1975

Effect of Variation in Manner of Oral Reading on the Fluency of Nonstutterers

Saralynn Scott
Eastern Illinois University

EFFECT OF VARIATION IN MANNER OF ORAL READING ON THE FLUENCY OF NONSTUTTERERS

(TITLE)

BY

SARALYNN SCOTT

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

MASTER OF SCIENCE

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1975
YEAR

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

15 MAY 75
DATE

15 MAY 75
DATE

PAPER CERTIFICATE #2

TO: Graduate Degree Candidates who have written formal theses.

SUBJECT: Permission to reproduce theses.

The University Library is receiving a number of requests from other institutions asking permission to reproduce dissertations for inclusion in their library holdings. Although no copyright laws are involved, we feel that professional courtesy demands that permission be obtained from the author before we allow theses to be copied.

Please sign one of the following statements:

Booth Library of Eastern Illinois University has my permission to lend my thesis to a reputable college or university for the purpose of copying it for inclusion in that institution's library or research holdings.

May 6/75
Date

I respectfully request Booth Library of Eastern Illinois University not allow my thesis be reproduced because _____

_____

_____

_____ _____
Date Author

pdm

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGEMENTS

The author would like to express her appreciation to all those who have assisted her in this investigation. The author gratefully acknowledges the continuous guidance of Dr. Lynn Miner, her research advisor, as well as the other members of her thesis committee, Dr. Jerry Griffith and Dr. Bob Johnston.

Special thanks are expressed to the author's parents without whose love and much needed support this could not have been undertaken. It is to them that this thesis is dedicated.

CHAPTER 1

INTRODUCTION

During the past thirty to forty years there has been a great deal of research in the area of stuttering. This research has dealt with a number of variables and their effects on stuttering. Brown (1938), for example, studied the effect of word accent and concluded that stuttering was more likely to occur on an accented rather than an unaccented syllable. He also reported that the first three words of a sentence or paragraph were most likely to be stuttered on since they "require relatively greater tension and increased activity of the speech mechanism."

Hahn (1942) studied the effects of phonetic factors on stuttering and concluded that the characteristics of speech sound formation (voiced as opposed to voiceless, plosive as opposed to continuant) seemed to have little effect on the general ranking of the difficulty of sounds in stuttering. Van Riper (1971) stated that "phonemes and their distinctive features are probably the most vital" stimuli that precipitate stuttering fears. These stimuli have been conditioned and are not distributed at random in any given stutterer. Quarrington, Conway and Siegel (1962) used a special set of sentences to compare the occurrence of stuttering on four consonants, said by Johnson and Brown (1935) to be the most difficult ones, with four other consonants

said to be least difficult. No significant differences in the amount of stuttering on the different sounds was found. No consistent characteristics of consonants on which stuttering occurs most often have been found, either in complexity of co-ordination or in manner of production, in research more recent than Hahn's.

In 1937 Brown demonstrated that those parts of speech which were crucial to the sentence meaning were stuttered a greater percentage of the time than those parts which were relatively unimportant to the meaning. He concluded in 1945 that both stutterers and non-stutterers use the initial sound, the grammatical function, the position in the sentence and the word length in order to determine the prominence of each word in the speech sequence. This was confirmed by Quarrington (1965) for stutterers and by Lanyon (1968) for non-stutterers. Brown (1938) showed that reading non-contextual material was a much easier task for most stutterers than was reading contextual material.

Most of the data obtained from the above investigations and from those on different but similar topics was gathered from subjects who stuttered. Some studies have used non-stuttering subjects, and comparisons of the types and locations of the dysfluencies made by the subjects have been made. These comparison studies were designed to determine whether nonfluency in stuttered speech is: a pathological "exaggeration of normal nonfluency"; or qualitatively different from nonfluency in normal speech. Johnson (1955, 1959) has been the chief exponent of the "exaggeration" position. In the "qualitative difference" position, stuttering is connected with physiological or

psychological factors. Evidence exists (Maclay & Osgood, 1959; Silverman, 1965) to demonstrate that for stutters, during oral reading, nonfluency and information value are positively related. There is no direct evidence for this type of relationship in stutterer's spontaneous speech. Lanyon (1968) demonstrated a positive relationship between information value and the likelihood of nonfluencies for normal speakers when reading a simple passage. These results are similar to those found by Quarrington (1965). (This relationship appears to exist independently of sentence position.) This type of relationship was not found in spontaneous speech of normals. The results of these studies by Lanyon (1968) suggest the possibility that the relationship between nonfluency and information value in stutterers may be a function of other variables such as one or more of those suggested by Brown (1945): word length, initial sound, position in sentence or grammatic effect. Love and Jeffress (1971) concluded from their study that the stutterer does something "different from the normal, even when he is not stuttering," and the greater number of "brief pauses" is at least part of that "something" they feel.

Another aspect of stuttering that has been dealt with in the literature describes ways to reduce the amount of stuttering (frequency) exhibited by stutterers. This has been examined by Bloodstein (1950), Barber (1939), and Johnson and Rosen (1937). A variation in manner of speaking will result in a significant decrease in stuttering severity.

The present study is an attempt to determine the effect of variations in the manner of oral reading rate on the fluency of

normal speakers. It has been shown (Johnson & Rosen, 1937) that altering the speed with which passages must be read is directly related to the amount of stuttering that occurs for stutterers. However, no research is available that describes the effect of reading rate on the fluency of nonstutters.

STATEMENT OF PURPOSE

It is the purpose of this study to determine the effect of:

1. reading 20% slower than baseline on the fluency of normal speakers
2. reading 20% faster than baseline on the fluency of normal speakers
3. reading in time to a metronome on the fluency of normal speakers.

Specific questions posed at the onset of this study are:

1. Is there a statistically significant difference in the fluency of nonstuttering subjects when they are exposed to the above three variations in manner of production of oral reading material?
2. Does oral reading, at least 20% slower than baseline, significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?
3. Does oral reading, at least 20% faster than baseline, significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?
4. Does oral reading in time with a metronome beat significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?

Dysfluency, for the purpose of this study will include: prolongations, hesitations, repetitions (part-word repetitions; whole-word repetitions; phrase repetitions), additions, omissions, revisions, interjections, and broken words.

CHAPTER 2

REVIEW OF LITERATURE

The literature reports a number of factors known to reduce stuttering severity. One factor is known as reduced "communicative responsibility." Eisenson and Horowitz (1945) reported that when isolated words, or nonsense material was read orally, a significantly higher level of fluency was experienced by their subjects. They concluded this was a result of the low level of communication value associated with the above stimuli. The reduction of dysfluencies was also evident for memorized material and emotional expressions. Bloodstein (1950) also noted that there was a reduction in frequency of stuttering associated with "reduced communication responsibility." His study included nonsense material and isolated words, memorized material, 'acting', as well as casual small talk. He suggested that the reduction in frequency of stuttering occurred because the subjects were reporting someone else's thoughts; that is, there was a limited amount of "communicative responsibility." He further suggested that with "a change in the stutterer's accustomed manner of speaking" (almost any novel speech pattern) there was a likely increase in his fluency. This he felt was a result of the stutterer's attention being absorbed by the modifications necessary to produce the new speech pattern, and not by his "communicative responsibility."

Fletcher (1928) reported that people who stutter rarely have dysfluencies when they sing. This implies that little communicative responsibility is felt for conveying a message. When dysfluent speakers imitate another person's manner of speaking or when the stutterer is alone, there was a limited number of dysfluencies that occurred, for the same reason. Chorus reading (Barber, 1939) was another condition described under which the stutterer felt that his "part had little consequence on the total end result, and since his performance was not easily differentiated from that of the total activity, he performed more efficiently." However, this phenomenon has a reciprocal effect. Once the person who stuttered felt that it was very important for him to speak well, his efficiency dropped greatly.

Johnson and Rosen (1937) reported that stuttering was reduced to the greatest extent when the subject was speaking "in accordance with some imposed and very definite rhythm." Very little stuttering occurred when:

1. singing
2. reading in time with a metronome
3. reading in time to the swing of an arm
4. reading in a sing-song manner
5. reading in unison with a stutterer
6. reading in unison with a non-stutterer.

Other patterns in decreasing order of effectiveness included:

1. whispering
2. reading with a high pitch
3. reading slowly
4. reading softly
5. reading loudly
6. reading rapidly

The last was the least effective. All of the above except the last,

significantly reduced stuttering for almost all subjects.

Additional work in the area of chorus reading was completed by Eisenson and Wells (1942). They supported Barber's conclusions that increased fluency, under chorus reading conditions, could be explained by reduced communication responsibility felt by the person who stuttered. Additional support for Barber's conclusions was found with respect to the adaptation effect (stuttering decreases with repeated readings or speakings of the same words) and the consistency effect (the tendency of stuttering to occur repeatedly in the same situations and on the same words). (Johnson, Darley, Spriestersbach, 1963; Dixon, 1947; Peins, 1961).

Other variations in speaking patterns that were found to result in reduced stuttering include:

1. imitating another person's manner of speaking
2. imitating a foreign or regional dialect
3. using an altered vocal quality
4. speaking through closed teeth
5. speaking in a monotone
6. using unusual inflections
7. using incorrect stress
8. speaking in a choppy, staccato manner
9. articulating with some degree of exaggeration
10. slurring the consonants

(Bloodstein, 1949). Other conditions described by Bloodstein that result in reduced stuttering are affected by psychological aspects. These include:

1. the behavior of the listener
2. the lack of urgency for favorable impression
3. strong or unusual stimulation
4. the result of suggestion.

Stuttering is widely reported to be reduced or absent when speech is accompanied by bodily movements (Fletcher, 1928; Van Riper,

1947). Additional verbalizations (starters) such as: "Well, say, listen, I mean, don't you know," given by Bluemel (1935) are related to the above situations since they add nothing to meaning.

Silverman and Williams (1967) attempted to determine "the loci of dysfluencies in the speech of nonstutterers during oral reading." They used the information from Brown's 1945 study in which he concluded that the greater number of the following four attributes that were present per word, the more likely it was to be stuttered on:

1. If the word were a noun, verb, adverb, or adjective - - GRAMMATIC EFFECT
2. If the word were the first, second or third of a sentence - - POSITION EFFECT
3. If the word began with a consonant sound other than /t,h,w,ð/ - - INITIAL SOUND EFFECT
4. If the word had five or more letters - - LENGTH EFFECT

Silverman and Williams concluded that nonstutterers were quite similar to stutterers with respect to the amount of dysfluencies experienced on words having the above characteristics. Nonstutterers as well as stutterers were more dysfluent when there were: one of the above characteristic effects present in a word, as opposed to none present; two of the above characteristic effects present in a word, as opposed to one; and three of the above characteristic effects present in a word as opposed to two. However, nonstutterers were found to be more fluent when all four characteristics were present than when there were only three present, while stutterers were less fluent when all four characteristics were present. Silverman and Williams concluded that with the exception of the last situation the "problem of words being spoken dysfluently appears to be positively related to their

number of characteristics in approximately the same degree as for stutterers," in Brown's study.

The present study represents a systematic continuation of prior research by Silverman and Williams. More specifically the purpose of the present investigation is to determine the effect of:

1. reading in time to a metronome on the fluency of normal speakers
2. reading slowly on the fluency of normal speakers, and
3. reading faster on the fluency of normal speakers.

Studies (Jones and Azrin, 1969; Fransella and Beech, 1965) have indicated that the most effective duration of "stimulus beat" is one of one to three seconds, for people who stutter since this results in the most "normal" rate of speaking for them. The metronome's positive effect is felt to be due to its rhythmic stimulus which exerts "control" over stuttering, and not the distractor effect, (that is, an auditory stimulus which diverts the subject away from the sound of his own voice).

In Johnson and Rosen's study (1937) the qualifications on "reading at an extraordinarily slow rate" were limited to not altering the subject's speech otherwise. Stop watch timings of the amount of reduction in speed were computed. In the "fast reading" situation, the instructions were to read as fast as possible while "maintaining distinct speech." The amount of reading time in this situation remained about the same, or was slower than on the "ordinary" readings. Johnson and Rosen concluded that the "mere attempt or intent to read fast, as well as any actual increase in rate, played a part in determining

the amount of stuttering that occurred in the reading for their subjects.

In summary, several factors have been found to reduce stuttering severity. Included among these are: reduced communicative responsibility; change in manner of speaking; chorus reading and speaking in time with an imposed rhythm. Variations in the effectiveness of deviations in oral reading rate have also been found. Johnson and Rosen (1937) determined that very little stuttering occurred when a stutterer read in time with a metronome, little stuttering occurred when a stutterer read slowly and reading rapidly resulted in the occurrence of the greatest amount of stuttering.

Silverman and Williams (1967) concluded that both stutterers and nonstutterers experienced similar amounts of dysfluencies on words that had Brown's (1945) characteristic effects. That is, the amount of dysfluency increased as the number of effects per word increased, except for nonstutterers when all four effects were present. Under that condition nonstutterers were more fluent, while sutterers were less.

The purpose of this study is to determine the effects on nonstutterers of three oral reading conditions known as a result of Johnson and Rosen's (1937) study to affect the fluency of stutterers to different degrees. The results of the study will be added to information demonstrated by Silverman and Williams (1967) related to location of dysfluencies of oral reading by nonstutterers.

CHAPTER 3

PROCEDURES

Sixteen students from Eastern Illinois University were selected on the basis of adequate hearing and fluent speech to participate in this investigation. Each subject read a different passage aloud under four different speaking conditions. After a two week interval each subject repeated the experimental procedures. Analysis of dysfluencies was completed and comparisons were made to determine conditions under which a statistically significant difference in fluency was evident.

Selection of Subjects

Sixteen undergraduate Speech Pathology and Audiology majors from Eastern Illinois University in Charleston, Illinois were selected from those who met the following criteria:

1. had fluent speech
2. had adequate hearing acquity to pass a 25 dB screening test at 500, 1,000, and 2,000 Hz.

Selection of Stimuli

Eight passages of approximately the same length (115-120 words) and reading complexity were obtained from a test of eye movement developed by Taylor (1960). Careful consideration of the vocabulary

used and the "readability," resulted in insured similarity of the eight selections.

In order to prevent the "order affect" the first four passages (numbered consecutively) were randomized for presentation to each subject. The last four passages were also randomized for retest after an interval of two weeks. All eight passages are shown in Appendix A.

Method of Testing

Each subject was tested individually in a room at the Eastern Illinois University Speech and Hearing Clinic. No observers were present. A Baycrest Cassette Tape Recorder Model Number HB 200 with 60 minute Audio Magnetics Corporation cassettes was used to record reading passages. A Seth Thomas metronome number E899-575 ISS-2 was used for the final reading passage. A stop watch was used to time the readings. Copies of the reading passages for the subject and the experimenter were also available.

The subject was seated opposite the experimenter and was told to read the first passage presented in a "normal manner." If there were any questions these were answered. The tape recorder was turned on. The stop watch was started as soon as the subject began to read. At the end of the reading the tape recorder and stop watch were stopped. The time on the stop watch was considered to be "baseline."

The next passage was read "20% slower than baseline." This figure was computed by determining 20% of the subject's baseline time and adding it to his baseline. In order to allow the subject to alter his reading rate a "practice" story was presented. (This passage can be found in Appendix B.) The practice session took place once

the baseline reading was completed. The practice passage was presented to the subject and the experimenter explained that this reading required a slowed rate. The subject was then asked to read the passage while it was timed by the experimenter. During this reading the experimenter guided the subject verbally with the words "faster" and "slower," in order to have his reading rate conform to the 20% target time. The practice passage was repeated until the time required for reading it was within ten seconds of the target time. At that point the test passage was presented. The tape recorder was turned on and the stop watch was started as soon as the subject began to read. During the reading the subject was given the same verbal cues as in the practice if needed. At the end of the reading the tape recorder and stop watch were stopped. Notation of the time on the stop watch was made. The subjects rarely managed to finish their readings at exactly the target time; on the average, they came within six seconds of it, for both test and retest. A variation of up to 15 seconds in addition to the time allotted for the slower reading was considered to result in valid information. This made the task one of greater than "20% slower than baseline" thus giving information beyond the requirements.

The third passage was to be read "20% faster than baseline." This was computed by using the same 20% of baseline figure as above and subtracting it from the baseline figure. This resulted in a shorter length of time being allotted to read a passage similar in length to that read for baseline. In order to allow the subject to alter his reading rate the same practice passage was presented. This time a quickened rate was required. The subject read the passage

while it was timed by the experimenter. The experimenter guided the subject verbally with the words "faster" or "slower," in order to have the subject's reading rate conform to the 20% target time. The practice passage was repeated until the time required for reading it was within ten seconds of the target time. At that point the test passage was presented, and the same procedure was followed as for the previous reading, that is, the tape recorder was turned on and the stop watch was started as soon as the subject began to read. During the reading the subject was given the same verbal cues as in the practice, if needed. At the end of the reading the tape recorder and stop watch were stopped. Notation of the time on the stop watch was made. The subjects on the average came within one second of the target time, for both the test and retest.

The final passage was to be read "in time to the beat of a metronome." The setting on the metronome was 120. This resulted in two beats per second and one beat per syllable read. The practice story was presented and was used to acquaint the subject with the manner of oral reading that was required. The subject was allowed to practice reading the story. At the end of the practice reading, the test passage was presented and the tape recorder was started. When the subject began to read the stop watch was started. At the end of the reading the tape recorder and stop watch were stopped and notation of the time was made.

After a two week interval the complete test procedure was repeated for each subject. Analysis of the dysfluencies, such as: pauses, prolongations, revisions, repetitions, was completed after

the data from both readings for all subjects was obtained. It was the sole responsibility of the examiner to determine the incidences of stuttering and as a result it was necessary that intra-examiner reliability be established. This was achieved by randomly selecting three taped samples from the total population and reanalyzing them after a two week time lapse from the initial transcription period had passed. An agreement index of .98 was obtained satisfying the requirements for intra-examiner reliability.

TABLE 1:--Reading rates under four conditions: (Condition 1--Baseline; Condition 2--20% Slower than Baseline; Condition 3--20% Faster than Baseline; Condition 4--Metronome). Figures in parentheses are attained rates, those not in parentheses are target rates.

SUBJECT	READING CONDITIONS					
	1	2		3		4
1	51	65	(61)	41	(42)	107
2	40	48	(58)	32	(33)	103
3	42	50	(64)	34	(34)	94
4	43	50	(50)	36	(41)	93
5	60	72	(81)	48	(44)	104
6	49	59	(67)	39	(37)	97
7	38	46	(61)	30	(31)	100
8	39	47	(59)	31	(31)	98
9	31	37	(46)	25	(24)	95
10	60	74	(75)	46	(44)	96
11	48	58	(64)	38	(38)	94
12	42	49	(55)	33	(34)	92
13	43	52	(57)	34	(37)	92
14	40	48	(50)	32	(34)	96
15	42	50	(55)	34	(37)	97
16	45	54	(53)	36	(36)	101
Mdn	42.5	50	58.5	34	36.5	96.5
Q	3.8	4.7	4.4	3.4	6.3	3.6

TABLE 2:--Reading rates under four conditions. (Same as for Table 1). Retest scores after two weeks.

SUBJECT	READING CONDITIONS					
	1	2		3		4
1	45	54	(53)	36	(37)	102
2	47	56	(62)	38	(38)	100
3	45	54	(58)	36	(36)	107
4	40	48	(53)	32	(37)	100
5	55	66	(74)	44	(44)	107
6	45	54	(59)	36	(38)	100
7	40	48	(60)	32	(32)	104
8	37	44	(46)	30	(32)	101
9	32	38	(41)	26	(27)	101
10	48	58	(62)	38	(40)	96
11	46	55	(61)	37	(37)	93
12	42	50	(55)	34	(32)	96
13	46	55	(64)	37	(42)	96
14	43	52	(63)	34	(37)	102
15	43	52	(62)	34	(34)	100
16	50	60	(68)	40	(43)	107
Mdn	45	54	60.5	36	37	100.5
Q	3.3	3.8	4.2	3.0	5.5	2.3

As evidenced by the medians for both the test and retest conditions, shown in Tables 1 and 2 respectively, it is inherent that the subjects came close to the target reading rates for the various speaking conditions as evidenced by the particularly small dispersion values.

CHAPTER 4

RESULTS AND DISCUSSION

The amount of dysfluency of sixteen nonstutterers was analyzed to determine if there were essentially the same amounts of dysfluency observed in each of the four reading conditions tested. This analysis was carried out for the purpose of answering the first question posed at the outset of this study. A non-parametric statistic, the Kruskal-Wallis H, (Downie & Heath, 1965) was used. The resulting H value of 16.54 was significant beyond the .001 level indicating that differential effects of fluency were observed in the four reading conditions.

Test Condition

In order to determine the specific sources of variance resulting from the significant H value, Mann-Whitney U's were computed between each of the pairs of variables. A total of six comparisons were made. The resulting U values are reported in Table 3.

TABLE 3:--Mann-Whitney U values for the six comparisons of reading conditions. Test scores.

Comparison	U Value
Baseline / 20% Slower	90.5
Baseline / 20% Faster	109.5
Baseline / Metronome	61*
20% Slower / 20% Faster	98.5
20% Slower / Metronome	93
20% Faster / Metronome	74.5*

* Significant at .05 level

Table 3 shows that two of the six comparisons achieved statistical significance at the .05 level, one tailed.

The first comparison test was carried out between the baseline reading and the 20% slower reading. Results indicated nonsignificance with respect to the relative amounts of dysfluency. This would indicate that for the subjects in this study the forced increase in time allotted for reading did not significantly reduce the dysfluencies experienced from the baseline reading. It should be noted that there was a decrease in the number of dysfluencies for the slower reading even though it was not a significant difference.

The second comparison test involved baseline reading and 20% faster than baseline reading. Results indicated nonsignificance with respect to the relative amounts of dysfluency. For these subjects the

forced reduction in time permitted for reading did not significantly affect the occurrence of dysfluencies.

The third comparison was between the baseline and metronome readings. Here significance was found. There was a significant difference in the number of dysfluencies in these two readings, with significantly fewer fluency breaks in the metronome reading. For these subjects the patterned beat of the metronome significantly reduced the number of dysfluencies that were experienced in the baseline reading.

No significant differences were found in the comparison between the 20% slower and the 20% faster than baseline readings. Notation should be made that the 20% slower reading did yield noticeably fewer dysfluencies.

Comparison of the 20% slower reading with the metronome reading resulted in no significant differences being noted with respect to the number of dysfluencies.

The final comparison involved the 20% faster reading and the metronome reading. Results indicated significance with respect to the relative numbers of dysfluencies. Significantly fewer dysfluencies were noted in the metronome reading. The regular patterned beat of the metronome significantly reduced the number of dysfluencies that were noted in the faster reading.

Retest Condition

The Kruskal-Wallis H test was calculated for the retest values of the four reading conditions. The resulting H value of 81.12 was significant well beyond the .001 level. This indicated that

differential effects of fluency were observed in the four reading conditions.

Mann-Whitney U's were computed between each of the pairs of variables to determine the specific sources of variance. Six comparisons were made and the resulting U values are reported in Table 4.

TABLE 4:--Mann-Whitney U values for the six comparisons of reading conditions. Retest scores.

Comparison	U Value
Baseline / 20% Slower	56*
Baseline / 20% Faster	110
Baseline / Metronome	67*
20% Slower / 20% Faster	47*
20% Slower / Metronome	121
20% Faster / Metronome	56.5*

* Significant at .05 level

Table 4 showed that four of the six comparisons achieved statistical significance at the .05 level, one tailed.

For the retest scores, the first comparison was between the baseline and the 20% slower reading. In this comparison a strong significance was noted with respect to the relative amounts of dysfluency. The 20% slower reading yielded significantly fewer dysfluencies.

The second comparison was between the baseline reading and the 20%

faster reading. Here, as with the test score results, no significance with respect to the relative amounts of dysfluency was attained. The third comparison was between the baseline reading and the metronome reading. Here as with the test score results statistical significance was noted with respect to the relative amounts of dysfluency. In this case the metronome reading resulted in significantly fewer dysfluencies.

The fourth comparison was between the 20% slower and the 20% faster reading. In this comparison a very strong significance was noted. The 20% slower reading yielded fewer dysfluencies.

The fifth comparison involved the 20% slower reading and the metronome reading. Here, as with the test scores, no significance with respect to the relative amounts of dysfluency was found.

The final comparison was between the 20% faster reading and the metronome reading. Here, as with the test scores, a strong significance with respect to the relative amounts of dysfluency was found. Significantly fewer dysfluencies were found in the metronome reading.

Table 5 represents a comparison of the test and retest conditions in which significance at the .05 level was, and was not found. For two comparison conditions significant differences were found in both the test and retest conditions. These were the Baseline / Metronome and the 20% Faster / Metronome comparisons. In both the conditions it was the metronome reading that resulted in significantly fewer dysfluencies. It can therefore be stated that the metronome in the two above conditions significantly affected the manner of oral reading with respect to the number of dysfluencies for these stutterers.

TABLE 5:--Comparison of test and retest results with respect to locations of significance and nonsignificance at the .05 level of confidence.

Comparison	Test	Retest
Baseline / 20% Slower	Nonsignificant	Significant
Baseline / 20% Faster	Nonsignificant	Nonsignificant
Baseline / Metronome	Significant	Significant
20% Slower / 20% Faster	Nonsignificant	Significant
20% Slower / Metronome	Nonsignificant	Nonsignificant
20% Faster / Metronome	Significant	Significant

It should be noted that in the comparison of the 20% Slower / Metronome reading, however, no significant difference was noted with respect to number of dysfluencies. This suggests that for nonstutterers to experience a beneficial effect (reduction in number of dysfluencies) from the regular patterned beat of the metronome in comparison oral reading manners, the types of oral reading must differ to greater extents than in the 20% Slower / Metronome comparison.

The cause of the differences in resulting significance is difficult to suggest since in the cases where significance was obtained it was at the .01 and .001 levels for the Baseline / 20% Slower and the 20% Slower / 20% Faster readings respectively.

The results of this study strongly support the hypothesis that nonstutterers produce speech with the fewest dysfluencies when that speech is controlled for rate of reading. Using the results of Johnson

and Rosen's (1937) study for stutterers similar comments should be made with respect to the fluency and rate for both their populations of stutterers and this writer's population of nonstutterers. That is:

1. the least amount of dysfluency resulted from reading with a metronome for both populations
2. reading with a slow rate was somewhat less effective in reducing dysfluencies for stutterers and was found to be both nonsignificantly effective and significantly effective during test and retest conditions respectively
3. reading with a fast rate was least effective in reducing dysfluencies for stutters in Johnson & Rosen's study and for nonstutterers in this study.

Current methods of stuttering therapy that use the metronome for control of stuttering have been shown (Van Riper, 1973) to be most effective "so long as the novelty persists." Once the stutterer's attention diverts from the "new way" of talking back to the "talking" itself the fears return and so do the dysfluencies. The results of this study indicate that similar reductions in dysfluencies can be expected to occur for nonstutterers when they utilize the regular beat of the metronome in oral reading. The basic difference seems to be that no fear was expressed by the nonstutterers.

CHAPTER 5

SUMMARY AND CONCLUSIONS

The purpose of this investigation was to determine if there were statistically significant differences in the fluency of non-stutterers with respect to three variations in manner or oral reading.

Sixteen undergraduate Speech Pathology and Audiology majors from Eastern Illinois University, Charleston, Illinois were chosen to participate in this study on the basis of fluent speech and adequate hearing.

The variations in manner of oral reading that were chosen for this investigation were based on the information gained from Johnson and Rosen's (1937) study which concluded that the least amount of stuttering resulted when their subjects read "in time with a metronome," reading "slowly" was somewhat less effective than the metronome condition in reducing stuttering, and reading "quickly" was least effective.

The number of dysfluencies for each of the readings was compiled and ordered in ranks. A non-parametric statistic, the Kruskal-Wallis H, was applied to the ranks to determine the degree of differential effect on fluency of the four reading conditions. Specifically, the following questions were posed at the outset of this investigation:

1. Is there a statisfically significant difference in the fluency of nonstuttering subjects when they are

exposed to the three variations in manner of production of oral reading material?

2. Does oral reading, at least 20% slower than baseline, significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?

3. Does oral reading, at least 20% faster than baseline, significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?

4. Does oral reading in time with a metronome beat significantly reduce the total number of dysfluencies that a nonstutterer experiences as compared with his baseline oral reading?

CONCLUSIONS

The above analyses concerning the relationship between manner of oral reading and number of dysfluencies were interpreted as follows:

1. Regarding the relationship between fluency and manner of oral reading:
   a. There was a statistically significant difference in the fluency of nonstuttering subjects when they were exposed to three variations in manner of oral reading material at beyond the .001 level in both the test and retest conditions.
2. Regarding the relationship between fluency, baseline reading, and the 20% slower than baseline reading:
   a. In the test situation there was no significant reduction in the number of dysfluencies from the baseline to the 20% slower reading. There was, however, a decrease in the number of dysfluencies.

b. In the retest situation significantly fewer dysfluencies resulted in the 20% slower reading, than were found in the baseline reading.

3. Regarding the relationship between fluency, baseline reading, and the 20% faster than baseline reading:
   a. In the test situation there was no significant difference in the number of dysfluencies for these two reading conditions.
   b. No significant difference was noted in the retest situation with respect to the number of dysfluencies for these two reading conditions.
4. Regarding the relationship between fluency, baseline reading, and the metronome reading:
   a. In the test situation there was a significant difference in the amount of dysfluencies for these two readings with fewer in the metronome reading.
   b. In the retest situation there was a significant difference in the amount of dysfluencies for these two readings with fewer in the metronome reading.
5. Regarding the relationship between fluency, the 20% slower than baseline reading and the 20% faster than baseline reading:
   a. In the test situation no significant difference in the number of dysfluencies was noted for either of these readings.

6. Regarding the relationship between fluency, the 20% slower than baseline reading and the metronome reading:
   a. In the test situation no significant difference in the number of dysfluencies was noted.
   b. In the retest situation no significant difference was noted.
7. Regarding the relationship between fluency, the 20% faster than baseline reading and the metronome reading:
   a. Significantly fewer dysfluencies were noted in the metronome reading for the test situation.
   b. Significantly fewer dysfluencies were noted in the metronome reading for the retest situation.

This study demonstrated that for nonstutterers in this investigation the metronome, when compared with baseline and 20% faster than baseline yielded a strongly significant reduction in the number of dysfluencies in both the test and retest conditions.

The 20% slower than baseline reading when compared with baseline reading and 20% faster than baseline reading yielded nonsignificant differences on the test situation, but highly significant differences on the retest.

The above information with that concluded from Johnson and Rosen's (1937) study has much in common even though the type of subject differs. That is, the manner of oral reading significantly affects

the fluency of both stutterers and nonstutterers. Silverman and Williams (1967) concluded that nonstutterers and stutterers were quite similar with respect to the location of the dysfluency in oral reading. This study presents another instance of similarity.

An obvious difference involves the comparison of the 20% faster than baseline reading and the baseline reading. No significant difference was obtained in this study, in either the test or retest situations. This suggests that the required increase in speed of reading did not affect, to a significant degree, the number of dysfluencies of these nonstutterers.

IMPLICATIONS FOR FUTURE RESEARCH

1. A study modelled after this investigation using different degrees of variation from the baseline would be beneficial in determining the most effective speed of reading for stutterers or nonstutterers to significantly reduce the number of dysfluencies experienced in oral reading.
2. A study in which variations that differ from those used in this study but that are known to affect the fluency of stutterers could be used as a means of further comparing the similarities between stutters and nonstutterers.

APPENDIX A

PASSAGE #1

Amundsen of Norway was one of the great explorers. He was noted for his thoroughness and perseverance. On his first expedition, he located the north magnetic pole and found the Northwest Passage. On his next voyage, he headed for the North Pole but, hearing that another explorer had reached it, sailed for the South Pole instead. On arriving, Amundsen established his base station on the ice cap. Using dog teams and sledges, he and his men equipped three supply stations to the south. After camping for the winter, they started for the pole, a journey of two months' duration. In 1911, Amundsen flew the Norwegian flag above the pole. They spent a total of eleven months reaching the South Pole.

PASSAGE #2

Houdini was one of the world's best escape artists. Born Ehrich Weiss in 1874, he took his professional name from the French magician, Houdin. No lock or straight jacket, no handcuff or sealed chest could restrain Harry Houdini. To secure publicity, he would vanish from the prison of each city where he appeared. A modest man, he performed his tricks with apparent ease, stating that they were based on natural laws. He was angered by mediums and others who claimed to have supernatural power, and spent much time and energy in exposing such frauds. An authority on magic, he willed his collection of writing to the Library of Congress. It is one of the most complete in the world.

PASSAGE #3

Louis Braille was a French teacher of the blind. Braille's own sight was destroyed in an accident when he was three. He attended the Paris Institute for the Blind and became an instructor there at the age of nineteen. At that time, raised letters were used in teaching sightless people to read, but Braille devised a simpler method. He improved upon a system of writing with raised dots invented by a French army officer. Braille's alphabet was formed from varying combinations of six dots. His system applied to music as well as literature. Braille first published it in 1829, but his system was opposed because it was so radical. Widespread acceptance came only after Braille's death.

PASSAGE #4

John Roebling was a pioneer in building suspension bridges. Roebling was educated as a civil engineer in Germany, and emigrated to the United States as a young man. Believing that steel cable would make possible the construction of long-span suspension bridges, he established a factory to produce it. His fellow engineers predicted failure for his first long-span suspension bridge at Niagara Falls, but it proved to be a success. His most ambitious task was the Brooklyn Bridge, over fifteen hundred feet in length. In supervising this project, John Roebling received a fatal injury. The Brooklyn Bridge was finally completed in 1883 under the direction of his son. At that time it was the world's longest suspension bridge.

PASSAGE #5

Dorothea Dix devoted her life to hospital and prison reform. Early in life, Dorothea directed her own school in Boston and authored many children's books. In 1841, a visit to a local prison initiated her lifelong interest in social reform. There she learned about the miserable life of the inmates and was shocked at the indiscriminate mixing of criminals and the insane. Miss Dix's work in Massachusetts resulted in the founding of a state hospital for the insane and improved prison conditions. She extended her work to other states and countries. Special treatment for the insane and the building of many state hospitals for their care resulted from her crusade. Her reform work continued until she was eighty.

PASSAGE #6

Clarence Darrow was an exceptionally able lawyer. He began his career as a corporation lawyer, but resigned his position to defend a prominent labor leader. When the defense was successful, he decided to spend his life defending the "underdog." As a firm opponent of capital punishment, he used his tremendous courtroom skill to save over a hundred persons charged with murder. None of his clients was ever sentenced to death. In 1925, he defended a school teacher who was charged with breaking a Tennessee law that forbade teaching evolution. He lost the case, but was so persuasive that many a state was discouraged from passing similar laws. Darrow was also an author of novels and books on crime.

PASSAGE #7

Paganini was one of the world's greatest violinists. Born in 1784, Paganini began violin lessons early in life. When he was eleven years old, violin teachers told him they could do no more to improve his technique. Paganini began to study strenuously on his own, practicing passages for ten hours at a time. He began professional tours when he was thirteen. Audiences were moved to tears by his rendition of quiet melodies and astonished by his force and speed. To show his virtuosity, he played entire selections on the fourth string alone. He took great delight in composing music so technically difficult that he alone could play it. His later life was a series of triumphant tours.

PASSAGE #8

Frank Lloyd Wright was a great force in architecture. Wright was one of the earliest architects to break away from the cluttered Victorian style, and now many regard him as the father of contemporary architecture. He was noted for both his original designs and his unusual use of building materials. In 1900, he developed his "prairie house," a new style of residence with long low lines. This home was a forerunner of today's "ranch house." Typical of his unique building methods was the Imperial Hotel in Tokyo, Japan. It was built on hundreds of concrete columns and has withstood the shock of earthquakes that leveled all other large buildings. Wright's influence has been felt throughout the world.

APPENDIX B

PRACTICE PASSAGE

It is a pleasure to visit the little town named Homedale, which is not far south of here. Life in Homedale is peaceful and quiet. There are only five stores and one garage along the main street of this little town. Most of the things needed by people who live there can be found in these few places of business. Perhaps the one and only drugstore in Homedale is the busiest place in town. It is the very hub of activity. No doubt the reason is that the greatest variety of things is to be found there. Among the items supplied for sale are children's toys and other playthings. Also there are books both large and small dishes, cups, saucers, perfumes, zippers and kitchen articles of every sort.

BIBLIOGRAPHY

Barber, V., "Studies in the Psychology of Stuttering XV, Chorus Reading as a Distraction in Stuttering," Journal of Speech and Hearing Disorders, 1939, 4, 371-383.

Barber, V., "Studies in the Psychology of Stuttering XVI, Rhythm as a Distraction in Stuttering," Journal of Speech and Hearing Disorders, 1940, 5, 29-42.

Bloodstein, O., "Conditions Under which Stuttering is Reduced or Absent: A Review of the Literature," Journal of Speech and Hearing Disorders, 1949, 14, 295-302.

Bloodstein, O., "Hypothetical Situations under which Stuttering is Reduced or Absent," Journal of Speech and Hearing Disorders, 1950, 15, 142-153.

Bluemel, C. S., Stammering and Allied Disorders, New York: Macmillan, 1935.

Brown, S. F., "The Influence of Grammatical Function on the Incidence of Stuttering," Journal of Speech Disorders, 1937, 2, 207-215.

Brown, S. F., "A Further Study of Stuttering in Relation to Various Speech Sounds," Quarterly Journal of Speech, 1938, 24, 390-397.

Brown, S. F., "Stuttering with Relation to Word Accent and Position," Journal of Abnormal and Social Psychology, 1938, 33, 112-120.

Brown, S. F., and Moren, A., "Frequency of Stuttering in Relation to Word Length during Oral Reading," Journal of Speech Disorders, 1942, 7, 153-159.

Brown, S. F., "The Loci of Stuttering in the Speech Sequence," Journal of Speech Disorders, 1945, 10, 181-192.

Dixon, C. C., "The Amount and Rate of Adaptation of Stuttering in Different Oral Reading Conditions," Master's Thesis, State University of Iowa, 1947.

Downie, N. M., and Heath, R. W., Basic Statistical Methods, New York: Harper and Row, Publishers, 1965.

Eisenson, J., and Wells, C., "A Study on the Influence of Communicative Responsibility in a Choral Speech Situation for Stutterers," Journal of Speech Disorders, 1942, 7, 259-262.

Eisenson, J., and Horowitz, E., "The Influence of Propositionality on Stuttering," Journal of Speech Disorders, 1945, 3, 193-197.

Fletcher, J. M., The Problem of Stuttering, New York: Longmans Green, 1928.

Fransella, F., and Beech, H. R., "An Experimental Analysis of the Effect of Rhythm on the Speech of Stutterers," Behavior Research and Therapy, 1965, 3, 195.

Hahn, E. F., "A Study of the Relationship between Stuttering Occurrence and Phonetic Factors in Oral Reading," Journal of Speech Disorders, 1942, 7, 143-151.

Johnson, W., "Measurements of Oral Reading and Speaking Rate and Disfluency of Adult Male and Female Stutterers and Nonstutterers," Journal of Speech and Hearing Disorders, 1961, 26 Suppl. 1-20.

Johnson, W., and Brown, S. F., "Stuttering in Relation to Various Speech Sounds," Quarterly Journal of Speech, 1935, 21, 481-496.

Johnson, W., Dailey, F. L., and Spriestersbach, D. C., Diagnostic Methods in Speech Pathology, New York: Harper and Row, 1963.

Johnson, W., and Inness, M., "Studies in the Psychology of Stuttering: XIII, A Statistical Analysis of the Adaptation and Consistency Effects in Relation to Stuttering," Journal of Speech and Hearing Disorders, 1939, 4, 79-86.

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

Johnson, W., and Rosen, L., "Studies in the Psychology of Stuttering, VII, Effect of Certain Changes in Speech Pattern upon the Frequency of Stuttering," Journal of Speech and Hearing Disorders, 1937, 2, 105-109.

Jones, R. S., and Azrin, N. H., "Behavior Engineering: Stuttering as a Function of Stimulus Duration During Speech Synchronization," Journal of Applied Behavior Analysis, 1969, 2, 223-229.

Lanyon, R. I., "Some Characteristics of Nonfluency in Normal Speakers and Stutterers," Journal of Abnormal Psychology, 1968, 73, 550-55.

Lanyon, R. I., and Duprez, D. A., "Nonfluency, Information, and Word Length," Journal of Abnormal Psychology, 1970, 76, 93-97.

Love, I. R., and Jeffress, L. A., "Identification of Brief Pauses in the Fluent Speech of Stutterers and Non-Stutterers," Journal of Speech and Hearing Research, 1971, 41, 229-240.

Maclay, H., and Osgood, C., Hesitation Phenomena in Spontaneous English Speech, Word, 1959, 19-44.

Peins, M., "Adaptation Effect and Spontaneous Recovery in Stuttering Expectancy," Journal of Speech and Hearing Research, 1961, 4, 91-99.

Quarrington, B., "Stuttering as a Function of the Information Value and Sentence Position of Words," Journal of Abnormal Psychology, 1965, 70, 221-224.

Quarrington, B., Conway, J., and Siegel, N., "An Experimental Study on Some Properties of Stuttered Words," Journal of Speech and Hearing Research, 1962, 5, 387-94.

Siegel, S., Nonparametric Statistics for the Behavioral Sciences, New York: McGraw-Hill, 1956.

Silverman, R., "Distribution of Instances of Disfluency in Consecutive Readings of Different Passages by Nonstutterers," Journal of Speech and Hearing Research, 1970, 13, 874-882.

Silverman, F., and Williams, D., "Loci of Disfluencies in the Speech of Nonstutterers during Oral Reading," Journal of Speech and Hearing Research, 1967, 10, 790-94.

Van Riper, C., Speech Correction, Principles and Methods, (Rev. ed.), New York: Prentice-Hall, 1947.

Van Riper, C., The Nature of Stuttering, New York: Prentice-Hall, Inc., 1971.