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A study to determine the effectiveness of a relative massing time pattern as compared with an additive time pattern on skill development in typewriting.

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Thesis

A STUDY TO DETERMINE THE EFFECTIVENESS OF A RELATIVE MASSING  
TIME PATTERN AS COMPARED WITH AN  
ADDITIVE TIME PATTERN ON SKILL DEVELOPMENT IN TYPEWRITING

Submitted by

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(B. S. in P. A. L., Boston University, 1938)

In partial fulfillment of the requirements for  
the degree of Master of Education

1950

Boston University  
School of Education  
Library

First Reader: Lester I. Sluder, Assistant Professor of  
Business Education

Second Reader: Arthur G. Miller, Assistant Professor of  
Education

To Professor Lester I. Sluder, I wish to express my sincere appreciation for his guidance and encouragement in planning this study.

To Dr. Arthur G. Miller, I wish to express my sincere thanks for his advice and interest in this study.

TABLE OF CONTENTS

CHAPTER	PAGE
I INTRODUCTION . . . . .	1
Statement of Problem . . . . .	1
Analysis of the Problem . . . . .	1
Justification of the Problem . . . . .	1
Delimitation of the Problem . . . . .	4
Definition of Terms . . . . .	5
Statement of Organization into Chapters . . . . .	6
II REVIEW OF RELATED RESEARCH . . . . .	7
III METHOD OF PROCEDURE . . . . .	12
The Plan of the Experiment . . . . .	14
Conducting the Experiment . . . . .	16
IV ANALYSIS AND INTERPRETATION OF THE DATA . . . . .	19
Gross Words Per Minute Scores Data . . . . .	20
Per Cent of Error Scores Data . . . . .	29
V SUMMARY AND CONCLUSIONS . . . . .	40
Summary and Conclusions . . . . .	40
Recommendations . . . . .	42
BIBLIOGRAPHY . . . . .	43
APPENDIX . . . . .	45

LIST OF TABLES

TABLE		PAGE
I	A Summary of the Mean Scores of the Gross Words Per Minute on the Constant Drill for the Control Group and the Experimental Group from Lesson 2 Through Lesson 9 . . . . .	22
II	Difference in Means of the Gross Words Per Minute Scores (Constant Drill) of the Second Lesson and the Ninth Lesson for the Experimental Group . . . . .	23
III	Difference in Means of the Gross Words Per Minute Scores (Constant Drill) of the Second Lesson and the Ninth Lesson for the Control Group . . . . .	23
IV	Difference in Mean Gains of the Experimental Group and the Control Group on the Constant Drill for the Second and Ninth Lessons . . . . .	24
V	A Summary of the Mean Scores of the Gross Words Per Minute on the Supplementary Drill for the Experimental Group and the Control Group from Lesson 2 Through Lesson 9 . . . . .	26
VI	Difference in Means of the Gross Words Per Minute Scores (Supplementary Drill) of the Second Lesson and the Ninth Lesson for the Experimental Group . . . . .	27
VII	Difference in Means of the Gross Words Per Minute Scores (Supplementary Drill) of the Second Lesson and the Ninth Lesson for the Control Group . . . . .	28
VIII	Difference in Mean Gains of the Experimental Group and the Control Group on the Supplementary Drill for the Second and Ninth Lessons . . . . .	28
IX	A Summary of the Mean Scores of the Per Cent of Errors on the Constant Drill for the Experimental Group and the Control Group from Lesson 2 Through Lesson 9 . . . . .	31

LIST OF TABLES

TABLE		PAGE
X	Differences in Means of the Per Cent of Error Scores (Constant Drill) of the Second Lesson and the Ninth Lesson for the Experimental Group . . . . .	32
XI	Difference in Means of the Per Cent of Error Scores (Constant Drill) of the Second Lesson and the Ninth Lesson for the Control Group . .	32
XII	Difference in Mean Gains of the Experimental Group and the Control Group on the Constant Drill for the Second and Ninth Lessons . . . .	33
XIII	A Summary of the Mean Scores of the Per Cent of Errors on the Supplementary Drill for the Experimental Group and the Control Group from Lesson 2 Through Lesson 9 . . . . .	35
XIV	Difference in Means of the Per Cent of Error Scores (Supplementary Drill) of the Second Lesson and the Ninth Lesson for the Experimental Group . . . . .	36
XV	Difference in Means of the Per Cent of Error Scores (Supplementary Drill) of the Second Lesson and the Ninth Lesson for the Control Group . . . . .	37
XVI	Difference in Mean Gains of the Experimental Group and the Control Group on the Supplementary Drill for the Second and Ninth Lessons . . . . .	37
XVII	A Summary of the Differences in the Mean Scores of the Beginning and Ending Lessons of the Experimental Group and the Control Group Including: Mean Gains, Differences in Mean Gains Between Lessons II and IX, Critical Ratios and Correlation Coefficient . . . . .	39

LIST OF FIGURES

FIGURE		PAGE
1	Mean Gross Words Per Minute Scores on Constant Drill of the Experimental Group and the Control Group . . . . .	21
2	Mean Gross Words Per Minute Scores on Supplementary Drill of the Experimental Group and the Control Group . . . . .	25
3	Mean Per Cent of Error Scores on Constant Drill of the Experimental Group and the Control Group . . . . .	30
4	Mean Per Cent of Error Scores on Supplementary Drill of the Experimental Group and the Control Group . . . . .	34

CHAPTER I  
INTRODUCTION

Statement of Problem

The problem was to determine the effectiveness of a relative massing time pattern as compared with an additive time pattern in the teaching of typewriting to beginners.

Analysis of the Problem

The subordinate problems involved in solving the major problem were:

- (a) to determine the effectiveness of a relative massing pattern for developing speed in typewriting as compared with the additive time pattern;
- (b) to determine the effectiveness of a relative massing pattern for developing accuracy in typewriting as compared with the additive time pattern.

Justification of the Problem

After reading Miller's<sup>1</sup> thesis, which is a study of

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<sup>1</sup> Miller, Arthur G., The Effect of Various Interpolated Time Patterns on Motor Learning, Doctor's Dissertation, Boston University, 1948, 71 pp.

various interpolated time patterns in skill building in billiards, the investigator became quite interested to conduct a similar research in the field of typewriting. Since Miller's results showed the additive pattern to be superior over the others, the investigator decided to include the additive pattern in the experiment. He makes the following summary:

There were statistically significant differences in the final results in favor of the additive pattern over the other three patterns. After the foundation has been laid, greater spacing between practice periods has a more favorable effect upon learning than continued massing. Progressively lengthening the time intervals between the practice periods (the additive pattern) proves beneficial in learning a new motor skill.<sup>1</sup>

Another study, which has brought to light the best pattern for the most effective time pattern for learning a motor skill is that of Longley.<sup>2</sup> His study, The Effect of Massed Followed by Evenly Spaced Practice on Learning a Motor Skill, was a follow-up of one of the problems suggested by Miller.<sup>3</sup> Longley compared his results with

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<sup>1</sup> Ibid, p. 54.

<sup>2</sup> Longley, Grant F., The Effect of Massed Followed by Evenly Spaced Practice on Learning a Motor Skill, Master's Thesis, Boston University, 1948, 38 pp.

<sup>3</sup> Miller, The Effect of Various Interpolated Time Patterns on Motor Learning, p. 55.

those of Miller's and concluded "The additive pattern showed statistically significant gains over other practice patterns."<sup>1</sup>

Although little research has been done specifically to determine the best spacing of practice periods in developing skill of typewriting, experts in typewriting are aware of the possible improvements through research in the field. As early as 1936, Dvorak, Merrick, Dealey and Ford<sup>2</sup> indicated the desirability of spaced typing practice as opposed to intensive practice. Odell and Stuart<sup>3</sup> consider the matter of determining the best spacing of practice periods as an important topic for further research. They say:

There is, of course, relatively little conclusive evidence as to the most effective practice and rest intervals for learning typewriting. The authors do not profess at the present time to know to what extent this principle can be applied to the subject. However, in their opinion it constitutes an extremely important topic for investigation.

A foremost psychologist, Kingsley<sup>4</sup>, indicated the superiority of distributed practice over massed practice.

<sup>1</sup>Longley, op. cit., p. 33.

<sup>2</sup>Dvorak, August and Nellie Merrick and William L. Dealey and Gertrude C. Ford, Typewriting Behavior, Psychology Applied to Teaching and Learning Typewriting, American Book Company, New York, 1936, p. 422.

<sup>3</sup>Odell, William R., and Esta R. Stuart, Principles and Techniques for Directing the Learning of Typewriting, D.C. Heath and Company, Boston, 1945, p. 23.

<sup>4</sup>Kingsley, H. L., The Nature and Conditions of Learning, New York, 1946, Prentice-Hall, Inc., pp. 248-249.

. . . . . it can be said, distributed practice is more effective than massed practice. Another theory maintains that the advantage of distributed practice is due to growth that takes place during the interval between practice. According to Snoddy<sup>1</sup> there are two distinct processes of growth involved in learning. One, called primary growth, is said to be a positive function of both repetition and the interpolated time interval, while the other, called secondary growth, is the result alone of the stimulation afforded by practice. Primary growth comes early in the practice series. It is a setting or stabilizing process that establishes a base upon which the effectiveness of later practice depends. Short periods of practice stimulate primary growth which continues through the interpractice interval.

The value of determining the best spacing of practice periods in learning a new skill is quite practical. If investigators could prove conclusively that what is now accomplished in five days could be easily accomplished in two, this study would be valuable. Much time and money would be saved by changing the present educational policy of daily practice periods to distributed practice periods.

#### Delimitation of the Problem

The method of teaching approximated, as far as possible, the present-day, vertical approach. The method of teaching was exactly the same for both groups, in order (1) to facilitate scoring and measuring of learning; (2) to keep variables at a minimum. The study was limited

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<sup>1</sup>Snoddy, G. S. Evidence for Two Opposed Processes in Mental Growth, Lancaster, 1935, Science Press, pp. 103.

to nine practice periods of forty minutes in length.

#### Definition of Terms

Following are some terms and definitions used in this study:

(1) Massed practice--is that procedure in which each practice period is immediately succeeded by another practice period with no interval of time between practices.<sup>1</sup>

. . . or the formation of a complicated motor habit by repetition without interruption.<sup>2</sup>

(2) Spaced or distributed practice--that procedure in which practice periods are repeated at various intervals.<sup>3</sup>

(3) Relative massing time pattern--a time pattern in which the practice periods are relatively massed. (the practice periods occur daily, which is the present-day setup of the typical high school class.)

(4) Interpolated time pattern--varying the length of time between practice periods in accordance with a set plan.<sup>4</sup>

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<sup>1</sup>Miller, The Effect of Various Interpolated Time Patterns on Motor Learning, p. 4.

<sup>2</sup>Warren, Howard C., Dictionary of Psychology, Houghton Mifflin Company, Boston, 1934, p. 159.

<sup>3</sup>Miller, The Effect of Various Interpolated Time Patterns on Motor Learning, p. 4.

<sup>4</sup>Ibid, p. 15.

(5) Additive time pattern or massed interpolated spacing--a time pattern in which the length of time between practice periods is increased progressively according to a set plan. In this study the same procedure was used which was used by Miller as given in the following paragraph:

. . . . the term additive time pattern was used because the days of practice were formed by adding the first two numbers or days to make the third number or day (1st day plus 2nd day equals 3rd day); the second and third numbers or days to make the fourth number or day (2nd + 3rd = 5th); the third and fourth numbers or days to make the fifth number or day (3rd + 5th = 8th); etc. up to and including the fifty-fifth day which was the ninth practice session. Listing the nine practice periods by numbers gave the days on which the practices occurred: 1st day, 2nd day, 3rd, 5th, 8th, 13th, 21st, 34th, 55th.<sup>1</sup>

#### Statement of Organization into Chapters

An experiment was conducted in which two groups of high school students were used as subjects. Group A met for forty minutes each day for nine successive days. Group B met for nine practice periods according to the additive time pattern. The results in the amount of learning taking place were compared.

A statement and the nature of the problem were given in Chapter I. In Chapter II a review of the related literature is given. In the remaining chapters, the investigator covers procedures, summary, conclusion, and recommendations for further research.

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<sup>1</sup>Ibid, pp. 15-16.

CHAPTER II  
REVIEW OF RELATED RESEARCH

A review of experimental research in the field of distributed and massed practice is given in this chapter to give the reader informational background related to this study.

As far as can be determined, little research has been done in the field of typewriting to decide upon the best time pattern in which the greatest amount of learning takes place.

The investigator found the following evidence that typing experts recognize the need for spacing typewriting practice in short units. Dvorak, Merrick, Dealey and Ford<sup>1</sup> state:

In the light of the students' daily schedule, careful planning eliminates unproductive practice. Instead, successive typing runs and intensive practice are fitted into shorter stretches over widely spaced parts of the day and of the week.

Odell and Stuart<sup>2</sup> state the following regarding the learning period:

The learning period should be broken up into short units, since shorter learning periods are more effective than longer ones.

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<sup>1</sup>Dvorak, Merrick, Dealey and Ford, loc. cit.

<sup>2</sup>Odell and Stuart, loc. cit.

However, it seems clear from the incomplete evidence available that extremely long practice periods should be avoided, because they are apt to prove uninteresting and monotonous. In addition to the interest factor, the element of fatigue also must be considered. This applies especially to the beginning stages of learning where the student tries very hard and exercises new combinations of muscles.

Experiments dealing with time patterns have been conducted in other fields. Miller<sup>1</sup> and Longley<sup>2</sup> have conducted research with various time patterns in the field of physical education to test the amount of learning in the motor skill of billiards. Both have concluded that the amount of learning gained was significant when the time interval between practice periods was of short duration at the beginning of the experiment and progressively longer as the practice periods continued. Statistically, the final results of the additive time pattern were more favorable than other time patterns.

Murphy<sup>3</sup> conducted an experiment to test the relative merits of various time patterns of practice in javelin throwing. He concluded as a result of his experiment that:

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<sup>1</sup>Miller, The Effect of Various Interpolated Time Patterns on Motor Learning.

<sup>2</sup>Longley, The Effect of Massed Followed by Evenly Spaced Practice on Learning a Motor Skill.

<sup>3</sup>Murphy, H. H., "Distribution of Practice Periods in Learning", Journal of Education Psychology, 7: July 1916, p. 161.

. . . . . better work, for the amount of time expended, can be done in our schools through a distribution of three times per week than through a distribution of five times per week.

Lorge<sup>1</sup> in conducting a series of experiments with code learning, mirror reading and nonsense syllables found that distributed learning resulted in better achievement than massed learning.

Howard L. Kingsley<sup>2</sup> sets forth the theory that "distributed practice is more effective than massed practice."

In a study on mental growth, Snoddy<sup>3</sup> developed evidence of two processes in mental growth--primary and secondary growth. He set forth that primary growth, which appears early, is enhanced by distributed practice. Encouraged by Snoddy's findings, Dore and Hilgard<sup>4</sup> conducted an experiment in which they concluded that it is better to have massing at the beginning and spacing later in primary growth.

The Dictionary of Psychology<sup>5</sup> refers to the principle

<sup>1</sup>Lorge, I., Influence of Regularly Interpolated Time Intervals Upon Subsequent Learning, Teachers College, Columbia, #438, 1930.

<sup>2</sup>Kingsley, loc. cit.

<sup>3</sup>Snoddy, loc. cit.

<sup>4</sup>Dore, L. R. & Hilgard, E. R., "Spaced Practice and the Maturation Hypothesis", Journal of Experimental Psychology, 23: 359-374, October, 1938.

<sup>5</sup>Warren, Howard C., op. cit., p. 82.

of distributed repetitions as:

A principle of the learning process according to which an ability is acquired with a smaller number of repetitions if these repetitions are distributed over a longer period of time than if they are crowded together. In practice these repetitions are often spaced gradually farther and farther apart (progressively distributed practice).

In summary, the related research indicates the value of various spaced time patterns in learning.

Dvorak, Merrick, Dealey and Ford<sup>1</sup>, as well as Odell and Stuart<sup>2</sup>, experts in the field of typewriting, have pointed out the need for spacing typing practice in short units.

Miller<sup>3</sup>, Longley<sup>4</sup>, Kingsley<sup>5</sup>, Murphy<sup>6</sup> and Lorge<sup>7</sup>, through experiments, have found distributed practice more effective than massed practice.

<sup>1</sup>Dvorak, Merrick, Dealey and Ford, Typewriting Behavior, Psychology Applied to Teaching and Learning Typewriting.

<sup>2</sup>Odell and Stuart, Principles and Techniques for Directing the Learning of Typewriting.

<sup>3</sup>Miller, The Effect of Various Interpolated Time Patterns on Motor Learning.

<sup>4</sup>Longley, The Effect of Massed Followed by Evenly Spaced Practice on Learning a Motor Skill.

<sup>5</sup>Kingsley, The Nature and Conditions of Learning.

<sup>6</sup>Murphy, Journal of Education Psychology.

<sup>7</sup>Lorge, loc. cit.

This study attempts to determine the relative effectiveness of a relative massing time pattern as compared with the additive time pattern and provides data which may be of value in improving instructional practices.

CHAPTER III  
METHOD OF PROCEDURE

The following procedures were employed in this study to determine the effectiveness of a relative massing time pattern as compared with an additive time pattern in the teaching of typewriting to beginners:

1. A review was made by the investigator of the related literature for the purpose of providing the background needed for the study.
2. A specific plan was prepared for conducting the experiment.
3. The lessons were tried out in advance on three students who were not included in the actual experiment. This provided the investigator an opportunity to determine weaknesses in the lesson plans and to improve the content and time element of the lessons.
4. At the end of the second week of school (in September, 1949), students in the Freshman Class were solicited to volunteer as subjects for the typewriting experiment. Applications (a copy of which is included in the Appendix) to take part in this experiment were received from seventy-nine Freshmen. Out of this number, sixty students were chosen for the study. Those who already knew how

to type were not considered. The number of students chosen for the study was limited to the number of usable typewriters available.

5. The students were equated on the basis of age, sex, general grades, previous experience with a typewriter, experience in playing a musical instrument and I. Q. and divided into two groups.
6. The control group met for nine successive days excluding Saturday and Sunday (starting on Monday, October 31, 1949, and ending on Thursday, November 10, 1949) for the typing lessons which were based upon the first few lessons of Gregg Typing.<sup>1</sup>
7. The experimental group was given instruction on the same lessons with the same teaching techniques, but spacing the lessons according to the additive time pattern--practice periods occurring on the following days: 1, 2, 3, 5, 8, 13, 21, 34, 55; (starting on Thursday, September 22, 1949, and ending on Thursday, November 15, 1949.) See page 6.
8. At the first lesson of each group, pupils were asked to promise not to practice typewriting outside of the nine lessons scheduled for the experiment.

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<sup>1</sup>Sorelle, Rupert P., and Harold H. Smith and William R. Foster and Clyde I. Blanchard, Gregg Typing, The Gregg Publishing Company, New York, 1945, pp. 1-12.

9. Two typing exercises in each lesson of each group were scored and used as the basis for determining the achievement in speed and accuracy in typing.
- (a) to provide a constant factor for determining growth, one exercise was repeated in each lesson;
  - (b) at the end of each lesson a test was given based upon the daily exercises and the previous work covered.
10. The results of the constant factor and the test data were analyzed and interpreted according to the significance of the differences in achievement of the two groups. Tables were prepared to show the results.
11. Conclusions and recommendations were made on the basis of the data secured from the experiment.

#### The Plan of the Experiment

The Lesson Plans. Lesson plans were prepared by the investigator for nine lessons. The content of these lessons was based upon lessons in Sorelle, Smith, Foster, and Blanchard<sup>1</sup>.

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<sup>1</sup>Ibid, pp. 1-12.

The first lesson, which was not counted in scoring in either group, was used to familiarize the students with the machines; to give necessary instruction in inserting and removing paper; and to teach the home row position, the use of the space bar and correct touch and stroking technique. The following keys were practiced at the first lesson: f, j, r, u, g, h, m.

A typing drill based upon the letters taught in the first lesson was developed and given as a constant drill near the beginning of each lesson to each group as one means of determining progress. Each lesson was progressively more difficult with the exception of this drill which was maintained as a constant throughout the experiment. The students in each group typed this constant drill during each lesson for the same length of time.

At the end of each of the nine lessons in both groups, a test was administered to the subjects. The fact that this exercise was a test was not revealed to the subjects. It was referred to by the investigator as a "supplementary drill". The reason for not revealing to the subjects the fact that a particular exercise was a test was because the investigator believed that the subjects would be mentally and physically at ease and relaxed if they were unaware of the fact that a test was being administered to them. Both the constant drills and the supplementary drills were scored in both groups.

Very detailed plans were kept. The investigator made notation of all additional remarks stated in each lesson and the exact words and actions were repeated at the same lesson with the other group.

Factors in Equating Groups. The High School Freshmen enrolled in the Business Curriculum were the first to be approached with the opportunity to take part in the experiment. Then Freshmen in the other courses were allowed to apply. Because a limited number of typewriters were available, only sixty Freshmen of the seventy-nine who applied were selected for the experiment. Pupils who had already studied typewriting were not considered. The sixty pupils were equated and placed in the two groups on the basis of age, sex, general grades, previous experience with a typewriter (whether or not they had ever touched a machine; whether or not they had tried to type with one finger), experience in playing a musical instrument, and I.Q.

#### Conducting the Experiment

The purpose of the experiment was carefully explained to all subjects. At the first lesson all students were asked to promise not to touch a typewriter or to do any practicing at all outside of the nine lessons in the experiment.

After the first lesson, no individual attention or individual instruction was given to any subject in either

group. Whenever instructions were found to be necessary, such as reminding pupils not to look at their keyboards, a general statement was made to the entire group and a notation of the statement written on the lesson plan so that the same statement in the exact words was made with the second group.

Each of the nine lessons was conducted the same for both groups in an attempt to keep variables at a minimum. Mimeographed sheets with drills, words and exercises (copies of which are included in the Appendix) were provided to each subject in both groups. Instructions were made orally. Each part of the lesson was timed.

The subjects came to the typewriting room for each lesson as soon as they were dismissed from their home rooms. If a pupil missed a lesson, he was automatically dropped from the group. Thirty pupils started in the experimental group. Twenty pupils remained in the experiment by the ninth (last) lesson. The ten were dropped from the group for the following reasons: three did not attend the lesson which fell on Saturday; one boy cut his hand very badly in an industrial arts class; one boy became discouraged and dropped out because he felt he could not learn to type; three subjects failed to attend a lesson because they had to stay after school for other teachers because of discipline; two subjects failed to attend a lesson because of illness.

Thirty subjects started out in the control group. By the ninth lesson, ten were dropped for the following reasons: four were detained by other teachers because of discipline and, therefore, failed to attend a lesson; four missed a lesson because of illness; one missed a lesson because he "forgot"; one dropped out voluntarily because he felt he could not learn to type.

Analysis of the Data. The constant drill and the supplementary drill (test) on each paper for each lesson in both groups were scored. The number of errors and the gross strokes were counted. The gross words per minute and the per cent of error were determined for the constant drill and the supplementary drill (test). Means of the scores of each group were computed. The mean differences of gross words per minute and the mean differences in per cent of errors of the two groups were computed. The mean differences of (a) gross words per minute scores and (b) per cent of error scores for the beginning lesson and the last lesson (lessons 2 and 9) were computed to compare the learning which took place over the period of nine lessons. The critical ratios were computed to determine the significance of the differences in mean scores.

## CHAPTER IV

## ANALYSIS AND INTERPRETATION OF THE DATA

The main data of this experiment consist of (a) gross words per minute scores and (b) per cent of error scores of 40 subjects in a typewriting experiment. Two exercises on each paper were scored: the Constant Drill and the Supplementary Drill (Test). As was explained in Chapter III, the Supplementary Drill was the test given in each lesson.

Gross words per minute scores were computed in accordance to the standard practice of dividing the gross strokes by 5.

The differences of the mean gains of (a) the Constant Drill and (b) the Supplementary Drill (Test) for Lessons 2 and 9 for the Experimental Group and the Control Group were studied to determine the effectiveness of the relative massing time pattern as compared with the additive time pattern on skill development in typewriting. In order for the differences between mean scores of the two groups to be interpreted as significant, those differences must yield critical ratios of 3 or better. A critical ratio of 3 will be considered indicative of a significant difference.<sup>1</sup>

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<sup>1</sup>Garrett, Henry E., Statistics in Psychology and Education, Longmans, Green and Company, New York, 1949, p. 208.

Correlations between groups will be declared significant if they are between  $\pm 0.90$  and  $\pm 1.00$ .

The Experimental Group is referred to as the X Group, and the Control Group is referred to as the C Group.

### Analysis of Data

#### Gross Words Per Minute Scores Data

##### Constant Drill

Gross Words Per Minute. Figure 1 shows the mean scores of gross words per minute on the Constant Drill for both groups from Lessons 2 through 9. Table I shows a summary of the mean scores from Lessons 2 through 9 for the Experimental and Control Groups. Although the beginning scores for both groups are approximately the same, after the sixth lesson, the scores of the X Group appear to level off; while the scores of the C Group rise very gradually.

Comparison of Difference in Means. The critical ratio of the differences in the mean scores from Lesson 2 to Lesson 9 between the X Group and the C Group was computed in order to compare the growth in typing skill of the two groups. Table II shows the differences in the mean scores for the X Group of Lessons 2 and 9.

Figure 1

Mean Gross Words Per Minute Scores on  
Constant Drill of the Experimental Group and  
the Control Group

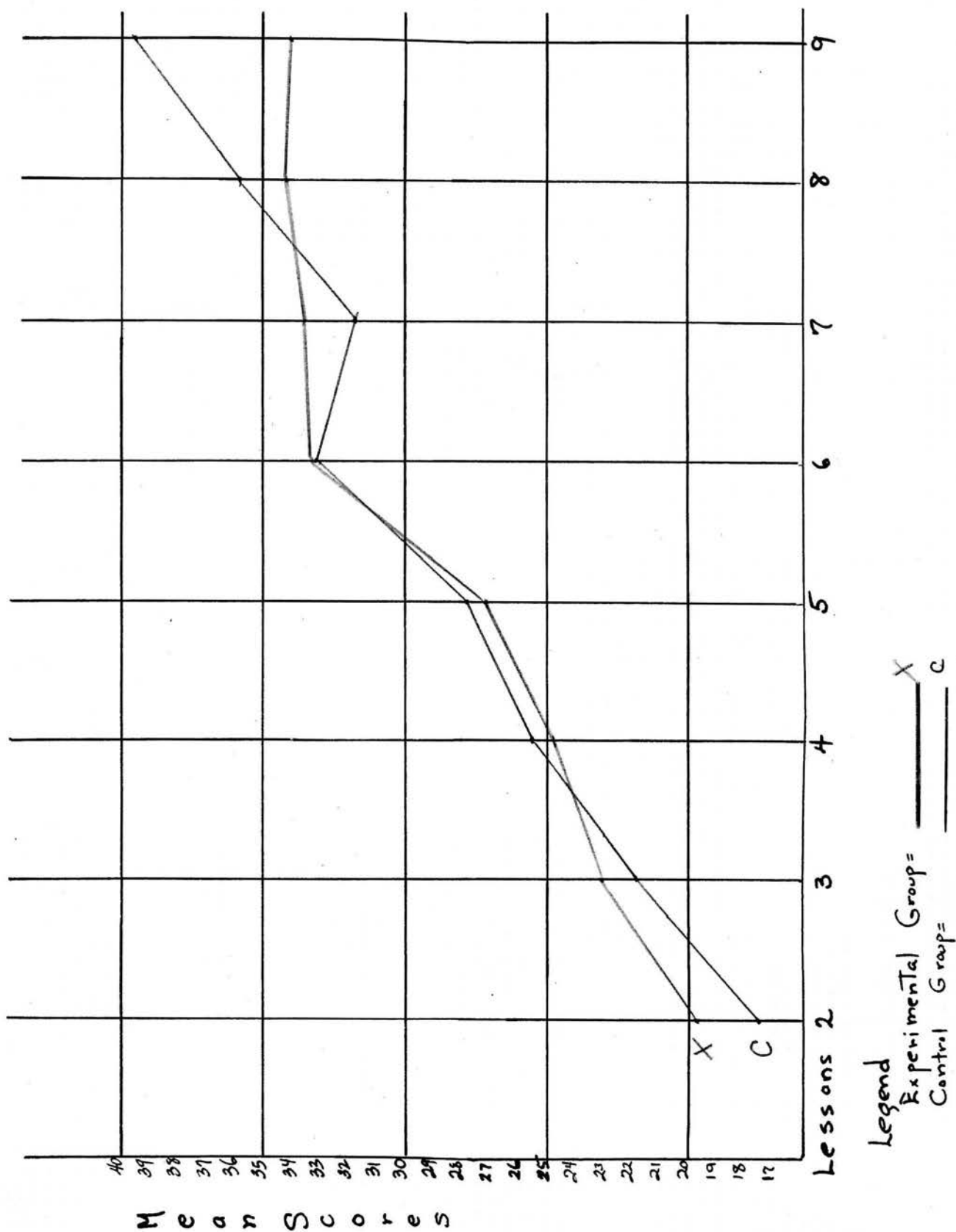


Table I

A SUMMARY OF THE MEAN SCORES OF THE GROSS WORDS PER MINUTE ON THE CONSTANT DRILL FOR THE CONTROL GROUP AND THE EXPERIMENTAL GROUP FROM LESSON 2 THROUGH LESSON 9

LESSON		
EXPERIMENTAL GROUP		CONTROL GROUP
19.95	2	17.55
23.15	3	21.80
24.85	4	25.50
27.15	5	27.70
33.40	6	33.35
33.55	7	31.80
34.30	8	35.90
34.15	9	39.50

Table II

DIFFERENCE IN MEANS OF THE GROSS WORDS PER MINUTE SCORES  
(CONSTANT DRILL) OF THE SECOND LESSON AND THE NINTH LESSON  
FOR THE EXPERIMENTAL GROUP

Lesson No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E.D	C.R.
2	19.95	7.17	1.62			
9	34.15	41.82	9.52	14.20	2.2	6.45

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is 6.45. The difference is significant.

Table III shows the difference in the mean scores for the C Group of Lessons 2 and 9.

Table III

DIFFERENCE IN MEANS OF THE GROSS WORDS PER MINUTE SCORES  
(CONSTANT DRILL) OF THE SECOND LESSON AND THE NINTH LESSON  
FOR THE CONTROL GROUP

Lesson No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E.D	C.R.
2	17.55	4.35	.99			
9	39.50	3.11	2.12	21.95	2.33	9.42

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is 9.42. The growth difference of the C Group is significant.

Comparison of Mean Gains. A comparison of the mean gains of the X Group and the C Group on the Constant Drill is shown in Table IV.

Table IV

DIFFERENCE IN MEAN GAINS OF THE EXPERIMENTAL GROUP  
AND THE CONTROL GROUP ON THE CONSTANT DRILL FOR THE  
SECOND AND NINTH LESSONS

Group	No.	SD	D mg	SE mg	D mg <sub>2</sub> -mg <sub>9</sub>	S.E. D	C.R.
X	20	11.61	14.20	1.85			
C	20	13.17	21.95	2.10	7.75	2.80	2.76

The critical ratio of the difference of the mean gains between the X Group and the C Group for the second and ninth lessons on the Constant Drill is 2.76. The difference between the mean gains of the two groups is not significant.

#### Supplementary Drill (Test)

Gross Words Per Minute. The mean scores of gross words per minute of the X Group and the C Group on the Supplementary Drill (Test) covering Lessons 2 through 9 are shown in Figure 2. Table V shows a summary of the mean scores of gross words per minute for the X Group and the C Group for Lessons 2 through 9. It may be noted that the score of the X Group for the second lesson is slightly higher than the score of the same group for the ninth lesson. The X Group shows a

Figure 2

Mean Gross Words Per Minute Scores  
 On the Supplementary Drill of the Experimental  
 Group and the Control Group 25

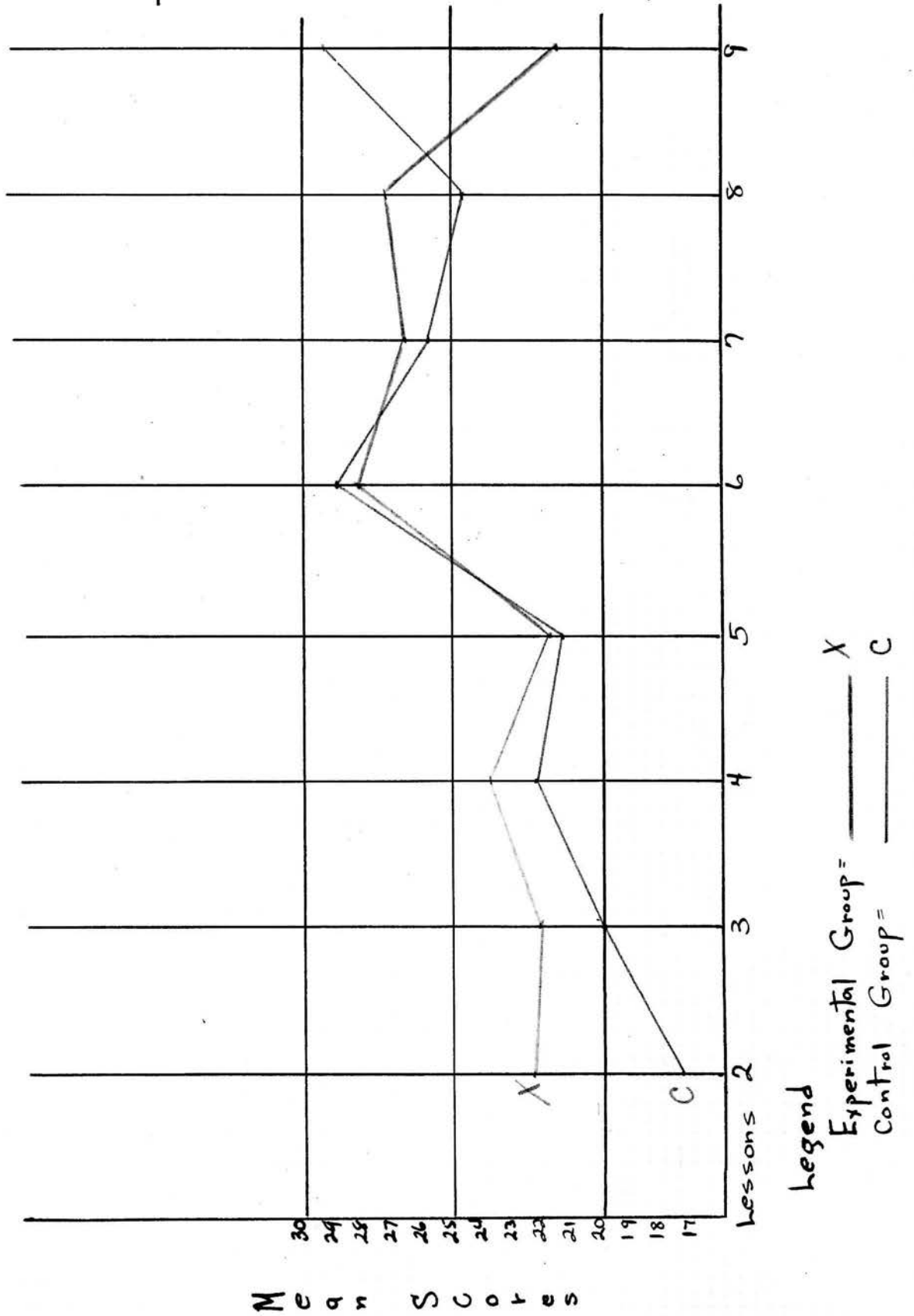


Table V

A SUMMARY OF THE MEAN SCORES OF THE GROSS WORDS  
PER MINUTE ON THE SUPPLEMENTARY DRILL FOR THE  
EXPERIMENTAL GROUP AND THE CONTROL GROUP FROM  
LESSON 2 THROUGH LESSON 9

LESSON		
EXPERIMENTAL GROUP		CONTROL GROUP
22.40	2	17.45
22.20	3	20.00
23.85	4	22.35
21.80	5	21.30
28.25	6	28.90
26.50	7	25.70
27.10	8	24.60
21.50	9	29.25

marked increase in the score from Lesson 5 to Lesson 6. The C Group also shows a marked increase in the score from Lesson 5 to Lesson 6. At the ninth lesson, the score of the C Group is higher than the score of the X Group.

Comparison of Difference in Means. The critical ratio of the differences in the mean scores from Lesson 2 to Lesson 9 between the X Group and the C Group was computed in order to compare the growth in typing skill of the two groups. Table VI shows the difference in mean scores for the X Group of Lessons 2 and 9.

Table VI

DIFFERENCE IN MEANS OF THE GROSS WORDS PER MINUTE SCORES  
(SUPPLEMENTARY DRILL) OF THE SECOND LESSON AND THE  
NINTH LESSON FOR THE EXPERIMENTAL GROUP

Lesson	No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E. <sub>D</sub>	C.R.
2	20	22.40	8.66	1.97			
9	20	21.50	4.89	1.11	-.90	2.27	-.35

The critical ratio of the difference of the mean loss between the second lesson and the ninth lesson is  $-.35$ . The growth difference of the X Group is not significant.

Table VII shows the difference in the mean scores for the C Group of Lessons 2 and 9.

Table VII

DIFFERENCE IN MEANS OF THE GROSS WORDS PER MINUTE SCORES  
(SUPPLEMENTARY DRILL) OF THE SECOND LESSON AND THE  
NINTH LESSON FOR THE CONTROL GROUP

Lesson	No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E. <sub>D</sub>	C.R.
2	20	17.45	3.00	.68			
9	20	29.25	4.68	1.06	11.80	1.26	9.36

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is 9.36. The growth difference of the C Group is significant.

Comparison of Mean Gains. A comparison of the mean gains of the X Group and the C Group on the Supplementary Drill (Test) is shown in Table VIII.

Table VIII

DIFFERENCE IN MEAN GAINS OF THE EXPERIMENTAL GROUP  
AND THE CONTROL GROUP ON THE SUPPLEMENTARY DRILL FOR THE  
SECOND AND NINTH LESSONS

Group	No.	SD	D <sub>mg</sub>	SE <sub>mg</sub>	D <sub>mg<sub>2</sub>-mg<sub>9</sub></sub>	S.E. <sub>D</sub>	C.R.
X	20	11.19	-.9	1.79			
C	20	6.51	11.8	1.04	12.7	2.07	6.13

The critical ratio of the difference of the mean gains between the X Group and the C Group for the second and the

ninth lessons on the Supplementary Drill (Test) is 6.13. The difference is significant.

#### Per Cent of Error Scores Data

##### Constant Drill

Per Cent of Error Scores. The two drills (Constant and Supplementary) were scored to determine the per cent of error. The per cent of error scores were found by dividing the total number of errors of each exercise by the number of hundreds of gross strokes typed.

The mean scores of the per cent of errors of both groups on the Constant Drill are indicated in Figure 3. Table IX shows a summary of the per cent of error scores of both groups for Lessons 2 through 9. Only in Lessons 5 and 6 does the per cent of errors for the X Group remain smaller than the per cent of the C Group.

Comparison of Difference in Means. The critical ratio of the differences in the mean scores from Lesson 2 to 9 between the X Group and the C Group was computed. Table X shows the differences in the mean scores for the X Group of Lessons 2 and 9.

Figure 3

Mean Per Cent of Error Scores on  
Constant Drill of the Experimental Group  
and the Control Group

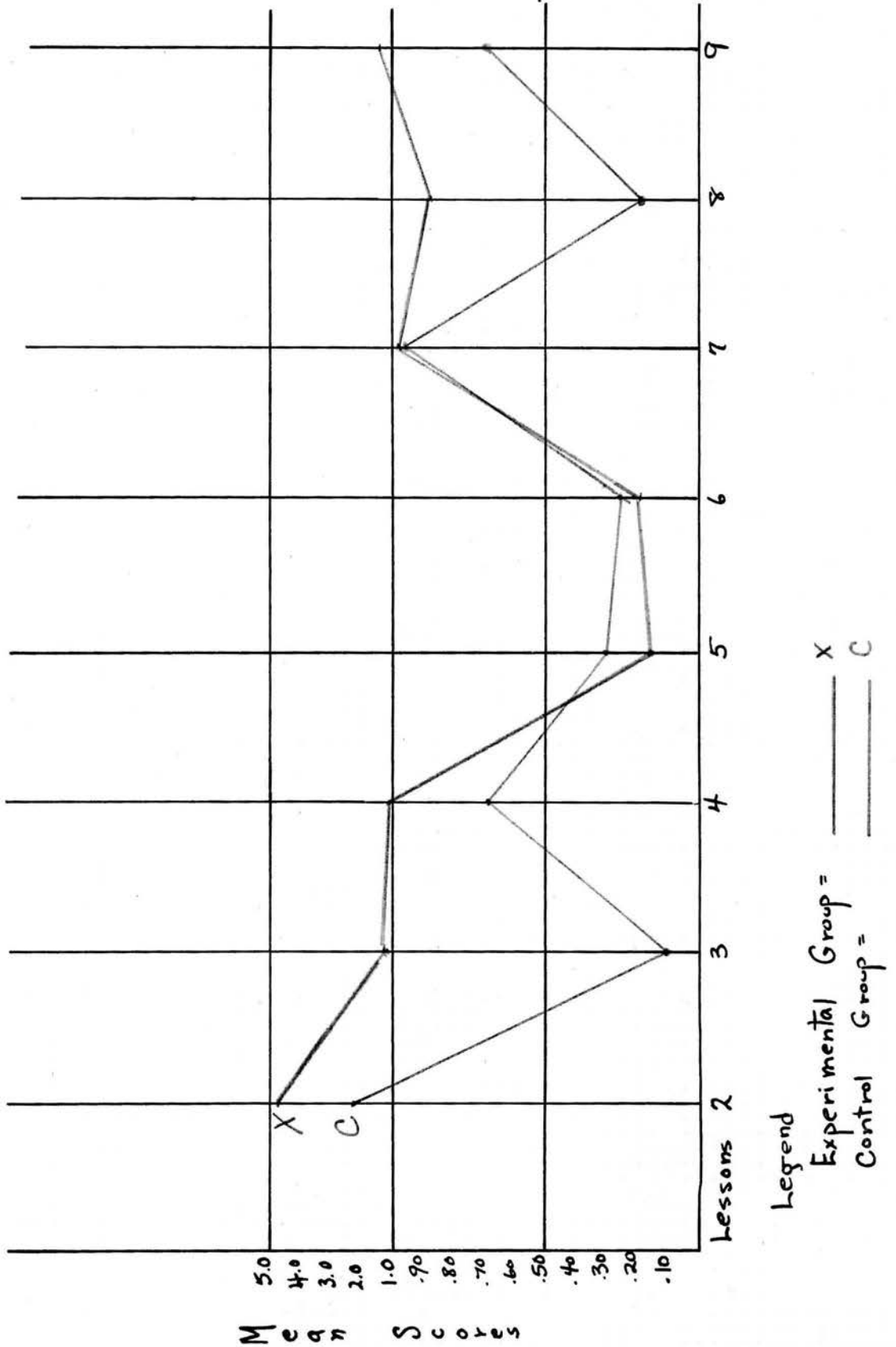


Table IX

A SUMMARY OF THE MEAN SCORES OF THE PER CENT OF ERRORS ON THE CONSTANT DRILL FOR THE EXPERIMENTAL GROUP AND THE CONTROL GROUP FROM LESSON 2 THROUGH LESSON 9

LESSON		
EXPERIMENTAL GROUP		CONTROL GROUP
4.58	2	2.29
1.19	3	.10
1.18	4	.69
.15	5	.30
.19	6	.25
.98	7	.95
.88	8	.19
1.48	9	.70

Table X

DIFFERENCES IN MEANS OF THE PER CENT OF ERROR SCORES (CONSTANT DRILL) OF THE SECOND LESSON AND THE NINTH LESSON FOR THE EXPERIMENTAL GROUP

Lesson	No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E.D	C.R.
2	20	4.58	6.06	1.38			
9	20	1.48	2.38	.54	3.10	1.5	2.06

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is 2.06. The difference is not significant.

Table XI shows the differences in the mean scores for the C Group of Lessons 2 and 9.

Table XI

DIFFERENCE IN MEANS OF THE PER CENT OF ERROR SCORES (CONSTANT DRILL) OF THE SECOND LESSON AND THE NINTH LESSON FOR THE CONTROL GROUP

Lesson	No.	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E.D	C.R.
2	20	2.29	4.55	1.03			
9	20	.70	2.29	.52	1.59	1.2	1.32

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is 1.32. The difference is not considered significant.

Comparison of Mean Gains. A comparison of the mean gains of the X Group and the C Group on the Constant Drill is shown in Table XII.

Table XII

DIFFERENCE IN MEAN GAINS OF THE EXPERIMENTAL GROUP AND THE CONTROL GROUP ON THE CONSTANT DRILL FOR THE SECOND AND NINTH LESSONS

Group	No.	S.D.	$D_{mg}$	$SE_{mg}$	$D_{mg_2 - mg_9}$	S.E.D	C.R.
X	20	4.90	3.10	.78			
C	20	3.25	1.59	.52	1.51	.937	1.61

The critical ratio of the difference of the mean gains between the X Group and the C Group for the second and the ninth lessons on the Constant Drill is 1.61. The difference between the mean gains of the two groups in favor of the X Group is not significant.

#### Supplementary Drill (Test)

Per Cent of Errors. Figure 4 shows the mean scores of the per cent of errors of both groups on the Supplementary Drill (Test) for Lessons 2 through 9 inclusive. A summary of the mean scores of the per cent of errors of both groups on the Supplementary Drill (Test) for Lessons 2 through 9 are shown in Table XIII. The per cent of errors scores for

Figure 4

Mean Per Cent of Error Scores on  
 Supplementary Drill of the Experimental Group  
 and the Control Group

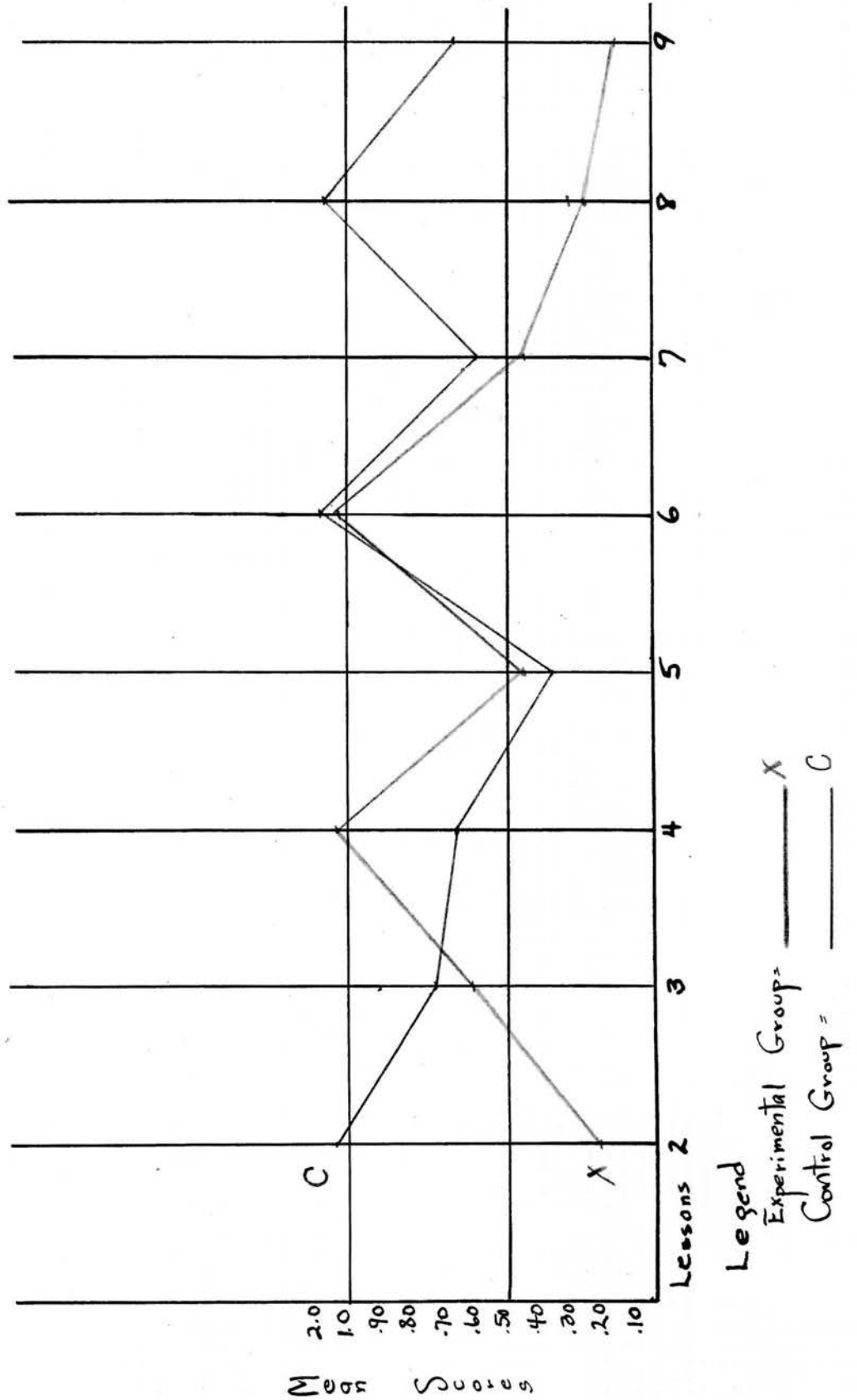


Table XIII

A SUMMARY OF THE MEAN SCORES OF THE PER CENT OF ERRORS ON THE SUPPLEMENTARY DRILL FOR THE EXPERIMENTAL GROUP AND THE CONTROL GROUP FROM LESSON 2 THROUGH LESSON 9

LESSON		
EXPERIMENTAL GROUP		CONTROL GROUP
.22	2	1.40
.61	3	.73
1.49	4	.67
.46	5	.36
1.35	6	1.95
.45	7	.60
.26	8	1.76
.16	9	.67

the X Group are smaller at the second and ninth lessons than those of the C Group. The per cent of errors appears to drop steadily for the X Group from Lesson 7 through 9.

Comparison of Differences in Means. The difference in mean scores of Lessons 2 and 9 between the X Group and the C Group were computed. Table XIV shows the differences in mean scores for the X Group of Lessons 2 and 9.

Table XIV

DIFFERENCE IN MEANS OF THE PER CENT OF ERROR SCORES (SUPPLEMENTARY DRILL) OF THE SECOND LESSON AND THE NINTH LESSON FOR THE EXPERIMENTAL GROUP

Lesson	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E. D	C.R.
2	.22	4.73	1.07			
9	1.19	2.86	.65	.97	1.3	.74

The critical ratio of the difference of the mean gains between the second and ninth lessons is .74. The difference is not considered significant.

Table XV shows the differences in the mean scores for the C Group of Lessons 2 and 9.

Table XV

DIFFERENCE IN MEANS OF THE PER CENT OF ERROR SCORES (SUPPLEMENTARY DRILL) OF THE SECOND LESSON AND THE NINTH LESSON FOR THE CONTROL GROUP

Lesson	Mean	SD	SE <sub>m</sub>	D <sub>m<sub>2</sub>m<sub>9</sub></sub>	S.E. <sub>D</sub>	C.R.
2	.665	2.99	.68			
9	1.40	2.86	.65	.73	.94	.77

The critical ratio of the difference between the second lesson mean and the ninth lesson mean is .77. This is not considered significant.

Comparison of Mean Gains. A comparison of the mean gains of the X Group and the C Group on the Supplementary Drill (Test) is shown in Table XVI.

Table XVI

DIFFERENCE IN MEAN GAINS OF THE EXPERIMENTAL GROUP AND THE CONTROL GROUP ON THE SUPPLEMENTARY DRILL FOR THE SECOND AND NINTH LESSONS

Group	No.	SD	D <sub>mg</sub>	SE <sub>mg</sub>	D <sub>mg<sub>2</sub>-mg<sub>9</sub></sub>	S.E. <sub>D</sub>	C.R.
X	20	3.99	.97	.63			
C	20	2.95	.73	.47	.24	.617	.38

The critical ratio of the difference of the mean gains between the X Group and the C Group for the second and ninth

lessons on the Supplementary Drill (Test) is .38. The difference between the mean gains of the two groups is not significant.

Summary of Data. A summary of the data of Lessons 2 and 9 for both groups, including the Constant Drill and the Supplementary Drill (Test), is shown in Table XVII.

Table XVII

A SUMMARY OF THE DIFFERENCES IN THE MEAN SCORES OF THE BEGINNING AND ENDING LESSONS OF THE EXPERIMENTAL GROUP AND THE CONTROL GROUP INCLUDING: MEAN GAINS, DIFFERENCES IN MEAN GAINS BETWEEN LESSONS II AND IX, CRITICAL RATIOS AND CORRELATION COEFFICIENT

Unit of Score	Means		Mean Gains	Differences in Mean Gains Between Lessons 2 & 9	C.R.
	Lesson II	Lesson IX			
CONSTANT DRILL					
G.W.P.M.					
X	19.95	34.15	14.20	7.75	6.45
C	17.55	39.50	21.95		9.42
Per Cent of Error					
X	4.58	1.48	3.10	1.51	2.06
C	2.29	.70	1.59		1.32
SUPPLEMENTARY DRILL					
G.W.P.M.					
X	22.40	21.50	-.90	12.7	-.35
C	17.45	29.25	11.80		9.36
Per Cent of Error					
X	.22	1.19	.97	.24	.74
C	.665	1.40	.73		.77

## COEFFICIENT OF CORRELATION

Group Correlation Coefficient

X-C .0624

## CHAPTER V

## SUMMARY AND CONCLUSIONS

The purposes of the study were: (a) to determine the differences in achievement when the time intervals between lessons were relatively massed or spaced according to the additive time pattern; and (b) to determine if one of the time patterns is superior to the other for developing typing skill.

Two groups of high school freshmen of the Branford High School, Branford, Connecticut, were selected as subjects in the experiment. Each group was given nine lessons in elementary typewriting. The content of each lesson, the techniques of teaching and all conditions were kept relatively constant for the two groups with the exception of the time intervals between each lesson. The Control Group met for one lesson each day for nine successive days. The Experimental Group met for nine lessons, the lessons being spaced according to the additive time pattern, which has been explained in Chapter I.

## Summary and Conclusions

At the end of the experiment the differences of achievement between the two groups were studied. Upon analyzing the data, the following summary and conclusions may be made:

1. No statistically significant difference was found in the mean gains of the gross words per minute scores between the Additive Time Pattern Group (Experimental Group) and the Relative Massing Pattern Group (Control Group) on the Constant Drill.
2. No statistically significant difference was found in the mean gains of the per cent of error scores between the Additive Time Pattern Group and the Relative Massing Pattern Group on the Constant Drill.
3. No statistically significant difference was found in the mean gains of the per cent of error scores between the Additive Time Pattern Group and the Relative Massing Pattern Group on the Supplementary Drill (Test).
4. A statistically significant difference was found in the mean gains of the gross words per minute scores between the Additive Time Pattern Group and the Relative Massing Pattern Group on the Supplementary Drill, the Relative Massing Pattern Group showing the greater amount of achievement.
5. The interest span of the Additive Time Pattern Group did not remain at the same high level as did the interest of the Relative Massing Pattern Group.
6. The number of initial massed lessons did not appear sufficient enough to establish a solid

foundation of the basic elements of typewriting, probably due to the complexity of learning to type.

The interpretation which is placed upon the results of this experiment is limited by the number and age of the students involved in this experiment.

#### Recommendations

The following recommendations for further investigation are suggested as an outgrowth of this study:

1. A similar study should be conducted with a larger number of subjects and in which a refined pretest is used.
2. A similar research study might be conducted using subjects of an older age level, who may be dependable in their attendance at the lessons.
3. A study might be conducted continuing the lessons for more than nine times and extending the initial massing in order to establish a better background in typing skill, because of the nature of this motor skill.
4. Similar research might be conducted using second-year typewriting students.

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APPENDIX

## QUESTIONNAIRE

Name \_\_\_\_\_

Class: Freshman \_\_\_\_\_

Sophomore \_\_\_\_\_

Junior \_\_\_\_\_

Senior \_\_\_\_\_

Please check in the  
proper space

Age \_\_\_\_\_ years

Sex: Female Male

Have you ever used a typewriter? \_\_\_\_\_

If answer to above question is "Yes", please state how you  
type:

By looking at the keyboard \_\_\_\_\_

Do not need to look at the keyboard \_\_\_\_\_

Do you play the piano? \_\_\_\_\_

If answer to this question is "Yes", please state for how  
many years (approximately) you have played the piano. \_\_\_\_\_

Do you play any other musical instrument? \_\_\_\_\_

If answer to this question is "Yes", please state for how  
many years (approximately) you have played this instrument.\_\_\_\_\_  
Name the instrument. \_\_\_\_\_

## Lesson II

(Practice)

fur rug jug hum gum mum ruff muff gruff

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

ded ded ded ded ded ded ded ded ded ded  
 ded ded ded ded ded ded ded ded ded ded

kik kik kik kik kik kik kik kik kik kik  
 kik kik kik kik kik kik kik kik kik kik

dcd dcd dcd dcd dcd dcd dcd dcd dcd dcd  
 dcd dcd dcd dcd dcd dcd dcd dcd dcd dcd

k,k k,k k,k k,k k,k k,k k,k k,k k,k k,k  
 k,k k,k k,k k,k k,k k,k k,k k,k k,k k,k

## New Words

he he he re re re red red red her her her  
 fee fee fee fed fed fed him him him  
 hid hid hid kid kid kid did did did

free free free deck deck deck  
 cede cede cede drug drug drug

## Phrases

did he, did he, did he, free her, free her, free her,  
 did he, did he, did he, free her, free her, free her,

## Sentence

he hid her, he hid her, he freed her, he freed her,

## Supplementary

rug hid he red free kid jug deck cede,  
 rug hid he red free kid jug deck cede,  
 rug hid he red free kid jug deck cede,

## LESSON III

## (Practice)

frf juj frf juj frf juj frf juj frf juj  
 fgf jmj fgf jmj fgf jmj fgf jmj fgf jmj  
 jhj ded jhj ded jhj ded jhj ded jhj ded  
 ded k,k ded k,k ded k,k ded k,k ded k,k  
 kik kik kik kik kik kik kik kik kik kik

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

ftf jyj ftf jyj ftf jyj ftf jyj ftf jyj  
 ftf jyj ftf jyj ftf jyj ftf jyj ftf jyj  
 fvf jnj fvf jnj fvf jnj fvf jnj fvf jnj  
 fvf jnj fvf jnj fvf jnj fvf jnj fvf jnj  
 fbf fgf fbf fgf fbf fgf fbf fgf fbf fgf  
 fbf fgf fbf fgf fbf fgf fbf fgf fbf fgf

## New Words

in in in the the the my my my be be be  
 kin kin kin ink ink ink get get get  
 bed bed bed but but but fee fee fee

junk junk junk mink mink mink  
 kink kink kink feet feet feet  
 ever ever ever during during during

## Phrases

even feet, kind turn, ever find much time  
 even feet, kind turn, ever find much time

## Sentences

buy her the big red jug, try the end run,  
 buy her the big red, jug, try the end run,  
 her friend hid the junk under the big tree  
 her friend hid the junk under the big tree

## Supplementary

be gruff bed drug kink run during ever end much  
 be gruff bed drug kink run during ever end much  
 be gruff bed drug kink run during ever end much

## LESSON IV

(Practice)

frf ftf frf ftf frf ftf frf ftf frf ftf  
 fvf fgf fvf fgf fvf fgf fvf fgf fvf fgf  
 juj jyj juj jyj juj jyj juj jyj juj jyj  
 fbf fbf fbf fbf fbf fbf fbf fbf fbf fbf  
 jmj jhj jmj jhj jmj jhj jmj jhj jmj jhj  
 jnj jnj jnj jnj jnj jnj jnj jnj jnj jnj  
 ded dcd ded dcd ded dcd ded dcd ded dcd  
 kik k,k kik k,k kik k,k kik k,k kik k,k

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

jjj jJj jJj jJj Ju Jus Just  
 lll lLl lLl lLl Li Lis List

lol lol lol lol lol lol lol lol lol lol  
 l.l l.l l.l l.l l.l l.l l.l l.l l.l l.l

## New Words

oh oh oh no no no you you you mind mind mind  
 look look look oil oil oil hill hill hill  
 the the the join join join milk milk milk  
 nook nook nook much much much refer refer refer  
 beg beg beg lot lot lot needed needed needed

## Phrases

the nook, to me, the nook, to me,  
 the nook, to me, the nook, to me,

## Sentences

The nook needed much.  
 The nook needed much.  
 Our good deed looked fine.  
 Our good deed looked fine.

## Supplementary

ruff hid deck think much  
 ruff hid deck think much  
 ruff hid deck think much

Bring the milk to me.  
 Bring the milk to me.

## LESSON V

(Practice)

fvf kik fvf kik fvf kik fvf kik fvf kik  
 fbf k,k fbf k,k fbf k,k fbf k,k fbf k,k  
 ftf jnj ftf jnj ftf jnj ftf jnj ftf jnj  
 lol l.l lol l.l lol l.l lol l.l lol l.l

ffF ffF Fu Fur  
 jjJ jjJ Ju Jug

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

sws sws sws sws sws sws sws sws sws  
 sxs sxs sxs sxs sxs sxs sxs sxs sxs

## New Words

we we we sew sew sew vex vex vex were were were  
 rest rest rest just just just list list list

lots lots lots down down down town town town  
 soon soon soon move move move sell sell sell

wish wish wish stock stock stock  
 vexed vexed vexed must must must

## Sentences

Just tell them they must wire this week.  
 Just tell them they must wire this week.

List your four lots down town very soon.  
 List your four lots down town very soon.

## Supplementary

hum free bring milk wish  
 hum free bring milk wish  
 hum free bring milk wish

You must know we do not wish to come down.  
 You must know we do not wish to come down.

## LESSON VI

## (Practice)

fbf k,k fbf k,k fbf k,k fbf k,k fbf k,k  
 lol l.l lol l.l lol l.l lol l.l lol l.l  
 sws sxs sws sxs sws sxs sws sxs sws sxs

Our Our Our For For For  
 Our Our Our For For For

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

aza aza aza aza aza aza aza aza aza aza  
 aza aza aza aza aza aza aza aza aza aza

aqa aqa aqa aqa aqa aqa aqa aqa aqa aqa  
 aqa aqa aqa aqa aqa aqa aqa aqa aqa aqa

## New Words

as as as at at at ax ax ax  
 fast fast fast adds adds adds  
 ages ages ages cars cars cars  
 far far far card card card

quiz quiz quiz quit quit quit  
 quiet quiet quiet quizzes quizzes quizzes  
 lazy lazy lazy aqua aqua aqua

## Phrases

They can They can They can  
 make off make off make off  
 never quit never quit never quit

## Sentences

They can bite fast. Then they make off.  
 They never quit.

They can bite fast. Then they make off.  
 They never quit.

## Supplementary

gum her junk big much stock lazy  
 gum her junk big much stock lazy  
 gum her junk big much stock lazy

Have them near you.  
Have them near you.  
Have them near you.

## LESSON VII

## (Practice)

lol lol lol lol lol lol lol lol lol lol  
 l.l l.l l.l l.l l.l l.l l.l l.l l.l l.l

k,k k,k k,k k,k k,k k,k k,k k,k k,k k,k  
 jnj jnj jnj jnj jnj jnj jnj jnj jnj jnj

sws sws sws sws sws sws sws sws sws sws  
 sxs sxs sxs sxs sxs sxs sxs sxs sxs sxs

aza aza aza aza aza aza aza aza aza aza  
 aqa aqa aqa aqa aqa aqa aqa aqa aqa aqa

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## New Strokes

;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p;  
 ;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p; ;p;

## New Words

pink pink pink link link link  
 lump lump lump hump hump hump  
 jump jump jump pull pull pull  
 pool pool pool fact fact fact

pike pike pike grip grip grip  
 bait bait bait leap leap leap  
 gaze gaze gaze bait bait bait

pride pride pride picked picked picked  
 swam swam swam swim swim swim

## Sentences

Five pike will jump when this bait hits.  
 They leap, dive, swim, and never quit.  
 Grip that line taut; keep them near you.

## Supplementary

mink beg vexed ages pike  
 mink beg vexed ages pike  
 mink beg vexed ages pike

Jeff parked quite close to the azure pool.  
 Jeff parked quite close to the azure pool.

They moved with pride.

## LESSON VIII

## (Practice)

aa bb cc dd ee ff gg hh ii jj kk ll mm nn oo  
pp qq rr ss tt uu vv ww xx yy zz

aa bb cc dd ee ff gg hh ii jj kk ll mm nn oo  
pp qq rr ss tt uu vv ww xx yy zz

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
fur rug jug hum gum mum ruff muff gruff  
fur rug jug hum gum mum ruff muff gruff

## Flash Drill

first learn typing value power practice

first first first learn learn learn first learn  
typing typing typing first learn typing value  
value value first learn typing value power power  
power first learn typing value power practice  
practice practice first learn typing value power  
practice

## Paragraph Practice

The first thing one has to learn in typing is the value of good form. Good form is the one and only basis on which fine typing skill can be built. If one has good form, typing power will come as right practice is done day after day.

## LESSON IX

(Practice)

aaa bbb ccc ddd eee fff ggg hhh iii jjj kkk lll mmm nnn ooo  
 ppp qq q rrr sss ttt uuu vvv www xxx yyy zzz

aaa bbb ccc ddd eee fff ggg hhh iii jjj kkk lll mmm nnn ooo  
 ppp qq q rrr sss ttt uuu vvv www xxx yyy zzz

## Constant Drill

fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff  
 fur rug jug hum gum mum ruff muff gruff

## Flash Drill

short quick sense control word whole

short short short quick quick quick short quick  
 sense sense sense short quick sense control  
 control control short quick sense control  
 word word word short quick sense control  
 word whole whole whole short quick sense control  
 word whole

## Paragraph Practice

A short and easy word can be typed with a quick stroke and with a sense of control if I will think the word; but as I type long or hard words, I should think the letter and not the whole word. This will aid me to type with control.