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THE EFFECT OF THE TIME  
OF CHANGE-OVER FROM MANUSCRIPT TO CURSIVE WRITING  
ON HANDWRITING SPEED AND LEGIBILITY

By

Sylvia Louise Thomas

B. A. University of Montana, 1961

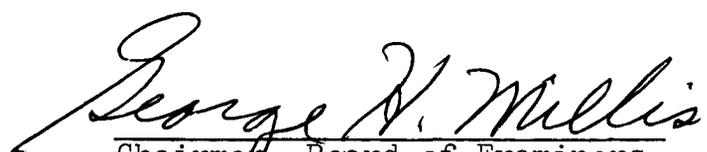
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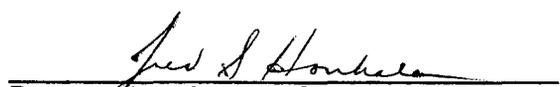
Master of Arts

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1966

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## CHAPTER I

### THE PROBLEM

Introduction. In different decades and in different school systems in America, various methods of handwriting have been taught. In some instances beginners in the first grade start by learning to write in cursive style and never change. In other times or places first-graders begin with manuscript writing and are never taught another form of handwriting unless they are self-taught. In still other situations first-graders learn to do manuscript writing in the first grade. Then, in various subsequent grades, they are given instruction in changing over to cursive writing. There has been some question as to the grade placement of these two handwriting styles.

Statement of the problem. This study was undertaken to obtain information concerning the following question. When should cursive writing be introduced in the school program to net the best results in producing speed and legibility in the handwriting of the pupils throughout their school years?

Definition of terms. "Manuscript is handwriting that makes use of adaptations of the printed letter forms,

as in printscript, but that permits of more ornamentation and free strokes than are used in printscript."<sup>1</sup>

"Printscript is defined as a style of handwriting that consists in the use of modified forms of the printed letter, simplified and without ornamentation, the letters in a word not being connected by strokes."<sup>2</sup>

"Cursive is writing that is characterized by running or flowing lines, with strokes joined within the word and angles rounded."<sup>3</sup>

Speed Score of writing is found by counting the number of letters written per minute.

Legibility of handwriting refers to ease and speed with which the handwriting may be read.<sup>4</sup>

Combined Handwriting Performance Score is a combination of the speed score and legibility score.

Cursive Group refers to the Deer Lodge fourth and sixth-grade children in this study who were members of matched pairs. Cursive writing was introduced to these children in the last half of first grade following the introduction of manuscript writing.

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<sup>1</sup>Carter V. Good, Dictionary of Education (second edition; New York: McGraw-Hill Book Company, 1959), p. 610.

<sup>2</sup>Ibid., p. 412.

<sup>3</sup>Ibid., p. 610.

<sup>4</sup>Harry A. Greene and Walter T. Petty, Developing Language Skills in the Elementary Schools (Boston: Allyn and Bacon, 1963), p. 529.

Manuscript Group refers to the Missoula fourth and sixth-grade children in this study who were members of matched pairs. These children did not begin cursive writing until the third grade.

Importance of the study. Since the appeal is made from time to time from schools of higher education and from business for the elementary school to attempt to improve the quality of handwriting of its pupils,<sup>5</sup> it appears desirable to attain a superior skill in producing legible handwriting at a reasonable rate of speed. This value accrues not only to each student, but is of interest to his future teachers and employers as well.

It was the opinion of some that style of handwriting is related to pupil's performance in reading and in spelling. But Varty, in a study done in 1938, found no basis for the opinion that manuscript writing produces greater spelling gain than cursive. There were no significant differences shown between the manuscript and cursive groups to support this belief.<sup>6</sup>

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<sup>5</sup>Paul S. Anderson, Readings in the Language Arts (New York: The Macmillan Company, 1964), pp. 144-49.

<sup>6</sup>Jonathon Varty, "Manuscript Writing and Spelling Achievement," Bureau of Publications (New York: Columbia University, 1938), pp. 35-41.

Some teachers report that children's marks in spelling are considerably lowered when they shift from manuscript to cursive. Although they consider manuscript to be more legible than cursive they claim that cursive need not be so illegible as to cause spelling errors if it is properly taught.<sup>7</sup>

McGinnis, Kleffner, and Goldstein report work with aphasic and deaf children at the Central Institute for the Deaf in St. Louis, in which they have used a method of teaching children spoken language and written language where the children previously had none developed. They work with pre-school and school-aged children. In the seven steps, which they call the "Association Method", the children first say the sounds, then write the sounds, then blend into words, and finally form sentences. The cursive script, rather than manuscript, is utilized in their teaching because the cursive script emphasizes the continuity and grouping of the letters and sounds into words and those who print rather than write are the exception. Of the 400 children taught there by this method they have found that children taught to read cursive symbols have had little

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<sup>7</sup>Bureau of Reference, Research and Statistics No. 9, Practices and Problems in Handwriting (New York: Board of Education, 1947), pp. 77,78.

or no difficulty in making the transition from reading cursive symbols to reading printed letters.<sup>8</sup>

Typical of another point of view is Freeman who maintains that manuscript is easier to learn for young children because the letters are separated so that they do not have to learn to make connecting strokes. Each letter stands out as a distinct unit.<sup>9</sup>

Greene and Petty maintain that the use of manuscript writing results in an indirect advantage favorably affecting learning of other subjects, particularly reading.<sup>10</sup>

There is need of controlled studies in which comparable groups of pupils are taught different handwriting styles. American schools have never developed norms for rate and quality of manuscript writing for elementary schools comparable to those described for cursive writing.<sup>11</sup>

Heese observed a relationship between quality of handwriting and early change-over from manuscript to

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<sup>8</sup>Mildred A. McGinnis, Frank Kleffner and Robert Goldstein, Teaching Aphasic Children, The Volta Bureau, No. 677 (Washington, D. C.: 1537 35th Street, N. W.).

<sup>9</sup>F. N. Freeman, "An Evaluation of Manuscript Writing," Elementary School Journal, 36:446-55, February, 1936.

<sup>10</sup>Greene, op. cit., p. 225.

<sup>11</sup>Anderson, op. cit., p. 167.

cursive writing among school children in South Africa. Prompted by his findings the present study was intended to be an elaboration of the Heese study done in the American culture, the results of which may pertain more relevantly to American educational practice.<sup>12</sup>

Purpose of the study. The nature of this study was to measure the relative effects of two varying times of change-over from manuscript to cursive writing on handwriting speed and legibility of elementary school children.

The hypothesis to be confirmed was that to engender superiority in quality of handwriting, it is more desirable for children to change from manuscript to cursive writing during the early portion of the last half of the first grade.

The .05 level was accepted by the author as the level of confidence necessary for rejection of a null hypothesis of which there are twelve:

1. There is no difference between manuscript and cursive fourth-grade groups of girls in terms of speed in the tested results of handwriting sampled.
2. There is no difference between manuscript and cursive fourth-grade groups of boys in terms of speed in the tested results of handwriting sampled.
3. There is no difference between manuscript and cursive fourth-grade groups of girls in terms of legibility in the tested results of handwriting sampled.

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<sup>12</sup>J. DeVilliers Heese, "The Use of Manuscript Writing in South African Schools," Journal of Educational Research, 40:175, November, 1946.

4. There is no difference between manuscript and cursive fourth-grade groups of boys in terms of legibility in the tested results of handwriting sampled.
5. There is no difference between fourth-grade manuscript and cursive groups of girls in terms of total quality in the tested results of handwriting sampled.
6. There is no difference between fourth-grade manuscript and cursive groups of boys in terms of total quality in the tested results of handwriting sampled.
7. There is no difference between manuscript and cursive sixth-grade groups of girls in terms of speed in the tested results of handwriting sampled.
8. There is no difference between manuscript and cursive sixth-grade groups of boys in terms of speed in the tested results of handwriting sampled.
9. There is no difference between manuscript and cursive sixth-grade groups of girls in terms of legibility in the tested results of handwriting sampled.
10. There is no difference between manuscript and cursive sixth-grade groups of boys in terms of legibility in the tested results of handwriting sampled.
11. There is no difference between sixth-grade manuscript and cursive groups of girls in terms of total quality in the tested results of handwriting sampled.
12. There is no difference between sixth-grade manuscript and cursive groups of boys in terms of total quality in the tested results of handwriting sampled.

Scope of the study. Handwriting samples were collected during the first two weeks in April, 1966 from 92 fourth-grade pupils and from 77 sixth-grade pupils which comprised the total enrollment in those two grades in Deer Lodge, Montana, city schools. In these schools cursive writing was begun in first-grade following the introduction of manuscript writing. Handwriting samples were also collected from 143 fourth-grade and 138 sixth-grade pupils selected from several city schools in Missoula, Montana, who

did not make the change-over from manuscript to cursive until the third grade. Only the handwriting of children who had been in the same school district since entering first grade was considered. Subjects from these two groups were matched on the basis of sex, reading scores, right or left-handedness, and chronological age because, upon reviewing the literature, these variables have been found to have an effect on handwriting performance. This procedure yielded 35 fourth-grade matched pairs and 30 sixth-grade matched pairs.

There was not an IQ score available in the school records for all the children in both districts in the same grade, nor one measured by the same instrument. Therefore, IQ was not used as a factor in matching.

Subjects of the two groups were first matched on the basis of sex. Boys were matched with boys and girls with girls.

Pairs were also matched for ability on the basis of the final third-grade reading test score as both school districts were found to have used the same editions of the same Scott, Foresman third-grade reading test (either More Roads to Follow or New More Streets and Roads).

Children were matched on the basis of chronological age and it was possible to match 21 pairs exactly to the

year and month. Variation of one to two months was allowed in 44 pairs.

Each child was directed to denote whether he was right or left-handed by stating at the top of his test paper either right-handed or left-handed.

Enstrom advises, contrary to some current statements that speed is not important--only legibility counts, that both speed and legibility must be considered and tested together since both depend mainly on the use of larger muscles employed in the writing process.<sup>13</sup>

Although slowly made, finger-drawn, letter forms may test high on a handwriting scale, under the pressure of speed in the practical use situation, such as keeping up with note taking, or with thinking, handwriting disintegrates. Therefore, any research which ignores speed is wholly fallacious.<sup>14</sup>

Limitations of the study. Because these handwriting samples are drawn from two separate school districts it is recognized that any differences found in the quality of handwriting could possibly result from other factors. It was necessary to find a school system that met the criterion of this study that cursive writing had been taught

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<sup>13</sup>E. A. Enstrom, "Research in Handwriting, "Elementary English, 41:875, December, 1964.

<sup>14</sup>Ibid.

in first grade. The Deer Lodge school system met this requirement. Particular schools in Missoula were selected, where the change-over to cursive occurred in third grade, due to the convenience of obtaining data from these schools.

There are differences in background preparation of the groups which are beyond control in this study. All Deer Lodge children attend kindergarten as part of the public school program. Some Missoula children attend private kindergartens. Deer Lodge utilized homogeneous grouping within all classrooms on the basis of IQ and reading achievement. One Missoula school sampled uses homogeneous grouping. The number of minutes per week spent on handwriting instruction in each classroom varied from 25 minutes to 90 minutes in Deer Lodge and from 45 to 100 minutes per week in Missoula.

## CHAPTER II

### REVIEW OF THE LITERATURE

Background of the development of handwriting. During the fifteenth and sixteenth centuries the monks used manuscript writing to write on the parchment which later they learned to cut into pages and bind together in books. These books were works of art, beautifully printed in manuscript writing, extremely legible, and often illuminated with expensive gold ink.<sup>1</sup>

With the invention of the copperplate, man's needs changed requiring writing without the lift of the pen after each stroke as in manuscript. So, cursive writing became the new style of writing, which though recognized as a degeneration of the original style of the monks, came to be accepted as the style of writing for use in personal and business affairs.<sup>2</sup>

Contemporary with efforts to improve cursive writing has come a movement to revive the very legible and beautiful writing of the monks. Mothers in England, who were concerned with finding an easy way for their children to learn

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<sup>1</sup>Bureau of Reference, Research and Statistics No. 9, Practices and Problems in Handwriting (New York: Board of Education, 1947), p.2.

<sup>2</sup>Ibid.

to write, used manuscript in a limited way. After 1913, when Mr. Edward Johnston convinced a group of teachers of its superiority to cursive writing, the movement has spread.<sup>3</sup>

In 1922 Miss Marjorie Wise, of England, gave impetus to the teaching of manuscript in this country by offering a course at Columbia University. By 1929 more than seven hundred schools were using it.<sup>4</sup>

The relative worth of one style of writing over another for children above third grade continues to be a debatable issue when the attitudes of teachers, children and the public are considered.<sup>5</sup>

Many studies indicate clearly that not the amount of time spent on handwriting as much as the specific techniques employed by pupils and teachers are the important factors in obtaining good handwriting results.<sup>6</sup>

The gist of the results of a questionnaire which Groff sent to 92 large American corporations inquiring their preference of handwriting styles for their employers, manuscript, cursive, or either, showed that over half or 52.7 per cent of the respondents indicated that either style

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<sup>3</sup>Ibid.

<sup>4</sup>Ibid.

<sup>5</sup>Ibid., p.3.

<sup>6</sup>Ibid., p. 11.

would serve their needs adequately. Manuscript was preferred by 33 per cent and cursive by 14.3 per cent. He inferred that those who made the choice of manuscript over cursive did so because they considered it to be more legible. Clearly they desired the most legible handwriting possible regardless of the style that was taught.<sup>7</sup>

Until the relative merits of manuscript and cursive writing are more carefully worked out and interpreted to the public, there is certain to be resistance from the older children if the teaching of manuscript writing is extended beyond the primary grades in all schools.<sup>8</sup>

Goetsch reports that research tends to support the use of manuscript writing in primary grades. He found that it was the form used until grade three in the majority of the schools studied in four cities. It is probable that manuscript is easier for young children to learn. He also found that children experience little difficulty in shifting to cursive above grade three and that the type of instruction given influenced neither speed nor quality of writing.

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<sup>7</sup>Patrick J. Groff, "Preference For Handwriting Style by Big Business," Elementary English, 41:863-868, December, 1964.

<sup>8</sup>Bureau of Reference, Research and Statistics No. 9, op. cit., p. 17.

The children from his manuscript groups did tend to write longer compositions with greater ease after the switch than did those initially taught cursive.<sup>9</sup>

Hildreth asserts the experts are correct in saying that, if a complete change to cursive is made, it should be made at the end of grade two to insure well established habits by the end of the elementary school period.<sup>10</sup> It takes several years to master efficient cursive. Ideally, handwriting should be nearly automatic before formal handwriting instruction ends. Those who write by hand should produce rapid, legible script while concentrating on ideas. Needless delay in introducing cursive may prevent the establishment of efficient habits.<sup>11</sup>

Hildreth adds that unfortunately the end of grade two is just the point at which a child is using his skill in manuscript writing to actively express his thoughts on paper and if he changes his style of writing at this point

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<sup>9</sup>Walter R. Goetsch, "The Effect of Early Handwriting Instruction," Elementary School Journal 36:297-98, December, 1935.

<sup>10</sup>Gertrude Hildreth, "Should Manuscript Writing Be Continued in the Upper Grades?" Elementary School Journal 45:85, October, 1944.

<sup>11</sup>E. A. Enstrom, "After Manuscript Writing--When Shall We Begin Cursive," The Elementary School Journal, 61:24-27, October, 1960.

the development of skill in functional expressive writing may be delayed or even destroyed.<sup>12</sup>

Falk agrees with Hildreth that shifting from manuscript to cursive at just the time the child wants to write his own letter or story, rather than participating in group composition, often upsets the pupil's feeling of competence in the difficult process of written self expression.<sup>13</sup>

Studies made by Enstrom indicate that many children are ready to learn cursive during the latter part of first grade. When print skill is high and no new challenge is offered at this time carelessness often sets in. The beginning of such carelessness after high quality print has been achieved is recognized as an additional indication of readiness for joined script. However, Enstrom recommends beginning with manuscript and making the change-over early in second grade, with instruction in both styles continuing throughout the elementary school to maintain skills and allow the pupil to choose which style he will use for various purposes as the needs diversify.

This recommendation is based on his experience with 2,500 second-grade classes in four states. Hundreds of these teachers have asked to begin cursive writing before

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<sup>12</sup>Hildreth, loc. cit.

<sup>13</sup>Ethel M. Falk, "Handwriting," Teaching Language in the Elementary School." The Forty-Third Yearbook of the National Society for the Study of Education, Part II (The University of Chicago, 1944), p. 162.

midyear in second grade. They insist that these children have the necessary skill and interest to make the change at this time.<sup>14</sup>

Since manuscript is recommended as the beginning type of writing the question is sometimes asked, why not continue using it rather than changing to cursive. Although writing with separate strokes seems to be easier to learn, writing the words with continuous strokes is more efficient after it has been learned. In manuscript writing, longer pauses are made in writing the letters separately. This slows the writing down. If it is speeded up to equal the speed of cursive, it loses its characteristic merit, that of legibility. We read words as units, and a slight departure of the form of the individual letters from the ideal form does not impair legibility to any serious degree.<sup>15</sup>

Sometimes the objection is made that switching from manuscript to cursive writing violates the law of habit and introduces an added difficulty. Those who raise this objection do so on the basis of theory rather than experience. Nevertheless, conclusive evidence does not exist as to

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<sup>14</sup>Enstrom, op. cit., Vol. 61, pp. 24-27.

<sup>15</sup>F. N Freeman, "An Evaluation of Manuscript Writing," Elementary School Journal, 36:448, February, 1936.

whether the change should be made in the second or third grade.<sup>16</sup>

In general, the time required for making the transition from manuscript to cursive decreases as the transition period is postponed. Herrick sees no reason for favoring one particular year over another in the elementary school program. In periods of fifteen to twenty minutes per day, over a period of four to six weeks, the transition can be made satisfactorily with third and fourth-graders.<sup>17</sup>

A comprehensive, well-controlled study done in South Africa in 1944 by Heese as to comparative legibility, speed, and grade placement of manuscript and cursive writing has shown, among many other enlightening finds, that manuscript writing has real value as a beginner's introduction to writing and reading, but that changing over to cursive writing in first grade has a significant favorable effect on his future writing legibility and speed. Heese showed that the longer the change-over was delayed, the poorer was the quality of the handwriting in higher grades including high school. However, it was clearly shown that

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<sup>16</sup>Ibid.

<sup>17</sup>Virgil E. Herrick and Leland B. Jacobs, Children and the Language Arts (New York: The Macmillan Company, 1964), pp. 162-167.

significantly better quality scores were obtained by those pupils who first used manuscript writing and then changed over to cursive writing in grade one than in all the other groups, even those who never used manuscript.<sup>18</sup>

Influence of sex, handedness, chronological age, and ability on handwriting. Girls are from 12 to 20 months ahead of boys in maturational development. Except during the years between ages 11 and 14, mean weight of boys exceeds that of girls from birth.

Evidence shows boys to have greater neuromuscular tension than girls.<sup>19</sup> As previously mentioned, Groff noted the importance to quality of handwriting of the proper use of the smaller muscles.

In one study, which measured the amount of force a number of writers used during the sampling of their handwriting, it was noted that regardless of the rate of writing, the most legible samples were generally produced with less force variability, suggesting a higher degree of fine motor control under varied conditions of writing. Fast writing conditions induced less disruption of fine motor control among good writers than among poor writers. Good

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<sup>18</sup>J. DeVilliers Heese, "The Use of Manuscript Writing in South African Schools," Journal of Educational Research, 40:175, November, 1946.

<sup>19</sup>Leonard Carmichael (ed.), Manual of Child Psychology (New York: John Wiley and Sons, 1946), pp. 956-67.

writers were also able to maintain a high level of legibility under relaxed conditions while displaying their highest level of fine motor control. Such findings suggest that these good writers, all girls, have developed a highly coordinated motor set in handwriting that is flexible and adaptable, yet stable. The poor writers, three boys and one girl in this sampling, do not appear to have achieved a corresponding level of stability and adaptability to varied conditions of the handwriting act.<sup>20</sup>

In another study of national scope it appears that, as a group, highest legibility was produced by fastest writers. In every condition of writing the girls in Rarick's study produced the best in legibility of handwriting. There were some differences shown in the writing of high and low IQ children--sharper differences among boys than among girls--although these differences were not statistically significant.<sup>21</sup>

More boys are naturally left-handed than girls. Cole found 5 girls in 100 and 7 boys in 100 to be naturally left-handed.<sup>22</sup> On the average, left-handed children reach

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<sup>20</sup>Virgil E. Herrick (ed.), New Horizons For Research In Handwriting (Madison: The University of Wisconsin Press, 1963), p. 811.

<sup>21</sup>Ibid., pp. 75-79.

<sup>22</sup>Luella Cole, Handwriting For Left-Handed Children, Grades 1-6, (Indianapolis: Bobbs-Merrill Co., 1955), p. 1.

only four-fifths of the speed of the right-handed. A right-handed pupil can do 20 per cent more written work in the same time. When the left-handed child first starts to write, he is more likely than the right-handed child to mistake letters that face in one direction for similar letters facing in the opposite way. This may have a marked effect on his attitude toward his ability to do handwriting. The child who writes some letters in reverse is likely to show certain reversal tendencies in reading.<sup>23</sup>

Left-handed children can learn to write easily, rapidly, comfortably, and legibly if conditions accompanying the writing situations are suitable for them, and if they are not expected to grapple undirected with instructions given to right-handed children.<sup>24</sup>

Manuscript writing diminished the difficulties encountered by the left-handed children in learning to write. The position of the body is the same as that of the right-handed children. The letters are relatively easy to make, and children form them, as a rule, without too much strain on immature muscles.<sup>25</sup>

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<sup>23</sup>Bureau of Reference, Research and Statistics  
No. 9, op. cit., p. 63.

<sup>24</sup>Ibid., p. 64.

<sup>25</sup>Ibid., p. 65.

Results of a survey which Groff made in two cities found no difference as to rate of handwriting between right and left-handed pupils. He did find significant differences in rate of handwriting of boys and girls in intermediate grades. Girls wrote faster.<sup>26</sup>

In summarizing this literature it is notably obvious that, while there are some contradictions among the various authors quoted, there tends to be general agreement to the following ideas.

For young children in the primary grades manuscript is faster and more legible, but for children past about the age of 13 cursive writing is faster. Superior legibility of manuscript is true only when pure manuscript form is observed. If this style is modified as to slant or letter formation, speed can be obtained but its superiority as to legibility is lost.<sup>27</sup>

There are definite advantages to the child in learning to write manuscript first in the first grade. The separation of the letters aids his initial perception and learning of each letter. These forms are more similar to the printed materials he uses in beginning reading, hence the manuscript is an aid to his learning to read.

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<sup>26</sup>Patrick J. Groff, "Who Writes Faster?" Educa-  
tion, 83:368, February, 1963.

<sup>27</sup>Freeman, loc. cit.

The earlier the change-over to cursive is made the easier it is to achieve. As children manifest readiness for cursive this change-over should be made well before the end of the second grade to promote the best quality cursive, as well as to get the mechanics of the skill under control early so as not to inhibit the free flow of ideas in written composition.

Most schools presently make this change-over before the end of the fourth grade.

The most rigorously controlled, comprehensive, and statistically significant of these studies, that of Heese, clearly shows that better quality in legibility of cursive writing was obtained by those pupils who began with manuscript writing and changed over to cursive in the first grade than by those who made the change-over in any of the other seven grades, as well as those who never learned manuscript, having learned only cursive.

## CHAPTER III

### PROCEDURE AND PRESENTATION OF DATA

Introduction. It would have been more desirable to have selected groups for comparison from the same school district and to have carried out a longitudinal study controlling for all variables other than time of change-over. However, this was not possible.

An alternative was to locate school districts where there already existed a difference in time of change-over from manuscript to cursive handwriting and gain their permission and cooperation to do the study of the children's handwriting. This was accomplished. Deer Lodge schools operate on the basis of change-over in the last half of first grade following the introduction of manuscript. Permission was gained to collect data relative to writing skills and to make comparisons with data on writing samples collected from students in Missoula schools where the change-over from manuscript to cursive was not made until third grade. It was decided that handwriting samples would be secured from the fourth-grade and sixth-grade children because cursive writing was begun in first grade in Deer Lodge the year these sixth-graders were first-graders.

Collecting the data. A two-minute handwriting test was administered to 281 Missoula and 169 Deer Lodge

children during the first two weeks of April, 1966. Handwriting samples were collected from 92 fourth-grade pupils and from 77 sixth-grade pupils which comprised the total enrollment in those two grades in Deer Lodge, Montana, city schools where cursive writing was begun in first grade following the introduction of manuscript writing. These, representing the cursive group, were compared with some of the handwriting samples collected from 143 fourth-grade and 138 sixth-grade pupils from several city schools in Missoula, Montana, representing the manuscript group, who did not make the change-over from manuscript to cursive until the third grade. From these two groups it was possible to closely match 35 fourth-grade pairs and 30 sixth-grade pairs.

The two-minute test consisted of the first two sentences of Lincoln's Gettysburg address as found in the Ayres' Handwriting Scale, which was the instrument used in judging the legibility rating assigned to each writing sample.

To promote a standardized collection procedure, specific, concise directions to each teacher administering the test were provided. These instructions were for the purpose of providing a brief review of the qualities generally pertaining to good handwriting, as well as to afford as much similarity as possible in practice sessions among all the classrooms involved. These instructions

were also intended to insure as much uniformity as possible as to amount of practice of the sentences prior to the test. Each child was to become familiar with them so that his handwriting performance was being tested rather than merely his ability to copy the material. Included in the directions was a request that the two-minute test should not follow a period where much handwriting had been done, nor a period of strenuous physical activity. Also included were specific verbal instructions to be spoken by each teacher immediately preceding the test so that each child was given the same orientation to the handwriting act at the time the test was administered.

Nineteen packets were prepared, one for each class tested. Each packet included: (1) a sheet of instructions to the teacher to be used on the day selected for practicing the sentences,<sup>1</sup> (2) another sheet of instructions to be used on the day the two-minute test was administered,<sup>2</sup> (3) copies for each child in the class of the two sentences to be written over and over<sup>3</sup> (These were made in large primer type on three-quarter sized sheets of paper to fit easily on the desk without crowding the writing paper.),

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<sup>1</sup>See appendix B.

<sup>2</sup>Ibid.

<sup>3</sup>Ibid.

(4) wide-ruled, sixteen-pound sheets of writing paper for each child (provided to insure a uniform appearance for the benefit of the three judges), (5) two number two pencils to be used in writing the test (again, provided to insure uniform appearance for the judges), (6) and a Chart for Each Class Tested<sup>4</sup> to collect information about each child necessary to facilitate the selection of the matched pairs. This chart provided space for the teacher to list the name, sex, right or left-handedness, IQ, birthdate, date entered that particular school system, and the third-grade final reading test score of each child, together with information regarding amount of time scheduled for daily handwriting instruction, name of IQ test used and date administered, as well as a brief description of the socio-economic and cultural make-up of the community.

Processing the data. The only handwriting samples used were those of children who had entered first grade and remained in their respective school districts through the sixth grade. These samples were assigned a code number rather than allowing the name to appear, which usually denotes sex, to avoid possible influencing of the judges.

Three judges of legibility were selected. One criterion for their selection was that each stated that she

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<sup>4</sup>See appendix B.

was sincerely interested in the improvement of handwriting instruction. One judge was a teacher who has had training and experience in considering, teaching, and marking upper-grade pupils' handwriting. One judge was a teacher who teaches both manuscript and cursive and has been involved in teaching children to make the change-over from manuscript to cursive. The other judge was a teacher who has taught handwriting in all eight grades.

They each received a sheet of instructions<sup>5</sup> directing them to compare each handwriting sample with the Ayres' Handwriting Scale, which was provided to them, and assign a numerical rating of the legibility from the scale to each handwriting sample. Legibility was equated with readability.<sup>6</sup> When variation in their judgment occurred, the average of the three ratings was taken.

According to Herrick best results in rating legibility of handwriting samples are obtained when at least three persons rate them independently and the ratings are combined to show their central tendency.<sup>7</sup>

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<sup>5</sup>See appendix C.

<sup>6</sup>See page 2.

<sup>7</sup>Virgil E. Herrick (ed.), New Horizons For Research In Handwriting (Madison: The University of Wisconsin Press, 1963), p. 189.

The Ayres' Handwriting Scale was selected for purposes of this study for several reasons. It utilizes all the letters of the alphabet except three. The same sentences are used to measure handwriting legibility in all grade levels. Since this study is concerned with handwriting in two different grades this feature affords more uniformity in judging. It is designed for either sex and for right or left-handed writers and is a composite cursive scale covering the middle grades.<sup>8</sup> Anderson considers it to be probably the most scientifically constructed handwriting scale available.<sup>9</sup> The nature of the Ayres' Scale is cardinal thereby denoting the direction of the differences between ratings and is, therefore, more powerful than an ordinal scale which merely shows that there is a difference.<sup>10</sup>

The speed score of each sample was found by counting the number of letters written per minute.

A combination of speed and legibility must be considered together in any handwriting since they are both involved in the practical use situation.<sup>11</sup> Therefore, a

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<sup>8</sup>Ibid.

<sup>9</sup>Paul S. Anderson, Language Skills in Elementary Education (New York: Macmillan, 1964), pp. 107, 108.

<sup>10</sup>Herrick, op. cit., p. 207.

<sup>11</sup>E. A. Enstrom, "Research in Handwriting," Elementary English, 41:875, December, 1964.

combined handwriting performance score was determined through use of the Gates formula (combined handwriting performance equals legibility x  $3\sqrt{\text{speed}}$ ).<sup>12</sup>

Statistical analysis of the data. Data relating to legibility, speed, and combined handwriting performances of the cursive and manuscript groups, which are displayed in Appendix A, were analyzed by application of the Wilcoxon matched-pairs signed-ranks test. This test allows consideration of the magnitude of the differences, as well as the direction of the differences.<sup>13</sup>

A summary of the procedure is given. "These are the steps in the use of the Wilcoxon matched-pairs signed-ranks test:<sup>14</sup>

1. For each matched pair, determine the signed difference ( $d_i$ ) between the two scores.
2. Rank these  $d_i$ 's without respect to sign. With tied  $d$ 's, assign the average of the tied ranks.
3. Affix to each rank the sign (plus or minus) of the  $d$  which it represents.
4. Determine  $T$  = the sum of the ranks having the less frequent sign.
5. By counting, determine  $N$  = the total number of  $d$ 's having a sign.
6. The procedure for determining the significance of the observed value of  $T$  depends on the size of  $N$ :

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<sup>12</sup>J. DeVilliers Heese, "The Use of Manuscript Writing in South African Schools," Journal of Educational Research, 40:170, November, 1946..

<sup>13</sup>Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences, New York: McGraw Hill Book Co., 1956, p. 75.

<sup>14</sup>Ibid., p. 83.

- a. If N is 25 or less, Table G shows critical values of T for various sizes of N. If the observed value of T is equal to or less than that given in the table for a particular significance level and a particular N,  $H_0$  may be rejected at that level of significance."

In order to apply the procedure described above it was necessary to determine matched pairs. From the 450 writing samples taken, 20 matched pairs of fourth-grade right-handed boys and 15 matched pairs of fourth-grade right-handed girls were utilized. There were 18 matched pairs of right-handed, sixth-grade boys and 11 matched pairs of sixth-grade right-handed girls, and 1 matched pair of left-handed boys.

The pairs were matched as closely as possible on the basis of sex, handedness, chronological age, and reading achievement test scores because, upon reviewing the literature, these variables were found to have an effect on handwriting performance.

There was not an IQ score available in the school records for all the children in both districts in the same grade, nor one measured by the same instrument. Therefore, IQ was not used as a factor in matching.

Subjects of the two groups were first matched on the basis of sex. Boys were matched with boys and girls with girls.

The 65 pairs were also matched for ability on the basis of the final third-grade reading test raw score as

both school districts were found to have used the same editions of the same Scott, Foresman third-grade reading test (either More Roads to Follow or New More Streets and Roads). The widest range between scores was 11 points. This was allowed on only 2 pairs. Sixteen pairs of scores were matched exactly. The other 47 pairs of scores varied from 1 to 8 points.

Subjects were further matched on the basis of chronological age and it was possible to match 21 pairs exactly to the year and month. Variation of one to two months was allowed in 44 pairs.

The final factor employed in the matching procedure was handedness. Each child was matched with a like-child from the other group on the basis of being either right-handed or left-handed.

## CHAPTER IV

### RESULTS OF STATISTICAL ANALYSIS

The results of the statistical analysis of the data collected on fourth-grade subjects are presented on Table I. The differences used for this analysis are given in Appendix A.

In Table I the observed T value is significant at the .05 level when it is equal to or less than the critical T value given.

Two of the six differences shown in fourth grade were found to be statistically significant at the .05 level and in favor of the cursive group. The first of these was the difference in speed scores of fourth-grade boys. The second was the difference in legibility scores of fourth-grade girls.

The results are such that it is possible to reject the null hypothesis which states that there is no difference between manuscript and cursive fourth-grade groups of boys in terms of speed in the tested results of handwriting sampled.

The data also allow rejection of the null hypothesis which states that there is no difference between manuscript and cursive fourth-grade groups of girls in terms of legibility in the tested results of handwriting sampled.

TABLE I  
 COMPARISON OF VARIOUS SCORES OF  
 DEER LODGE CURSIVE AND MISSOULA  
 MANUSCRIPT FOURTH-GRADE  
 MATCHED PAIRS

Sex	Quality	Difference favoring	N	T	Critical T value**
Boys					
	legibility	manuscript	16	38	30
	speed	cursive	19	36.5*	46
	combined	cursive	20	87	52
Girls					
	legibility	cursive	10	6*	8
	speed	cursive	15	49.5	25
	combined	cursive	15	26	25

\*This T value is significant at the .05 level.

\*\*If the observed T value is equal to or less than the critical T value given in Table I, the null hypothesis may be rejected at the .05 level.

Outcomes of the statistical analysis of the data collected on sixth-grade subjects are presented in Table II. The observed T value is significant at the .05 level when it is equal to or less than the critical T value given.

There were no statistically significant differences found between sixth-grade, matched-pair groups.

TABLE II  
 COMPARISON OF VARIOUS SCORES OF  
 DEER LODGE CURSIVE AND MISSOULA  
 MANUSCRIPT SIXTH-GRADE  
 MATCHED PAIRS

Sex	Quality	Difference favoring	N	T	Critical T value**
Boys					
	legibility	cursive	13	46.5	17
	speed	cursive	19	62	46
	combined	cursive	19	91	46
Girls					
	legibility	cursive	9	19.5	6
	speed	manuscript	11	19	11
	combined	manuscript	11	17	11

\*\*If the observed T value is equal to or less than the critical T value given in Table II, the null hypothesis may be rejected at the .05 level.

## CHAPTER V

### SUMMARY AND RECOMMENDATIONS

Summary. This study deals with the measure of the effect of the time of change-over from manuscript to cursive writing on handwriting speed and legibility as it appeared among elementary school children in the fourth and sixth grades. The 65 matched pairs were drawn from the Missoula, Montana manuscript group, whose time of change-over was in third grade, and from the Deer Lodge, Montana, cursive group, whose time of change-over was the last half of first grade. There were twelve null hypotheses:

1. There is no difference between manuscript and cursive fourth-grade groups of girls in terms of speed in the tested results of handwriting sampled.
2. There is no difference between manuscript and cursive fourth-grade groups of boys in terms of speed in the tested results of handwriting sampled.
3. There is no difference between manuscript and cursive fourth-grade groups of girls in terms of legibility in the tested results of handwriting sampled.
4. There is no difference between manuscript and cursive fourth-grade groups of boys in terms of legibility in the tested results of handwriting sampled.
5. There is no difference between fourth-grade manuscript and cursive groups of girls in terms of total quality in the tested results of handwriting sampled.
6. There is no difference between fourth-grade manuscript and cursive groups of boys in terms of total quality in the tested results of handwriting sampled.
7. There is no difference between manuscript and cursive sixth-grade groups of girls in terms of speed in the tested results of handwriting sampled.

8. There is no difference between manuscript and cursive sixth-grade groups of boys in terms of speed in the tested results of handwriting sampled.
9. There is no difference between manuscript and cursive sixth-grade groups of girls in terms of legibility in the tested results of handwriting sampled.
10. There is no difference between manuscript and cursive sixth-grade groups of boys in terms of legibility in the tested results of handwriting sampled.
11. There is no difference between sixth-grade manuscript and cursive groups of girls in terms of total quality in the tested results of handwriting sampled.
12. There is no difference between sixth-grade manuscript and cursive groups of boys in terms of total quality in the tested results of handwriting sampled.

The statistical analysis employed in this study, which was accomplished through application of the Wilcoxon matched-pair signed-ranks test, revealed only two statistically significant differences. Both were found to favor the handwriting of pupils who changed from manuscript to cursive during the last half of grade one.

(1) The data show that there was a statistically significant difference in the speed of writing of the fourth-grade cursive group of boys when compared with the boys in the fourth-grade manuscript group.

(2) The data show that there was a statistically significant difference in the legibility of writing of the fourth-grade cursive group of girls when compared with the girls in the fourth-grade manuscript group.

Recommendations. From the data collected for this study it is impossible to come to any definite conclusions as to when the change-over from manuscript to cursive writing should take place. However, the presence of two differences that were statistically significant in favor of the cursive group were found at the fourth-grade level and no statistically significant differences were found at the sixth-grade level. This would indicate that the effects of time of change-over which were present in the fourth-grade had disappeared by the time students reached sixth grade.

The fact that the two statistically significant differences that were found were in favor of the cursive group, and the fact that of the twelve comparisons made, nine of the absolute differences were in favor of the cursive group would suggest that further studies be made in this area in an effort to cast further light on the most appropriate time to switch from manuscript to cursive.

It is recommended that a follow-up study, incorporating the hypotheses used in this study, and made in a single school district using an experimental approach be carried out. Additional questions could be included, also, to broaden the scope of a further study. To produce optimum quality handwriting should a change-over be necessary? Would beginning with cursive writing yield best results, or

would beginning with manuscript writing and never making the change-over be the ideal handwriting method? After reading the literature related to this study, the question may be posed as to whether or not children should be taught manuscript writing to coincide with their beginning reading experience.

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## APPENDIX

APPENDIX A

Score Differences of Matched Pairs  
on Three Measures of Handwriting Performance

Matched Pairs	Speed	Legibility	Combined
Fourth-Grade Boys			
1	+15	-10	-39
2	+41	+20	+769
3	-20	0	-242
4	-16	-10	-375
5	+12	-10	+25
6	-5	+20	+444
7	+28	-10	-16
8	-1	0	-10
9	-14	+10	+35
10	+40	-10	+152
11	+29	-20	-120
12	+16	-10	-92
13	-7	0	-57
14	0	-10	-190
15	+26	-10	+36
16	+9	+10	+297
17	+21	0	+249
18	+12	-20	-224
19	+55	-20	+205
20	+13	-20	+793

Matched Pairs	Speed	Legibility	Combined
Fourth-Grade Girls			
21	+1	+20	+549
22	-5	+30	+542
23	+4	+20	+459
24	+26	0	+395
25	+15	+10	+388
26	+18	+10	+383
27	-4	+20	+368
28	+7	-20	-347
29	-10	-10	-338
30	-2	-10	-257
31	+22	0	+226
32	-2	0	-16
33	+15	0	+159
34	-20	+10	+117
35	-23	0	-169
Sixth-Grade Boys			
36	+23	-30	-519
37	-7	=20	-337
38	-18	-20	-590
39	+1	+10	-250
40	-4	+10	+116
41	+5	-10	-168

Matched Pairs	Speed	Legibility	Combined
42	+25	+10	+498
43	+48	-10	+157
44	+8	+10	+324
45	+15	-10	-274
46	-35	0	-889
47	+23	0	+111
48	+10	+10	+143
49	+18	+10	+404
50	+53	-10	-5
51	+36	0	+431
52	-14	0	-159
53	-8	0	-63
Sixth-Grade Girls			
54	-17	-10	-613
55	+19	-10	-44
56	-28	+10	-92
57	-61	-10	-826
58	+16	0	+122
59	+18	-20	-265
60	-29	+20	+245
61	+6	-10	-110
62	-17	0	-181
63	-6	-10	+50
64	-36	-20	-39
65	-11	0	-224

## APPENDIX B

### Instruments Used in Collecting Data

To the teacher administering the handwriting test:

This two-minute handwriting test is being administered to fourth and sixth-grade pupils as participants in a research project regarding handwriting legibility, the results of which will be presented to the University of Montana in a thesis. Your school district will also have access to these results. Your assistance will be gratefully received.

Your assistance will consist of three items: 1) to administer the two-minute handwriting test according to the simple directions given, 2) allow your pupils a period of practice prior to the test as suggested, and 3) to fill in the information about each pupil participating needed to validate this study on the form provided entitled, "Chart For Each Class Tested." Please use a separate chart for each class.

#### Procedure

1. Please ask the children in your class to write the sentences found on the attached copy over and over. Each child is to have a copy of these sentences at his desk.
2. Please allow the children time the day before the test is administered to practice the sentences which they are to write so that they become familiar with the content, phrasing and spelling of the words employed. They may practice on their regular school practice paper. At this time, please discuss with them the following factors pertaining to good handwriting quality.
  1. Make the letters b, f, h, k, and l all the same height, and the letters d and t slightly shorter. Cross the t's and avoid loops on the t's and d's.
  2. Make all small letters uniform in size.
  3. Round the tops of the m's and n's. Pointed letters are responsible for many untidy papers. Only the s has a point.
  4. Close the a, d, o, g, f, s, and p.
  5. Do not crowd letters.
  6. Differentiate between the b's and f's.
  7. Set all letters on the line.
  8. Make all loops thin.
  9. Make all letters with your ordinary, but uniform, slant.
3. Your pupils may also practice these sentences again on the day the test is administered for five minutes sometime during the hour previous to the test.

## Administering the Test

1. Please ask the children in your class to write the sentences found on the attached copy over and over. Each child is to have a copy of these sentences at his desk. These copies are supplied to you.
2. Please have the children write on the ruled paper which accompanies this test and use the pencils which are also provided with the test. Each child should have 2 of the pencils on his desk, sharpened and ready for use. (Should any child be hindered for some reason from writing continuously during the two-minute test, please make a note of this on the back of his paper when you collect it.)
3. Please time them carefully so that they start and stop right on the second and write exactly two minutes. A clock or watch with a second hand or a stop-watch may be used. When the time is up, the handwriting samples are to be collected immediately.
4. It is requested that this test will not be administered directly following a period in which children have done a great amount of handwriting and may be comparatively tired. It is further requested that this test not follow a period of strenuous physical activity for the same reason.
5. Please administer this two-minute timed handwriting test one morning during the first two weeks in April, 1966.
6. Before the timing starts, please have each pupil write his name and grade level and whether he is right or left-handed at the top of his paper.
7. The following instructions are to be spoken exactly as given below to the children by the one who administers the handwriting test. "When I say begin, start to write (cursive style) as well as you can, as fast as you can, but at your ordinary speed and quality in a comfortable way. In other words, don't waste time, yet don't hurry so much that you fail to use your best handwriting. So, just write as well as you can, as fast as you can, but at your ordinary speed and quality in a comfortable way. Write your sentences over and over until I say to stop. When I say stop, you are to quit writing at once, even though you are in the middle of a letter. You each have a copy of the sentences to be written at your desk. Ready, begin."  
 \*\*        \*\*        \*\*        \*\*        \*\*
8. Please fill in the "Chart for Each Class Tested" sheet found in the folder accompanying this test and supply the information requested at the bottom of the chart.
9. Again, I assure you that your effort expended in assisting in this study will be most gratefully received.

Four score and seven years ago  
our fathers brought forth a new  
nation, conceived in liberty, and  
dedicated to the proposition that  
~~all men are created equal.~~

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Now we are engaged in a great  
civil war, testing whether this  
nation, or any nation so conceived  
and so dedicated, can long endure.

# CHART FOR EACH CLASS TESTED

CHILD'S NAME	SEX BOY GIRL	HANDED- NESS R L	ANY UNUSUAL PHYSICAL IMPAIRMENT	HAS USED CURSIVE IN HALF OF FIRST GRADE AND SINCE	DATE OF BIRTH MONTH DAY YEAR	DATE ENTERED DEER LODGE OR MISSIONARY SYSTEM	IQ IN THIRD GRADE	NAME OF SCOTT - FORESMAN READING TEST ADMINISTERED IN THIRD GRADE	TOTAL RAW SCORE
1									
2									
3									
4									
5									
6									
7									
8									

TEACHER'S NAME \_\_\_\_\_ GRADE 4 OR 6 (CIRCLE ONE)

HOMOGENEOUS OR HETEROGENEOUS GROUPING? \_\_\_\_\_

AVERAGE AMOUNT OF TIME YOUR SCHOOL SCHEDULES FOR HANDWRITING INSTRUCTION PER DAY \_\_\_\_\_ MIN. PER WEEK \_\_\_\_\_ MIN.

NAME OF IQ TEST IN THIRD GRADE \_\_\_\_\_ MONTH GIVEN \_\_\_\_\_

BRIEFLY DESCRIBE YOUR COMMUNITY BY FILLING IN PERCENTAGES.  
(ESTIMATE APPROXIMATE PER CENT OF POPULATION)

- PROFESSIONAL \_\_\_\_\_%
- OCCUPATIONAL \_\_\_\_\_%
- AGRICULTURAL \_\_\_\_\_%
- TRANSIENT \_\_\_\_\_%

OVERALL CULTURAL SOCIO-ECONOMIC DESCRIPTION OF THIS COMMUNITY (CIRCLE ONE):

UPPER CLASS \_\_\_\_\_ MIDDLE CLASS \_\_\_\_\_ LOWER CLASS \_\_\_\_\_

APPENDIX C

Instructions to Judges

## Instructions to Judges

1. One of the criteria upon which you have been selected to assist in this study is that you shall be one who is sincerely interested in the improvement of handwriting instruction.
2. Please compare each sample of handwriting with the Ayres' Handwriting Scale provided and evaluate the handwriting legibility of each sample in terms of the Ayres' Scale. Assign each sample a numerical rating from the Ayres' Scale.
3. The writing samples are listed according to assigned numbers. Please do not write on the child's paper, ~~but record the numerical rating from the Ayres' Scale~~ which you assign to each sample on the chart provided in the column indicated on the chart, as:

ay1 -- 20  
ay2 -- 30  
ay3 -- 20  
by4 -- 60 etc.

4. Spelling errors or words left out should not be considered since they do not pertain to legibility of writing, but refer to comprehension.