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AN INVESTIGATION OF ADAPTATION AND THE
EFFECT OF SUGGESTION ON THE ORAL READING
OF FOURTH GRADE STUTTERERS

Thesis for the Degree of M. A.
MICHIGAN STATE UNIVERSITY
Robert Harold Williams
1960



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FOURTH GRADE STUTTERERS

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Submitted to the College of Communication Arts
of Michigan State University in Partial
Fulfillment of the Requirements
for the Degree of

Department of Speech

Approved

Robert Harold Williams

ABSTRACT

This study was designed to ascertain whether fourth grade stutterers demonstrated an adaptation effect when orally reading the same material five consecutive times. The study also attempted to discover whether suggestion relative to the ease or difficulty of the reading passage affected the frequency of stuttering moments and the degree of adaptation.

Eleven fourth grade stutterers from the Flint Public Schools and adjacent school systems participated in the study.

The stutterers read each of two reading passages five times consecutively. The experimenter suggested that one passage was hard to read and the other was easy to read.

The number of stuttering moments was tabulated for each reading. The analysis of results of this study by means of t tests indicates no significant difference on the mean frequency of stuttering moments between the first readings of two equated reading passages ("hard" and "easy").

The reading of both the hard and easy passages produced inversely negatively accelerated curves which were similar to those found in adaptation studies of adult stutterers. The degree of adaptation, however, was non-significant. The tests for both adaptation measures between the two conditions also proved to be non-significant.

Possible explanations were advanced for the failure of significant adaptation to occur.

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ACKNOWLEDGEMENT

I wish to express my sincere appreciation for the stimulating and constructive guidance received from Dr. Ralph Leutenegger throughout the execution of this thesis.

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INTRODUCTION

With the exception of a few Indian tribes, stuttering appears to be an almost universal problem. Neither the cause nor the cure of stuttering is definitely known. Studies of stuttering etiology indicate that the majority of stuttering problems originate prior to the age of six.

Research in recent years has been interpreted to indicate that stuttering may be some type of learned behavior.

In early psychological research, a phenomenon commonly called the "power of suggestion" was described. Suggestion plays an important part in all our lives. The business of advertising is based upon this phenomenon.

More recently, researchers in speech pathology described a phenomenon which they called the adaptation effect. The adaptation effect was one of the first strong clues that stuttering may be a form of learned behavior.

This study incorporates both of these phenomena into an experimental design to explore the stuttering of fourth grade children.

Much stuttering research has been done in college and university clinics. Research has been recently encouraged in public school systems due to a recognition of possible differences between clinic subjects and public school subjects. This study was undertaken in the Public School System of Flint, Michigan.

Statement of the Problem

The purpose of this study was to investigate the speech behavior of fourth grade stutterers during consecutive oral readings of the same passage.

The study was also designed to determine whether suggestions about reading difficulty would influence the frequency of stuttering moments.

Importance of the Study

It was believed that the results of this study might reveal an adaptation effect in the oral reading of fourth grade stutterers similar to that demonstrated by adult stutterers. The adaptation effect might be used therapeutically to demonstrate to the young stutterer that his stuttering is modifiable. This study would also indicate whether the adaptation effect was influenced by suggestion.

Limitations of the Study

It was not the purpose of this study to determine the causes of the adaptation effect, but rather to ascertain whether this phenomenon was demonstrable in the oral reading of fourth grade children. Neither did the study purport to investigate the causes of possible relationships between the adaptation effect and stutterer's suggestibility, but simply to determine whether or not such a relationship existed.

Definitions of Terms Used

Stuttering. "Stuttering may be defined functionally as a transient disturbance in communicative, propositional language usage. The disturbance is characterized overtly by hesitations, repetitions, prolongations, and hypertension. Covert reactions include apprehension, anxiety, and avoidance drives related to the act of speaking."¹

¹Mack D. Steer, "An Objective Study of the Relationship between the Psychological Factors and the Severity of Stuttering," Journal of Abnormal and Social Psychology (1936), 31:36-46.

Stuttering moment. A stuttering moment is that duration of time during which overt stuttering is judged to occur in spontaneous speech or in oral reading.

Adaptation effect. "The decrease in stuttering as measured with reference to its frequency or severity that occurs when a stutterer reads the same passage a number of times consecutively."¹

Suggestion. "Suggestion is a process of communication resulting in the acceptance with conviction of the communicated proposition in the absence of logically adequate grounds for its acceptance."²

Suggestability. Suggestibility is the tendency to respond to suggestion.

History and Present Status of Problem

". . . They [stutterers] are one of the very largest contingents of the disadvantaged, and since their predicament was recorded by the ancients it has been held to be among the more baffling of mankind's woes."³

Stuttering, because it appears to be a form of learned behavior, may be found in almost every population regardless of social status, race, creed, color, financial status or the individual's educational level. Stuttering is inconsistent in it's severity over a long period of time.

¹Charles Van Riper and Catherine J. Hull, "The Quantitative Measurement of the Effect of Certain Situations on Stuttering," Stuttering in Children and Adults, ed. Wendell Johnson (University of Minnesota Press, 1955), pp. 199-206.

²William McDougall, An Introduction To Social Psychology (rev. ed.; Boston: J. W. Luce, 1926), p. 377.

³Wendell Johnson, editor, Stuttering in Children and Adults (Minneapolis; University of Minnesota Press, 1955)

It can originate early in life or suddenly begin in later years. Stuttering behavior can cease after several years duration or be a millstone for life.

"Stuttering, which affects approximately six to ten out of every thousand school children, is, from many points of view, the most challenging of all speech defects, not only to the speech correctionist but also to the classroom teacher."¹

Not until the twentieth century has the problem of stuttering been subjected to the experimental techniques of the scientific method.

The first systematic studies leading towards the discovery of certain phenomena exhibited during the oral reading by stutterers were done after the turn of the twentieth century.

The first record of counting moments of stuttering was done by Sara Stinchfield and reported in the M.A. thesis by M. D. Steer. This study, completed in 1933, opened a new field for research--that of investigating stutterers' patterns of speech. "The concept of the moment of stuttering almost immediately suggested the feasibility of measuring the amount of stuttering and the variations in it by the rather obvious means of counting the moments of stuttering in systematically obtained samples of speech."²

¹Wendell Johnson et al. Speech Handicapped School Children (New York: Harper & Bros., 1948), Chapter V., "Stuttering."

²W. Johnson, editor, loc. cit.

Numerous studies^{1, 2, 3, 4, 5} have verified the adaptation effect. This phenomena was first reported in 1937,⁶ but apparently was preceded by another experiment written about the same time but not published until recently.⁷ Another early investigation, done between 1935 and 1937 by Spencer F. Brown, dealt with the frequency of stuttering. His findings were published in a series of articles for the 1945 Journal of Speech Disorders.⁸

Three basic findings emerged from these early studies. These were the adaptation effect, the consistency effect, and spontaneous recovery of the strength of the stuttering response.

These basic findings have been interpreted to indicate that stuttering responses are similar in behavior to learned conditioned responses.

¹G. J. Wischner, "Stuttering Behavior and Learning: A Preliminary Theoretical Formulation," Journal of Speech and Hearing Disorders (1950), 15:324-335.

²Wendell Johnson and Marjorie Inness, "Studies in the Psychology of Stuttering: XIII. A Statistical Analysis of the Adaptation and Consistency Effects in Relation to Stuttering," Journal of Speech Disorders (1939) 4:79-86.

³W. Johnson and John R. Knott, "Studies in the Psychology of Stuttering, I: The Distribution of Moments of Stuttering in Successive Readings of the Same Material," Journal of Speech Disorders, 2 (1937), 17-19.

⁴E. L. Jones, "Explorations of Experimental Extinction and Spontaneous Recovery in Stuttering," Stuttering in Children and Adults.

⁵J. Maddox, "Studies in the Psychology of Stuttering, VIII. The Role of Visual Cues in the Precipitation of Moments of Stuttering," Journal of Speech Disorders, 3 (1938), 90-94.

⁶Johnson and Knott, loc. cit.

⁷Van Riper and Hull, loc. cit.

⁸Spencer F. Brown, "The Loci of Stutterings in the Speech Sequence," Journal of Speech Disorders, X (1945), pp. 181-92.

Further interpretations have suggested that the adaptation effect was due to a reduction of anxiety. Additional interpretations have indicated that the adaptation effect is due to the decreasing intellectual significance of the reading material.

In Stuttering in Children and Adults, Johnson notes that:

This effect [spontaneous recovery] may be looked upon as a laboratory model, so to speak, of the process that is recognized clinically as a relapse. Like the adaptation effect, it can be investigated under controlled conditions with a view to identifying and evaluating the factors associated with increase and decrease in its rate and extent.

The most important finding of research to date have been the phenomenon found in the consecutive oral reading of stutterers. These phenomena of adaptation, consistency and spontaneous recovery not only provide laboratory models for the study of stuttering, but also indicate that stuttering behaves like a learned conditioned response or learned behavior rather than disorders or incoordinations of neurophysiological mechanisms which subserve the speech process.

It has been thought that results of previous studies have been influenced by stutterers' mental attitudes. Some of these mental attitudes have been variously designated readiness, determining tendency, preparatory set, set to respond and mental set.

Van Riper's "preparatory set" therapy is based on the fact that stuttering is anticipated during the act of speaking. In Oliver Bloodstein's article, "Hypothetical Conditions under which Stuttering is Reduced or Absent,"¹ he concludes that stuttering is diminished when the stutterer's

¹Oliver Bloodstein, "Hypothetical Conditions under which Stuttering is Reduced or Absent," Journal of Speech and Hearing Disorders, Vol. 15 (1950), pp. 142-53.

anxiety about his speech is reduced and he has less desire to avoid stuttering. The "preparatory sets," anticipations, or anxieties are formed because the stutterer has specific sound or word fears.

The stutterer may also have a general situation fear which forms these anxieties and preconceptions into mental attitudes prior to the act of speaking. The nature of the task, the experimenter, the materials used or the written or verbal instructions for the task, may have directed the stutterer to form such a mental attitude. Rees and Israel in their study, "An Investigation of the Establishment and Operation of Mental Sets,"¹ noted that "this direction appears as a prominent feature of thinking and behavior. This direction may be a consequence of experimental instructions or it may emerge from the subject's interpretation of the properties of the task itself."²

In further consideration of mental attitudes it should be noted that attitude scales reflect the possibility of the subject's interpretations of the properties of the task, in that the attitude scales attempt to register these preconceived self-evaluations of the individual's speech. These evaluations or attitudes may be altered by several factors such as physical environment, punishment for failure, or the anxiety of producing non-fluent speech during the communicative process. Psychologists have explored attitudes which are subjected to change due to a process known as "suggestion." "Suggestibility," the tendency for this process to occur,

¹Hulda J. Rees and Harold E. Israel, "An Investigation of the Establishment and Operation of Mental Sets," Psychological Monographs 210, pp. 1-26.

²Ibid.

has also been studied. Suggestion and suggestibility have been studied in an attempt to discover their influence upon various types of response such as physical labor, gross and fine discrimination of the five senses and mental activities such as memory, recognition, imagination and estimation.

The anticipation and expectancy to stutter due to word, sound or situational fears may be influenced by suggestion and the suggestibility of the stutterer, if anticipation and expectancy can be classified as predetermined attitudes.

"In the field of stuttering the words 'expectancy' (expectation), 'anticipation,' 'fear' and related terms have been employed by different investigators, if not always synonymously, at least in a content suggesting that the referents of these terms are highly interrelated."¹

Anticipation and expectation appear to play a strong role in disrupting the stutterer's speech. In a study by Knott, Johnson and Webster,² it was found that the stutterer can anticipate the words on which he will have verbal difficulty, with an accuracy of 94 to 96 percent. Johnson and Sinn³ found that 98 percent of stuttered speech was eliminated when the subjects were instructed to omit words that they anticipated would be stuttered. In the Van Riper and Milisen⁴ study, the stutterers

¹G. J. Wischner, "An Experimental Approach to Expectancy and Anxiety in Stuttering Behavior," Journal of Speech and Hearing Disorders (1952), 17:139-54.

²John R. Knott, Wendell Johnson, and Mary J. Webster, "Studies in the Psychology of Stuttering II. A Quantitative Evaluation of Expectation of Stuttering in Relation to the Occurrence of Stuttering," Journal of Speech and Hearing Disorders, Vol. 2 (1937) pp. 20-22.

³W. Johnson and A. Sinn, "Studies in the Psychology of Stuttering: V. Frequency of Stuttering With Expectation of Stuttering Controlled," Journal of Speech Disorders, Vol. 2 (1937), pp. 98-100.

⁴C. Van Riper and R. L. Milisen, "A Study of the Predicted Duration of the Stutterer's Blocks as Related to Their Actual Duration," Journal Speech Disorders, Vol. 4 (1939), pp. 339-45.

could not only predict the moment of stuttering but could apparently predict its duration as well. The stutterers in these studies had preconceived attitudes as to the frequency and duration of their stuttering.

Experimenters have hypothesized that propositionality or intellectual significance of reading material have influenced the quantity of stuttering moments. Instructions to the stutterer may have also influenced the frequency (and severity) of these moments. In the Parley W. Newman study, the instructions suggested that the speaking task would be very difficult. "... descriptions would be recorded and later presented to a number of different listeners who would attempt to draw the figures described solely from the recorded directions. It was explained that measures based on the accuracy with which the figures were reproduced by the listeners would be used for the purpose of studying the communicability of stuttered speech."¹ In this explanation of the instructions it was apparent that several factors were being used as suggestions to the stutterer that this task was difficult. The suggestions of difficulty were, firstly, that the stutterer was to tape record his message, secondly, that his message must be highly intelligible to the listener, and thirdly, the stutterer would be rated upon the listener's performance which was dependent upon the stutterer's speech. Newman thereby attempted to influence attitudes in each stutterer prior to the experiment.

"It is rather widely agreed that effective therapy for a stutterer should include techniques effecting a change in the stutterer's evaluation

¹Parley W. Newman, "A Study of Adaptation and Recovery of the Stuttering Response in Self-formulated Speech," Journal of Speech and Hearing Disorders (1954), 19:450-58.

of speech situations."¹ It has been clearly indicated by stuttering self-inventory scales and related research that stutterers fear not only the speaking situations and form attitudes from their fear, but that they also form attitudes about stuttering on particular words and syllables and sounds.

In the study by Maribel H. Connett,² a deliberate attempt was made to induce or alter an attitude by suggestion. The attitude that was to be developed was the perceived difficulty of the [t] sound. The results of this study suggested that attitudes can be induced or influenced since the stutterers in this study did tend to have more difficulty with the [t] sound after such difficulty was suggested.

In the study, "Frequency of Stuttering in Relation to Induced Modification following Expectancy of Stuttering" by Eloise Oxtoby,³ it was found that modifying the stutterer's reaction to his expectation of stuttering produced changes in the anticipatory, consistency and adaptation aspects of his speech. Oxtoby found that increased frequency of stuttering is more likely to occur when the anxiety level increases, and that there was no appreciable difference in frequency of stuttering when given directions to stutter in a customary pattern, then to stutter in a customary pattern

¹Irene C. Shumak, "A Speech Situation Rating Sheet for Stutterers," Stuttering in Children and Adults, ed. Wendell Johnson (University of Minnesota Press, 1955), pp. 341-47.

²Maribel Happer Connett, "Experimentally Induced Changes in the Relative Frequency of Stuttering on a Specified Speech Sound," Stuttering in Children and Adults, ed. Wendell Johnson (University of Minnesota Press, 1955), 472:268-74.

³Eloise T. Oxtoby, "Frequency of Stuttering in Relation to Induced Modification following Expectancy of Stuttering," Stuttering in Children and Adults, ed. Wendell Johnson (University of Minnesota Press, 1955), pp. 218-25.

but with as little effort or tension as possible. This experimenter also found that greater adaptation was achieved with the customary stuttering pattern and easy stuttering pattern than with the avoidant stuttering pattern that increase the anxiety level.

The general conclusions of the Oxtoby study were postulated seven years earlier by Porter¹ who surmised that stutterers have assumptions which are projected on to the situation. Porter further noted that the stutterer seemed to base his actions upon these assumptions rather than the actualities. Porter concluded that the stutterer's assumptions appeared to be significantly related to the frequency of stuttering.

Researchers have studied "suggestion" and "suggestibility" to ascertain how they functioned and under what conditions they functioned. Hollingworth and Poffenberger² in discussing suggestion emphasized the fact of "uncritical acceptance of an idea coming from another person." Woodworth hypothesized that "suggestion works when a particular stimulus (what is suggested) arouses response without other stimuli being able to contribute to the response."³

In investigating to find how suggestion functioned, Binet and Féré⁴

¹H. V. K. Porter, "Studies in the Psychology of Stuttering: XIV. Stuttering Phenomena in Relation to Size and Personnel of Audience." Journal of Speech Disorders, Vol. 4 (1939), pp. 323-33.

²Harry Levi Hollingworth and A. T. Poffenberger, Applied Psychology (new ed., enl. and rev. New York, London: D. Appleton and Co., 1923).

³Robert S. Woodworth, Psychology: A Study of Mental Life (New York: Henry Holt and Company, 1921), p. 580.

⁴Alfred Binet and Charles Féré, Animal Magnetism (New York: D. Appleton and Company, 1888, 1901).

found that suggested images behaved not unlike real images. The suggested images followed the laws of optics, contrast, color mixture and retinal rivalry. Hansen¹ found that digestive reaction and metabolism changed with suggestions of heat, cold and eating food, like the real stimuli.

In W. Brown's study of "Differences in Suggestibility," individual differences were emphasized. "It must be said at once that there are no individual differences which are sufficiently conspicuous to justify the experimenter in calling one person "very suggestible" and another "not suggestible."² Brown noted that ". . . the most skeptical individual will yield at times with surprising readiness to suggestions, while a person who has yielded to some test [of suggestion] with very little apparent resistance will unexpectedly become very recalcitrant."³ Brown, however, maintained that the absence of conspicuous cases of high or low suggestibility consistently maintained throughout a number of tests can not be taken as proof that there may not be a tendency in some individuals to be suggestible or to resist suggestion.

In a study by Margaret Otis,⁴ "A Study of Suggestibility of Children," of grades three to six, it was found that the tendency of suggestibility did not vary appreciably through several grades, but the range in the case of third and fourth grade children indicated that they may respond more to

¹K. Hansen, "Zur Theorie der Symptomenbildung in der Neurose," Der Nervenarzt, Vol. 1 (1928), pp. 21-26.

²Warner Brown, Individual and Sex Differences in Suggestibility (Berkeley: University of California Press, 1916), p. 430.

³Ibid.

⁴Margaret Otis, "A Study of Suggestibility of Children," Archives of Psychology, No. 70 (May, 1924).

suggestion. She also noted that direct suggestions were easy to resist.

The findings of the Otis study were substantiated several months later by Irene Case Sherman, who noted that suggestibility tends to decrease with the increasing age in normal children. Sherman¹ also noted that suggestibility depends upon the type of test used to measure suggestibility.

The term suggestion has been used in abnormal psychology to describe responses found in conditions such as hysteria and hypnosis; it has been used in social psychology as a concept to explain in part the process of acquisition or change of attitudes; and it has been used in experimental (laboratory) psychology in ways which seem to be efforts to measure the first two conceptions.

The older theories dealt with the response to suggestion as a special type of response, and with suggestibility as a trait. Later studies, such as those of Krech and Crutchfield,² rejected this conception and stressed perceptual and cognitive factors in suggestion. A number of these later experiments found that perception and cognition play a significant role in suggestion and suggestibility. However, many of these experiments had disregarded motivational and experiential factors.

The basic assumption of Herbert Kelman's³ study entitled "Effects of Success and Failure on 'Suggestibility' in the Autokinetic Situation,"

¹Irene Case Sherman, "The Suggestibility of Normal and Mentally Defective Children," Comparative Psychological Monographs, Vol. II, Serial No. 9 (August, 1924), pp. 1-34.

²D. Krech and R. S. Crutchfield, Theory and Problems of Social Psychology (New York: McGraw-Hill, 1948), p. 332f.

³Herbert C. Kelman, "Effects of Success and Failure on 'Suggestibility' in the Autokinetic Situation," Journal of Abnormal and Social Psychology, Vol. 45 (1950), pp. 267-85.

was that the response made to suggestion followed the same laws of learning as any other response; that it was learned through the process of differential reinforcement. Kelman observed by experiments and by relevant personality inventories that suggestibility reflects an individual's previous experiences.

In the study by G. M. Whipple,¹ it was noted that suggestion was a process that occurred in the normal consciousness which could create belief or affect judgment.

Experiments have shown that the efficiency and amount of physical work can be effected by suggestion. Strong,² used a hand dynamometer and found that positive suggestion was superior to negative, visual to auditory, and that when the subject voiced the suggestion, it was the most effective. He also noted that the amount of work was increased, but that the accuracy was disturbed. Manzer,³ found similar results with his study which emphasized verbal suggestion.

Brown,⁴ attempted to determine the ability of suggestion to change performance of several types of behavior. His study is representative of many previous studies mentioned above. Brown tested eight areas of behavior: the five senses, for sensation and change; memory; recognition;

¹G. M. Whipple, Manual of Mental and Physical Tests. Pt. II (Baltimore: Warwick and York, 1924), 336 pp.

²E. K. Strong, "The Effect of Various Types of Suggestions on Motor Activity," Psychological Review, Vol. 17 (1910), pp. 279-93.

³C. W. Manzer, "The Effect of Verbal Suggestion on the Output and Variability of Muscular Work," Psychological Clinic, Vol. 22 (1934), pp. 248-56.

⁴Warner Brown, loc. cit.

imagination; illusion; estimation; proportion; and esthetic preference.

The aforementioned studies have been designed to test the effects of suggestion and suggestibility. Additional studies concentrated upon the factors which determined the acceptance of suggestion, and the contributing factors that determined the tendency of suggestibility.

In Thomas Coffin's study¹ "Some Conditions of Suggestion and Suggestibility: A Study of Certain Attitudinal and Situational Factors Influencing the Process of Suggestion" the earlier and later studies of suggestion were grouped into four classifications. The first classification consisted of those studies of ideomotor suggestion. These studies were based upon the premise that suggestion was influenced by sensory perseveration, simple repetition of a previous response, suggestion by sensory set, expectancy induced by non-verbal stimuli, verbal-motor suggestion and verbal suggestion which touched off an attitude or set. The second classification consisted of prestige suggestion which dealt with the emotional aspect of suggestibility which included prestige by personal influence and negative suggestibility to prestige. The third general classification was suggestibility as a trait. This classification included studies which dealt with individual differences, and which compared the results of different suggestibility tests to determine whether suggestibility can be established as a consistent character or personality trait. The last classification included studies which dealt with the particular conditions under which suggestion and suggestibility occurred. The results of these

¹Thomas E. Coffin, "Some Conditions of Suggestion and Suggestibility: A Study of Certain Attitudinal and Situational Factors Influencing the Process of Suggestion," Psychological Monographs, Vol. 53, No. 4 (1941).

studies indicated that the conditions of investigation seem almost as important as the types or individuals or groups being tested.

Coffin summarized that suggestion seemed to be a general term that included many psychological processes. Coffin indicated that the evidence of previous research had not pointed conclusively to any uniform differences between the sexes or individuals. He also noted that suggestibility was not a matter of degree, and for this reason the conditions under which suggestibility occur must be specified.

The results of the studies of suggestion and suggestibility indicate several pertinent factors for the design of this study. Response may be modified by suggestion. The five senses, cognitive behavior, non-symbolic responses and symbolic responses have been modified by suggestion in past studies. It is pertinent to this study that third and fourth grade children were found to be more suggestible than older children. It is also pertinent that suggestion has no uniform difference in effecting response between individuals of the same age and grade level and that opposite sexes of the same age and grade respond equally well to suggestion. It is further noteworthy that suggestion is not dependent upon I.Q. per se but dependent upon the acquired knowledge of the individual.

"In addition, the favorable effects of suggestion on stuttering . . . are probably due, ultimately, to the reduction of anxiety upon stuttering."¹

In view of the aforementioned data, the experimenter has chosen fourth grade children for this study, as age and knowledge in one grade level would be fairly consistent. Children of this age and grade would also have a greater tendency to respond to suggestion.

¹Bloodstein, loc. cit.

The experimenter attempted to determine whether suggestion would affect the stutterers' frequency of stuttering by suggesting that two equated reading passages were of different difficulties, i.e., one was hard and the other was easy.

Selection of Subjects

Eleven subjects, ten male and one female, were selected from the fourth grade of the Flint Public Community Schools and from classes of the Mott Foundation Speech Correction Program in Genesee County, Michigan. The Mott Foundation Speech Correction Program has been established to serve the speech correction needs of the parochial and county school systems. The criteria for the subjects were as follows: no articulation problem so severe as to render the subjects' speech incomprehensible; a previous diagnosis of "stutterer" by a speech correctionist certified to teach in the state of Michigan; and a minimum of eight speech non-fluencies regarded as stuttering when reading 150 words of fourth grade reading material. It was presupposed that a child in the fourth grade could read fourth grade material. No extremely dull or mentally retarded children were accepted for the study. The classroom teacher's judgment was accepted as valid for this last criterion.

Selection of Reading Material

Two reading passages, 150 words in length, were composed by the experimenter with the assistance of an elementary school classroom consultant and remedial reading teacher of the Flint Public Schools. These passages constitute Appendices A and B of this study.

Both reading passages were adopted from a fourth grade reading text previously read by the subjects a minimum of one month prior to the experiment. It was assumed that a one month or longer interval between readings would minimize the children's familiarity with the reading passages.

Reading Passage I (in Appendix A) was equated with Reading Passage II (in Appendix B) using Brown's word-weights.¹

Every word in each passage was assigned a weight from zero to four. The weight assigned to a word depended on how many of the following conditions it met: (1) first, second, or third word in a sentence; (2) beginning with an initial consonant; (3) five or more letters in length; (4) noun, verb, adjective, or adverb in grammatical function. If none of the above conditions were met, it received a weight of zero. Thus each word was placed in one of five weight categories.²

The reading passages were also equated by using Flesch's formula for "Ease of Readability."³

Both reading passages were judged to be non-emotional in content.

Recording the Stuttering Moments

The experimenter recorded as moments of stuttering all repetitions of syllables, words, or phrases. Hesitations between words or sentences and during words judged to be abnormally long to the experimenter also were recorded as moments of stuttering. Interjections preceding or during the reading passage were classified as moments of stuttering. Undue prolongations of any syllable were recorded as moments of stutterings.

¹Spencer F. Brown, loc. cit.

²W. Ed Johnson, loc. cit.

³R. Flesch, How to Test Readability (New York: Harper and Brothers, 1951).

The inclusion of reading errors in the tabulation of stuttering moments was minimized by presenting the subject with a list of all the words found in both reading passages prior to reading them. The experimenter clarified for the subject any words with which he was unfamiliar. The experimenter clarified these words by using a synonym and by using the synonym or word in simpler context.

Observational Reliability

In order to determine the experimenter's observational reliability, the experimenter marked words stuttered in tape-recorded speech samples of two stutterers on two separate days, one week apart.

By using the formula " $\text{Reliability} = C / \sqrt{xy}$," in which C represents the number of words marked as stuttered on both days, and x and y represent the number of words marked on each of the two days, respectively, the experimenter's reliability was computed to be .90. The ratio of the words marked on both days to the total number of different words marked on either day was determined as .87. The experimenter's consistency index, obtained by dividing the total number of words marked on the first day by the total number of words marked on the second day, was .94. These three scores of reliability compare favorably with the mean values of .72, .57, and .87 respectively, obtained by Tuthill for a group of experienced speech clinicians.¹

¹C. E. Tuthill, "A Quantitative Study of Extensional Meaning With Special Reference to Stuttering," Speech Monographs (1946) 13:81-98.

Procedure of the Experiment

The experimental study was conducted in the elementary Flint Public Schools of Flint, Michigan. Children in the Mott Foundation Speech Correction Program were transported to the Flint Public Schools by their parents. These children were tested at the Durant Tuuri-Mott Special Education Building of the Flint Public Schools.

Letters seeking cooperation were sent to the principals of the schools involved in the study. A letter was also sent to the parents of the children asking their permission to have their children participate in the study.

The experimental environment was quite variable due to the varied facilities available in the schools. The criteria for selection of the testing room were that the room be available for at least 30 minutes with no interruptions; that the room have one electrical outlet and that the room be sufficiently lighted and moderately quiet. The experiment was conducted after the normal school hours. The experimenter traveled to the various schools with the appropriate equipment for testing, i.e., the tape recorder, music stand, reading materials and electrical extension cord.

The subjects were tested individually. The subject was seated in a chair directly facing the experimenter. The experimenter read the following directions to each subject:

WILL YOU PLEASE LOOK AT THE LIST OF WORDS IN FRONT OF YOU AND TELL ME WHICH WORDS YOU DO NOT KNOW.

The experimenter then clarified for the subject any words he designated. These words were noted on the experimenter's copy of the

reading passage. Upon completion of the word-classification, the directions continued as follows:

PLEASE HAND ME THE LIST OF WORDS THAT YOU HAVE JUST LOOKED AT.
 THANK YOU HERE IS A FOLDER WITH A READING INSIDE, BUT PLEASE DO NOT OPEN IT YET. IN THE FOLDER IS SOMETHING VERY ^{hard}_{easy} TO READ. I WOULD LIKE YOU TO READ ALOUD TO ME THIS ^{hard}_{easy} READING, BUT DO NOT STOP TO ASK QUESTIONS ONCE YOU HAVE BEGUN TO READ. WHEN I POINT MY FINGER AT YOU, OPEN THE FOLDER AND READ. WHEN YOU HAVE FINISHED READING, CLOSE THE FOLDER AND LOOK AT ME. EVERY TIME I SIGNAL BY POINTING AT YOU, RE-OPEN THE FOLDER AND READ AGAIN WHAT IS ON THE PAGE. PLEASE REMAIN QUIETLY IN YOUR CHAIR WHEN YOU ARE NOT READING. DO YOU HAVE ANY QUESTIONS ABOUT WHAT YOU ARE TO DO?

After a short pause to answer any questions and to see whether the subject was comfortably seated, the directions continued as follows:

HERE IS THE ^{hard}_{easy} PASSAGE FOR YOU TO READ.
 (hard) TAKE ALL THE TIME YOU NEED, SINCE THE PASSAGE IS QUITE DIFFICULT AND I THINK YOU WILL FIND IT HARD TO READ. (easy) YOU MAY TAKE ALL THE TIME YOU NEED, BUT I THINK YOU WILL FIND THE READING IS QUITE EASY.

As explained in the preceding instructions, the reading material was placed in a manila folder which was opened and read by the subject when instructed by the experimenter. A duration of approximately ten seconds elapsed between trials. A trial shall be interpreted to mean one complete reading of the reading passage.

Subjects for whom eight or more stuttering moments were recorded for the first trial, were instructed at the end of their fifth trial to read the other reading passage and the following additional instructions were given:

PLEASE HAND ME THE FOLDER THAT YOU HAVE JUST FINISHED READING. I AM ABOUT TO GIVE YOU A DIFFERENT FOLDER. IN THIS FOLDER IS A PAGE QUITE A BIT DIFFERENT FROM THE ONE YOU HAVE JUST READ. THIS PAGE IS VERY ^{easy} TO READ. PLEASE KEEP THE FOLDER CLOSED UNTIL I SIGNAL YOU BY POINTING ^{hard} MY FINGER: THEN, OPEN THE FOLDER AND READ ALOUD TO ME THE ^{easy} ^{hard} PASSAGE. WHEN YOU HAVE FINISHED READING, CLOSE THE FOLDER AND LOOK AT ME. EVERY TIME I SIGNAL, BY POINTING, OPEN THE FOLDER AND RE-READ WHAT IS ON THE PAGE. PLEASE REMAIN QUIETLY IN YOUR CHAIR WHEN YOU ARE NOT READING. DO YOU HAVE ANY QUESTIONS ABOUT WHAT YOU ARE TO DO?

After a short pause to answer any questions, the directions continued as follows:

HERE IS THE ^{easy} ^{hard} PASSAGE FOR YOU TO READ.

(easy) YOU MAY TAKE ALL THE TIME YOU NEED, BUT I THINK YOU WILL FIND THE READING IS QUITE EASY.

(hard) TAKE ALL THE TIME YOU NEED, SINCE THE PASSAGE IS QUITE DIFFICULT AND I THINK YOU WILL FIND IT HARD TO READ.

The instructions to the subject contain alternate words and phrases. When the subject was to read the easy passage, the words and phrases denoting easy were read by the experimenter. When the hard passage was to be read by the subject, the alternate words and phrases denoting hard or difficult were read by the experimenter.

In order to guarantee a sufficient number of subjects, a tape recorder was used to record the subject's reading, in the hopes that it would raise anxieties and hence increase stuttering. The microphone was placed in an observable position near the subject. The tape recorder used was a Wollensak Dual-Speed Hi-Fi Recorder, Model T-1500. The microphone was the standard component of this model. This microphone is a unidirectional

ceramic type, capable of receiving frequencies of 40 to 15,000 cycles per second according to the manufacturers' specifications.

An interval of approximately one minute's duration occurred between the readings of Reading Passage I and Reading Passage II.

Subjects who did not stutter the required eight or more times on the first reading trial were dropped from the study immediately following the completion of their first trial.

To minimize any possible effect of the order of presentation of the two different reading passages, the order of presentation was alternated. Every second subject read Reading Passage II first, the remaining subjects read Reading Passage I first. All subjects read both reading passages. Reading Passage I was designated as "easy" and Reading Passage II as "hard" by flipping a coin.

The experimenter had mimeographed copies of the reading material and recorded his observations for each successive trial on a separate mimeographed sheet. Each mimeographed sheet as it was completed was placed out of sight of the experimenter and the subject.

A standard collapsible portable music stand separated the experimenter and subject. A 12 x 22 inch piece of construction cardboard was placed on the music stand. This music stand was so positioned as to prevent the subject from seeing the motions of writing made by the experimenter.

The experimenter recorded all stuttering moments on his mimeographed copy with a circle for the syllable, word or phrase concerned and with a slash mark or diagonal line for the interjections concerned.

During a practice period of two weeks, the experimenter familiarized himself with recording moments of stuttering by using the above coding system. The speech samples used by the experimenter for practice were tape-recorded.

Two sixth-grade stutterers recorded different reading passages. These reading passages were used to determine the experimenter's observational reliability prior to use as practice material.

Statistical Treatment of Results

The first and fifth trials and the first and second trials of both the "hard" Reading Passage II and "easy" Reading Passage I were to be compared separately by use of the t test. The 5 percent level of significance was used to test the hypothesis that the value of the differences of their respective means is zero.

The formula for the t test is as follows:

$$t = \frac{M_D}{S_{M_D}}$$

where

$$M_D = \frac{D}{N} ; (D = X_1 - X_2) : (X = \text{Subject's total number of stuttering moments on a given trial})$$

$$S_{M_D} = \sqrt{\frac{\frac{1}{N} (N \sum D^2 - (\sum D)^2)}{N-1}}$$

The formula used to derive the t values was an adaptation of formula 6a found on page 107 of Psychological Statistics by McNemar.¹ The adaptation of this formula is explained on pages 107, 108, and 109.

The number of stutterings on Trial 1 of the "hard" Reading Passage II were compared with Trial 1 of the "easy" Reading Passage I by use of the t test at the 5 percent level of significance to determine whether the

¹Quinn, McNemar, Psychological Statistics (2nd ed.; New York: John Wiley, 1955).

stutterer's "set" made an initial difference between the two reading passages.

The adaptation scores (Trial 1 less Trial 5) on Reading Passage II were compared with the adaptation scores on Reading Passage I by use of the t test at the 5 percent level of significance to determine whether the stutterer's "set" affected the degree of adaptation.

These tests were also made utilizing another adaptation score. The formula used was " Adaptation = $\frac{X - Y}{X}$ " where X = the number of stuttering moments in Trial 1 and Y = the number of stuttering moments in Trial 5.

RESULTS

The mean frequency of stuttering moments was computed for the five trials of each of the experimental conditions. These figures are plotted in Figure 1. An inspection of the graph reveals a steady decrement from reading to reading in both of the experimental conditions which indicates that adaptation occurred. The frequencies recorded for the hard passage were consistently higher than those for the easy passage.

An inspection of the individual scores reveals a general tendency of all subjects to stutter less on all of the trials with the exception of some minor inversions of the first and second trial for two subjects and the second and third trial of two other subjects on the easy reading condition.

Similar minor inversions are noted in inspecting the scores for the hard condition. These inversions were not consistent for individuals from condition to condition.

On further inspection of the raw data for individual subjects, it would appear that the suggestion played an important role in the first trial of the hard condition in that more than one-half of the subjects stuttered one-third to one-half again as much in Trial 1 of the hard condition as they did in Trial 1 of the easy condition.

Upon inspection of the raw data it was noted that all but one of the subjects stuttered more in the hard condition than in the easy condition.

Inspection of the adaptation (Trial 1 minus Trial 5) figures for individual subjects reveal a "difference score" range of 0 to 14 for the easy condition and a range of 3 to 27 for the hard condition. The

adaptation ratio scores yielded individual ranges from 0 to .60 for the easy passage and .16 to .75 for the hard passage.

For purposes of more systematic comparisons a t test was run to determine whether or not the subjects adapted between the first and fifth trial in each of the two conditions.

The obtained t values of 1.73 and 1.61 for the hard and easy conditions respectively were not significant at the 5 percent level. Hence, although inspection of Figure 1 reveals adaptation, the size of this difference is not significant as tested.

Inasmuch as differences between Trials 1 and 5 were non-significant for both conditions, no tests were made between Trials 1 and 2.

Two tests were made of the significance of the difference between the easy and hard conditions. The t test of the differences of adaptation between the two conditions was based on the raw score differences between Trial 1 and Trial 5. The t value based on these difference scores was .82. This difference was not significant. The second test of the difference in adaptation between the two conditions used as its criterion measure the ratio $\frac{X - Y}{X}$. The resultant t of .48 was also non-significant.

To determine whether the stutterer's set made an initial difference between the two reading passages, a t test was run comparing the number of stuttering moments of Trial 1 of the hard condition to Trial 1 of the easy condition. This t of 1.08 was not significant.

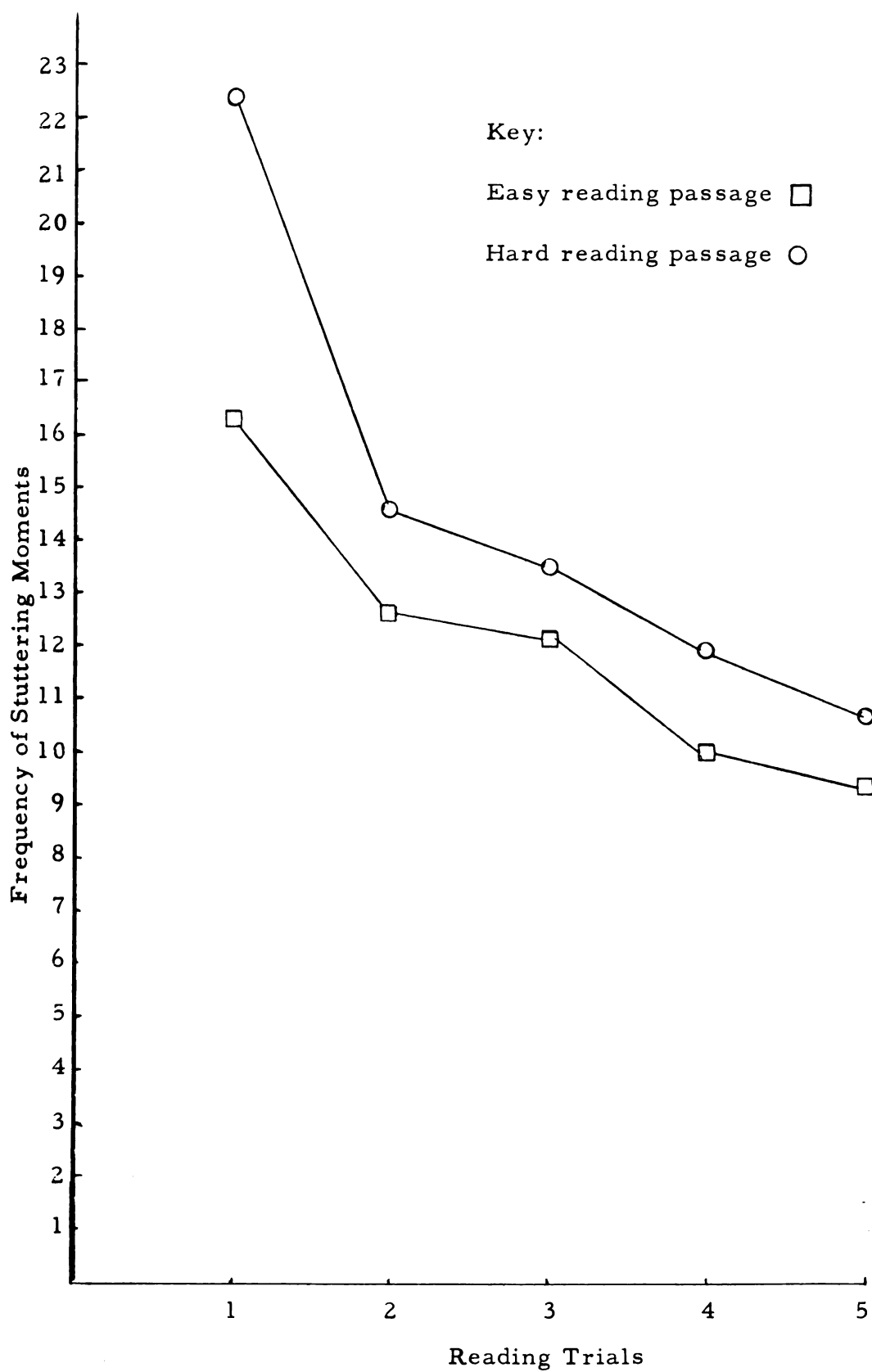


Figure 1. Mean frequency of stuttering moments during five successive readings under reading conditions suggested as "hard" or "easy."

DISCUSSION

The non-significant tests for adaptation between Trials 1 and 5 in both conditions indicate, insofar as this group of subjects might be considered an adequate population sample, that fourth grade stutterers do not demonstrate the degree of adaptation that has been found in the reading of many adult stutterers.^{1, 2, 3, 4, 5}

The difference between the mean frequency of the stuttering moments of Trial 1 of the easy reading passage and Trial 1 of the hard reading passage was determined to be statistically non-significant. From this it might be inferred that suggestion did not significantly modify the initial anxiety or anticipation of stuttering on the hard reading passage.

The differences between the adaptation measures of the hard and easy reading passages proved to be non-significant. The lack of significant differences indicates that suggestion did not differentially modify expectancy or anticipation of stuttering, and thereby the adaptation effect of fourth grade stutterers.

Despite the non-significant findings of this study, the trend demonstrated by this group of subjects suggests that this study might profitably be pursued further with a larger group of subjects and that adaptation might be used therapeutically to demonstrate to the young

¹Wischner, loc. cit.

²Johnson and Inness, loc. cit.

³Johnson and Knott, loc. cit.

⁴E. L. Jones, loc. cit.

⁵Maddox, loc. cit.

stutterer that his stuttering may be decreased.

If successive studies bear out that this age group does not adapt significantly, some of the references that could be advanced in explanation are that (1) subjects of this age and grade do not have as high initial anxiety levels as adults, or (2) their initial high anxiety levels do not lower as do those of adults engaged in repeated readings of the same material, or (3) the subjects may not be responding to the intellectual significance of the material.

The experimenter advances several possibilities for failure to secure significant adaptation in this study. Due to their age, the stutterers' situational and word fears may not have been as thoroughly conditioned as those of adult stutterers and hence their oral reading was less susceptible to the extinction-like adaptation phenomenon. It was the experimenter's subjective impression that some subjects appeared to rush through the readings since the study was conducted after school hours. In addition, the subjects were probably not sufficiently motivated to read for the meaning of the passage. If the subjects of this study are similar to subjects of previous studies^{1, 2, 3, 4} which indicated that individuals respond differently to suggestion, it is possible that the responses would tend to cancel each other in group averages, thereby minimizing the possibility of group differences.

The amount of suggestion was probably inadequate for a significant change to occur as it was given in casual oral instructions. The amount of

¹Connett, loc. cit.

²Warner Brown, loc. cit.

³Otis, loc. cit.

⁴Kelman, loc. cit.

suggestion might have been increased by spending more time developing the suggestion, or by typing "hard" and "easy" on the subjects' reading material, or by having the subjects "study" the hard reading passage overnight, or by forewarning the subject of the difficulty of the future task several days in advance. The stutterer's anxiety level may have been significantly higher if an explanation had been offered to each stutterer stating why the passage would be hard for him in terms of his own stuttering patterns. Perhaps both channels of auditory and visual suggestion should have been used simultaneously.

In retrospect it seems there may have been profit in asking the subjects whether or not they felt the suggestions had affected their attitudes toward the task.

The minimal external suggestion utilized in the study was apparently not sufficient to alter the stutterers' current attitudes toward his speech or to produce a new attitude. This is consistent with general knowledge that attitudes are not quickly modified.

SUMMARY AND CONCLUSIONS

This study was designed to ascertain whether fourth grade stutterers demonstrated an adaptation effect when orally reading the same material five consecutive times. The study also attempted to discover whether suggestion relative to the ease or difficulty of the reading passage affected the frequency of stuttering moments and the degree of adaptation.

Eleven fourth grade stutterers from the Flint Public Schools and adjacent school systems participated in the study.

The stutterers read each of two reading passages five times consecutively. The experimenter suggested that one passage was hard to read and the other was easy to read.

The number of stuttering moments was tabulated for each reading. The analysis of results of this study by means of t tests indicates no significant difference on the mean frequency of stuttering moments between the first readings of two equated reading passages ("hard" and "easy").

Although the reading of both the hard and easy passages produced inversely negatively accelerated curves similar to those found in adaptation studies of adult stutterers, the degree of adaptation was non-significant. The tests for both adaptation measures between the two conditions also proved to be non-significant.

Possible explanations were advanced for the failure of significant adaptation to occur.

APPENDIX A

READING PASSAGE I "EASY"

When the first men and women came to America, there were no schools. Have you ever wondered how the boys and girls in those days learned to read and write?

In one town, a woman started a school in her house. Small children were sent to her to learn. While the children studied, she would spin or sew. Often she had to stop a lesson to stir or turn something that was cooking over the open fire.

Later, some schools were built. After a time there were a good many schools. All the people helped to build the new school. The parents of the children paid the woman for teaching them.

There was very little money in those days. Some parents gave things to help pay the teacher. So the fathers and mothers paid the teacher by giving her meat or fruit or some wood for her fire.

APPENDIX B

READING PASSAGE II "HARD"

The first schools were built of mud and logs. They had an oiled paper for the window. There was a fireplace at one end of the room. Each father who sent a child to school had to send some wood for the fireplace. There was plenty of wood in those days. The country was covered with forests.

Sometimes when a father did not send his share of wood to the schoolhouse, his children were sent home. If they were not sent home, they were made to sit in the seats farthest from the fireplace. This was the coldest part of the schoolroom.

People who could afford it, hired private teachers for their children, at least for their boys. No parents worried about giving girls much education. However, most girls learned how to read and write. They all learned to sew and mend. They were taught sewing at home and in school.

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