# THE RELATIONSHIP OF DISFLUENCIES TO THE RATE OF SPEECH

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THE RELATIONSHIP OF DISFLUENCIES

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ABSTRACT

The purpose of this study was to compare the number of disfluencies occurring in children who speak faster than average with those who speak slower than average. The main hypothesis was that children who speak faster will not differ significantly in the number of produced disfluencies from those who speak slower. A sub-hypothesis was that there would be no significant difference in disfluencies produced between reading and speaking for the faster speakers. A second sub-hypothesis was that slower speakers would not show a significant difference in disfluencies produced during speaking and reading.

Eighty-four fifth-grade students were selected as a pool from which the faster and slower speakers were drawn. The twenty-one faster speakers and the slower twenty-one speakers were evaluated for frequency of disfluencies on speaking and reading tasks. Both groups were required to respond to posters presented in the Peabody Language Development Kit and to read a standard passage.

Tape recordings of the speaking and reading samples were analyzed for type and frequency of disfluencies. In comparing the number of disfluencies found in the faster speakers to the number of disfluencies found in the slower speakers, a *t*-test indicated no significant difference between the two groups. Similarly, there was no significant difference between the disfluencies found in the faster speakers on speaking and reading tasks. However, there was a significant difference in disfluencies found in the slower speakers on speaking and reading tasks, with more disfluencies produced during reading.

# CHAPTER I

## STATEMENT OF THE PROBLEM

The focus of this research was to determine if faster speakers produce the same number of disfluencies as slower speakers. The basic problem is that speaking rates may influence the number of disfluencies that a child may emit. If these disfluencies are more prevalent in faster speakers than slower speakers, faster speakers may be more likely to be labelled or diagnosed as stutterers. It is known that most children speak slowly at onset of stuttering (Johnson, 1959). It is not known, however, what the rate of speaking was prior to onset. The problem to be researched is what effect does speaking rate have on speech fluency. Are there more normal hesitations, repetitions, or prolongations with faster or slower speakers? Researching this problem should provide important information on speaking rate as related to fluency and/or non-fluency of speech.

Two additional questions were asked: a) Do fast speakers have the same number of disfluencies in speaking as well as reading? and b) Do slow speakers have the same number of disfluencies in speaking and reading? Due to the abundance of evidence already available in these areas, the variables sex, socioeconomic status, voice loudness level, and intelligence were not investigated. Age was considered only in the respect that fifth-grade subjects participated. Attention focused only on the speaking and reading rates and the number of disfluencies found at each rate.

## Hypotheses

To give direction to the data analysis, three hypotheses were developed:

1) There would be no significant difference in the number of disfluencies found at the faster and slower rates of speech of normal-speaking fifth-grade students.

2) There would be no significant difference in the number of disfluencies found among the faster speakers in speaking and reading tasks.

3) No significant difference would be found in the number of disfluencies among the slower speakers in speaking and reading tasks.

Hypotheses were tested at the .05 level of significance.

## Definitions

The researcher defined disfluencies as "irregularities in fluency" (Johnson, 1961; Wingate, 1964; and Goldman-Eisler, 1968) which are characterized by: (i) interjections of sounds, syllables, words, or phrases, (ii) part-word repetitions, (iii) word-phrase repetitions, (iv) prolongations, and (v) revisions (Young, 1961).

A normal-speaking subject was defined as one who has never been in any type of formal speech, language, or hearing program. The faster and slower rates of speech were determined by computing the speaking rate for each subject, rank ordering the subjects from slow to fast speaking rate and eliminating the middle forty-two who spoke at an average rate. The overall rate of speech in words per minute was obtained by the number of words produced divided by the time in seconds and the result was multiplied by sixty, the number of seconds in one minute (Kelly and Steer, 1948).

## Assumptions

It was assumed that all the subjects read at a level that was competent for the selected passage. Secondly, it was assumed that at the onset extraneous variables were distributed randomly among all subjects.

## Limitations

Because the pool of eighty-four may not represent an adequate sample of all fifth-graders, this study should not be generalized to all populations. A resultant limitation is that the number in each group of faster and slower speakers is not large enough to represent a normal third standard deviation sample of faster and slower speakers for this grade group. Also, since the researcher was the only judge of the number of disfluencies found in each speech sample, the reliability of the study may be questioned. Cullinan, Prather and Williams (1963) obtained different results in their study when several types of scales measuring stuttering were used. Their results on the reliability of one judge rating each speech sample are as follows:

> Reliability coefficients of over 0.90 could be expected from this single judge if he rated the same speech sample three or more times and took a mean of these ratings. The same pattern of increasing reliabilities can be expected if one takes the mean of a single rating from a number of judges (Cullinan, Prather and Williams, 1963).

Another limitation in the study concerned disfluency distribution. It has been shown that non-stuttering males produce more disfluencies than non-stuttering females by a ratio of 3:1 (McDowell, 1928). A final limitation concerning selection of subjects for the study existed. The fifth grade students that were chosen to participate had to return a parental permission before they could be used in the study. Thus, a limitation existed that only those who returned the permission to test form could be chosen.

# CHAPTER II

# REVIEW OF RELATED LITERATURE

## Normal Disfluencies

"Fluency irregularities are common to nearly all children and some of these normal disfluencies are generally no different from those observed in individuals identified as stutterers" (Wingate, 1962, pg. 111). Most children show individual variation in the type, amount, and frequency of their disfluencies. Sheehan (1958) feels that nearly all children seem to pass through the stages of hesitancy and syllable repetition.

## The Importance of Using Speaking and Reading Tasks to Assess Stuttering Frequency

No studies were found that examined the number of disfluencies associated with various rates of speech, although many studies rated the disfluencies of stutterers and non-stutterers. This information is only relevant to this study in the respect that disfluency types were categorized in speaking and reading tasks. Sander (1961) performed one of the most comprehensive studies in this area. His main goal was to assess the reliability of the Iowa Speech Disfluency Test. The stutterers in his group read a standard passage of prose and spoke spontaneously for three minutes. After a 24-hour interval, the tests were repeated with only a change in the speaking task. Measures were obtained including the number of disfluencies in each of the eight categories of disfluency types, the number of disfluent words, and the

rate of utterance. Sander found that the number of disfluencies in the reading task did not necessarily correspond with those in the speaking task. This result shows the importance of using both a speaking and a reading task to assess a change in stuttering frequency. Consistency was found between the disfluency scores and the rate of utterance over a 24-hour period. This result may be due to the temporal interval used. Changes may be more feasible in terms of weeks rather than hours (Beech and Fransella, 1968).

## Types of Disfluencies Found In Stutterers and Non-stutterers

Three studies were reported by Johnson (1959) which compared non-stuttering children and children regarded as stutterers, from two to fourteen years of age. When analyzing the differences in speech characteristics, he found that the stutterers used significantly more syllable repetitions. However, the non-stutterers used more phrase repetitions. He also noted that the stutterers used more prolongations in their speech and the non-stutterers were found to show disfluencies of silent intervals, pauses or interjections.

## Disfluencies Reported In Non-stutterers

Brownell (1973) believed that disfluencies do not occur at random but are influenced by verbal planning which he defined as "the combination of decisions a speaker must make during the communication process--word choice, grammatical structure, and the level of abstraction, or 'ideation level'" (pg. 16). He analyzed the ideation levels of a child's spontaneous speech, obtained through the child's description of what he saw in a photograph. It was found that verbal planning is "directly linked" to the frequency of speech disfluencies, although more disfluencies were found at the

descriptive level than the ideation level. An average of 13.7 disfluencies were found per every one-hundred words uttered. He found no significant differences in sex or socioeconomic status except that middle class males produced more disfluencies than middle class females.

Another related study delt with the disfluencies found in normal speaking preschoolers. Silverman (1972) obtained speech samples in two situations. One speech sample was taken while in the classroom and the other sample was recorded in a structured interview. Considerably more disfluency was observed in the structured interview. She concluded that "young normal speaking children are more disfluent while talking with an experimenter than while interacting with peers" (Silverman, 1972, pg. 85).

Disfluencies Noted In Two Speaking Situations

Martin, Haroldson and Kuhl (1972) studied normal speaking preschoolers in two speaking situations. The children conversed with a talking puppet and an adult for ten sessions. The number of disfluencies emitted by the children were totaled. The results indicated that the number of words that the children said were stable across all ten sessions, although the children produced more words with the puppet within each session. It was also found that the number of disfluencies was stable across all ten sessions and that there was no significant difference in the percentage of disfluencies produced between the adult and the puppet.

Disfluencies Related to Age

"Past research dealing with normal speaking children and adults has indicated that speech disfluencies generally decrease with age"

(Davis, 1939, pg. 308). Yairi and Clifton (1972) investigated the types and frequency of disfluencies found in three groups of normal speaking subjects: preschool children, high school seniors, and geriatric patients. All the subjects responded to CAT (Children's Apperception Test) cards and spontaneous speech samples were obtained. The results showed that the geriatric patients and the preschool children exhibited more disfluencies than the high school students and the disfluency patterns were found to be similar.

The Relationship of Pitch and Loudness Upon Rate

Shanks (1970) conducted an interesting study of vocal pitch and loudness upon rate and fast syllable repetition. She found that pitch and pitch-loudness significantly change the rate of syllable repetition. The differences in rate were most evident when the subjects used low pitches. Rates increased as the pitch became louder or a high pitch was used. The subjects were found to produce the fastest rate when they were speaking at a comfortable pitch and loudness level.

Four Tracks of Stuttering Development

Van Riper (1971) studied three hundred children diagnosed as stutterers in order to determine how stuttering changed with the passage of time. Certain common patterns of progressive change were revealed. All but sixty-nine of the three-hundred cases could be categorized into four major tracks of development.

Track I was the most common. It gradually began between thirty and fifty months. The stuttering appeared after a period of normally fluent speech. A few remissions occurred lasting for periods of a week or longer. The behaviors of Track I stutterers consist of good articulation,

normal rate, and syllabic repetitions. They exhibit no tension or tremors. They are not aware of their stuttering nor are they frustrated. They are willing to talk. This normal speech is well intergrated.

Track II stutterers differ from Track I in that the fluency disruptions begin much earlier in speech development although onset is still gradual. Most of these children showed retarded speech development and did not use phrases or sentences until 3 to 6 years of age. These children were never fluent but the onset of stuttering began with the onset of connected speech. The children exhibit no remissions, tension or tremors. They have poor articulation and the stuttering occurs as gaps, revisions, syllable and word repetitions. It is evident that they speak with hesitation and gaps even when there is no disfluency. They are not aware of their stuttering nor are they frustrated. They are willing to talk.

Track III stutterers are different from Track II in that stuttering begins suddenly, often after a trauma. It may begin at any age after the children have acquired consecutive speech and are found to be previously fluent. They have a few short remissions, with normal articulation and a slow careful rate. They exhibit prolongations, blockings, much tension and tremors. They continue with a consistent pattern of stuttering although their normal speech is very fluent. They are highly aware of their stuttering which makes them very frustrated and fearful of speaking.

Track IV stuttering begins later than that in any of the other tracks, usually after four years of age. Like those in Track III, Track IV stutterers were previously fluent and the stuttering began suddenly. They are often erratic and exhibit unusual behaviors. They have no

remissions, normal articulation and normal rate. They show variable tension, few tremors and a highly consistent pattern of stuttering. They are highly aware of their stuttering although they exhibit no frustration nor evidence of fear.

Of the four courses of stuttering development, the first two are the most common. Some stutterers do not follow any of the tracks and some shift from one to another at different times.

This review of the related studies falls short of its expectations. All manner of disfluency data has been recorded with stutterers but relatively little has dealt with normal speaking subjects. Disfluency is a condition that is predominantly seen in stutterers, but most non-stutterers in any type of speaking situation exhibit some disfluency. The present study attempted to investigate the disfluencies found in normal speaking subjects.

# CHAPTER III

## RESEARCH PROCEDURES

A descriptive study was designed to investigate the hypothesis that there would be no statistically significant difference between the number of disfluencies found in children who speak faster than average and those who speak slower than average. Descriptive research "deals with the relationships between variables, the testing of hypotheses, and the development of generalizations, principles of theories that have universal validity" (Best, 1977, p. 15).

### Subjects

One-hundred and twenty-six subjects, the entire population of normal speaking fifth-grade students at Pineview Elementary School in Lexington County School District #2 in West Columbia, South Carolina, were given Permission to Test forms to secure parental consent before participating in this study. The form letter that was used is available in Appendix A. Fifth-grade subjects were chosen for this study for two reasons. First, they are readers and the study contained a part in which the students read a standard passage to ascertain a reading rate for each. Secondly, fifth-graders have been in school long enough to be detected by a speech pathologist as a stutterer. Younger children might not have been exposed to such testing. This study did not use stutterers, for they would alter the results, so it was very important to study an age group in which fluency was developmentally feasible.

The entire fifth-grade population was chosen in order for a wide cross section of faster and slower speakers to be obtained. Also, the mean of all speaking rates was used to determine an average rate of speech. For this reason a large number of children needed to be tested.

Procedures and Materials

Eighty-four forms were returned with permission to test granted. At least five minutes of a tape-recorded speech sample was obtained from each one of the eighty-four students. The researcher used the Peabody Language Development Kit posters from Level #2 for the spontaneous speech sample. The same four posters were used with every subject and the following instructions were presented, "Tell me all about this picture." If the subject did not speak the entire five minutes or if a response such as "I don't know" was emmitted, prompts were used to elicit more speech. The four prompts are presented below:

> (Now) Here's one. What do you think is happening in this picture?
>
> (Well) Let's look real hard over the picture and tell me something else about it.
>
> (Hey) What do you think was happening just before this picture was taken?
>
> (Let's) Look at the picture again. Why don't you make up a story about what's going to happen next (Leonard, 1972, P.431).

The last three minutes of the sample were used to compute the speaking rate. If the last three minutes of the sample did not include two-hundred words, the last two-hundred words spoken by the subject were used for computation.

A speech rate in words per minute was then computed from all eighty-four speech samples. The rate was obtained by dividing the number of words produced by the time in seconds and multiplying the result by sixty, the number of seconds in a minute. The twenty-one subjects that had the slower rates of speech and the twenty-one subjects that had the faster rates of speech were then given a passage to read entitled Arthur, the Young Rat. This procedure eliminated the middle forty-two students with the average rates of speech.

Arthur, the Young Rat (Darley and Spriestersbach, 1978) contains all phonemes in the English language. This would be helpful for investigating the phonemes on which disfluencies occur most. This passage can be found in Appendix B.

The rate of reading was computed using the same formula as stated above for the speaking rate.

The researcher listened to the tape-recorded samples on three consecutive days in order to obtain the number of disfluencies found in each sample. The numbers found on all three days were averaged together to obtain a mean number of disfluencies. This procedure, as stated before, was expected to raise the reliability coefficients of a single judge to over 0.90 (Cullinan, Prather and Williams, 1963). The researcher was found to have a reliability of .97 when averaging for a mean number of disfluencies with each subject.

An independent *t*-test was then applied to test the main hypothesis that there would be no statistically significant difference in the number of disfluencies found in normal-speaking fifth-grade students who speak at a faster rate than average as compared with those who speak slower than average. This computation is used to compare

two sets of scores from two different groups (Christensen, 1977). The independent t-test used can be found in Appendix C. To test the two sub-hypotheses a correlation between speaking and reading disfluencies was found and a dependent t-test was applied. A dependent t-test is one that compares the two sets of scores from one group (Christensen, 1977). The correlation formula and the dependent t-test used are presented in Appendix D. Results from the t-tests were tested at the .05 level of significance.

Disfluencies were defined as "irregularities in fluency" (Johnson, 1961; Wingate, 1964; Goldman-Eisler, 1968) which are characterized by: (i) interjections of sounds, syllables, words, or phrases, (ii) part-word repetitions, (iii) word-phrase repetitions, (iv) prolongations, and (v) revisions (Young, 1961). A definition of each of these categories follows: (i) Interjections of sounds, syllables, words or phrases encompass "extraneous sounds such as "uh", "er", and "hmm" and extraneous words such as "well" which are distinct from sounds and words associated with the fluent text" (Darley and Spriestersbach, 1978, p. 264). (ii) Part-word repetitions include syllables and phonemes that are repetitions of parts of words. (iii) Word-phrase repetitions include repetitions of whole words, including words of one syllable, and repetitions of two or more words. (iv) Prolongations encompass "phonemes or parts of words that are judged to be unduly prolonged and those broken words which are not completely pronounced or those in which the normal rhythm of the word is broken in a way that it definitely interferes with the smooth flow of speech" (Darley and Spriestersbach, 1978, p. 265). (v) Revisions include "phrases in which the content has been modified or in which there is grammatical modification" (Darley and Spriestersbach,

1978, p. 265). Also included in this category are incomplete phrases in which the thought or content has not been completed.

# CHAPTER IV

## RESULTS

Speaking rate and the number of disfluencies found in speaking were recorded for the twenty-one faster speakers. The mean speaking rate of this group was 136.8 words per minute. The same faster speakers were also analyzed for a reading rate and the number of disfluencies found in reading. The mean reading rate for this group was 116.2 words per minute. These figures can be found in Table A. Speaking and reading rates and the number of disfluencies found in both were also recorded for all of the slower speakers. The mean speaking rate for the slower speakers was found to be 70.7, although, the mean reading rate was 110.5. These results were compiled in Tables A and B.

The researcher hypothesized that there would be no significant difference in the number of disfluencies found at the faster and slower rates of speech of normal-speaking fifth-grade students. The results of the *t*-test for independent samples indicated that there was no statistically significant difference in the number of disfluencies found when comparing the two groups ($t=0.7836$).

It was also hypothesized that no significant difference would be found in the number of disfluencies of the faster speakers in speaking and reading tasks. In examining the disfluencies between reading and speaking for the faster speakers, a *t*-test for dependent samples revealed no significant difference ($r=.082$, $t=1.31$).

Another hypothesis stated that no significant difference would be found in the number of disfluencies of the slower speakers in speaking

and reading tasks. A statistically significant difference was found when analyzing the disfluencies between speaking and reading for the slower speakers with the use of a t-test for dependent samples ($r=.106$, $t=4.35$).

As mentioned earlier, a limitation existed in this study concerning disfluency distribution. It has been shown that males produce more disfluencies than females by a ratio of 3:1 (McDowell, 1928). In this study, the disfluencies in speaking rates between boys and girls were analyzed and a ratio of 186:167 was found. A ratio of 264:164 was found when comparing the disfluencies found in reading between boys and girls.

The different types of disfluencies found in both the faster speaking subjects and slower speaking subjects in the speaking and reading tasks were also examined. The types of disfluencies were categorized according to the five disfluency types advocated by Young (1961), which were defined earlier. The results can be found in Appendix E.

By examining these results, it can be seen that the faster speakers and the slower speakers had essentially the same types of disfluencies with more interjections of sound, syllable, word, or phrase and part-word repetitions present. The faster speakers had a mean of 32.4 disfluencies on the speaking task, whereas on the reading task the mean number of disfluencies was higher at 43.4. The slower speakers were found to have a mean of 38.2 on the speaking task with a higher mean, 42.2 on the reading task. This shows that there was slightly more disfluency found in the reading task of both groups.

TABLE A: RAW SCORES OF FASTER SPEAKERS

| SUBJECT | SPEAKING RATE IN WORDS PER MINUTE | DISFLUENCIES FOUND IN SPEAKING | READING RATE IN WORDS PER MINUTE | DISFLUENCIES FOUND IN READING |
|---|---|---|---|---|
| #1 | 168.7 | 3 | 150 | 6 |
| #2 | 164.5 | 8 | 110.2 | 11 |
| #3 | 162.7 | 8 | 144 | 6 |
| #4 | 151.5 | 14 | 144 | 8 |
| #5 | 145.8 | 5 | 150 | 5 |
| #6 | 139.1 | 7 | 150 | 3 |
| #7 | 137.6 | 7 | 112.5 | 11 |
| #8 | 135.6 | 7 | 135 | 8 |
| #9 | 133.8 | 14 | 135 | 14 |
| #10 | 133.3 | 6 | 144 | 2 |
| #11 | 131.7 | 4 | 112.5 | 8 |
| #12 | 131.6 | 8 | 72 | 11 |
| #13 | 128.9 | 2 | 113.6 | 6 |
| #14 | 128.8 | 2 | 121.3 | 3 |
| #15 | 128.4 | 3 | 43.9 | 38 |
| #16 | 127.1 | 21 | 93.1 | 13 |
| #17 | 126.6 | 11 | 56.8 | 14 |
| #18 | 124.6 | 8 | 81.8 | 23 |
| #19 | 124.4 | 7 | 125.5 | 2 |
| #20 | 124.2 | 8 | 98.1 | 19 |
| #21 | 123.7 | 9 | 147.9 | 6 |
| $\bar{X}$ = | 136.8 | 7.7 | 116.2 | 100.3 |
| Standard Deviation = | 13.5 | 4.4 | 31.1 | 8.2 |
| Range = | 46 | 20 | 107.1 | 37 |

TABLE B: RAW SCORES OF SLOWER SPEAKERS

| SUBJECT | SPEAKING RATE IN WORDS PER MINUTE | DISFLUENCIES FOUND IN SPEAKING | READING RATE IN WORDS PER MINUTE | DISFLUENCIES FOUND IN READING |
|---|---|---|---|---|
| #22 | 41.9 | 4 | 63.1 | 12 |
| #23 | 44.6 | 0 | 168.7 | 6 |
| #24 | 53.8 | 10 | 95.5 | 16 |
| #25 | 60.9 | 12 | 106.9 | 8 |
| #26 | 63.8 | 4 | 158.8 | 5 |
| #27 | 67.5 | 3 | 36.9 | 19 |
| #28 | 68 | 9 | 138.4 | 6 |
| #29 | 68.8 | 14 | 55.9 | 16 |
| #30 | 69.2 | 20 | 114.8 | 9 |
| #31 | 72.3 | 2 | 152.1 | 5 |
| #32 | 72.3 | 12 | 152.1 | 8 |
| #33 | 72.3 | 6 | 122.7 | 4 |
| #34 | 73.2 | 8 | 124.1 | 3 |
| #35 | 75.8 | 7 | 154.2 | 7 |
| #36 | 76.6 | 30 | 91.5 | 10 |
| #37 | 78 | 6 | 121.3 | 6 |
| #38 | 82.3 | 12 | 71.5 | 15 |
| #39 | 82.3 | 8 | 43.2 | 26 |
| #40 | 83.7 | 4 | 109 | 10 |
| #41 | 88.4 | 13 | 166.1 | 9 |
| #42 | 88.5 | 7 | 72.9 | 11 |
| $\bar{X}$ = | 70.7 | 9.10 | 110.5 | 10 |
| Standard Deviation = | 12.7 | 6.55 | 40.36 | 5.52 |
| Range = | 47.6 | 31 | 132.8 | 24 |

# CHAPTER V

## SUMMARY, DISCUSSION, AND RECOMMENDATIONS FOR FURTHER RESEARCH

### Summary

The primary hypothesis in this study was that children who speak faster will not differ significantly in the number of disfluencies produced from those who speak slower. This hypothesis was accepted. Sub-hypothesis 1) was that there would be no significant difference in disfluencies produced during reading and speaking for the faster speakers. This hypothesis was also accepted. Sub-hypothesis 2) was that slow speakers would not show a significant difference in disfluencies produced during speaking and reading. This hypothesis was rejected. Slow speakers produce significantly more disfluencies during reading than speaking.

### Discussion

The results of this study appear to add to our knowledge of the relationship of disfluencies to different rates of speech. In particular, these results indicate that rate of speech has no effect on the number of disfluencies produced. It also revealed that those who speak faster than average exhibit no difference in the number of disfluencies produced in speaking and reading tasks. The number of disfluencies found in the slower speakers on speaking and reading tasks is significantly different.

When examining the different types of disfluencies it was found that in speaking, the faster and slower speakers had more disfluencies in the category of interjections of sounds, syllables, words or phrases.

In the reading task, the faster and slower speakers had more disfluencies in repetitions. The faster speakers were more prone to use word-phrase repetitions and the slower speakers used more part-word repetitions. In comparing the reading and speaking tasks of both groups, it was noted that there were more interjections in both groups in the speaking task while there were few in the reading task.

It was noted that the subjects who spoke faster than average usually read faster. There was one very notable exception to this. Subject #15 obtained a speaking rate of 128.4 words per minute. In reading, he was found to be much slower than average, exhibiting 43.9 words per minute. It was also found that he was only disfluent on three occasions during the speaking task although 38 disfluencies were noted during reading. This is thought to be due to a combination of factors. First, he may not be reading at a fifth-grade level, as the others seemed to be. Thus he had trouble reading the words in the passage. He also may not be used to reading aloud and nervousness attributed to these findings. Visual problems also could have played a role but no evidence of this was recorded.

It was noted that the subjects who spoke slower than average usually read slower. One exception to this could be found in Subject #23. He had a speaking rate of 44.6 words per minute, very much slower than average. His reading rate was 168.7 words per minute, the fastest reading rate recorded in the study. His disfluencies did not alter significantly in either task. He demonstrated excellent reading ability although his conversational speech skills seemed to be less developed. He was more comfortable when he had something in front of him to say. Nervousness during the speaking task may have contributed

to these results.

Once again the sex ratio concerning the prevalence of stuttering is in agreement that males show more stuttering than females. In the speaking tasks, the ratio was not noticeably different, although, in the reading task a ratio of 1.6:1 (male to female) was found. These results can be explained by stating that in this study the girls were found to be more fluent readers. However, no significant sex ratio data was found in conversation.

## Recommendations For Further Research

It is recommended that the following suggestions be used to continue the research being performed in this area:

1) This study should be repeated on a larger population to determine the reliability statistics.
2) The different types of disfluencies should be compared to stuttering scales in order to determine if any of the subjects used were actually stutterers.
3) This study should be repeated on different age groups, ranging from preschool to high school students, in order to determine if disfluencies increase or decline with age.
4) This study should be repeated on the same group of children to determine if any children have been diagnosed and treated as stutterers.

# A P P E N D I X E S

APPENDIX A

PARENTAL PERMISSION FOR TESTING

Dear Parents,

I am a graduate student conducting my Master's Thesis on the rate of speech of fifth graders. This information will be gathered through a storytelling task which should be enjoyable for your child. Your signature will enable me to talk with your child in order to obtain his/her reading and speaking rates. The results will be kept in strictest confidence. However, the task will be done only with parental consent. Please indicate your wishes below and return to Pineview Elementary School as soon as possible. If you have any further questions about this project, please do not hesitate to contact me. Thank you for your promptness.

Sincerely,

Lynn G. Blackley

Lynn G. Blackley
359-3871 or 794-4826

I give consent for my child to participate in this project.

_____ Yes _____ No

Date _____

Parent's Signature

_____

## APPENDIX B

## ARTHUR, THE YOUNG RAT

Once, a long time ago, there was a young rat named Arthur who could never make up his flighty mind. Whenever his swell friends used to ask him to go out to play with them, he would only answer airily, "I don't know." He wouldn't try to say yes, or no either. He would always shrink from making a specific choice.

His proud Aunt Helen scolded him: "Now look here," she stated, "no one is going to aid or care for you if you carry on like this. You have no more mind than a stray blade of grass."

That very night there was a big thundering crash and in the foggy morning some zealous men with twenty boys and girls rode up and looked closely at the fallen barn. One of them slipped back a broken board and saw a squashed young rat, quite dead, half in and half out of his hole. Thus, in the end the poor shirker got his just dues. Oddly enough his Aunt Helen was glad. "I hate such oozy, oily sneaks," said she (Johnson, Darley, and Spriestersbach, 1963, p. 233).

# APPENDIX C

## INDEPENDENT t-TEST FORMULA

Independent t-test formula:

$$S^2 = \frac{\sum_{N_1} x^2 - \left(\sum_{N_1} x\right)^2 / N_1 + \sum_{N_2} x^2 - \left(\sum_{N_2} x\right)^2 / N_2}{N_1 + N_2 - 2}$$

(Ferguson, 1966, p. 168)

# APPENDIX D

## CORRELATION FORMULA AND DEPENDENT t-TEST FORMULA

Correlation Formula:

$$\sigma = \sqrt{\frac{\Sigma x^2 - \frac{(\Sigma x)^2}{N}}{N-1}}$$

(Operating Instructions, 1974, p. 20)

Dependent t-test formula:

$$t_d = \frac{\bar{x} - \bar{y}}{\sqrt{\frac{\sigma_x^2 + \sigma_y^2 - 2r\sigma x \sigma y}{N}}}$$

(Operating Instructions, 1974, p. 22)

# APPENDIX E

## TYPES OF DISFLUENCIES

The different types of disfluencies found in both the faster speaking subjects and slower speaking subjects in the speaking and reading tasks, are presented in the following four tables. The types of disfluencies are categorized according to the five disfluency types as advocated by Young (1961), which were defined earlier. Although the data was not essential to this study, it would be advantageous to any follow-up investigations that may result from this study.

Table C - This table shows the types and total number of disfluencies found in the faster speakers during the spontaneous speaking task. As it can be seen, interjections of sounds, syllables, words or phrases far outweigh all the other types of disfluencies.

Table D - The types and total number of disfluencies found in the slower speakers during the spontaneous speaking task, are shown in Table D. One hundred and four interjections of sounds, syllables, words or phrases were demonstrated.

Table E - Table E presents the types of disfluencies found in the faster speakers during the reading task. The most disfluencies were found in the category of word-phrase repetitions.

Table F - Presented in Table F are the types of disfluencies found in the slower speakers during the reading task. The most disfluencies were found in the category of part-word repetitions.

TABLE C

TYPES OF DISFLUENCIES FOUND IN THE FASTER SPEAKERS
ON THE SPEAKING TASK

TYPES OF DISFLUENCIES

| SUBJECT | PROLONGATIONS | INTERJECTIONS OF SOUND, SYLLABLE, ETC. | PART-WORD REPETITIONS | WORD-PHRASE REPETITIONS | REVISIONS |
|---|---|---|---|---|---|
| #1 | 1 | 1 | 0 | 1 | 0 |
| #2 | 1 | 2 | 1 | 3 | 1 |
| #3 | 0 | 7 | 0 | 0 | 1 |
| #4 | 2 | 5 | 0 | 2 | 5 |
| #5 | 1 | 1 | 1 | 1 | 1 |
| #6 | 3 | 1 | 0 | 0 | 3 |
| #7 | 1 | 4 | 0 | 0 | 2 |
| #8 | 0 | 5 | 0 | 1 | 1 |
| #9 | 0 | 5 | 2 | 1 | 6 |
| #10 | 0 | 3 | 0 | 1 | 2 |
| #11 | 0 | 0 | 1 | 1 | 2 |
| #12 | 0 | 3 | 3 | 1 | 1 |
| #13 | 0 | 0 | 0 | 2 | 0 |
| #14 | 0 | 1 | 0 | 0 | 1 |
| #15 | 0 | 1 | 0 | 1 | 1 |
| #16 | 1 | 15 | 2 | 2 | 1 |
| #17 | 0 | 6 | 0 | 4 | 1 |
| #18 | 0 | 3 | 1 | 1 | 3 |
| #19 | 1 | 2 | 1 | 3 | 0 |
| #20 | 2 | 4 | 0 | 0 | 3 |
| #21 | 1 | 5 | 0 | 0 | 2 |
| TOTAL | 14 | 74 | 12 | 25 | 37 |
| $\bar{X}$ = | .67 | 3.52 | .57 | 1.19 | 1.76 |

TABLE D

TYPES OF DISFLUENCIES FOUND IN THE SLOWER SPEAKERS
ON THE SPEAKING TASK

| | TYPES OF DISFLUENCIES | | | | |
|---|---|---|---|---|---|
| SUBJECT | PROLONGATIONS | INTERJECTIONS OF SOUND, SYLLABLE, ETC. | PART-WORD REPETITIONS | WORD-PHRASE REPETITIONS | REVISIONS |
| #22 | 0 | 4 | 0 | 0 | 0 |
| #23 | 0 | 0 | 0 | 0 | 0 |
| #24 | 2 | 0 | 0 | 3 | 5 |
| #25 | 0 | 8 | 2 | 2 | 0 |
| #26 | 1 | 0 | 0 | 3 | 0 |
| #27 | 1 | 1 | 1 | 0 | 0 |
| #28 | 2 | 5 | 1 | 1 | 0 |
| #29 | 0 | 5 | 2 | 5 | 2 |
| #30 | 0 | 14 | 1 | 5 | 0 |
| #31 | 0 | 1 | 1 | 0 | 0 |
| #32 | 1 | 4 | 1 | 0 | 6 |
| #33 | 0 | 4 | 1 | 0 | 1 |
| #34 | 1 | 3 | 2 | 1 | 1 |
| #35 | 1 | 3 | 0 | 3 | 0 |
| #36 | 3 | 23 | 0 | 3 | 1 |
| #37 | 0 | 2 | 1 | 0 | 3 |
| #38 | 1 | 8 | 0 | 0 | 3 |
| #39 | 1 | 4 | 1 | 0 | 2 |
| #40 | 0 | 3 | 0 | 1 | 0 |
| #41 | 0 | 9 | 1 | 1 | 2 |
| #42 | 0 | 3 | 0 | 1 | 3 |
| TOTAL | 14 | 104 | 15 | 29 | 29 |
| $\bar{X}$ = | .67 | 4.95 | .71 | 1.38 | 1.38 |

TABLE E

TYPES OF DISFLUENCIES FOUND IN THE FASTER SPEAKERS
ON THE READING TASK

| | TYPES OF DISFLUENCIES | | | | |
|---|---|---|---|---|---|
| SUBJECT | PROLONGATIONS | INTERJECTIONS OF SOUND, SYLLABLE, ETC. | PART-WORD REPETITIONS | WORD-PHRASE REPETITIONS | REVISIONS |
| #1 | 0 | 0 | 2 | 4 | 0 |
| #2 | 2 | 0 | 4 | 2 | 3 |
| #3 | 1 | 0 | 2 | 2 | 1 |
| #4 | 0 | 0 | 3 | 4 | 1 |
| #5 | 0 | 0 | 1 | 4 | 0 |
| #6 | 1 | 0 | 2 | 0 | 0 |
| #7 | 0 | 0 | 2 | 6 | 3 |
| #8 | 0 | 0 | 0 | 8 | 0 |
| #9 | 0 | 5 | 2 | 1 | 6 |
| #10 | 0 | 0 | 1 | 1 | 0 |
| #11 | 1 | 0 | 3 | 3 | 1 |
| #12 | 1 | 0 | 2 | 6 | 2 |
| #13 | 0 | 0 | 3 | 0 | 3 |
| #14 | 0 | 0 | 1 | 1 | 1 |
| #15 | 1 | 0 | 10 | 20 | 7 |
| #16 | 5 | 0 | 1 | 7 | 0 |
| #17 | 0 | 1 | 6 | 7 | 0 |
| #18 | 0 | 1 | 7 | 9 | 6 |
| #19 | 0 | 0 | 1 | 1 | 0 |
| #20 | 0 | 0 | 3 | 2 | 1 |
| #21 | 1 | 1 | 6 | 1 | 10 |
| TOTAL | 13 | 8 | 62 | 89 | 45 |
| $\bar{X}$ = | .62 | .38 | 2.95 | 4.24 | 2.14 |

TABLE F

TYPES OF DISFLUENCIES FOUND IN THE SLOWER SPEAKERS
ON THE READING TASK

| | TYPES OF DISFLUENCIES | | | | |
|---|---|---|---|---|---|
| SUBJECT | PROLONGATIONS | INTERJECTIONS OF SOUND, SYLLABLES, ETC. | PART-WORD REPETITIONS | WORD-PHRASE REPETITIONS | REVISIONS |
| #22 | 0 | 0 | 10 | 2 | 0 |
| #23 | 1 | 0 | 2 | 1 | 2 |
| #24 | 0 | 0 | 8 | 6 | 2 |
| #25 | 0 | 0 | 1 | 6 | 1 |
| #26 | 0 | 0 | 2 | 2 | 1 |
| #27 | 2 | 1 | 9 | 5 | 2 |
| #28 | 0 | 0 | 1 | 3 | 2 |
| #29 | 1 | 0 | 6 | 5 | 4 |
| #30 | 0 | 0 | 2 | 4 | 3 |
| #31 | 1 | 0 | 0 | 3 | 1 |
| #32 | 1 | 0 | 1 | 6 | 0 |
| #33 | 0 | 0 | 1 | 2 | 1 |
| #34 | 0 | 0 | 2 | 1 | 0 |
| #35 | 1 | 0 | 3 | 1 | 2 |
| #36 | 0 | 0 | 5 | 4 | 1 |
| #37 | 0 | 0 | 6 | 0 | 0 |
| #38 | 0 | 2 | 2 | 8 | 3 |
| #39 | 3 | 0 | 11 | 8 | 4 |
| #40 | 1 | 1 | 2 | 3 | 3 |
| #41 | 0 | 0 | 5 | 2 | 2 |
| #42 | 1 | 0 | 5 | 3 | 2 |
| TOTAL | 12 | 4 | 84 | 75 | 36 |
| $\bar{X}$ = | .57 | .19 | 4.0 | 3.57 | 1.71 |

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