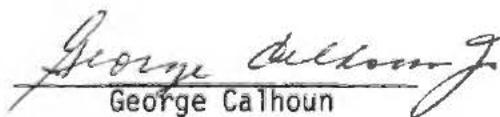


MANUSCRIPT HANDWRITING: AN EMPIRICALLY-BASED STUDY
OF THE TEACHING OF HANDWRITING

by
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ABSTRACT

This paper examines the present state of handwriting instruction and in particular that provided for developmentally disabled students. A survey of literature showed that many of the present methods of instruction are based on conjecture and not empirical research. It was suggested that the traditional belief in the superiority of cursive writing over manuscript was unfounded. There was no significant difference to be found between either method. The data from the studies that were reviewed were used to develop a writing program. This produced a whole-word copying method combined with a backward chaining procedure for individual letters that were a problem for particular subjects. This program was compared with a faded-tracing method that was being used by the 34 developmentally disabled adolescents used in this study. Both programs used token economies to provide reinforcement. At the end of a two month study, it was found that both groups had made statistically significant improvement as measured by the pretests and posttests. However, there was no significant difference to be found between the two programs.

CHAPTER I

INTRODUCTION

Writing is a very important part of learning in everyday life. "Writing is used to express and communicate meaning" (Freeman, 1954, p. 9). When one begins to think of the many daily uses of writing, it is easy to see how a person who cannot write or who has poor handwriting is soon labeled and categorized. The crucial need for efficient handwriting skills in regular classrooms where handwriting is the poorest taught branch of the curriculum (Enstrom, 1966) can only emphasize the shortcoming of the handwriting within special education classes where all branches of the curriculum suffer.

After teaching mentally retarded children and adults, an instructor soon becomes aware that most of the traditional methods and techniques do not meet the needs of these students. New strategies and curriculum must be developed that will bring about as much progress as efficiently and as quickly as possible. If learning disabled students are going to be brought back into the mainstream of society, let alone the school, then it is important that the many identifying attributes commonly used to label a retarded person as different be remediated, particularly writing. "Since handwriting is not taught beyond the sixth grade in most schools, there must be overlearning to carry the individual through additional years of schooling and then meet his occupational needs" (Enstrom, 1966, p. 309).

The present state of handwriting instruction is unable to cope with its many problems. In the development and use of most handwriting programs and procedures, no consideration has been given to direct research. Most programs are based on conjecture. The findings from the Summary of the Project Literacy Curriculum Writing Seminar (1966) showed:

Current handwriting systems were examined and many inconsistencies discovered. Data are meager on rationale for letter formation, size of letter, width of line, or kind of tool. Occasionally, a statement such as "research has shown" occurs but never with a clarifying footnote. Search for empirical findings proved fruitless (p. 7).

The deficiency of supporting data to substantiate the many different hypotheses on handwriting leaves unquestioned many types of programs that purport to teach writing. Instead of trying to understand the motoric process of handwriting as it relates to development, as many programs do, it would seem that handwriting should be viewed in terms of results. The success of learning principles to teach new behaviors and the lack of behavioral programs for teaching handwriting suggest the need for further investigation into the possibility of applying behavioral techniques to handwriting. The important question is not whether or not normal handwriting development happens because of learning principles, but rather can handwriting be taught to non-writers through the use of learning principles.

The notion of readiness is based upon the developmental assumption that something magical happens to a child with age. From the teaching-oriented view, nothing magical can happen. The child is simply taught the concepts. The longer the period of time, the more concepts he is taught. Unless the child's performance is expressed in these terms, there is no remedy for the child who is not ready except to let time exert its magical influence on his development (Englemann, 1970, p. 115).

The major concern in any program should always be with the child. The teacher is responsible for finding the right approach to avoid the possibility that if the student does not succeed, it is the failure of the teacher.

Review of Literature

There is question whether manuscript or cursive should be taught first. In surveys conducted by Freeman (1946), Herrick (1963), and Polkinhorne (1946), results indicated that most of the children in America were first taught manuscript and then taught cursive in the second or third grade. The reasons for this practice has not been established through empirical research. It appears to be that way because the parents demand it, or because in some states a person might sign his name and is not allowed to print, therefore making it necessary to learn cursive. But more than any other reason, it is part of the traditional educational curriculum. Huitt (1972) says that if there is a significant difference to be found between the two styles, it will be in speed, legibility, usefulness, or ease of learning.

Herrick (1955) and Anderson (1966) expressed the opinion that manuscript is easier to learn and is more legible than cursive, but failed to substantiate their views with data. Turner (1930) and Freeman (1936) also contended that the handwriting of children who used manuscript was significantly more legible than those who used cursive. Other researchers, Templin (1963) and Groff (1964) found no significant differences between adults.

Contrary to other reserachers, Larson (1970) and Mullins (1972), believe cursive easiest to learn because of the natural separation

between the words. They believe it helps beginning handwriters who have poor motor function, and visuo-motor perception, background-foreground, and spatial problems to achieve a product that is more legible. Cursive writing is able to do this, because all lower-case letters start on the same line. Also, all words are separated no matter how small the space is.

It has generally been assumed that the reason for teaching cursive writing is that it is faster than manuscript. Cursive writing uses a continuous motion; the pencil does not have to be lifted between letters. Studies by Freeman (1936) and Hildreth (1944), Reeder (1930) Turner (1930), and Washburn and Morphett (1937) have concluded that there is no significant difference between the speed of the two styles. More recently, Jackson (1970), found that when students were instructed to write as fast as they could, the speed of the subjects using manuscript was significantly faster than those who used cursive. Jackson's study also showed a slight but not significant difference between the two styles in legibility and ease of reading which favored manuscript.

While there seems to be no empirical evidence to support the traditional practice of teaching manuscript in first grade and then changing to cursive in second or third grade, Herrick (1955) found that 79% of the schools in the United States do this. The question is, should cursive be taught at all.

After reviewing the relevant research both Harris (1960) and Anderson (1966) concluded that there is little evidence to recommend the change to cursive writing. Manuscript writing seems to meet the needs of adults in terms of both speed and legibility (Otts, 1971, p. 338).

Another problem to consider is how handwriting should be taught. There are many different approaches to teaching handwriting. Some educators believe that there are definite readiness skills essential for the learning of handwriting (Harrison, 1970), readiness (perceptuo-motor), activities using gross motor arm movements, and activities with pencil, crayon, or felt pen using finer movements. Larson (1970) advocates the use of the blackboard to develop gross motor skills. Through a variety of gross motor muscular movements, the student is supposed to develop the necessary skills to make finer motor movements. After the blackboard, Larson says that children should begin tracing structured patterns one- to two-inches in size through onionskin paper. Other activities suggested for developing readiness are "writing in a clay pan with a stylus or in a sand pan with a finger will help reinforce the pattern both kinesthetically and tactually" (p. 14). Similarly, Madison (1970) stresses the need for gross motor development. She suggests the use of fingerpaint to help some children learn to write.

Application of fingerpaint techniques to the writing instruction program in this manner helps to bring about integration of kinesthetic, visual and auditory memory for the symbol. Correct symbol formation seems to be more easily retained" (p. 18).

Levine and Carter (1970), Myers (1955), Enstrom and Enstrom (1972), Reger (1968), Kephart (1960), and Getman and Kane (1964) also base their handwriting training techniques on gross motor activities. Myers (1955) recommended the use of water colors and music. The music makes the task a rhythmic activity which the children enjoy. Myers says that children should begin writing their letters four inches high at first and then reduce the size of the letters gradually. The

important thing to remember is that these conclusions are not based on any empirical data.

A number of people have sought to reach some type of conclusion about the proper way to teach handwriting. Haworth (1970) studied the effects of rhythmic-motor training and gross-motor training on the reading and handwriting abilities of educable mentally retarded children. Using 28 children from ages 10 years 0 months to 12 years 11 months with I.Q. ranging from 53 to 83, Haworth concluded, after eight weeks of training in gross-motor skills using activities designed to develop body-image, laterality, directionality, balance, and movement with and in relation to objects, the experimental group showed no significant difference in reading and handwriting. However, it did show a statistically significant difference in rhythmic ability from the control group.

Pomeroy (1971) investigated the relationship between understanding of topological, projective, and Euclidean representational spatial concepts, as Piaget described them, and the legibility of manuscript handwriting of first- and second-grade children. Twenty subjects were given the Test of Spatial Concepts, and Evaluation Scale for Manuscript Writing, the Steinbach Test of Reading Readiness, the Metropolitan Achievement Test, and the Otis-Lennon. Results were inconclusive because of the small number of scores available. The conclusions based on the comparison between the Evaluation Scale of Manuscript Writing and the Test of Spatial Concepts showed no significant difference between over-all understanding of selected spatial concepts and legibility nor between understanding of projective straight lines

and legibility of manuscript handwriting. The tests also showed a significant negative linear relationship between topological linear and circular order and legibility and between Euclidean horizontal and vertical coordinates and legibility of manuscript handwriting. These findings would suggest that the nine Piaget tasks were not suitable as components of a curriculum to develop legible handwriting.

Furner (1967) found that an instructional method that emphasized verbalization of procedures to develop perception of the handwriting task could produce a significant difference in the quality of writing as measured by the Guiding Growth in Handwriting Evaluation Scale. Hirsch and Niedermeyer (1973) investigated the effect of copying versus faded tracing and discrimination training. They found that subjects who copied letters only did significantly better on the posttest than the subjects who practiced gradually fading and tracing prompts. There were a number of problems with the faded-tracing method. First, the subject tended to connect the dots in separate strokes while avoiding the use of a continuous stroke to form the letter. Second, when the dots were backward faded, the subjects were unable to continue. They ended at the last dot and did not finish the letter. Third, the subjects connected the wrong dots. The next variable was discrimination training of correct and incorrect letter forms. While the subjects who received the discrimination training did significantly better on the discrimination posttest they did not do significantly better on the letter formation posttest.

Hertzberg (1926) conducted an experiment to determine the effectiveness of the mechanical device method as contrasted with the

direct learning method of teaching beginning writing. Using kindergarten children from New York City Public Schools, Hertzberg's design employed four groups of children. Group I, used groove tracing, sand-paper outline tracing, and finger tracing of letters. Group II, traced the letters through transparent paper. Group III, copied the letters-- direct learning. Group IV, used a combination of all four methods. The training lasted 15 days after which the subjects were evaluated using the Pintner-Cunningham Primary Mental Test. The results of the four methods showed a significant difference in favor of the direct learning method. Hertzberg (1926) stated that:

The results of the investigation indicate that the devices do not contain elements which are common to writing to the extent that the ability developed from training in them transfers appreciably to writing" (p. 58-59).

A similar study was done by Gates and Taylor (1923) in which they found that the transfer from tracing to writing produced only meager results and that direct learning was more efficient.

The finding in the Project Literacy Curriculum Writing Seminar (1966) and Handwriting, Exploration of Handwriting Skills with Head Start Children (1966) suggests that the data on the rationale for letter formation, size of letter, width of line, and kind of tool do not support current handwriting practices. It was found that the line for beginning writing could be between $\frac{1}{2}$ and 1 inch, which was the size that 67% of the children made their letters when asked to write on unlined paper. It was also observed that letters should be made from top to bottom, left to right. Sequencing of letter shapes to be taught was also modified. The observation showed that the daily usage

of letters was more important than ease of formation. Therefore, lower-case letters should be taught first along with a few capitals.

Enstrom and Enstrom (1972) have found that learning manuscript form is easier if the student is allowed to make oval shapes. Ruled paper was found to solve many instructional problems that arise in the early stages of handwriting. It provides the students with cues that they can use to position letters. Although vertical handwriting is not natural, they recommend the use of this approach in the beginning.

The question is not whether or not developmentally disabled children can be taught to write; they can. Hofmeister (1969) found that trainable mentally retarded students could benefit significantly from training in the areas of time telling, reading, counting, and writing. Staats (1968), McNees (1972), and Fauke (1973) found that a significant change in handwriting can be achieved through the use of behavior modification procedures. By using primary and social reinforcers, along with several instructional procedures, Fauke (1973), was able to bring about a 65% increase in copying letters with a model, an increase from 25% correct to 90% correct in 14 sessions. Also, an 80% increase was also achieved in writing letters without a model, an increase from 5% to 85%. Using a reversal procedure, when reinforcement was withdrawn there was a substantial decrease in correct response. Reinstatement of reinforcement brought back the increase of correct responses. Fauke (1973) states: "Follow-up testing two weeks later, and one month later indicate that the child maintained his high level of performance" (p. 29). McNees (1972) used a system of cues and reinforcers appropriate to shape an educable mentally retarded student

whose writing was barely legible because he did not space his words.

A strip of paper was used to prompt correct spacing of the words.

After 15 weeks, the paper was dropped and the boy continued to properly space the words.

CHAPTER II

A COMPARISON OF THE EFFECTS OF TWO PROGRAMS ON THE HANDWRITING OF DEVELOPMENTALLY DISABLED ADOLESCENTS

After examining research on handwriting, it appears that many handwriting programs tend to be based on conjecture and not empirical data. Now, it is time to bring the above research based techniques together and suggest an alternative program. Otto (1969) states " . . . there seems to be more interest in finding out what is being done and in telling people what they should be doing than in testing hypotheses or creating new ones" (p. 577).

This study investigated the effect of two different approaches in the teaching of manuscript writing. One group (T) was taught manuscript writing with Write and See, which teaches letter formation and words through faded tracing. The other group (C) was taught manuscript through a combination of direct copying of the whole words and backward chaining of individual letters that the subject had particular difficulty forming.

Method and Procedures

The subjects for this study were 34 institutionalized adolescents with ages ranging from 12 to 20. Their grade levels as measured by the Wide Range Achievement Test ranged from k.4 to 5.2. The

34 subjects were given a pretest in February (Appendix A). Based on their pretest scores, they were divided into two homogeneous groups I and C. The groups received 15 to 30 minutes of handwriting instruction daily for two months. Group I used a modified Write and See handwriting program. Instead of using the special pen that was designed to be used with the program, the subjects used a regular pencil. After the subjects completed all the letters on each page, the teacher went over all the letters that were formed incorrectly with a hot pink or orange felt tip pen (Hofmeister, 1973). Then the subjects were put through an over-correction procedure where they had to erase the incorrect letters, leaving the ink from the felt tip pen. Then, the subjects traced over the letters. After correcting all the mistakes, if there were any, the teacher then graded the subjects paper. If the teacher felt that the subject had not tried, and that the cause of the poor paper was behavioral, he did not give the subject any tokens. If the subject showed some effort, but still did not do a good job relative to his individual abilities, he earned one token. For a good effort the subject received three tokens. An outstanding paper earned a subject six tokens and allowed him to exit the correction procedure. Those subjects who earned zero or one token had to do the entire paper over again. Those subjects that earned three tokens only had to do over those letters or words that they had formed incorrectly on the first paper. The second page was graded on improvement; no improvement one token, improvement three tokens, and an outstanding improvement paper six tokens. After completion of the second paper, the subject moved to the next task.

Group C was placed in a whole word copying program. The subjects in Group C were given a paper with two word phrases or sentences on it (Appendix B) and two spaces available in order that the subjects could make two separate responses to each task (Hofmeister, 1973). After completion of the first response, the subjects had the teacher check their papers and make any corrections if needed. If corrections were needed, the teacher made them with a hot pink or orange felt tip pen. Then the subjects erased their mistakes and traced over them, after which they made a second response directly below. As for the other group, the first response was graded on performance, and the second response on improvement. Zero, one, or three tokens were given for the first response, zero token for a poor effort, one token for a good effort, and three tokens for an outstanding effort. Those subjects that received three tokens earned the right to skip the second response and move to the second task. Those subjects who earned zero or one token had to make a second response. The second response earned them one token for no improvement or three tokens for some improvement. As the subjects progressed through the program, they were required to decrease the size of their writing after 25 pages (Appendix C).

If a subject was consistently unable to form a particular letter, he entered an alternate treatment. In the alternate treatment the subject was taught the formation of the letter through backward chaining (Appendix D). During the alternate treatment the subject received one token for every row completed. When the subject had successfully completed the alternate treatment for that particular letter, he was brought back into the copying phase.

The tokens that the subjects earned were used by them to buy such reinforcements as candy, cookies, soda, toys, clothing, personal items, time in a reinforcement event area, and trips. The tokens were also used in conjunction with the other subjects that were taught. The subjects had anywhere from six months to three years experience in the use of tokens. They valued the tokens and were highly motivated to earn them.

Results

There was no significant difference found between the two programs. Table 1 presents the mean score, standard error of the means, coefficients of correlation, difference of the means, standard error of the mean differences, and the \bar{z} ratios for the pretest and posttests. The gain scores for groups C and T also are reported in Table 1. The C and T groups have a slight mean difference on the pretest, but the \bar{z} of .14 for this difference is so small that it fails to reach significance which requires a \bar{z} of 1.96 at the .05 level. It is concluded that the two groups can be regarded as probably not being initially different, but it cannot be said they are equal. The same is true of the two groups on the posttest where the \bar{z} equals .88. This would seem to indicate that there is no significant difference between the two programs. However, since the two groups had an initial difference on the pretests, this initial difference should be considered. Therefore, it was necessary to use the gain scores for the two groups. By using the gain scores a \bar{z} equal to 1.61 was derived. This indicates that the difference between the programs was not significant. It was found that there was a significant difference between

TABLE 1
 TESTS OF SIGNIFICANCE OF GAINS OF TWO HANDWRITING
 PROGRAMS: COPYING VERSUS FADED-TRACING

	Group <u>C</u>		Group <u>T</u>		r_{ct}	Difference	SD_{DM}	\bar{z}
	M_c	SD_m	M_t	SD_m				
Pretest	86.24	12.10	85.76	12.72	.98	.48	3.51	.14
Posttest	91.71	12.55	88.53	13.05	.98	3.18	3.62	.88
Gain ($M_2 - M_1$)	5.74	1.45	2.77	.99	.28	2.70	1.68	1.61
\bar{z}	3.77		2.80				1.61	

the pretest and posttest scores within the group. The one tailed-test for significance requires a \bar{z} of 2.33 at the .01 level. The \bar{z} for group C and I were 3.77 and 2.80 respectively.

CHAPTER III

DISCUSSION AND CONCLUSION

The purpose of this study was to investigate the effects of two different types of handwriting programs on the manuscript handwriting performance of developmentally disabled adolescents.

The outcome of the study failed to show any significant difference between the subjects who used the copying method and those who used the faded-tracing method. An examination of the training exercises showed that the subjects in Group I who were unable to form a letter without any cues were still unable to form the entire letter at the end of the two months. The problem seemed to arise from the fact that there were no cues to indicate to the subject that a letter should go in the blank. The subjects always needed some type of cue, even if it was just a dot. The subjects in Group I had a tendency to trace only over the part of the letter that was given and to leave the rest of the letter unfinished. They never learned to complete an entire letter on their own without cues.

The subjects in Group C seemed to be unable to position their letters in proper relation to the lines. The lines did not provide sufficient cues for the subject to position their letters. A second problem that the subjects in Group C experienced was a tendency to ignore the letter that they were instructed to copy and instead write a letter that they could write. Subjects who were placed into the al-

ternate treatment seemed to be able to benefit from this treatment, but they needed an ongoing maintenance program to review the letter formations that they had been taught.

For both groups, spacing of words seemed to be a problem that could be corrected to some degree, but most subjects did not seem to generalize this skill to other groups of words. Pencils and erasers seemed to affect the writing skills of the subject. Those subjects that had problems writing dark enough were given softer pencils. The subjects that wrote too dark, tended to have messy papers, were given harder pencils. Because the subjects were put through an over-correction procedure where they had to erase their mistakes, it was found that those subjects who used softer erasers tended to produce neater papers than those who used hard erasers. The subjects that made superior gains were those that had most of the necessary skills, but were unable to position their letters properly.

Contrary to the findings of Hirsch and Niedermeyer (1973), the group that learned manuscript handwriting through direct copying did not do significantly better than the group that used faded tracing. This could have been caused by the fact that both groups were subjected to behavior modification procedures which could have neutralized the differences between the groups, as suggested by the success of Fauke (1972), McNees (1972), and Staats (1968) in their use of behavior modification to improve writing skills.

Conclusion

Both methods were shown to produce a statistically significant gain, but neither method was shown to be more significant than the

other. What seemed to be apparent is the fact that both methods have drawbacks. A task analysis should be done to determine the subtasks that are involved in handwriting. From this analysis a child should be able to be entered into an appropriate program that would sequentially train the subtasks that the child needs to learn. It would appear that further studies should be done to investigate the effects of the application of behavior modification procedures on different methods of instruction and different curricula. The one thing that is very apparent is that too many instructional procedures for teaching handwriting have been based on conjecture and not on empirical analysis. More research into primary teaching methods of handwriting is necessary, if the teaching of handwriting is to be taught effectively and efficiently.

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APPENDIX A

PRETEST AND POSTTEST

A a B b C c D d

(8)

E e F f G g H h

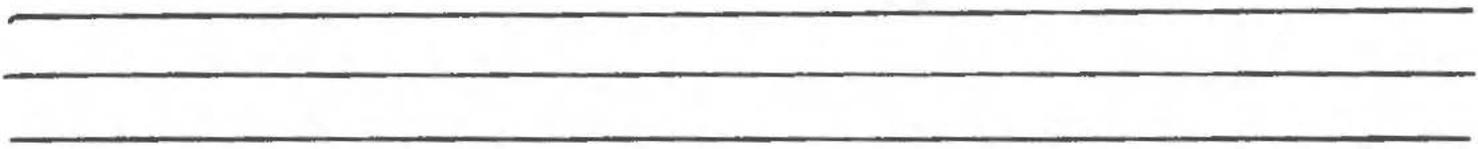
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I i J j K k L l

(24)

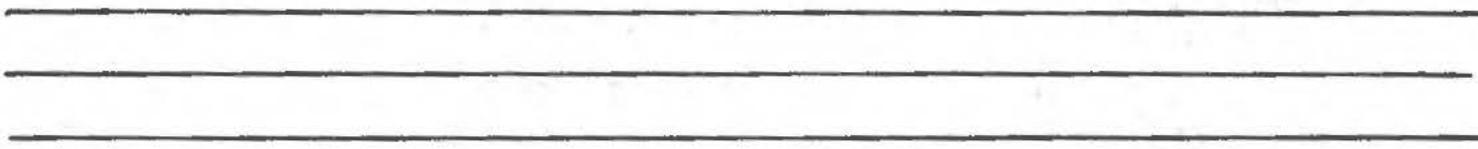
M m N n O o P p

(32)



Q q R r S s T t

(40)



U u V v W w

(46)



X x Y y Z z

(52)

The boy put the cat

(71)

under the box.

(85)

The cow is yellow and red.

(111)

x

Put the flowers on the table.

(140)

x

APPENDIX B

COPYING EXERCISES--LARGE LETTERS

1.

the horse is black

2.

3.

1.

a yellow box

2.

3.

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SOUTHWESTERN REGION
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APPENDIX C

COPYING EXERCISES--SMALL LETTERS

1. The chicken has the egg.

2.

3.

1. He is playing at school.

2.

3.

APPENDIX D

ALTERNATE TREATMENT--BACKWARD CHAINING

