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A comparative study of certain linguistic aspects of high school stutterers and their nonstuttering peers

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A COMPARATIVE STUDY OF CERTAIN LINGUISTIC ASPECTS OF HIGH SCHOOL STUTTERERS AND THEIR NONSTUTTERING PEERS

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CHAPTER I

INTRODUCTION

Purpose

The purpose of this study is to compare certain aspects of the language of stutterers who report "avoidance behavior," and their non-stuttering peers who report no "avoidance behavior," to determine whether these aspects differ as would be predicted from current stuttering theory.

In recent years increasing contributions to the sciences have allowed us to become better informed and more technical in our perception of individual fields of study. This is true in the area of communication disorders referred to as "stuttering."[1] Within the last few decades, innumerable studies have been conducted and quantities of literature have been written to advance our understanding of this type of communication disorder. Nevertheless, we remain far from knowing the entire nature of stuttering.

Research contributions have been made to many facets of the disorder of stuttering. Some of these include developing theories of stuttering, understanding the onset of stuttering, determining factors related to variations in amount of stuttering, and devising therapeutic approaches to stuttering. Yet, it appears relatively little

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[1] The author uses the term "stuttering" to refer to a developmental communication disorder involving anxieties about disfluencies as well as disfluencies themselves. The word "stuttering" is often used to label other or more limited behavior. Frequently it is used to refer to the disfluencies of a clinical population referred to as stutterers. In most references cited in this study the reader will be able to ascertain the behavior implied by the word "stuttering" so no detailed attempt is made to define it in each case.

research has been concentrated on the analysis of the language of stutterers. Therefore, it seems advisable that the dimension of language be evaluated more completely to adequately understand the nature of "stuttering."

Background

According to Van Riper (30, p. 22) an important aspect of speech is rhythm or time. He states that if the sounds or syllables of a word, the words of a phrase, and speech in general are to be considered normal they must be sequential and patterned in time. However, there is a notable range in the variation of rhythm among speakers. Disruptions of the rhythm or time pattern of speech are apparent in most speakers and frequently referred to as nonfluencies (14, p. 451), or more precisely, disfluencies (18, p.3).[2] Studies by Davis (9), Branscom, Hughes, and Oxtoby (6), and by Johnson, et al. (17) clearly indicate that disfluencies appear in most speakers of all ages. In addition, these studies disclose there is considerable intragroup range and variability regarding disfluencies.

However, Van Riper has written, "Only when the timing of our sounds and syllables is so far off the standard that our speech is conspicuous, unpleasant or unintelligible do we have a disorder of rhythm" (30, pp. 22-23). A common communication disorder involving rhythm is stuttering.

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[2] The speaking behaviors classified by Johnson, et al. (17, p. 3) as being disfluencies are interjections of sounds, syllables, words or phrases; repititions of parts of words, words or phrases; revisions; incomplete phrases; broken words; and prolonged sounds or parts of a word. These classifications have been used in developing a disfluency index. Though some significant disfluencies are not included in the index, e.g., prolonged pauses, this method of classification has been useful because of its reliability of measurement.

Stuttering is described by Van Riper as being characterized by speech which as abnormally interrupted by "...repetitions or prolongations of a sound or a syllable or posture, or by avoidance and struggle reactions" (30, p. 311). Van Riper points out that stuttering may be considered a communicative disorder more than a speech disorder per se. This is most apparent since the stutterer can speak with few interruptions of speech when alone; but more difficulty is encountered in the presence of a listener or in a situation involving increased communicative stress (30, p. 309).

Johnson (14, p. 452) distinguishes normal nonfluency from that of a stutterer. He states:

> Stuttering is an evaluational disorder. It is what results when normal non-fluency is evaluated as something to be feared and avoided. . . In the normal speaker non-fluency is simply a response occasioned by some external stimulus or, perhaps, by a lack of vocabulary or preparation. As a response in this sense, non-fluency is, indeed, normal. For the stutterer, on the other hand, non-fluency has become a stimulus to which he reacts with anxiety and with an effort to avoid it and its supposed social consequences. Non-fluency as a response is hardly a problem; non-fluency as a stimulus is something else again.

This reaction to stimuli may appear at various levels of communication development.

Stuttering is generally considered to be a developmental communication disorder (3, 15, 30). The onset of stuttering usually occurs during the preschool years and as the child grows older the characteristics of stuttering tend to follow a pattern of development. Bloodstein (3,pp. 220-236) states stuttering may be regarded as passing through four major phases in its development. Phase one is distinguished as episodic, usually occurring on the first word of a sentence and on "small" parts of speech with little emotional involvement on the part of the child. Phase two is

considered to be chronic, occurring on the "major" parts of speech and when the stutterer is excited. During this stage the child commonly regards himself as a stutterer. Phase three is characterized by distinctly more difficulty in particular situations and by work substitutions and difficulties; yet, few deep feelings of fear or embarrassment are noted. Phase four is marked by anticipation; special difficulty with various sounds, words, situations, and listeners; frequent interruptions and circumlocution; avoidance; fear and embarrassment. This final stage of stuttering is most common at high school age levels (23, p. 20).

Disfluency is one of the most prominent features of stuttering as may be determined from the characteristics of the disorder's phases. Disfluencies are significantly influenced by communicative stress. According to Van Riper increased communicative stress or anxiety tend to disrupt the fluency of most speakers, particularly stutterers (30, p. 309). Anxiety is one factor which correlates with increased disfluency and other stuttering behavior. In one study Bloodstein (1, p. 35) concluded, "Stuttering appears to diminish under conditions of reduced 'communicative responsibility,' reduced need to make a favorable impression, absence of unfavorable listener reactions, changes in speech pattern, associated activity and intense or unusual stimulation." In a later article Bloodstein examined reduced stuttering conditions and found they could be related to reduced anxiety about speech difficulty (2, p. 152).

The factor of anxiety is one aspect which allows stuttering to be largely predictable according to Eisenson. "For stutterers both as individuals and as a group, though not without exception, the incidence of stuttering can be predicted or anticipated" (10, p. 236). Expectancy or the predictability of disfluency is an important factor in stuttering.

In 1937 Knott, Johnson and Webster (20, pp. 20-22) experimentally determined the presence of expectancy in stuttering behavior and showed its high statistical significance in being related to the precipitation of stuttering. Not only were the stutterers able to predict when they would stutter but also when they would not.

In a later study (15, pp. 101-102) Johnson and Ainsworth determined that the stutterer actually anticipated stuttering with relative consistency on certain words in repeated readings of the same material. Test results showed, as was predicted by the stutterers, that instances of stuttering occurred on both the first and second readings. These results imply the need to consider consistency of anticipation and prediction of instances of disfluency in developing an understanding of stuttering.

Johnson (13, p. 23) explains stuttering as an "anxiety-motivated avoidant response." Further he states:

> Like other anxiety-motivated avoidant responses, stuttering is anticipatory . . . This anxious or apprehensive expectation comes to be associated with and to be elicited by the sounds, words, listeners, and other cues or features of situations in relation to which stuttering has been experienced in the past.

Van Riper also discusses expectancy in relation to stuttering. He states that there are certain symptoms, notable avoidance, postponement, anti-expectancy, or starters which are primarily associated with, or conditioned to, expectancy of speech difficulty. Avoidance is explained by Van Riper (30, pp. 340-341) in this way:

> No one likes to have feelings of frustration, anxiety, guilt, or hostility. When these feelings appear in conjunction with repetitive or prolonged interruptions in the flow of speech, those interruptions will be viewed as highly unpleasant. The stutterer will seek to prevent, avoid, or escape from repetitions which keep repeating, from prolongations of a sound or posture which persist.

Van Riper discusses the concept of expectancy and avoidance in terms of situation fears and word fears. That is, the stutterer scans words and situations for ones which might indicate a stuttering reaction and unpleasantness which may be associated with a similar prior experience. Situations fears and word fears are greatly increased by avoidance and may serve as "maintaining causes" of stuttering (30, pp. 339-340).

Increased disfluency may change verbal behavior. This is shown by patterns of avoidance and the effect they have on various aspects of communicative adjustment. In 1938 a study by Kimmell (18) was made to determine the types of avoidance that stutterers reveal and the effect of such avoidances on specific phases of adjustment. Autobiographical documents written by twenty-nine adult stutterers were examined, and the general conclusion reached was that avoidances tend to delay, decrease, or prevent speech in certain situations as well as limit the range of social experience. It was found in speech behavior that avoidance patterns generally affected the amount of speech, the choice of words and the subject matter (18, pp. 96-100).

Johnson states that ". . .the behavior of stutterers appears to be quite understandable when viewed as their attempts to avoid non-fluency" (14, p. 458). Bloodstein classifies avoidance as very ". . . characteristic of stuttering in its developed form" (4, p. 232). Therefore, as stuttering increases and avoidance patterns develop, it is plausible that the stutterer will avoid using words associated with disfluencies more than words which are not. The result should be a significant change in the language pattern.

The prominence of disfluency in all stages of stuttering suggests the reason why extensive research has been devoted to this aspect of the

disorder. Several studies have been conducted to determine specifically where the stutterer's disfluencies occur in the speech sequence. Johnson and Brown (16, pp. 494-495) first studied the relationship of phonetic factors to the incidence of stuttering and found that, though there was considerable variability between subjects, intra-subject variability was minimal. They concluded that in general consonant sounds occasion greater difficulty for stutterers than do vowel sounds.

In another study Brown (7, p. 209) determined that in analyzing oral readings by stutterers from a grammatical standpoint, stutterers had more difficulty with "content words" such as adjectives, nouns, adverbs, and verbs, than with "function words" such as pronouns, conjunctions, prepositions, and articles. Brown and Moren (8, p. 158) later studied the relation of word length to stuttering and found that longer words tended to be stuttered more than shorter words. The two measures of word length used were number of syllables and number of letters. Graphically there was an increase in the percentage of stuttering as the number of syllables and letters were increased. The stuttering increase according to syllable groups was slightly more regular (8, p. 158). The difference between the two measures was shown to be relatively small because they tend to fluctuate interdependently. In discussing increased stuttering on longer words Brown and Moren (8, p. 159) observed that a ..."possible explanation for this is found in terms of the greater prominence of longer words and the stutterer's consequent greater desire to avoid stuttering at these points."

More recently Soderberg (27, p. 585) also demonstrated that word length has significant effect on stuttering. Using syllables as the measure of length, he showed that the "instances of stuttering" increased

as the length of words increased from one to two, and from two to three or four syllables. Soderberg concurrently studied the relationship of word frequency to the instances of stuttering. Although his findings suggest that "...word length is a more potent variable than word frequency for differentiating the frequency of stuttering...", he found that there was a significant difference between the words of high and low frequency with more instances of stuttering occurring on low frequency words (27, p. 586). However, there was no significant difference between words of high and medium frequency or words of medium and low frequency.

Soderberg supported the Brown and Moren (7) conclusion that longer words are more distinctive in the speech sequence and increased stuttering occurs because the stutterer desires to avoid stuttering on these words. He also mentioned the possibility suggested by Schlesinger, et al. (26, p. 36) that increased stuttering with increased word length may occur for phonetic reasons. These explanations of increased stuttering would also seemingly apply to words infrequently used.

Stuttering frequency in relation to word frequency usage has been studied by Henja (12). His results indicate more frequent stuttering on uncommon nouns than on commonly used nouns. Henja (12, p. 3) stated "... the most plausible explanation for the finding is that an adaptation effect does exist in the spontaneous daily speech utterances of the stutterer." He explained that this finding may account for previous studies which have found that stuttering occurred significantly less on articles than on nouns. In the case of articles the stutterer only has a possible choice of three words and becomes adapted to them through daily use.

Disfluency research has shown that increased stuttering behavior or disfluency occurs on long words and infrequently used words. It is

known that the stutterer tries to avoid disfluencies and also that disfluencies tend to occur on certain types of words. The effect that increased disfluencies may have in developing patterns of avoidance of certain types of words, specifically longer and infrequently used words, is of importance in this study. Knowledge about the presence or absence of these types of words in the stutterer's spontaneous speech may contribute information to the overall language patterns of stutterers.

Although there is considerable research relating moments of stuttering to various aspects of language, there seems to be relatively few studies comparing stutterer's language usage with that of nonstutterers. In one such study by Felstein (11) the language of a group of fourteen stutterers was compared with that of a matched group of fourteen nonstutterers on their use of the "because" ratio, the verb-adjective ratio, and the Type-Token Ratio. Although her results did not indicate a significant difference between the stutterers' and nonstutterers' use of the "because" ratio and the verb-adjective ratio, there was a statistically significant difference between the stutterers and the nonstutterers with respect to the Type-Token Ratio. Felstein (11, p. 37) observed:

> "A lower type token ratio may be regarded as an indication that his nonfluency prevents the stutterer from using a broader selection of words. He may get to rely on certain words and may repeat these to change the structure of his sentence in order to avoid blocking."

However, the findings of Knabe (19, p. 181) are inconsistent with those of Felstein. Knabe's recent study made a comparative analysis of some general characteristics of the linguistic output of stutterers and nonstutterers as they orally responded to a series of questions. As well as degree of disfluency, the characteristics assessed were: (1) latency of response, (2) time of response, (3) rate of response, (4)

total word output, (5) total different word output, (6) total semantic-word output, (7) total function-word output, (8) total personal-pronoun output, and (9) total nonpersonal-pronoun output (19, p. 170). Her results indicated that the only significant difference between stutterers and nonstutterers of matched age, sex, and verbal ability was degree of disfluency as she expected because of her selection criteria. She concluded that "...stutterers may be more familiar to nonstutterers than many researchers and clinicians have indicated" (19, p. 182).

The groups in both the Knabe study and the Felstein study were remarkably similar in age, number, sex ratio, and in methods of determining Type-Token Ratio. It should be noted that no criterion was established in either study for rating severity of stuttering. One apparent difference between the two studies was the amount of spontaneous speech analyzed. While Felstein examined the first 2,000 words, Knabe examined the total word output the mean of which was 105.34 words for the stutterers and 113.94 words for the nonstutterers.

Knabe has discussed the focus of previous stuttering research. She stated:

> "Because stuttering implies a deviation from norms in the fluent production of spoken language, most research in this disorder has been focused on malfunction in the act of speaking rather than on more general characteristics of language in a given encoding situation" (19, pp. 178-179).

This would indicate that research has emphasized the fluency or disfluency aspect of stuttering with less regard for other dimensions of communication. The author submits that examination of the relative occurrence of word length, word frequency, and word diversification will provide information regarding specific language patterns used by stuttering population.

The function of this study was to compare certain aspects of the language of stutterers who report "avoidance behavior", and their nonstuttering peers who report no "avoidance behavior", to determine whether these aspects differ as would be predicted from current stuttering theory. Avoidance behavior is considered to be a very prominent characteristic of the advanced stutterer. Research has demonstrated that avoidance patterns generally affect the amount of speech and the choice of words and subject matter used by stutterers (18, pp. 96-100). Previous studies have also concluded that stutterers tend to be disfluent on certain types of words, specifically, longer and less commonly used words.

Since some stutterers avoid disfluencies, and disfluencies tend to occur on certain types of words, it would be expected that these aspects of the stutterer's language would result less frequently during his spontaneous speech than during that of his nonstuttering peer. Therefore, it was hypothesized that in their spontaneous speech stutterers who report "avoidance behavior", will use shorter words, more common words, and fewer different words than their nonstuttering peers who report no "avoidance behavior". The results were evaluated using a five percent coefficient of risk.

CHAPTER II

PROCEDURE

The subjects for this study were selected from stutterers and their nonstuttering peers attending high schools located in various parts of the country. To obtain these subjects letters explaining the purpose of the study and the method of obtaining the necessary speech samples were sent by the author to approximately twenty Montana high school principals. These letters requested assistance in locating subjects in schools immediately available to the experimenter. Two of the principals who responded indicated possible subjects were enrolled in their schools.

Letters were also sent to ten school clinicians located in California, Iowa, Massachusetts, Montana, Nevada, and Washington. These letters requested assistance in locating subjects and gathering speech samples from them. Ten clinicians were contacted of whom two located in California and Montana returned the necessary information.

Each of the possible subjects contacted by the principals, speech clinicians, or author was provided with a letter explaining the purpose of the study. The subjects were also required to complete a questionnaire which was used in the final selection of the experimental and control groups (see Appendix A). The final group consisted of ten stutterers and ten nonstuttering peers. Of these ten pairs, nine pairs were from Montana and one pair from California.

The ten stutterers comprising the experimental group consisted of nine males and one female ranging in age from 15.5 years to 18.8 years with a mean age of 17.6 years (see Appendix B). The criteria for this group were that each be considered by himself and others as a stutterer,

that he had started stuttering before the second grade, and that he be required to report avoiding words at least three to four times a day because he anticipated not being able to say them. Determining the approximate age of onset of stuttering was included as part of the criteria to eliminate as nearly as possible those students who did not follow the general pattern of developmental stuttering as described by Bloodstein (3, p. 23). The criteria also included establishing the approximate frequency of word avoidances. The prescribed number of word avoidances was not as important as the relative amount of word avoidance reported by the subjects. Numbers arbitrarily selected by the author were used only to suggest a point of reference for the subjects.

The control group consisted of friends selected by each of the respective experimental subjects. These friends were to be of the same sex and within six months of the age of the stutterer. However, in one case the stutterer was 1.8 years older than his friend. The control group of nine males and one female ranged in age from 15.4 years to 18.4 years with a mean age of 17.2 years (see Appendix B). The control group criteria required that each be regarded by himself and others as a normal speaker and that he report avoiding words no more than three to four times a month because he anticipated not being able to say them.

To substantiate the similarity between the stutterers and their peers, data on their respective verbal abilities was obtained from their high school records (see Appendix E). The percentile scores of the verbal ability subtests of four different educational tests showed one half of the stutterers were superior to their nonstuttering peers. Scores of seven of ten pairs of the subjects were obtained from the Iowa Test of Educational Development. These results disclosed the nonstutterers

were superior to the stutterers in four of the seven pairs of subjects. However, the average difference between the two groups of subjects was less than 5.3 percentile units as determined by the Iowa Test of Educational Development. On the basis of this data, the author concluded that the peer group was generally similar to the stuttering group in verbal ability.

The procedure for obtaining spontaneous speech samples from each subject followed that used by Johnson et al. (17) in their study of speech disfluencies and rate in stutterers and nonstutterers. Sixteen of the twenty speech samples were directly obtained by the author. Two speech clinicians in other schools procured the remaining speech samples according to detailed instructions outlined by the author (see Appendix C).

In the presence of a speech clinician, samples of spontaneous speech were tape-recorded as each subject was instructed to talk for about five minutes on his future job or vocation including telling about the vocation, why he chose it, and anything else he wished to discuss. If he had not selected a future vocation, he was asked to talk about jobs he had held in the past. For the TAT Task the subject was given the Thematic Apperception Test card # 10 (25) and asked to develop a dramatic story based on the picture. He was asked to be prepared to speak for about five minutes about what was happening at the moment in the pictured situation, what events had preceded those shown in the picture, and what the outcome of the story was to be. For each task one minute was allowed the subject to prepare the story. The recorder was then turned on and the subject was asked to begin. Encouraging questions were asked to elicit more speech if the minimal time limit of five minutes was not completed.

The taped recordings of each task were then transcribed verbatim by the author. Repetitions of initial sounds, syllables, and words and interjections of extraneous sounds were not transcribed. For example: "m-m-me" was transcribed as "me"; "I uh I" was transcribed as "I". These repetitions of initial sounds and interjections of extraneous sounds were excluded because they did not conform to the definition of a word as determined for this study. Words repeated singly or in a phrase were transcribed only once since these repetitions were considered to be disfluencies and therefore a deviation form the subject's basic word usage. The author concluded that these diversions should not be included in the measures of language patterns used in this study.

It was recognized that establishing an operational definition of a word in terms of oral language as opposed to written language posed certain problems. For purposes of this study a word was defined as a "...morpheme-complex consisting of a single base, its accompanying suffixes (if any), and a superfix" (29, p. 56). Segmental morphemes, the basis of morphological structure, are divided into two types: bases and suffixes. According to Trager and Smith (29, p. 55) "...bases are the part of the structure usually described as having the 'meaning' of the item." Bases must come first in a morpheme-complex. Bases are further classified by whether they do or do not combine with suffixes. The first item of a multibase sequence, that is a prefix, is considered by Trager and Smith to be a "pre-base" and distinct from the usual classification of affixes (30, p. 56). Suffixes are the morphemic segments which follow bases. Superfixes are suprasegmental morphemes consisting of patterns of stress and may include plus junctures. This definition of a word was used to determine most of the words in the transcriptions;

however, it was necessary to devise special classes for exceptions. The special classes arbitrarily selected were:

1. Contractions such as "don't," "I've," "whadays," and "hafta" were each considered as one word.
2. Compound words as listed in Thorndike and Lorge (28) were considered as one word. For example: "everything," "myself," "New York," and "seventy-five."
3. Letters used in abbreviations such as "IBM" and "JC" were counted as separate words.

To obtain the transcribed speech samples for the experiment the first 300 words of each speaking task were determined on the basis of the previously stated definition of a word and its special classes. Three measures were then used in analyzing the data obtained from each subject. They were the mean length of the words, the frequency-of-use of the words, and the Type-Token Ratio. Each of these measures was applied to the Job Task and the TAT Task speech samples obtained from each subject.

The mean length of the words used in the Job Task and the TAT Task was computed for each subject by determining the mean number of syllables per word. A syllable was defined as "...a unit of spoken language that is next bigger than a speech sound and consists of one or more vowel sounds alone or of a syllabic consonant alone or of either accompanied by one or more consonant sounds preceding or following" (31, p. 2315). The formula used was Mean Length of Words = (TS/300) in which TS represents the total number of syllables of the first 300 words of each speaking task and 300 represents the first 300 words used in each task. In the analysis of the transcriptions the number of syllables in a given word was determined by how they had been orally produced. For example, "probably" (three syllables) was distinct from "prob'ly" (two syllables);"'cause" (one syllable) was distinct from "because" (two syllables) in terms of number of syllables.

The frequency of the words used by each subject in his speech sample was also determined. On the basis of the Thorndike and Lorge (28, p. x) word count, two categories of word frequency were established: infrequent and frequent. Infrequent words included those words used 1 to 99 times per million words. Frequent words were those used 100 or more times per million words. Word frequency was then measured by classifying the first 300 words of each task accordingly. A ratio of the number of infrequent words used per 300 words was then established for each subject for each speaking task. Any word of the speaking tasks listed in Thorndike and Lorge (28) was rated according to the stated frequency. In colloquial utterances the first "base" of each word was rated for frequency, e.g., "godda" was rated as "got". All words not listed in Thorndike and Lorge were placed in the infrequent category.

To determine the diversification of the words used by each subject the Type-Token Ratio was used. "This is a measure of vocabulary 'flexibility' or variability designed to indicate certain aspects of language adequacy. It expresses the ratio of different words (types) to total words (tokens) in a given language sample" (14, p. 506). The formula to be used is: Type-Token Ratio = DW/ 300 in which DW represents the number of different words and 300 again represents the number of words used in each task. In counting different words, any two words were judged to be diverse if they were transcribed differently. Exceptions to this were such utterances as "an' " and " 'n' " which were all forms of "and"; or "ta" and "to" which were both transcribed as "to". These were cases in which word length, frequency, and diversification would not be altered by the use of the "base" word.

A college freshman paid under the Federal Work-Study program transcribed the Job Task speech samples; counted number of words and number of

syllables; and classified word frequency of all twenty subjects to determine interjudge reliability. In transcribing the speech samples the overall pattern showed that there were fewer differences between the first transcriber (the author) and the second transcriber (the freshman) for the speaking tasks of the nonstutterers than there were for the stutterers. Most of the differences may be accounted for by the phonetic differences, e.g., "ya" - "you"; "like" = "liked"; "it'd" - "it would". These had little or no effect on word length, frequency, or diversification. By using the Pearson product moment correlation, interjudge reliability was shown to be: word length, +.84[3]; word frequency, +.83; word diversification, +.84.

[3]The 1% confidence limit for r=.84 N20 is .54-.95 using a z transformation where $z = 1/2 \log_e \frac{1+r}{1-r}$; σ of $z = \frac{1}{\sqrt{N-3}}$ (34, p. 211-214).

CHAPTER III

RESULTS

Speech samples in response to the Job and TAT tasks were obtained, as noted, from a group of ten stutterers and ten nonstuttering peers. The language behavior of these subjects was then analyzed according to word length, word frequency, and word diversification.

The stutterers as a group were lower than their nonstuttering peers on all three measures: word length, frequency, and diversification. The means for stutterers and nonstutterers for word length were 1.21 and 1.29 respectively; frequency, .080 and .098 respectively; and diversification, .44 and .47 respectively (see Tables 1, 2, and 3). The analysis of variance technique using experimental design referred to by Lindquist (21, p. 257) as Type I was used to analyze the statistical significance of these results. For purposes of this study a .05 coefficient of risk had been established. The differences between the means of the stutterers and the nonstuttering peers were significant at this .05 level on two of the three measures: word length and word frequency. Summary tables for the analysis of variance for word length, frequency, and diversification are presented in Tables 4, 5, and 6 respectively.

Examination of the means of the two groups demonstrated that the stutterers were consistently lower than the nonstutterers on all measures in both speaking tasks. There was no significant Task X Group interaction. A notable pattern of the stutterers is shown by the individual raw scores (see Appendix D). For the Job Task in nine of the ten pairs the stutterers were lower than their nonstuttering peers on the measure of word length and word diversification. In eight of the ten pairs the

stutterers were lower than their nonstuttering peers on the measures of word length and word diversification. In eight of the ten pairs the stutterers were lower than their nonstuttering peers on the measure of word frequency of the Job Task. A similar though less consistent pattern was revealed when the individual scores of the TAT Task were examined.

Examination of the mean scores of the two speaking tasks showed that on all three measures the mean scores of the TAT Task, for both stutterers and nonstuttering peers, were lower than those of the Job Task. However, the analysis of variance indicates that these differences were not statistically significant.

TABLE 1.- -Group means for word length. Mean number of syllables per word for stutterers and nonstuttering peers on the Job and TAT Tasks.

	Job Task	TAT Task	Group means for Job and TAT Tasks
Stutterers	1.21	1.22	1.21
Nonstuttering peers	1.31	1.27	1.29
Task means for stutterers and nonstuttering peers	1.26	1.25	

TABLE 2.- - Group means for frequency. The ratio of low plus medium frequency words per total words for stutterers and nonstuttering peers on the Job and TAT Tasks.

	Job Task	TAT Task	Group means for Job and TAT Tasks
Stutterers	.085	.076	.080
Nonstuttering peers	.106	.090	.098
Task means for stutterers and nonstuttering peers	.100	.083	

TABLE 3.- - Group means for word diversification. Type-Token Ratio for stutterers and nonstuttering peers on the Job and TAT Tasks.

	Job Task	TAT Task	Group means for Job and TAT Tasks
Stutterers	.44	.44	.44
Nonstuttering peers	.49	.46	.47
Task means for stutterers and nonstuttering peers	.47	.45	

TABLE 4.- -Summary of analysis of variance. Mean number of syllables per word for stutterers and nonstuttering peers on the Job and TAT Tasks.

Source of Variation	df	ss	ms	F	p[a]
Between subjects	19	.2302			
Groups	1	.0583	.0583	6.07[b]	.05
Error between	18	.1719	.0096		
Within subjects	20	.0431			
Task	1	.0022	.0022	1.17[c]	NS
Task X group	1	.0063	.0063	3.31[d]	NS
Error within	18	.0346	.0019		
Total	39	2733			

[a] p = point in the F-distribution
[b] F = $ms/ms_{error(b)}$
[c] F = $ms/ms_{error(w)}$
[d] F = $ms/ms_{error(w)}$

TABLE 5.- -Summary of analysis. The ratio of infrequent words per total words for stutterers and nonstuttering peers on the Job and TAT Tasks.

Source of variation	df	ss	ms	F	p[a]
Between subjects	19	.32880			
Groups	1	.00441	.00441	4.41[b]	.05
Error between	18	.01814	.00100		
Within subjects	20	.01640			
Task	1	.00256	.00256	3.37[c]	NS
Task X group	1	.00000	.00000	0.00[d]	NS
Error within	18	.01384	.00076		
Total	39	.34520			

[a] p = point in the F-distribution
[b] $F = ms/ms_{error(b)}$
[c] $F = ms/ms_{error(w)}$
[d] $F = ms/ms_{error(w)}$

TABLE 6.- - Summary of analysis of variance. Type-Token Ratio for stutterers and nonstuttering peers on the Job and TAT Tasks.

Source of variation	df	ss	ms	F	p[a]
Between subjects	19	.0893			
Groups	1	.0126	.0126	3.00	NS
Error between	18	.0767	.0042		
Within subjects	20	.0377			
Task	1	.0024	.0024	1.33[c]	NS
Task X group	1	.0027	.0027	1.50[d]	NS
Error within	18	.0326	.0018		
Total	39	.1270			

[a] p = point in the F-distribution
[b] $F = ms/ms_{error(b)}$
[c] $F = ms/ms_{error(w)}$
[d] $F = ms/ms_{error(w)}$

CHAPTER IV

DISCUSSION

Although the measure of word diversification was not found to be statistically significant, the results of this study did support the hypothesis that stutterers who report "avoidance behavior" will use shorter words and more common words in their spontaneous speech than will nonstutterers who report no "avoidance behavior." When viewed in terms of current stuttering theory as presented by Bloodstein (3; 4), Johnson (14), Van Riper (30), and Eisenson (10), these results which support the above hypothesis are very plausible within the limitations of this study.

Generally stuttering is considered to be a developmental communication disorder (1; 14; 30). People who stutter usually differ significantly from those who do not in terms of their speech, are more anxious about speaking, are able to anticipate and predict disfluencies with accuracy, and demonstrate avoidance behavior with respect to words and situations. Yet these are only some of the communication differences between stutterers and nonstutterers.

The results of this study seem to expose another communicative difference in language behavior. Stuttering has typically been considered a communicative disorder of fluency. Consequently, most research has focused upon this aspect of the stutterer's communicative behavior. However, some of the characteristics of language which are equally essential to the communication situation have received less attention. In examining some of these characteristics, the present study indicates that in the advanced stutterer, as determined by

reported "avoidance behavior," language is significantly different than that of his nonstuttering peer.

It would appear that at least in later stages, the stutterer has a communication disorder in a broader sense than has previously been implied by theorists of stuttering. In addition any development of a theory of stuttering would seem to require consideration of the specific language patterns of stutterers including those dimensions evaluated in this study.

Previous research has demonstrated that instances of disfluency tend to occur on particular types of words and, perhaps more importantly, to be anticipated and predicted by the stutterer. These factors, in combination with avoidance behavior, would seem to develop a pattern of the language behavior in the spontaneous speech of the stutterer. The author deduces that the findings of this study illustrate how the spontaneous speech of a stutterer who reports avoidance behavior may be influenced so he will use shorter and more common words.

It is reasonable to conclude that the advanced stutterer uses short, common words because he has developed patterns of avoidance rather than as the result of an organic inability to use long, uncommon ones. Brown and Moren (8), Soderberg (27), and Henja (12) have reported in various studies that in controlled situations stutterers tend to be more disfluent on longer words and low frequency words. Those researchers hypothesized that such disfluencies may occur as a result of (1) the phonetic complexity and difficulty in pronouncing these words, (2) the greater prominence of these words, or (3) the unfamiliarity of these words, and consequently, the stutterer's desire to avoid disfluencies at these points. Yet, even stutterers report their avoidance of disfluencies and that such avoidances tend to reduce the amount of speech and influence the stutterer's

choice of words and subject matter (18). The results of the present study would appear to support these studies regarding word length and word frequency.

Another aspect of language behavior examined in this study was the number of different words used by each subject as measured by the Type-Token Ratio. Although word diversification was not significantly lower for the stutterers at the .05 level of confidence, the stutterers' observed mean ratio was lower than the nonstutterers. Examination of the individual scores of each subject's Type-Token Ratio indicated that the stutterers were lower than their nonstuttering peers on thirteen of the twenty possible scores. Although this result may reflect nothing more than sampling error, the slight tendency for less diversification may be a reflection of the strong interrelationship among the measures of word length, frequency and diversification. According to Zipf (32, p. 27) the length of words tends to be inversely related to the number of occurrences, and that the number of different words seems to increase as the frequency of occurrences becomes smaller. He stated that a "...statistical relationship has been established between high frequency, small variety and shortness in length, a relationship which is presumably valid for language in general" (32, p. 27). On the basis of this relationship, the stutterers' lower Type-Token Ratio in thirteen of the twenty subjects may be due to his use of short, frequently occurring words rather than his direct avoidance of the use of a wider variety of words as hypothesized by the author.

The procedure for obtaining speech samples for this study was similar to that used by Johnson et al. (17) in their study of speech disfluencies and rate in stutterers and nonstutterers. This procedure makes some allowance for establishing rapport and familiarizing the subject with the

situation. It is recognized that because of the formality of the setting and because people will speak differently in different situations, this study's speech samples probably do not represent the subject's "average" speech. However, the Job Task and the TAT Task were chosen to compensate somewhat for this problem of speech sampling. The Job Task represents a speaking task in which the subject tells about what vocatinn he has chosen or what jobs he has held in the past. The subject is relatively familiar with this area. In contrast, the TAT Task is a relatively unfamiliar speaking task of developing a story based on a picture from the Thematic Apperception Test. Even though these tasks represent two quite different kinds of spontaneous speech, the means show the nonstutterers were consistently higher on all measures of both tasks than were the stutterers. On the basis of this consistency it would be expected that other samples of the subject's spontaneous speech may tend to follow this same pattern.

The three measures, word length, frequency, and diversification, were selected for this study because, in addition to being interrelated as stated by Zipf (32), they could readily be applied to a 300 word speech sample. Other language measures, for example, the "verb-adjective ratio" or the "because ratio" as used by Felstein (11), although they may also show difference, would be less substantial for a speech sample of this size. Two of the three measures were found to be significant, word length and word frequency. When these differences could be determined using only ten stutterers and ten nonstutterers, this would seem to support the usefullness of these measures of language in studies of this type.

Although the number of subjects used in this study was small,

the author does not feel that an increase in the sample number would contradict the results of the study. In addition to the statistical significance of the results, visual inspection and comparison of individual raw scores reveals that the stutterers were consistently lower than the nonstutterers in nearly all measures of both speech samples, particularly on the Job Task. On this speaking task, in only one of the ten pairs of subjects did the stutterer score higher than his nonstuttering peer for the measures of word length and diversification. For the measure of word frequency, the stutterer scored higher than the nonstuttering peer in only two of the ten pairs of subjects.

Since the length of a speech sample and each measure applied to it was based on a word, it was necessary to establish an operational definition for a "word" to be used in this study. The definition described by Trager and Smith (29) was chosen because it seemed the most precise for purposes of this study, and assisted the utilization of the three measures employed. It is assumed that any definition would have obtained comparable results; however, an operational definition is necessary for consistency within the study and its adaptation in any possible future studies.

The three measures of language utilized in this study were applied only to the spontaneous speech of the stutterers and nonstutterers. It would be interesting to determine what results could be obtained if these measures were applied to the written language of stutterers. It may be postulated that if avoidance of certain types of words which incur disfluencies in fact do affect differences in the spoken language of stutterers, then written language should not be affected to this degree. Possibly stutterers may equal or better nonstutterers when these measures

are applied to their written language.

One must consider the limitations of the present experimental group when interpreting the results of this study. Although an attempt was made to obtain a larger sample from a broad geographical area, the final group consisted of a small number of stutterers predominantly from one state. These stutterers were all of high school age, had volunteered to participate in the study, and were considered to be advanced stutterers. The selectiveness of this particular sample restricts the extent to which the results of this study may be applied to the general stuttering population. Further studies to examine the language usage of other stutterers grouped, for example, according to age, sex, or stuttering severity, would be suggested.

The results of this study require the conclusion that the language behavior of stutterers who report "avoidance behavior" is significantly different from that of their nonstuttering peers who report no "avoidance behavior." These results demonstrate that stutterers tend to use shorter and more common words in their spontaneous speech than their nonstuttering peers. It is hypothesized that these language differences result not because of an innate inability on the part of the stutterer or a general personality disorder, but rather because of patterns of avoidance which are gradually developed over a period of time. Within the limitations of this study, its findings indicate that advanced stuttering seems to be a communication disorder in a broader sense than has previously been implied. It therefore would seem that development of a theory of stuttering requires consideration of all aspects of the language behavior of stutterers as well as specific findings such as presented herein.

CHAPTER V

SUMMARY

Historically research works have shown that stutterers tend to be more disfluent on longer and less frequently used words. Stutterers have reported that their amount of speech and choice of words and subject matter is affected by their attempts to avoid disfluencies, a pattern of behavior which is a prominent characteristic of the advanced stutterer. On that basis, it has been concluded that stutterers who report "avoidance behavior" will use shorter words, more common words, and fewer different words than nonstutterers who report no "avoidance behavior" in their spontaneous speech.

Twenty subjects selected from various high schools located in Montana and California participated in this study. The experimental group consisted of ten stutterers. Each considered himself as did others a stutterer who reported stuttering before the second grade, and who reported avoiding words at least three to four times per day because he anticipated not being able to say them. The control group of ten nonstuttering friends were selected by the respective stutterers, were of the same sex, and with one exception were within six months of age of each other. Members of the control group were considered by themselves and others as normal speakers and reported avoiding words no more than three to four times per month because they anticipated not being able to say them.

The procedure used to obtain speech samples for this study followed Johnson et al. (17) in which each subject spoke for about five minutes on both the Job and TAT Tasks. The three measures, word length, freguency, and diversification, were then applied to the first 300 words of

each speaking task. By the use of the analysis of variance technique, it was determined that at the .05 level of significance the stutterers were lower than the nonstutterers on the language measures of word length and word frequency. The measure of word diversification was not significant at the .05 level; however, the observed difference showed the stutterers to be lower than their nonstuttering peers as predicted.

It was determined that generally stutterers, as represented in this study, tend to use shorter and more common words in their spontaneous speech than do their nonstuttering peers. Although there are other explanations for these findings, this author concludes that these differences may be attributed to the development of avoidance of those types of words which incur disfluencies. Past research and theory have not clearly established the extent to which stuttering is in fact a communication disorder. The results of this study suggest that stuttering is more of a speech and language disorder than has previously been considered. In view of this conclusion future research and theoretical development would necessarily have to include consideration of the overall language behavior of stutterers and particular findings of this study.

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APPENDIX A

Letters and Questionnaire

Dear Parents and High School Students,

A study at the University of Montana is being conducted in selected high schools. The subjects are high school students who stutter and their friends. Your son (daughter) has been referred to me because he is considered to have a stuttering problem.

The purpose of this study is to learn more about the problem of stuttering so that future clinicians can be more effective in helping individuals with this difficulty. Your son (daughter) can help in this endeavor by giving fifteen minutes of his school time during which a sample of his spontaneous speech will be recorded. This recording will be used in the above study but the identity of the speaker will be known only to the researcher.

It would be appreciated if you would provide the necessary information requested on the attached form and return this letter immediately to your principal to facilitate the completion of this study. Thank you very much for your assistance,

Sincerely,

Sue Jensen
Graduate Student,
Speech Pathology

Principal or therapist

Dear Parents and High School Students,

A study at the University of Montana is being conducted in selected high schools. The subjects are high school students who stutter and their friends. Your son (daughter) has been referred to me because he is a friend of a student who stutters.

The purpose of this study is to learn more about the problem of stuttering so that future clinicians can be more effective in helping individuals with this difficulty. Your son (daughter) can help in this endeavor by giving fifteen minutes of his school time during which a sample of his spontaneous speech will be recorded. This recording will be used in the above study but the identity of the speaker will be known only to the researcher.

It would be appreciated if you would provide the necessary information requested on the attached form and return this letter immediately to your principal to facilitate the completion of this study. Thank you very much for your assistance.

Sincerely,

Sue Jensen
Graduate Student
Speech Pathology

TO BE FILLED IN BY STUDENT:

Name:_____

Age:_____Birthdate:_____

Do you avoid words you know because you expect that you will not be able to say them? _____yes
_____no
_____I don't know

If "yes," how frequently does this expectation of not being able to say words occur? _____frequently (about 1-4 times per day)
_____infrequently (about 3-4 times per week)
_____rarely (about 3-4 times per month)

Do you consider yourself to be a stutterer? _____yes
_____no

If "yes," do you or your parents feel you began stuttering before you were in the second grade? _____yes
_____no

FOR STUTTERER ONLY:

Please choose a friend of the same sex and within six months of your age and whom you consider to be a normal speaker to participate in the study with you. Please give him the attached letter as it will be necessary for him (her) and his (her) parents to also complete a similar questionnaire and consdnt to participation in the study.

Friend's name:_____

TO BE FILLED IN BY PARENTS:

I, _____,(DO, DO NOT) consent to allow my son (daughter) to participate in this study of the speech and language behavior of high school students, and to allow a taped recording to be made for this purpose.

Signed,

Parent or guardian

APPENDIX B

Ages of Subjects in Years

Stutterers	Nonstuttering Peers
1. 15.5	1. 15.4
2. 18.1	2. 17.5
3. 17.9	3. 17.7
4. 17.6	4. 17.4
5. 18.0	5. 18.4
6. 18.7	6. 18.1
7. 18.8	7. 17.0
8. 16.7	8. 17.1
9. 18.4	9. 17.9
10. 15.9	10. 15.6
Range: 15.5 - 18.8 years	Range: 15.4 - 18.4 years
Mean age: 17.6 years	Mean age: 17.2 years

APPENDIX C

INSTRUCTIONS

The following procedure will take place in the presence of the experimenter only with the tape recording equipment in full view of the subject, the recording being made a 7 1/2 inches per second, and the microphone placed 2 to 3 feet from the speaker. The subject will not be informed of the speaking tasks prior to this situation.

1. With the recorder running, engage in about one minute of casual conversation about the student and his school. This is to familiarize the student with the situation.

2. Turn off the equipment and give the following instructions for the Job Task.

   "I would like you to talk for about 5 minutes or so on what future job or vocation you would like to take up when you've finished school. Tell about the vocation, why you chose it and anything else you would like to discuss. If you have not yet chosen a vocation, tell about the jobs you've held in the past. You may have about a minute to think about this." (Reread instructions to emphasize what information is wanted.)

   Time one minute, turn on tape recorder.
   "Please begin talking."

   Time for 5 minutes. Ask leading questions if necessary to obtain the minimal 5 minute speech sample.

3. Turn off the equipment and give the following instructions for the TAT Task. A copy of TAT card #10 is enclosed.

   "Now I would like you to develop a dramatic story based on this picture. Be prepared to speak about 5 minutes about what is happening in the pictured situation, what events have preceded those shown in the picture and what the outcome of the story is to be. You may have about a minute to think about the story." (Reread the instructions to emphasize what information is wanted.)

   Time about one minute, turn on recorder.
   "Please begin talking."

   Time for 5 minutes. Ask leading questions if necessary to obtain the minimal 5 minute speech sample.

   "Thank you very much for your help."

APPENDIX D

RAW DATA
Job Task

STUTTERERS

	Word Length	Word Frequency	Word Diversification
1.	1.26	.07	.45
2.	1.12	.07	.46
3.	1.21	.06	.40
4.	1.24	.13	.46
5.	1.26	.11	.42
6.	1.27	.09	.46
7.	1.15	.05	.40
8.	1.31	.09	.45
9.	1.12	.08	.43
10.	1.14	.10	.46

NONSTUTTERING PEERS

	Word Length	Word Frequency	Word Diversification
1.	1.18	.03	.35
2.	1.27	.10	.54
3.	1.40	.10	.49
4.	1.24	.10	.50
5.	1.41	.16	.55
6.	1.29	.12	.51
7.	1.28	.09	.53
8.	1.42	.16	.49
9.	1.40	.08	.46
10.	1.20	.12	.49

RAW DATA
TAT Task

STUTTERERS

	Word Length	Word Frequency	Word Diversification
1.	1.27	.04	.49
2.	1.11	.05	.42
3.	1.16	.03	.39
4.	1.23	.09	.49
5.	1.23	.06	.46
6.	1.15	.09	.54
7.	1.16	.08	.25
8.	1.35	.08	.48
9.	1.27	.08	.47
10.	1.24	.09	.41

NONSTUTTERING PEERS

	Word Length	Word Frequency	Word Diversification
1.	1.16	.06	.39
2.	1.29	.07	.41
3.	1.33	.13	.47
4.	1.21	.10	.52
5.	1.29	.08	.48
6.	1.29	.11	.48
7.	1.21	.05	.50
8.	1.34	.07	.44
9.	1.36	.15	.49
10.	1.21	.08	.41

APPENDIX E

General Verbal Ability Percentile Scores

	Stutterers	Nonstuttering Peers	Percentile Differences	Test
1.	99%	86%	+13	NEDT[1]
2.	3%	38%	-35	ITED[2]
3.	15%	30%	-15	ACT[3]
4.	89%	38%	+51	ITED
5.	96%	71%	+25	ITED
6.	48%	84%	-36	ITED
7.	57%	77%	-20	ITED
8.	76%	70%	+ 6	ITED
9.	71%	99%	-28	ITED
10.	60%	15%	+45	DAT[4]

[1]NEDT - National Educational Development Test: General Vocabulary

[2]ITED - Iowa Test of Educational Development: Word Usage

[3]ACT - American College Test: English Unit

[4]DAT - Differential Aptitude Test: Verbal Reasoning