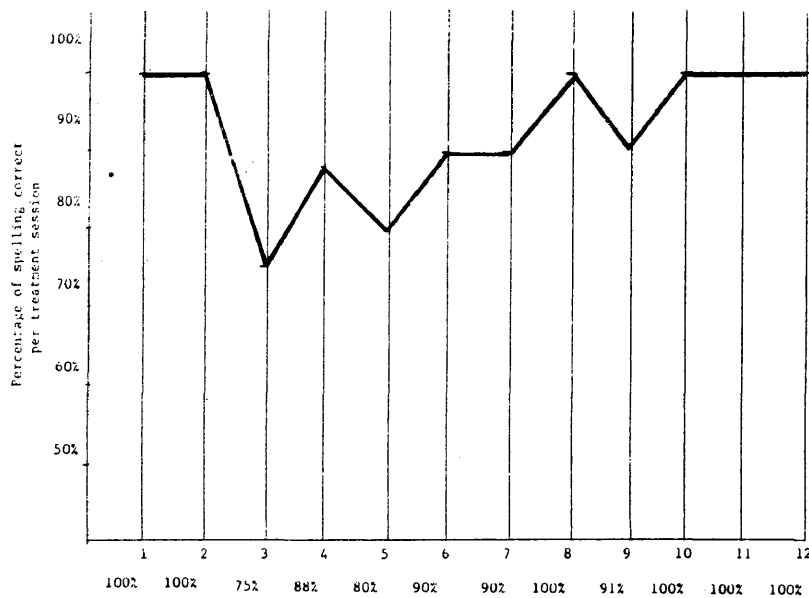
PRE AND POSTTEST GRADE SCORES IN
ORAL READING AND SPELLING - TERESA



Teresa indicated a deficit of 4.0 in her grade placement and pretest grade level score of 2.8 on the Gray Oral Reading Test. Her scoring of 2.3 grade level on the interval test of Form B, is also reflected on the graph indicating daily spelling scores. After this interval testing Teresa's daily scores improved to a maintenance score of 100%, while her reading test scores also indicated a slight - but increased performance rate.

FIGURE 2

PERFORMANCE SCORES ON DAILY SPELLING LIST - TERESA



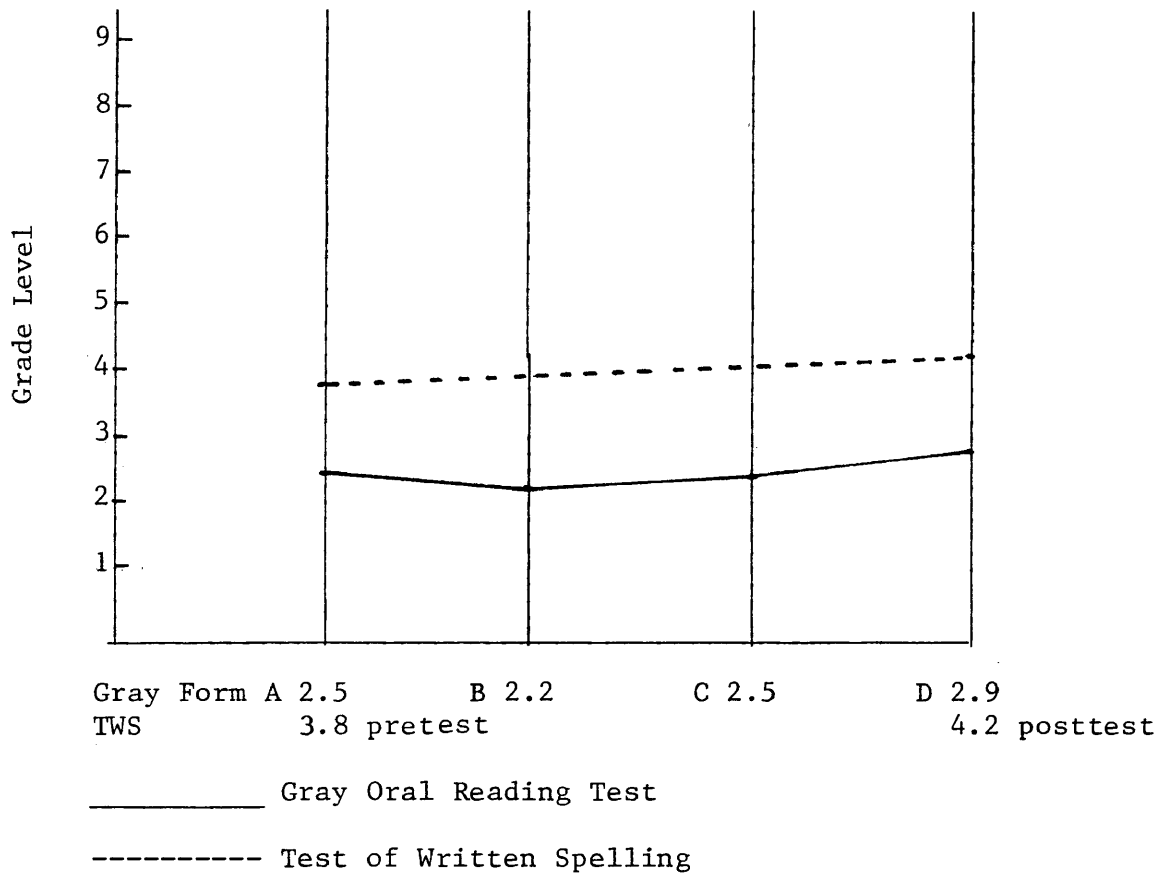
This graph (Figure 2) indicates that at no point did Teresa fall below a 75% level of efficiency on the daily spelling test. After the fifth treatment session Teresa's performance stabilized, and fell no lower than a 90% efficiency rate.

Tina:

Tina, whose grade placement was 5.8, indicated a difference of +.4 between her scores on the pre and posttest on the Gray Oral Reading Test. Tina also indicated a gain of 1.4 grade level between pre and posttesting on the Test of Written Spelling (see Figure 3).

FIGURE 3

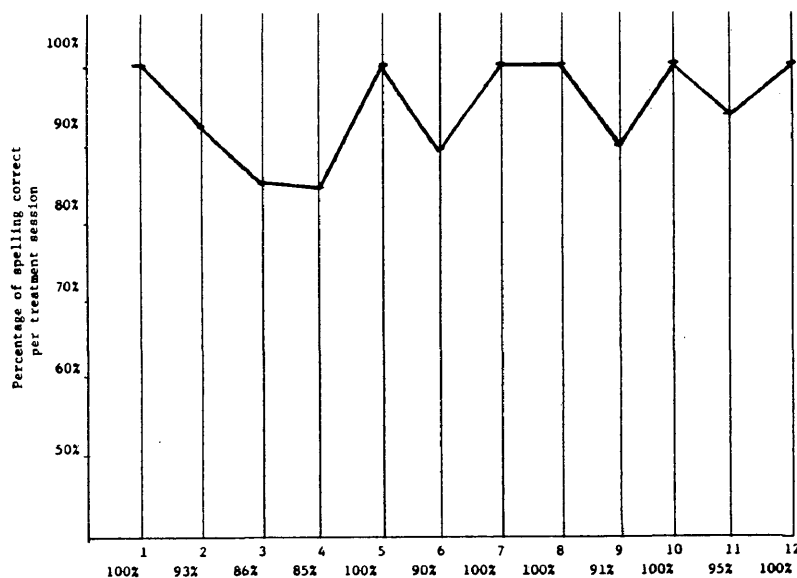
PRE AND POSTTEST GRADE SCORES IN
ORAL READING AND SPELLING - TINA



Tina showed a deficit of 3.3 in her grade placement and pretest grade score level of 2.5 on the Gray Oral Reading Test - Form A. Her subsequent lower score of 2.2 on the administration of Form B, like Teresa's, was reflected in her daily spelling scores of that period. Tina settled in after this initial period, which is further seen in her maintenance of the pretest level of 2.5 grade level on Form C, and a gain of +.4 on posttesting on Form D.

FIGURE 4

PERFORMANCE SCORES ON DAILY SPELLING LIST - TINA

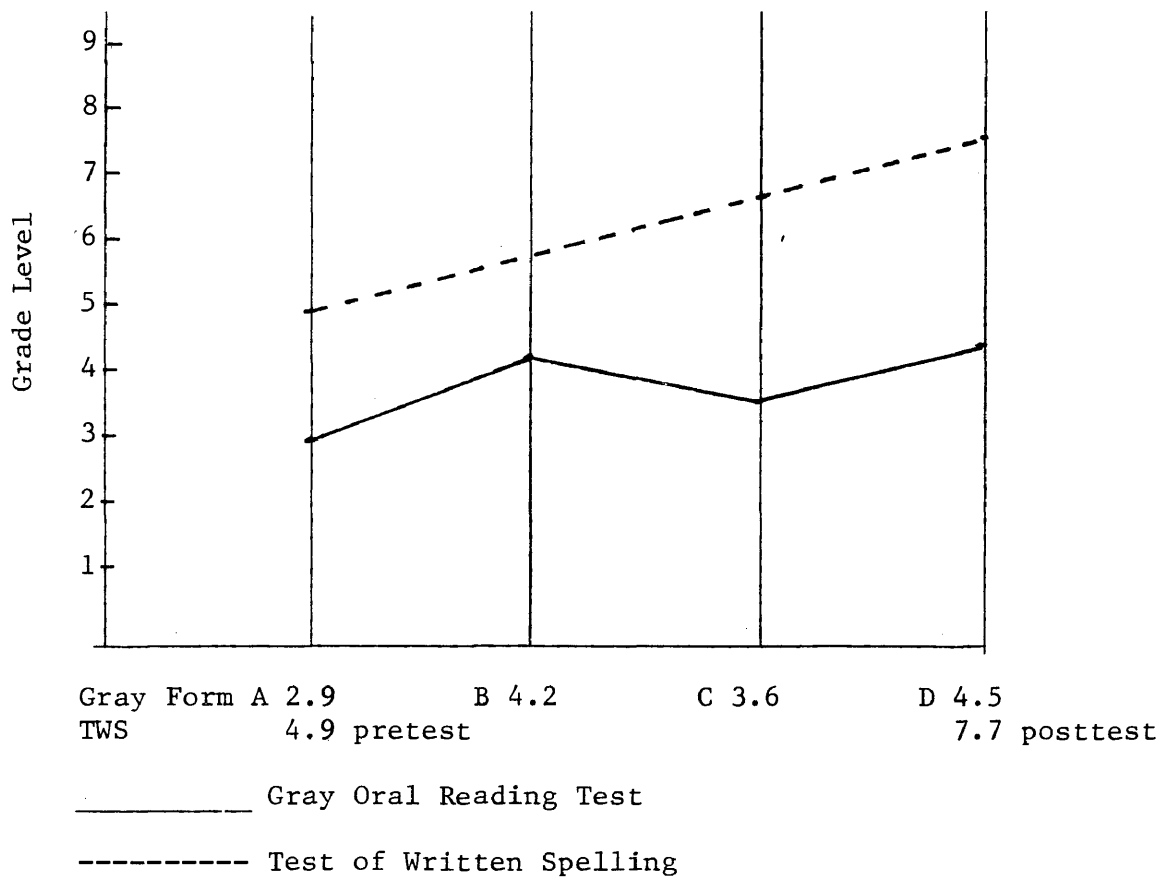


As indicated in Figure 4, Tina's performance at all times during the administration of treatment, fell between an 85% and 100% efficiency rate. After the initial treatment Tina's performance dropped from 100% to 85%, but then stabilized, and fell between 90% and 100% efficiency rate.

Lamont:

Lamont (6.8 grade placement) demonstrated a gain of +1.6 between his pre and posttests on the Gray Oral Reading Test. Lamont's grade level scores of 4.4 (pretest) and 7.7 (posttest) respectively on the Test of Written Spelling indicates a gain of 3.3 grade levels (see Figure 5).

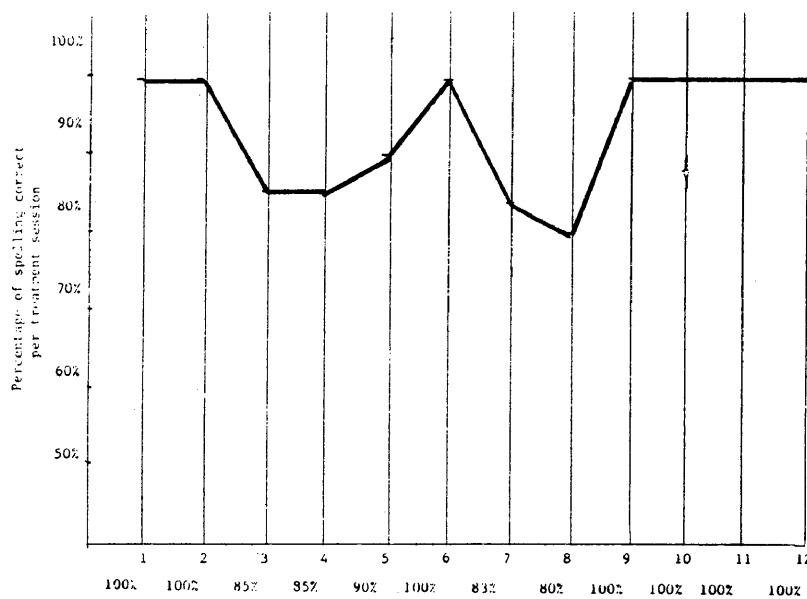
FIGURE 5
PRE AND POSTTEST GRADE SCORES IN
ORAL READING AND SPELLING - LAMONT



Lamont indicated a deficit of 3.9 between his grade placement and pretest grade level score of 2.9 on the Gray Oral Reading Test (Form A). An increase in this score to a 4.2 grade level on Form B of the interval testing was contrasted by a subsequent score of 3.6 on Form C. Lamont's grade level score of 4.5 on posttesting on Form D was in keeping with the fluctuation of his daily spelling scores.

FIGURE 6

PERFORMANCE SCORES ON DAILY SPELLING LIST - LAMONT



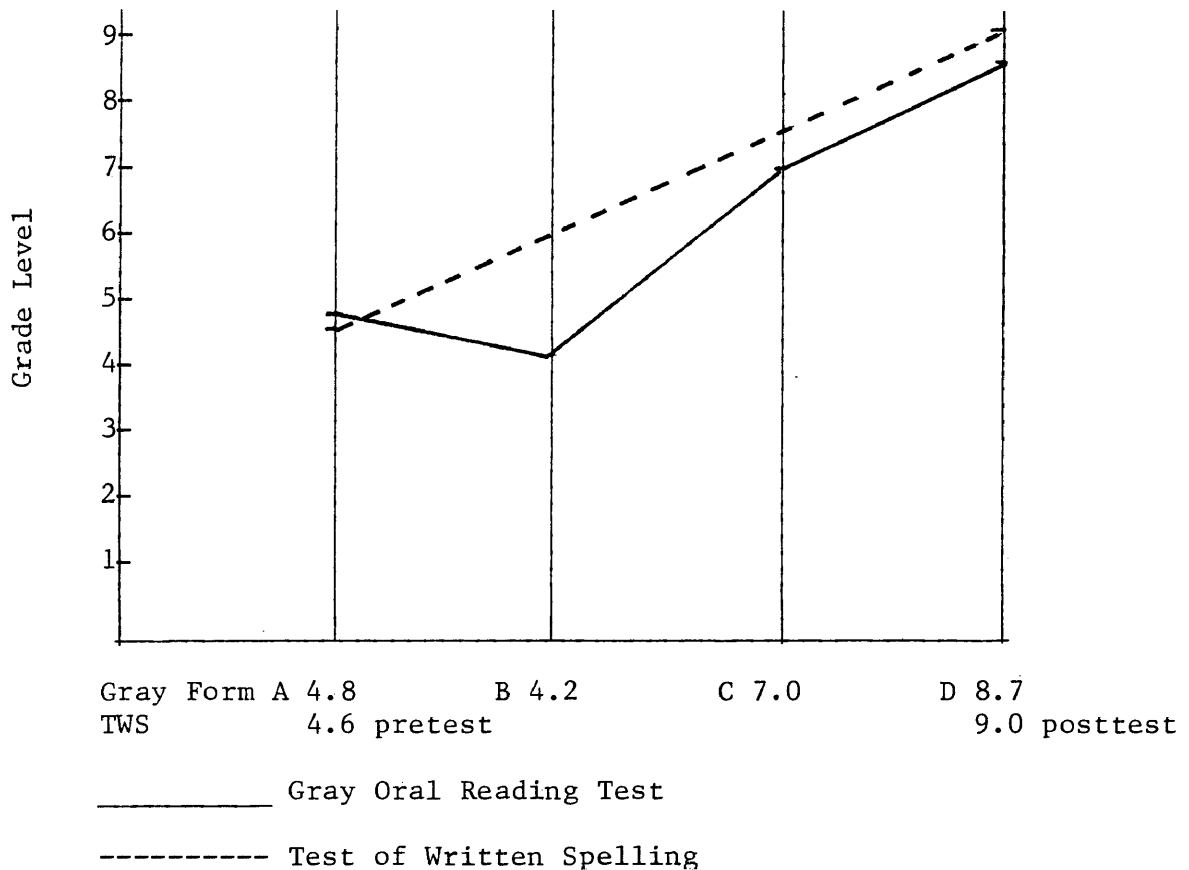
As indicated by Figure 6, Lamont's scores fluctuated and did not reach a level of consistency until the last four treatment sessions. While this lack of consistency existed, Lamont's lowest score was at the 80% level, while for at least half the treatment sessions his scores were at the 100% level of efficiency.

Carleton:

Carleton at 6.8 grade placement, indicated a deficit of 2.0 in his oral reading, as shown by a pretest score of 4.8 grade level on Form A of the Gray Oral Reading Test. A posttest score of 8.7 on Form D indicated a gain of +3.9. A gain of +4.4 was indicated by pre and posttest scores on the Test of Written Spelling.

FIGURE 7

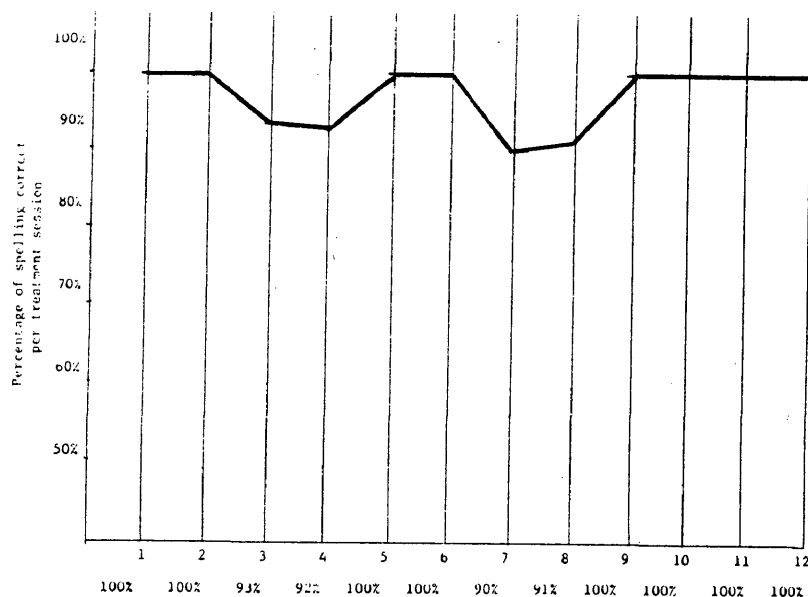
PRE AND POSTTEST GRADE SCORES IN
ORAL READING AND SPELLING - CARLETON



Carleton's performance on the Gray Oral Reading Test on each form administered indicated gains at all times, except on the administration of Form B, when his grade score fell to 4.2 grade level. His scores of 4.6 and 9.0 grade levels on the pre and posttesting of the Test of Written Spelling, was consistent with his daily performance on spelling lists.

FIGURE 8

PERFORMANCE SCORES ON DAILY SPELLING LIST - CARLETON



As indicated by Figure 8, Carleton consistently scored between a 90% and 100% efficiency rate on daily spelling lists. This is a reflection of his increase on grade scores on both the Gray Oral Reading Tests, and the Test of Written Spelling.

From the results of this study it may be stated that each subject made gains in their performance on both oral reading and spelling. Performance on daily spelling lists were consistent with scores on the interval testing on the Gray Oral Reading Test.

CHAPTER V
SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This study attempted to determine if intensive clinical instruction in spelling skills help to increase the decoding skills of intermediate grade students who are identified as reading disabled.

The four intermediate grade students who participated in this study were from a large metropolitan school system. These students were identified as being both reading and spelling disabled. The Gray Oral Reading Test (Form A) and the Test of Written Spelling were administered as pretest measures of reading and spelling achievement. Each student received intensive individualized instruction in spelling skills for twelve treatment sessions of twenty five minutes each. Spelling lists from the Silver Burdett Spelling Series were taught using a micro-computer as a means of instruction. Interval testing using Forms B and C of the Gray Oral Reading Test were administered after every four of the twelve treatment sessions. The Gray Oral Reading Test (Form D) and the Test of Written Spelling were administered as posttests. Each student's pre and posttest scores on these tests were then evaluated and compared. The scores on daily spelling lists were then discussed and commented upon.

Summary of the Results:

On examination of the pre and posttest scores of oral reading and spelling, it was found that gains ranging from +.4 of one grade level to +4.4 grade levels were achieved by the subjects of this investigation. In summary - gains in oral reading and spelling of at least +.5 of one grade level were made by all subjects, with the exception of one, who made gains of +.4 of one grade level. While performance scores on daily spelling lists fluctuated, it was found that these fluctuations were consistent with scores on the interval testing on the Gray Oral Reading Test. All subjects achieved a degree of consistency on their daily performance during the last four treatment sessions, with no subject scoring less than 91% on a spelling list.

Conclusions:

It is concluded from the results of this study that the hypothesis is supported in its contention that if intermediate grade students who are identified as reading disabled, improve their spelling skills by means of intensive clinical instruction in spelling strategies, there will be a corresponding improvement in their decoding skills. It is felt that the following factors may have influenced student performance in the clinical situation:

1. Individual intensive instruction.

Each subject was instructed on a one-to-one basis, with emphasis on teaching spelling skills geared to that individual's needs. Therefore, the element of class competition was removed, thus establishing a more relaxed atmosphere. Each

spelling list varied in the number of items presented each day in direct relationship to the difficulty of the spellings, so that there was no pressure applied in completing a minimum number of spellings.

2. Rapport.

Twelve clinical sessions of twenty five minutes each, on an individualized basis, afforded both the teacher and the students an opportunity to establish rapport. Because the teacher was not a member of the school staff and was not in the building for any other purpose, the students were relaxed, and were made to feel that they were receiving something special. While no positive reinforcement other than verbal feedback in the form of - good, very good, excellent, etc. was given, the students did not have to worry about extra study, thus making the atmosphere more positive, and therefore, perhaps more conducive to learning.

3. Use of micro-computer.

While the use of a micro-computer in this study is incidental, it is felt that it exerted an influence on the performance of the students. Micro-computers were not utilized in the classrooms as a means of spelling instruction; therefore, the novelty effect of this may have played a large part in student performance and motivation. The fact that the students could receive immediate visual feedback, which if necessary was instantly correctable, placed an element of control in the students' hands.

It is not possible to isolate and discuss all influencing factors, but this researcher concludes, that because each student received individualized instruction in spelling skills, with an opportunity to leave the home-classroom, they were more receptive to learning. This was further enhanced by the novelty of using a micro-computer.

As student performance scores on daily spelling lists did not remain consistent throughout the implementation of this study, factors which could not be controlled by this researcher may have been at work. Examples of these factors would be:

1. Build up to school track meet.
2. Oncoming summer vacation.
3. Onset of Spring weather.
4. Happenings in the home-classroom.
5. Events occurring outside the school.

Oral reading was not taught or referred to throughout the teaching periods, and yet gains on reading test performance were made by each student. Therefore, it may be concluded that the teaching of spelling skills does exert an influence on the decoding skills of reading disabled students, if spelling skills are taught in isolation using a variety of teaching strategies, especially using a micro-computer.

Recommendations:

The limited evidence of this study suggests that the hypothesized relationship between reading and spelling can be tentatively accepted. While there is considerable disagreement among

researchers on the precise nature of this relationship, the fact that it does exist suffices to encourage further research. Because the population for this study was limited to four subjects, it is suggested that a further study using a larger population in an experimental/control design could yield more information.

The success of the students in using a micro-computer instead of paper and pencil, also suggests that the use of less conventional methods may enhance a student's attitude to learning. Further research in the use of the micro-computer as a learning tool for reading disabled students is necessary in order to learn the extent of the influence exerted by a computer on the learning situation.

Concluding Statement:

The results of this study are offered as an attempt to aid in the understanding of the interrelationship between spelling and reading.

It is hoped that the results of this study will serve a useful purpose by adding to the research within the area of reading and spelling, as it pertains to reading disabled students.

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