6-1933

A STUDY OF THE QUALITY AND SPEED OF WRITING OF A GROUP OF LEFT HANDED CHILDREN

Mildred Skourup
Kansas State Teachers College

A STUDY OF THE QUALITY AND SPEED OF WRITING OF A GROUP OF LEFTHANDED CHILDREN

A Thesis Submitted to the Graduate Division in Partial Fulfillment of the Requirements for the Degree of Master of Science

By

Mildred Shourup

KANSAS STATE TEACHERS COLLEGE

Pittsburg, Kansas

June, 1933

ACKNOWLEDGMENTS

At this time I wish to express my appreciation for the suggestions and advice tendered me by Dr. Paul Murphy and Dr. C. B. Pyle. I also wish to thank the principals and teachers of the city schools tested for their cooperation and courtesy.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

AN INTRODUCTION TO THE PROBLEM

Introduction

An interest in the phenomena of handedness is by no means new. Many investigations have been carried out with the purpose of answering the numerous and various questions that have been asked about the relation of man's hands to each other. Almost as many different conclusions have been reached concerning the experiments mentioned above. Only a very few of the questions have been given an unanimous answer.

Many studies have been made heretofore concerning left-handedness, as to its correlation with speech defects, sight, intelligence, eyedness, scholastic activities and as to the varying degrees of handedness and their effect on the above mentioned factors. Since none of these phases is taken into account in the present study, a review of the various experimental findings on them is not essential here. As far as the investigator has been able to discover, little or no work has been done along the lines to be taken up in the present investigation.

Problems considered in this study

The present study was begun with two main ends in view: first, to compare the rate of the handwriting of lefthanded children with the average rate of righthanded children; second, to analyze the quality of the handwriting of left-handed children and to point out any peculiarities that

might be found to exist.

The first aim of the study: that is, the survey of the speed of handwriting of lefthanded children was begun with the purpose of finding out if lefthanded children as a whole write slower or faster than righthanded children. Can it be said that all lefthanded writers are slower than righthanded ones, as is the common belief?

The second aim of this study--the analysis of the quality of handwriting--was the original basis of the problem and as such is the part upon which the study attempts to throw more light. The following questions were raised: Is the quality of writing of lefthanded people poorer than the writing of righthanded people? Are there any peculiarities common to lefthanded writing? If so, what? In making an analysis of alignment, spacing, slant, and legibility, are there any differences between right and lefthanded writing?

CHAPTER II

SELECTION OF SUBJECTS

Method of selection

A survey was made of three public schools in Pittsburg, Kansas, namely: Washington, Lakeside, and Eugene Field, as to the number of lefthanded children in the three upper grades--the fourth, the fifth, and the sixth. Through the cooperation of the principals and teachers of these schools, the following number of lefthanded children were found: 10 lefthanded children out of a class of 108 in the three fourth grades; 9 out of a total class number of 119 children in the fifth grades; 6 lefthanded children in a total number of 90 in the three sixth grades.

After this preliminary selection was completed, actual experimentation as to the eyedness and handedness of the children was begun, taking up each of the groups tested in turn. This was done since it was thought that a knowledge of the eyedness and degree of handedness of each child might prove beneficial in the further work of the study.

The first step was the determination of the eyedness of each lefthanded child to be considered in this experiment. Each child was taken into a room by himself so that he might not be distracted by his classmates. The room used in each instance was an ordinary classroom, lighted and ventilated by several windows. By this means it was possible to have the child in surroundings perfectly familiar to him, and thus eliminate any wandering of his attention from the testing.

The child was then given two different tests of eyedness. In the first--the paper hole test--a sheet of cardboard with a small hole in the center of it was placed about fifteen inches from the child's face. He was then asked to look at a picture which was standing on a desk in front of him. First the right eye was covered and the child was asked to describe what he saw. If he did not see the picture, he was judged right-eyed, which was verified by covering the left eye and having him describe what he saw with the right eye. If he was able to describe the picture when his right eye was covered he was judged to be left-eyed. The picture used was that of a jayhawk, the school emblem of the University of Kansas. This test was repeated three times to see if there was any variation. The second test of eyedness was made by use of the A-B-C vision test of Miles[1]. In this a manuscope and five cards with two circles of different sizes on them were used. The child pressed the scope open, brought it up to the eyes, looked at the cards held up in front of him, and told which circle of the two on the card was the larger. By observing which side of the face was covered by the scope to the greater extent, the eyedness was discovered; that is, if the scope was placed more toward the left side of the face, the child was judged to be natively left-eyed. The advantage in this test is that the child did not know that he was moving the scope to either one side or the other, but thought that he had it directly in front of both eyes. In this way guess-

[1] "Ocular Dominance in Human Adults."--Journal of General Psychology, III, (1930) p. 424.

ing on the part of the child was prevented, since the observer was able to see clearly which side was favored without permitting the child to know that he was observed.

The second step was the presentation of a laterality index to each child. This index was to be filled out by the child with the aid of his parents and returned to his teacher. The index was based on the technique used by Jasper in his study of stutterers, in which he found that it was very reliable as a guide to handedness[2]. In the index used in this study there were thirty-five questions on acts performed by children of all ages. There were three different answers that might be given: that is, the child might answer the question by encircling the letter "R" which would mean that the right hand was always used in performing that act; he could encircle the letter "L", the left hand being the favored one in such a case; or he might encircle the letter "X" which would give no preference to either hand, but meant that either hand might be used indiscriminately. The index in the form used appears in the appendix.

Results of tests of eyedness and handedness

After the examination of the eyedness of the twenty-five lefthanded children had been completed, it was found that of that number all were left-eyed with the exception of four, all of whom were boys. No variation was found between the results

[2] "A Laboratory Study of Diagnostic Indices of Bilateral Neuromuscular Organization in Stutterers and Normal Speakers," Psychological Monographs, 43, 1932, p. 75.

of the two tests of eyedness given. Of the twenty-five cases, 16 per cent were right-eyed, and the remaining 84 per cent were left-eyed.

In the laterality index the score was obtained by subtracting the percentage of all items marked "right" from that of the items answered "left." Thus a positive score indicated a majority or left hand preferences, and a majority of right hand preferences was indicated by a negative score. As found in Table I which gives the eyedness and percentage of handedness for each child, there was only one negative score, showing that that child had a righthand preference. That same child was also right-eyed. Most of the pupils tested showed a high percentage of left hand preference. Several cases--one, fourteen, and twenty-two who were right-eyed, show a high percentage of left hand preference. But it might be well to state that they had quite a number of ambidextrous responses which were not considered in the scoring. The average of left-handedness was found to be 74.12 per cent, with the range going from 16 per cent to 100 per cent.

On the twenty-five copies of the laterality index given out, there were 875 questions in all. Of this number 756 of the L's were encircled, or 86.4 per cent of the total number; 75 R's, 27 X's, and 17 questions omitted composed the remaining number of answers. This would seem to show that the group was predominantly lefthanded in activity as well as in eyedness.

Summarizing the information found concerning the number

TABLE I

Eyedness and Percentage of Handedness Found

in Twenty-five Cases Studied

Number of case	Eyedness	Percentage of handedness
1	R	83
2	L	100
3	L	100
4	L	97
5	R	-21
6	L	100
7	L	97
8	L	81
9	L	53
10	L	100
11	L	94
12	L	100
13	L	82
14	R	76
15	L	53
16	L	100
17	L	94
18	L	97
19	L	100
20	L	100
21	L	94
22	R	92
23	L	13
24	L	94
25	L	94
	Average	74.12

of lefthanded children, there were twenty-five lefthanded children in a school population of 317--that is, 7 per cent of the upper three grades of the three schools examined were lefthanded. In the total number of 317 there were 157 boys and 160 girls. Of the twenty-five lefthanded children found, seventeen of them were boys and eight were girls. Thus, 10.8 per cent of the total number of boys were lefthanded, and 5 per cent of the entire number of girls were lefthanded. Of this number--that is, the twenty-five tested, 84 per cent were left-eyed, and 16 per cent were right-eyed, all the right-eyed being boys.

Wilson and Dolan found in their investigation on handedness that among 2,328 junior high school pupils 3.54 per cent were lefthanded[3]. Smith found lefthandedness in a group of 2,055 children at the rate of 4.5 per cent for girls and 5.5 per cent among the boys[4]. Parsons believed that more than 20 per cent of the world's population was lefthanded. From his manuscope test given to 887 pupils he found 69.3 per cent right-eyedness, 29.3 per cent left-eyedness, and 1.37 per cent impartial eyedness[5]. Miles found for a normal population about 65 per cent right-eyed dominance, about 30 per cent left-eyed

---

[3]"Handedness and Ability". American Journal of Psychology. LXIII, (1931) p. 267

[4]"A Brief Summary of Right and Lefthandedness". Pedagogical Seminar, XXIV, (1927) p. 33

[5]Lefthandedness, p. 105

dominance, and about 5 per cent mixed or impartial vision.[6]

The difference between the results found in the above studies and those of this study are probably due to the small number of cases examined in this instance.

---

[6] "Ocular Dominance in Human Adults", Journal of General Psychology, III, (1930) p. 428

CHAPTER III

EXPERIMENTATION

At the conclusion of the individual testing of the left-handed children, the next step was the testing of each grade as a whole as to speed of handwriting. Here the procedure followed partially that given in the Palmer American Handwriting Scale. As in the scale a different selection was given to each of the three grades tested. This material was typewritten in individual copies and was comprised of four sentences or phrases of twenty-five letters each, making a total of one hundred letters for each selection. The following were the selections used, taken from the Palmer American Handwriting Scale:

fourth grade,

A dozen boys had a jolly picnic,
They rode to the woods in autos.
Some took lunch in large boxes.
All of them had a very fine time.

fifth grade,

Dick drank much milk every day,
brushed his teeth after meals,
and tried to be quite a good boy.
He was happy and extra healthy.

sixth grade,

Teacher gave us writing tests,
and found quite a vew very poor.
Even lazy boys like the drill,
and will improve the next time.

These copies were handed out to the children and on the signal "go", they began to write and continued until they were told to stop, the interval of writing being two minutes. This speed test was given by the teachers during the penman-

ship period as a part of the lesson. In this way the distractions caused by the presence of an outsider such as the experimenter were eliminated, the children pursuing their customary habits, and in this way giving a better example of their normal speed of writing. By not segregating the left-handed children from the rest of the class, it was possible to obtain samples of the speed of handwriting of the class as a whole. At the same time it did not give the lefthanded pupils any hint that the investigator was especially interested in their writing.

The sample of handwriting obtained from the above speed test was the one used for the judgment of quality, since in the Palmer American Handwriting Scale the quality ratings were based on the same selections that are given for the speed test. The writing found in samples taken in this manner probably more nearly equalled their ordinary writing since time was not given for the extreme carefulness in writing that is found in special work that requires neatness and correctness.

Methods of analyzing the results obtained

In the grading of the speed tests the rate of writing in terms of letters per minute was computed by adding up the total number of letters written and by dividing this total by two. Any letters added or omitted by the writer were subtracted from the first total. Averages were then computed as to the speed of the lefthanded group, the righthanded group, and of the class as a whole. Then the three averages for each

of the three grades tested were compiled and conclusions drawn from the figures so obtained.

The quality of the handwriting was judged according to the Palmer American Handwriting Scale which classified the writing for each grade in seven groups, ranging from very poor to excellent. The specimen was placed beneath the scale samples for the grade to which it belonged and moved to the right or the left until that sample was reached which most nearly agreed with the specimen in appearance.

At this time it might be well to state why the Palmer American Handwriting Scale was chosen as the scale of measurement of quality and to tell some of the details of its compilation. It was compiled of specimens of handwriting collected by tests given to the various grades in cities and towns well distributed over the United States. Fifty specimens selected from each of the grades were ranked in quality by the teachers of that grade, supervisors, and handwriting experts. The final quality ratings were determined by an analysis of these combined judgments. This scale was chosen by the investigator on the advice of Mrs. Hallie Bennington, instructor of penmanship at the Kansas State Teachers College of Pittsburg, Kansas. It is considered one of the more detailed and newer of the various handwriting scales used by penmanship teachers.

After the rating of quality had been made according to the scale, each specimen was examined as to alignment, spacing, slant, and legibility. This was done by setting up three

standards for each of the four characteristics of handwriting which were mentioned above: a rating of one meant bad; a rating of two, fair; and a rating of three, good. The average found for these four aspects of handwriting in lefthanded children then was checked with the averages on the same four aspects as found in the papers of twenty-five pupils in the righthanded group, the specimens being chosen at random.

CHAPTER IV

DATA AND CONCLUSIONS ON SPEED

When the papers on the speed tests of the entire group, both right and lefthanded pupils, had been graded according to the method indicated in Chapter III, several facts were evident.

Taking up individually the nine groups in the three grades tested, it was found that in only two of the nine, that is, the fifth grades at Lakeside and Washington, did the lefthanded group have an average higher than that of the righthanded group. As seen in Table II the average for that grade at Lakeside was 60.66 letters per minute for the lefthanded group and 57.42 letters for the righthanded group. This average of 60.66 letters was also the highest one of the averages found for the three fifth grades. At Washington the lefthanded group in the fifth grade attained an average of 47 letters per minute, while that of the righthanded group was 41.58 letters. In the fifth grade at Lincoln the lefthanded group was slower in speed of writing that the righthanded group, making an average of 36.75 letters per minute to the 47.81 letters of the righthanded group.

In the three fourth grades the lefthanded groups were all slower than the righthanded ones as to speed of writing. At Lakeside the lefthanded group made an average of 46.66 letters per minute as compared to the average of 51.12 letters per minute for the righthanded group. At Washington the difference between the averages of the two groups was larger, the left-

handed class obtaining an average of 37.50 letters as compared with the average of 54.23 letters of the right-handed group. At Eugene Field the averages for the right and left-handed groups were respectively 52.95 letters and 48.80 letters per minute.

In the sixth grade of the schools involved the lefthanded groups were also below the averages found for the righthanded groups. The greatest difference in this grade was found at Lakeside where the lefthanded group had an average of 45 letters per minute, while the righthanded group had an average of 71.20 letters. At Washington the difference was large; an average of 31 letters for the lefthanded pupils and one of 56.07 letters for the righthanded group. At Eugene Field the average for the lefthanded pupils was found to be 50 letters and that of the righthanded 61.21 letters.

TABLE II

Averages of Letters per minute for Each Grade

Name of school	4th grade L.H.	4th grade R.H.	5th grade L.H.	5th grade R.H.	6th grade L.H.	6th grade R.H.
Washington	37.50	54.23	47.00	41.58	31.00	56.07
Lakeside	46.66	51.12	60.66	57.42	45.00	71.20
Eugene Field	48.80	52.95	36.75	47.81	50.00	61.21

Taking up the three fourth grades as a whole, it was found that the lefthanded group was 14.71 per cent slower in speed of writing than the righthanded group. The average for the lefthanded pupils was 45.90 letters per minute and for the

righthanded group 52.64 letters. Of the ten lefthanded children in this grade, five were above the average for their group and three of the five were above the average for the righthanded group.

TABLE III

Averages for the Three Grades Taken as a Whole

Grades	Pupils L.H.	Pupils R.H.	L.H. Average	R.H. Average	Diff. S.D. diff.
4th	10	98	45.90	52.64	
5th	9	110	47.00	48.72	
6th	6	84	42.00	61.60	
Totals	25	292	44.97	54.32	3.3

In the three groups of the fifth grade tested, the lefthanded group was found to be only 3.54 per cent slower in speed of writing than the righthanded group. The averages were as follows: the lefthanded pupils 47 letters per minute, for the righthanded 48.72 letters. Of the nine lefthanded pupils in these groups, there were three above the averages obtained by both the right and lefthanded groups.

In the three groups of the sixth grade the lefthanded group was 31.82 per cent slower in pseed of writing than the righthanded group. The average for the lefthanded pupils was found to be 42.00 letters per minute, and for the righthanded pupils it was 61.60 letters. Of the six lefthanded pupils in the sixth grade, there were three above the average found for

their group, but all were below the average for the right-handed pupils.

Of the total of twenty-five lefthanded pupils found in the nine groups, only six equalled or surpassed the average for the righthanded group. Thirteen were below the average attained by the lefthanded children, while the remaining six ranged between the two averages.

The average for the twenty-five lefthanded cases was found to be 44.97 letters per minute. The average for the group of 292 righthanded pupils was 54.32 letters. The difference between the two was 9.35 letters. Through the use of Formula 19 in Garrett's Statistics in Psychology and Education, the standard error of the difference was found to be 2.507, or 3.5 times smaller than the difference itself. According to Garrett it is customary to take a difference over sigma difference of three as indicative of complete reliability. A result greater than three is to be taken as indicating just so much added reliability. Therefore the difference found may be considered reliable.

CHAPTER V

DATA AND CONCLUSIONS ON QUALITY

The quality of the handwriting of the twenty-five left-handed children tested was judged by the Palmer American Handwriting Scale according to the method described in Chapter III. Three persons judged each copy--Mrs. Hallie Bennington, a penmanship instructor; a graduate student; and the experimenter. The results of these judgments were checked and an average chosen for the final judgment. There was a high degree of agreement in the three judgments, as can be seen in Table IV.

TABLE IV

Quality Rankings Given by three Judges

Case Number	Rankings of A	Rankings of B	Rankings of C
1	P	VP	P
2	VP	VP	VP
3	VP	VP	-VP
4	VP	VP	VP
5	VP	-VP	VP
6	-VP	VP	-VP
7	VP	VP	VP
8	-VP	-VP	VP
9	VP	VP	VP
10	VP	VP	-VP
11	-VP	-VP	VP
12	-VP	-VP	-VP
13	VP	VP	VP
14	VP	VP	-VP
15	VP	VP	VP
16	VP	BP	P
17	-VP	-VP	-VP
18	VP	VP	VP
19	-VP	VP	-VP
20	-VP	-VP	VP
21	VP	-VP	VP
22	F	F	BF
23	VP	VP	VP
24	P	BF	P
25	G	AF	G

The terms used in the table are the ones which will be used throughout the rest of this discussion on quality--P standing for poor, VP for very poor, BF for below fair, F for fair, AF for above fair, and G for good. These terms were taken from the Palmer American Handwriting Scale.

The following ranking of papers as to quality was found; seven received a rank of below very poor, thirteen a rank of very poor, two poor, one below fair, and one good.

From this it would seem that the quality of writing of the lefthanded is decidedly inferior to that of the right-handed with twenty-two of the twenty-five receiving a rating of poor or below.

Taking up each grade as a whole, it was found as is shown in Tables V and VI that the fourth and fifth grades were almost equally poor; the fourth having two papers graded below very poor, seven as very poor, and one poor; and the fifth grade with four papers judged as very poor, four as below very poor, and one judged fair. The sixth grade received the highest rating in quality with one paper below very poor, two very poor, one poor, one fair, and one good. From this it would seem that the sixth more nearly approached the standards for writing than either of the other two grades. This may be due to the fact that the sixth grade may be better adjusted to school standards. However, it is impossible to state this definitely on account of the small number of cases found in any grade.

Of the three schools tested Eugene Field ranked lowest in quality. Of eleven papers five were below very poor, five

TABLE V

Quality Ranking of the Individual Grades

School	Grade	-VP	VP	P	BF	F	G
Lakeside	4th		2	1			
	5th		3				
	6th		1			1	
Washington	4th		2				
	5th	2					
	6th			1			1
Eugene Field	4th	2	3				
	5th	2	1		1		
	6th	1	1				

TABLE VI

Quality Rankings of the Grades as a Whole

Grades	-VP	VP	P	BF	F	G
4th	2	7	1			
5th	4	4		1		
6th	1	2			1	1

were judged very poor, and one fair. At Washington there were two papers marked below very poor, two very poor, with one each for poor and good. At Lakeside six papers received a ranking of very poor, and the other two were ranked poor and fair respectively. Lakeside was the only school which had no papers ranked below very poor.

An analysis of some special characteristics of quality

The experimenter now analysed some of the special characteristics of lefthanded writers according to the methods set forth in Chapter III.

In alignment it was found that the lefthanded writers had an average rank of 1.8 or below fair. The average of the twenty-five papers of righthanded children chosen at random was 1.7 or below fair.

In spacing the lefthanded group attained an average of 2.4, while the average of the righthanded group was 2.5, both of these ratings being above fair.

As to legibility the lefthanded group had an average of 1.9 or slightly below fair, while the righthanded group made an average of 2.2 or above fair. Legibility was judged on the basis of whether or not it was easily readable.

From the above data it is seen that the lefthanded group was slightly better than the righthanded group in alignment. In spacing the righthanded group excelled the lefthanded group about 10 per cent. In legibility the lefthanded group was approximately 19.35 per cent poorer than the righthanded group.

These conclusions are to be taken as only tentative, since the groups examined were small.

Although the lefthanded group was quite inferior to the righthanded in quality it seems from the above figures that such a wide degree of difference did not exist in the measurements of alignment, spacing, and legibility. The difference in quality was probably due to the fact that the writing of the lefthanded children was less legible due to poor formation of letters. This tendency tended to lower the quality ranking. The formation of letters was not measured in this study since the technical knowledge on which such a study must necessarily be based was lacking.

Upon the analysis of slant, a greater degree of variation was found between the two groups. Where the righthanded group wrote predominantly with a slight slant to the right, the lefthanded group displayed several different trends. Of the twenty-five papers of the lefthanded group examined, the writing of two slanted to the left, that of eight to the right, and that of the remaining fifteen was perpendicular. Five of the papers revealed peculiarities in the writing of the first letter of a word. In two cases the letter "d" when used at the first of a word always slanted sharply to the left while the rest of the word was written with a slant to the right. In another case the letter "d" was always written upright while the other letters slanted to the right. In another case it was the letter "j" which always slanted in an opposite direction to that of the rest of the word. In the fifth case the first letter of every

word slanted to the left and the rest of the word slanted to the right.

This seems to show that the lefthanded child had a tendency to upright writing where the righthanded child used a slant to the right. This might be due to the way the paper was placed on the desk.

Relation of speed and quality

In making only a cursory examination and comparison of the speed and quality of writing in the lefthanded group, it was found that in the six cases where the speed rate per minute exceeded that for the whole class the writing was very poor. In the three cases where the quality of writing was judged as fair or above fair, the speed rate was much below the average. Of these three cases, two were in the sixth grade where the average in rate of writing for the lefthanded was the lowest of the three grades and the one where the greatest difference existed between the two averages. This may be due to the tendency to sacrifice quality to speed. The remaining sixteen papers showed a deficiency both in speed and quality, tending to further substantiate the assumption that speed and quality are close related.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study was undertaken with the purpose of making an examination of the speed and quality of the handwriting of lefthanded children.

Preliminary experimentation consisted of the testing of the group selected by the various teachers of the fourth, fifth, and sixth grades of the three public schools of Pittsburg, Kansas. This experimentation was for the purpose of ascertaining the eyedness and handedness of the group. The results of this testing showed that the group of twenty-five examined was predominantly lefthanded and left-eyed.

Speed tests based on the material from the Palmer American Handwriting Scale were given, and the averages for the right and lefthanded children compiled and compared.

The samples of handwriting thus obtained were next judged as to quality by three individuals and ranked according to their findings in terms of the Palmer American Handwriting Scale. The specimens were also examined as to four characteristics: alignment, spacing, legibility, and slant. The results were checked with those obtained from a survey of twenty-five papers of righthanded writers selected at random from the same grades as the lefthanded group.

After these investigations had been completed, the following conclusions were reached.

1. Lefthanded children may be said to be appreciably slower as to speed of writing when compared with righthanded children of the same grades. The difference found in this

study may be considered as reliable, since the sigma difference was found to be 3.3 times smaller than the difference found between the two averages--the one for the lefthanded group and that of the righthanded group.

2. The quality of the handwriting of lefthanded children is markedly below average, and much inferior to that of the righthanded children, when measured according to the standards set up in the Palmer American Handwriting Scale.

3. Taking up individual characteristics, lefthanded children are not widely divergent from the righthanded in alignment and spacing. As to slant, lefthanded children tend to favor upright movement as compared to the slant to the right found in the writing of righthanded writers. In legibility the writing of the lefthanded was inferior to that of the righthanded. This was probably a major reason for the lower quality ranking given to the writing of the lefthanded children. These conclusions should be taken as only tentative, and as contingent on the techniques used in this study.

4. In a comparison of speed and quality, it was found that quality was sacrificed for speed of writing in the cases where the speed of writing exceeded the standard set up for the righthanded group. However, the lefthanded group as a whole was characterized by an inferior ranking in quality as well as in speed. This would seem to prove that on the whole the lefthanded group was poorer in both speed and quality, regardless of a desire to write either better or faster.

APPENDIX

Laterality Index

When you perform a manual act, one of your hands usually does all of the work. With this idea in mind, you are to answer the questions below. Answer each one by drawing a circle around either "R", "L", or "X". If you almost always use the right hand, for performing the act which is covered by a given question, draw a circle around the "R" opposite the question. If you almost always use the left hand, draw a circle around the "L". If you have no particular choice (that is, if you use either hand for an act) draw a circle around the "X". If you are not sure which hand you use, observe yourself perform the act, Do not answer any question for which you do not perform that act which it mentions.

1.	Which hand uses the needle in sewing?	R	L	X
2.	Which glove is put on first?	R	L	X
3.	When you are standing with both feet together, which foot moves first when you start to fall forward?	R	L	X
4.	Which hand holds the thread when you thread a needle?	R	L	X
5.	Which hand uses the tooth brush?	R	L	X
6.	Which hand erases on paper?	R	L	X
7.	Which hand does the stirring when you are mixing something?	R	L	X
8.	Which hand puts the letter in the envelope?	R	L	X
9.	Which hand uses the saw?	R	L	X
10.	Which hand scratches matches?	R	L	X
11.	Which hand turns on a water tap?	R	L	X
12.	Which hand leads when you reach to a high shelf?	R	L	X
13.	Which hand would you use for lifting and carrying a cup full of water?	R	L	X
14.	Which hand pulls a cork from the bottle?	R	L	X
15.	Which hand combs your hair?	R	L	X
16.	Which hand uses wrenches?	R	L	X
17.	Which hand uses the dust cloth?	R	L	X
18.	Which hand uses the hammer?	R	L	X
19.	Which hand do you use for drawing pictures?	R	L	X
20.	Which hand holds the knife when you whittle?	R	L	X
21.	Which hand uses the salt shaker?	R	L	X
22.	Which hand puts stamps on an envelope?	R	L	X
23.	Which hand uses the screw driver?	R	L	X
24.	Which hand reaches to pick up a small object on the floor in front of you?	R	L	X
25.	Which hand holds the fork when you eat with it?	R	L	X
26.	Which hand turns the pages of a book when you are reading?	R	L	X
27.	Which hand takes the mail out of a box?	R	L	X
28.	Which hand holds a paper cup for drinking?	R	L	X
29.	Which hand uses scissors?	R	L	X
30.	Which hand cuts with the knife when eating?	R	L	X

31.	With which foot do you kick?	R	L	X
32.	Which hand throws a ball?	R	L	X
33.	Which hand wraps the string around a package?	R	L	X
34.	Which hand spread butter on bread?	R	L	X
35.	Which hand goes in the coat sleeve first?	R	L	X

SPEED SCORES MADE IN THE FOURTH GRADE

Eugene Field		Washington	Lakeside
46		35	43
56		40	41
62		48	56
49		40	58
31		50	50
37	50	50	50
50	68	99	48
50	59	44	41
43	75	56	31
53	37	57	46
37	62	37	50
62	53	37	42
38	62	47	75
45	37	67	44
37	42	98	44
27	67	57	62
61	51	37	61
81	43	68	53
50	37	62	48
37	54	32	28
50	67	48	38
79	51	55	42
79	43	50	56
64	37		44
43	54		46
39			50
75			50
63			50
53			39
50			73
42			57
50			50
50			96
67			63
77			
50			

(Scores above line __ are those of lefthanded pupils)

SPEED SCORES MADE IN THE FIFTH GRADE

Eugene Field		Washington		Lakeside	
38		50		45	
44		44		58	
21		25	50	79	62
44		31	42	81	46
50	55	33	44	42	65
50	50	23		46	67
48	50	27		81	44
50	50	54		80	
50	55	37		61	
37	66	40		54	
50	50	46		50	
25	50	37		68	
55	50	48		62	
50	72	30		72	
50	50	38		25	
36	76	50		37	
55	55	15		62	
20	50	36		70	
50	57	50		44	
40	45	36		36	
50	47	64		36	
50	34	50		69	
50	29	66		58	
50	37	56		75	
52	48				
44	52				
37	33				
47	50				
62	47				
57	37				
42	50				
37	40				
50	50				
50	40				

SPEED SCORES MADE IN THE SIXTH GRADE

50				39		40
50				23		50
81	55	69	71	50		66
85	64	50	87	57		79
46	62	60	71	56		50
31	83	50	55	53		50
50	44	50	60	52		57
81	71	60	50	69		87
56	41	74	56	66		89
69	62	100	44	73		91
62	62	54	60	62		79
75	58	50	67	56		64
54	89	62	81	34		
55	49	48	53	41		
56	55	50	50	60		
55	50	94	48			
62	50	66	75	56		

BIBLIOGRAPHY

BOOKS

Garrett, Henry. Statistics in Psychology and Education. New York: Longmans, Green and Company, 1926, pp. 129-133.

Parsons, Beaufort Sims. Lefthandedness. New York: The Macmillan Company, 1924, 137 pp.

MAGAZINE ARTICLES

Downey, June. "Types of Dextrality and their Implications." American Journal of Psychology, XXXVIII, (1927), 317-367.

Miles, Walter R. "Ocular Dominance in Human Adults." Journal of General Psychology, III, (1930), 412-431

Smith, Laura. "A brief Summary of Right- and Lefthandedness." Pedagogical Seminary, XXIV (1917), 19-35.

Wilson, Milbourne, and Dolan, L.B. "Handedness and Ability." American Journal of Psychology, XLII, (1931), 261-268.

MONOGRAPHS

Beeley, Arthur. An Experimental Study in Lefthandedness with Practical Suggestions for Schoolroom Tests. Chicago: University of Chicago Press, 1918, 74 pp.

Haefner, Ralph. The Educational Significance of Left-handedness. New York: Teachers College, Columbia, 1929, 84 pp.

Jasper, Herbert. A Laboratory Study of Diagnostic Indices of Bilateral Neuro-Muscular Organization in Stutterers and Normal Speakers. Psychological Monographs, 43, 1932, 72-175.