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AN ABSTRACT OF THE THESIS OF Pamela Paguia Christianson for  
the Master of Science in Speech Communication presented  
October 15, 1987.

Title: Disfluencies in Normal Three and Five Year Old Male  
Children.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

  
Robert L. Casteel, Chair

  
Mary E. Gordon

  
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Just as a speech-language pathologist uses knowledge of normal language development to make a diagnosis of language delay, normative data on fluency development can be used to make a differential diagnosis of normal disfluency from fluency disorders. Data at each discrete age level on normal disfluency is an important aspect in understanding the development of fluency.

The purpose of this study was to compare the frequency of specific disfluencies in 3 year old and 5 year old normal

male children in terms of part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations and tense pauses. The disfluencies were observed while each child spontaneously interacted with an investigator in a clinical room. Two questions were addressed:

1. Do three-year-old male children exhibit a higher overall frequency of disfluencies than five-year-old male children?
2. Do three-year-old male children exhibit a greater frequency of certain disfluencies than five-year-old male children?

Twenty normal preschool male children comprised the subjects of this study. All children were randomly selected from the greater Portland area and passed the selection criteria. The children were of two groups: 10 three-year-old male children ( $\bar{x}$ =36 months) and 10 five-year-old children ( $\bar{x}$ =60 months). After spontaneous speech samples were obtained and recorded from each subject, the investigator transcribed the text verbatim and categorized seven types of disfluencies. The Mann-Whitney U Test (Siegel, 1956) was used to analyze the data. The results indicated that a statistically significant difference on the total disfluency did not exist between the two age groups. Results indicated that at the 0.05 level of confidence, a statistical significance did exist for interjections. Male

children in the five-year-old age group evidenced a higher number of interjections than the three-year-old children. No other statistically significant differences were found.

The results yielded the following conclusions:

1. The three-year-old children did not exhibit a higher overall frequency of disfluencies than the five-year-old children. Although no statistical difference was found, the data indicated that the five-year-old children exhibited a higher overall frequency than the three-year-old children.
2. There was no statistically significant difference in the frequency of occurrence of part-word repetitions, word repetitions, and phrase repetitions exhibited by the two age groups of normal male children.
3. There was no statistically significant difference in the frequency of occurrence of revision-incomplete phrases, tense pauses, and disrhythmic phonations.
4. Both age groups evidenced low frequencies and small standard deviations of the disfluency types most often considered to be indicators of incipient stuttering: part-word repetitions, disrhythmic phonations and tense pauses.

The results of the current study indicate that interjections, revision-incomplete phrases, word repetitions

and phrase repetitions are the most common types of disfluencies occurring in the speech of three- and five-year-old normal male children. Part-word repetitions, disrhythmic phonations and tense pauses, however, were the least frequently occurring type of disfluencies observed in three- and five-year-old children. The findings of the current study are also consistent with results of recent studies which found that the occurrence of part-word repetitions, tense pauses and disrhythmic phonations is infrequent in the speech of normal three- and five-year-old male children. This supports theorists who contend that part-word repetitions, disrhythmic phonations and tense pauses should be indicators of incipient stuttering.

DISFLUENCIES IN NORMAL THREE-YEAR-OLD AND  
FIVE-YEAR-OLD MALE CHILDREN

by

PAMELA PAGUIA CHRISTIANSON

A thesis submitted in partial fulfillment of the  
requirements for the degree of


MASTER OF SCIENCE  
in  
SPEECH COMMUNICATION:  
with emphasis in  
SPEECH-LANGUAGE PATHOLOGY

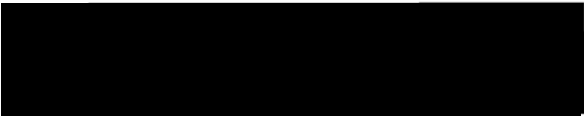
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1987

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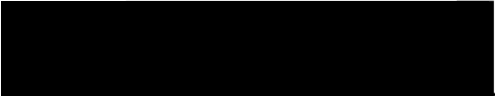
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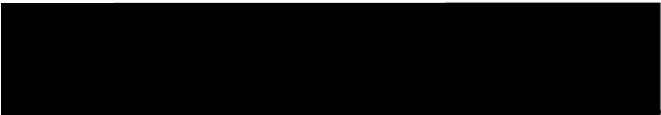
  
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## CHAPTER I

### INTRODUCTION AND STATEMENT OF PURPOSE

#### INTRODUCTION

Speech and language pathologists in the field of stuttering are often faced with the problem of deciding whether a preschool child is presenting normal disfluencies or is exhibiting characteristics of a beginning stutterer. Early and correct differentiation is necessary to alleviate concerns felt by parents of the normally disfluent child. In addition, differential diagnosis is critical because early intervention for the incipient stutterer provides a better prognosis for the remediation of fluent speech (Starkweather, 1985). However, an accurate differential diagnosis appears to be difficult to obtain because the characteristics of the incipient stutterer and the normally disfluent child tend to overlap (Wingate, 1964). The literature indicates that most children, between the ages of two and six, go through a period of normal disfluencies while others become incipient stutterers (Johnson, 1959; Van Riper, 1971). According to Andrew and Harris (1964), approximately 60 to 80% of the young children spontaneously

outgrow these normal disfluencies while the remaining become incipient stutterers.

Using the classification system defined by Johnson (1961) and Williams, Silverman and Kools (1968), there are different types of disfluencies that have been identified and observed in both nonstuttering and stuttering populations. Repetitions have been generally classified by investigators as part-word, whole word, or phrase repetitions. However, Yairi (1981) has further divided word repetitions into categories of monosyllabic and polysyllabic words.

Other disfluencies that have been tabulated by investigators include revisions, incomplete phrases, disrhythmic phonations, interjections and tense pauses. Studies by Yairi (1981) and Wexler and Mysak (1982) have chosen to collapse revision and incomplete phrases into one category. In addition, DeJoy and Gregory (1985) have identified two types of pauses in their investigation: grammatical and ungrammatical.

The focus of early investigations (Branscom, Hughes and Oxtoby, 1955; Davis, 1939; Johnson, 1959) has been on the normal preschooler's disfluencies. Some of the studies have been limited in the types of disfluencies identified and tabulated (Branscom et al., 1955; Davis, 1939; Floyd and Perkins, 1974; Johnson, 1959), the age levels of subjects (Egland, 1955) and the quality and availability of

electronic recording equipment (Davis, 1939; Egland, 1955; Metraux, 1950). As a result, recent investigations have been focused toward the determination of norms for the frequency of disfluencies in normal young children (Haynes and Hood, 1977; Wexler and Mysak, 1982; Yairi, 1981).

Current investigators (DeJoy and Gregory, 1985; Haynes and Hood, 1977; Wexler and Mysak, 1982; Yairi, 1981; Yairi and Lewis, 1984) using the classification system, have focused their research on discrete age groups between the ages of two and six years. Most of the investigations, however, have concentrated on the specific ages of two, four, and six years. There is only one study that has concentrated on the normal childhood disfluencies of three- and five-year-old preschool children (DeJoy and Gregory, 1985). DeJoy and Gregory indicated that more studies are needed to determine developmental trends. Therefore, research which analyzes specific disfluencies is warranted at these two age levels, specifically three and five years, to add more information to the current literature.

#### STATEMENT OF PURPOSE

The purpose of this study was to compare the frequency of specific disfluencies in three-year-old and five-year-old normal male children in terms of part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations and tense pauses.



The present investigation sought answers to the following questions:

1. Do three-year-old children exhibit a higher overall frequency of disfluencies than five-year-old children?
2. Do three-year-old children demonstrate a greater frequency of certain disfluencies than five-year-old children?

To both of these questions, the null hypothesis states that there will be no difference between the younger children and the older children.

#### DEFINITION OF TERMS

**Clustering:** the occurrence of more than one disfluency on the same word or consecutive words or both (Silverman, 1969 as reported by Wexler and Mysak, 1982).

**Disfluency:** interruption in normal flow of speech, which is characterized by involuntary, audible or silent, repetitions or prolongations (Van Riper, 1971; Wingate, 1964).

**Disrhythmic phonation:** refers to audible or silent continuation of a sound or articulatory posture which is of such excessive duration as to interrupt the rhythmic flow of speech. This disfluency occurs within words and includes broken words and sound prolongations (Williams, Silverman and Kools, 1968).

**Frequency:** the number of disfluencies per 100 words of speech (Riley, 1972).

**Grammatical pause:** silent pause that occurs between grammatical junctures (DeJoy and Gregory, 1985).

**Incipient stutterer:** an individual who is beginning to demonstrate stuttering behavior that is not within normal limits (Adams, 1977). This type of individual

may require intervention for the development of fluent speech and may probably not recover spontaneously.

Interjections: extraneous sounds such as "uh," "er," "well," and "um" (Johnson, 1961). Also referred to as "stallors" by Egland (1955).

Intrusive schwa: refers to the presence of the neutral schwa vowel intruding on the intended vowel. Example: "tuh-tuh-table" (Van Riper, 1971).

Nonfluency: interruption in the normal flow of speech; also referred to as disfluency.

Normal disfluency: interruptions in the flow of speech demonstrated by mostly all speakers which do not warrant concern or intervention.

Oscillation: number of repetitions per instance of disfluency (Wexler and Mysak, 1982). Also referred to as unit repetitions (Branscom et al., 1955).

Part-word repetitions: the repetition of a sound or syllable unit which is less than the entire word. For example "b-b-boy" is a sound repetition and "ta-ta-table" is a syllable repetition.

Parallel talk: is an individual commenting on what a child is doing, perceiving, or feeling, and also allowing moments of silence, while playing with the child, to encourage the child to verbalize (Emerick and Hatten, 1979).

Phrase repetitions: unintentional repetitions of two or more words involving no modification or revision of the content. The sentence, "He drove, he drove, he drove home" contains two units of phrase repetition (Johnson, 1959).

Repetition instance: refers to the occurrence of a part-word, word, or phrase repetitions, regardless of the number of times the part-word, word or phrase is reiterated. Example: "She, she, she was g-going" contains one instance of word repetition and one instance of part-word repetition (Johnson, 1961).

Repetition unit: refers to the number of times a part-word, word, or phrase is repeated, not including the most complete form. Example: "ta-ta-ta-table" contains one repetition instance and three repetition units.

Revision-incomplete phrases: refers to the modifications in the pronunciation of a word, or in the grammatical form or content thought or content of a phrase which is not completed (Johnson, 1961). "Because the doggie - and Daddy went home to eat" has an example of an incomplete phrase.

Tense pauses: a disfluency judged to exist between part-words, words, and nonwords when at the between point in question there are barely audible manifestations of heavy breathing or muscular tightening (Williams et al., 1968).

Ungrammatical pauses: silent pauses that occur at nongrammatic junctures (DeJoy and Gregory, 1985).

## CHAPTER II

### REVIEW OF THE LITERATURE

#### NORMAL DISFLUENCIES IN PRESCHOOL CHILDREN

Many children demonstrate normal disfluencies during the time of two to six years of age as their language skills are becoming more proficient. These disfluencies generally occur at low frequencies and are produced effortlessly. In addition, the disfluencies usually go unnoticed unless a more extreme version of the disfluencies occur. Recent researchers in the field of stuttering have focused their attention in gathering normative data on the disfluencies of normal young children to aid in making differential diagnosis of normal disfluency from incipient stuttering characteristics.

This chapter reviews the occurrence of disfluencies observed at the discrete ages of two through six years. In addition, the characteristics of the young children identified as incipient stutterers will be reviewed to provide a basis for the comparison of the results gathered in this study.

## Disfluencies in Two-Year-Old Children

Disfluencies in the speech of two-year-old children have been observed by a few investigators. In early research Metraux (1950) and Davis (1939) studied children in this age group. In a cross-sectional study by Metraux, 207 children between the ages of 18 and 54 months were observed. Metraux indicated that repetitions characterized by part-word, whole word or phrase repetitions were observable in the speech of the one-and-a-half- and two-and-a-half-year-old age groups. Unfortunately, Metraux did not report the frequency of each type of repetition.

Davis (1939) gathered data and analyzed repetitions in 62 normal children, 36 male and 26 female, ages 24 to 60 months. The 15 two-year-old children produced phrase repetitions more frequently than word repetitions, which in turn occurred more frequently than part-word repetitions during free-play.

In 1943, Hughes (in Branscom et al., 1955) administered a speech test to 39 normal male and female children with 10 children in the two-year-old age group. In contrast to Davis's study, word repetitions occurred more frequently than phrase repetitions which in turn occurred more frequently than part-word repetitions. Both studies however, reported that part-word repetitions occurred less frequently than phrase and word repetitions. Wendel Johnson, in 1945 (in Branscom et al., 1955), also studied

two-year-old children but collapsed the data with the three- and four-year-olds rate of disfluencies. The combined age groups were observed to have 2.78 word repetitions per 100 words, 2.33 phrase repetitions per 100 words and finally 1.22 part-word repetitions per 100 words (see Table I).

Unlike the early studies, recent investigators obtained spontaneous language samples and tabulated the frequencies of repetitions as well as interjections, revision-incomplete phrases, disrhythmic phonations and tense pauses (DeJoy and Gregory, 1985; Haynes and Hood, 1977; Wexler and Mysak, 1982; Yairi and Clifton, 1972; Yairi, 1981). These investigators sampled the speech of children at discrete age levels to determine whether developmental trends exist in the speech of preschool children and to collect normative data.

Conducting the only longitudinal study which was for one year, Yairi (1981) observed normally speaking two-year-old male and female children. There were 18 girls and 15 boys in this study. Word repetitions were subcategorized and tabulated as single syllable word repetitions and polysyllabic word repetitions. Incomplete phrases were not addressed in this study. Male children exhibited the disfluencies, beginning with the most frequent, in the following order: interjections, single syllable word repetitions, part-word repetitions, revisions, phrase repetitions, tense pauses, disrhythmic phonations, and

TABLE I

DATA SUMMARY OF PAST INVESTIGATIONS OF NORMAL DISFLUENCIES  
MEAN PER 100 WORDS

INVESTIGATOR(S)	SEX	N of Subj	AGE			THREE YEARS			FOUR YEARS			FIVE YEARS			SIX YEARS		
			TWO YEARS														
1. Davis (1939)	F/M	62	1. PHR 3.12 2. WR 1.66 3. PW 0.61			1. PHR 2.69 2. WR 1.26 3. PW 0.53			1. PHR 2.34 2. WR 1.24 3. PW 0.38								
2. Branscom (1942)	F/M	49				1. WR 2.62 2. PHR 1.08 3. PW 0.45			1. WR 2.48 2. PHR 0.85 3. PW 0.42			1. WR 1.97 2. PHR 0.92 3. PW 0.20					
3. Hughes (1943)	F/M	39	1. WR 1.81 2. PHR 1.33 3. PW 0.91						1. WR 1.13 2. PW 0.97 3. PHR 0.56								
4. Egland (1955)	F/M	26										1. PW 0.41 2. WR 0.34 3. PHR 0.17 4. I 0.032					

LEGEND: PW = part-word repetition  
 I = interjection  
 IP = incomplete phrase  
 UGP = ungrammatical pause

WR = word repetition  
 RIP = revision-incomplete phrase  
 DP = disrhythmic phonation  
 GP = grammatical pause

PHR = phrase repetition  
 REV = revision  
 TP = tense pause

TABLE I (Continued)

INVESTIGATOR(S)	SEX	N of Subj	AGE				FIVE YEARS	SIX YEARS
			TWO YEARS	THREE YEARS	FOUR YEARS			
5. Oxtoby (1943)	F/M	25		1. PHR 2.23 2. WR 1.48 3. PW 1.03				
6. Johnson (1945)	F/M	18	Combined Age groups of 2, 3, and 4 years					
			1. WR 2.78 2. PHR 2.33 3. PW 1.22					
7. Yairi and Clifton (1972)	F/M	15				1. RIP 2.40 2. I 1.90 3. WR 1.24 4. DP 0.74 5. PW 0.60 6. PHR 0.59 7. TP 0.09		

LEGEND: PW = part-word repetition  
I = interjection  
IP = incomplete phrase  
UGP = ungrammatical pause

WR = word repetition  
RIP = revision-incomplete phrase  
DP = disrhythmic phonation  
GP = grammatical pause

PHR = phrase repetition  
REV = revision  
TP = tense pause



TABLE I (Continued)

INVESTIGATOR(S)	SEX	N of Subj	AGE				
			TWO YEARS	THREE YEARS	FOUR YEARS	FIVE YEARS	SIX YEARS
8. Haynes and Hood (1977)	F/M	30			(Data for Male Subjects only)		
			1. REV 2.24 2. WR 1.53 3. PHR 0.75 4. I 0.48 5. PW 0.44 6. DP 0.24 7. IP 0.16 8. TP 0.00	1. REV 2.83 2. WR 1.83 3. I 0.98 4. PHR 0.88 5. DP 0.73 6. IP 0.55 7. PW 0.55 8. TP 0.00			
9. Yairi (1981)	F/M	33	(Data for Male Subjects only)				
			1. I 1.95 2. SSWR 1.56 3. PWR 1.53 4. REV 1.32 5. PHR 0.54 6. TP 0.50 7. DP 0.48 8. PSWR 0.07				

LEGEND: PW = part-word repetition  
I = interjection  
IP = incomplete phrase  
UGP = ungrammatical pause

WR = word repetition  
RIP = revision-incomplete phrase  
DP = disrhythmic phonation  
GP = grammatical pause

PHR = phrase repetition  
REV = revision  
TP = tense pause

TABLE I (Continued)

INVESTIGATOR(S)	SEX	N of Subj	AGE				
			TWO YEARS	THREE YEARS	FOUR YEARS	FIVE YEARS	SIX YEARS
10. Wexler and Mysak (1982)	M	36	1. RIP 3.50 2. I 3.00 3. PHR 2.20 4. WR 2.10 5. DP 1.50 6. TP 1.50 7. PW 0.70		1. I 2.60 2. RIP 2.60 3. TP 1.50 4. WR 0.90 5. DP 0.60 6. PHR 0.60 7. PW 0.40		1. I 3.40 2. RIP 2.30 3. TP 1.10 4. WR 0.90 5. PHR 0.70 6. PW 0.60 7. DP 0.20
			Neutral Stress Situation				
11. Wexler (1982)	M	36	1. RIP 3.48 2. I 3.03 3. PHR 2.18 4. WR 2.11 5. TP 1.54 6. DP 1.48 7. PW 0.73		1. RIP 2.60 2. I 2.58 3. TP 1.47 4. WR 0.89 5. PHR 0.59 6. DP 0.58 7. PW 0.39		1. I 3.37 2. RIP 2.25 3. TP 1.10 4. WR 0.86 5. PHR 0.68 6. PW 0.57 7. DP 0.24
			Stress Situation				
			1. RIP 2.62 2. I 2.54 3. PHR 1.42		1. RIP 2.56 2. I 1.86 3. TP 1.53		1. I 3.40 2. RIP 2.24 3. TP 1.51

LEGEND: PW = part-word repetition  
 I = interjection  
 IP = incomplete phrase  
 UGP = ungrammatical pause

WR = word repetition  
 RIP = revision-incomplete phrase  
 DP = disrhythmic phonation  
 GP = grammatical pause

PHR = phrase repetition  
 REV = revision  
 TP = tense pause

TABLE I (Continued)

INVESTIGATOR(S)	SEX	N of Subj	AGE				THREE YEARS	FOUR YEARS	FIVE YEARS	SIX YEARS
			TWO YEARS							
			4. TP 1.42 5. WR 1.34 6. DP 1.06 7. PW 0.96			1. REV 2.73 2. UGP 1.93 3. I 1.78 4. WR 1.37 5. PHR 1.16 6. DP 0.90 7. IP 0.88 8. PW 0.43 9. GP 0.22	4. WR 0.78 5. PW 0.65 6. DP 0.58 7. PHR 0.52	1. REV 2.40 2. UGP 1.82 3. I 1.66 4. WR 0.78 5. PHR 0.66 6. IP 0.60 7. DP 0.50 8. PW 0.48 9. GP 0.41	4. WR 0.94 5. PHR 0.54 6. PW 0.54 7. DP 0.27	
12. DeJoy and Gregory (1985)	M	60								
13. Arnold-Cockburn (1987)	F	20				1. PW 1.50 2. WR 1.30 3. RIP 0.73		1. WR 1.37 2. RIP 0.73 3. PW 0.63		

LEGEND: PW = part-word repetition  
I = interjection  
IP = incomplete phrase  
UGP = ungrammatical pause

WR = word repetition  
RIP = revision-incomplete phrase  
DP = disrhythmic phonation  
GP = grammatical pause

PHR = phrase repetition  
REV = revision  
TP = tense pause

SOURCES: Davis (1939), Branscom (1942), Oxtoby (1943), Hughes (1943) refer to Branscom, M.E., Hughes, J., and Oxtoby, E.T. (1955) in Bibliography. Johnson (1945), refer to Johnson, W. (1955) in Bibliography.

lastly, polysyllabic words. Collapsed data of both sex groups revealed that interjections occurred most frequently followed by single syllable word repetitions, part-word repetitions and then revision-incomplete phrase. After observing the children three times during the year, Yairi concluded that the children's disfluencies did not follow a particular pattern and that there were extreme variations in the frequency of disfluencies.

In Wexler and Mysak's 1982 study of two-, four-, and six-year-old male children, the two-year-old children reportedly demonstrated disfluencies while playing with specified toys. The disfluencies occurred in the following rank order: revision-incomplete phrases, interjections, phrase repetitions, word repetitions, disrhythmic phonations, and tense pauses. The least occurring type of disfluency was part-word repetitions. This study showed that the two-year-old children had significantly higher disfluency frequencies for word and phrase repetitions than the four- and six-year-old children. In addition, the two-year-old children demonstrated a higher frequency of disrhythmic phonations than the six-year-old children.

Wexler (1982) also studied disfluency rates of 36 two-, four-, and six-year-old male children under two conditions: neutral stress situation and stress situation. During both situations, the two-year-old children exhibited the following disfluencies beginning with the most frequent:

revision-incomplete phrases, interjections, phrase repetitions, word repetitions, tense pauses, disrhythmic phonations, and part-word repetitions. The disfluencies occurred in the above order in both situations; however, the frequencies appeared to be slightly lower during the stress situation. Word repetitions and phrase repetitions were significantly higher in the neutral situation among the two-year-children when compared to the four- and six-year-old children. In the stress situation, the two-year-old children had a significantly higher mean of disrhythmic phonations than the six-year-old children.

Based on the findings of recent investigations, interjections and revision-incomplete phrases occurred more frequently than repetitions in the speech of two-year-old male children. Part-word repetitions occurred to be one of the least occurring type of disfluencies. For a summary of the frequencies of disfluencies see Table I.

#### Disfluencies in Three-Year-Old Children

In her early study of preschool male and female children, Davis (1939) studied 20 three-year-old children. The three-year-old children exhibited the same pattern of repetitions as the two-year-old children; phrase repetitions occurred more frequently than word repetitions which in turn occurred more frequently than part-word repetitions. However, the frequencies of occurrence of these repetitions were lower than the two-year-old children (see Table I).

Branscom, et al. (1955) reported that, in the 1943 Oxtoby study, 13 three-year-old children were observed. This study replicated the findings of Davis's study. Phrase repetitions occurred most frequently followed by word repetitions followed by part-word repetitions. In contrast, Branscom's 1942 study (Branscom et al., 1955) of 19 three-year-old children revealed more word repetitions occurred followed by phrase repetitions and finally part-word repetitions. Based on the results of the early studies, part-word repetitions were the least occurring type of repetitions.

DeJoy and Gregory's 1985 study observed three-and-a-half-year-old male children. The results on repetitions supported Branscom's 1942 study. Thirty male children ranging from three years, three months to three years, nine months, and 30 five-year-old male children were observed. Nine types of disfluencies were tabulated. Tense pauses were separated into two categories: grammatical and ungrammatical. Grammatical pauses were defined as silent pauses which occurred at grammatical junctions and ungrammatical pauses as ungrammatical pauses that occurred at nongrammatical junctures (DeJoy and Gregory, 1985). Furthermore, revisions and incomplete phrases were separated rather than being collapsed into one category as in Wexler and Mysak's 1982 study. In DeJoy and Gregory's (1985) comparison of the two age groups, the three-and-a-half-year-

olds exhibited significantly more part-word repetitions, word repetitions, phrase repetitions, incomplete phrases and disrhythmic phonations. Interestingly, the younger children showed significantly less grammatical pauses while demonstrating no significant difference in frequencies of ungrammatical pauses, revisions and interjections. These children displayed disfluencies in the following order: revisions, ungrammatical pauses, interjections, word repetitions, phrase repetitions, disrhythmic phonations, incomplete phrases, part-word repetitions and finally, grammatical pauses. As for repetitions, word repetitions were most frequent followed by phrase repetitions while once again part-word repetitions were the least frequent type of repetitions as was noted in almost all of the studies at any age level (see Table I).

In a more recent study, Arnold-Cockburn (1987) tabulated the frequencies of part-word repetitions, word repetitions, and revision-incomplete phrases in the speech of 30 and 36 month old and 54 to 60 month old normal female children. The younger children evidenced more part-word repetitions followed by word repetitions and then revision-incomplete phrases in their speech. In addition, Arnold-Cockburn indicated that the younger children used significantly more part-word repetitions than the older children. These results did not support previous findings of part-word repetitions.

Based on the findings of DeJoy and Gregory's 1985 study, revisions, ungrammatical pauses and interjections were most common in the speech of three-year-old children. Unlike Davis (1939), Branscom et al. (1955), and Arnold-Cockburn (1987), DeJoy and Gregory's 1985 and Branscom's 1942 study revealed that word repetitions were more frequent than phrase repetitions. Part-word repetitions were the least frequently occurring type of repetitions in all studies with the exception of Arnold-Cockburn (1987).

#### Disfluencies in Four-Year-Old Children

At about age four, early studies noted that the frequency of repetitions decreased when compared to younger children. The results of Davis's 1939 study indicated that the four-year-old male and female children displayed lower frequencies of repetitions than the three- and two-year-old children that she studied. Interestingly, Davis found that the four-year-old children also had more phrase repetitions than word repetitions which in turn occurred more than part-word repetitions.

Branscom's 1942 study (Branscom et al., 1955) also included 10 four-year-old male and female children. Word repetitions had the greatest mean of frequency of occurrence followed by phrase repetitions and finally part-word repetitions. This rank order of repetitions was the same as the repetitions noted in the three-year-old, however the four-year-olds evidenced lower frequencies.



Hughes in 1943 (Branscom et al., 1955) conducted a study involving 29 four-year-old male and female children. Similar to the two-year-old children in his study, word repetitions occurred most frequently during the administration of a speech test. The mean per 100 words of word repetitions for the four-year-old children was lower: 1.13 than the amount of word repetitions used by the two-year-old children. Unlike the two-year-olds, part-word repetitions were the next most frequently occurring repetitions in the four-year-old children followed by phrase repetitions. These results conflicted with the findings of the four-year-old children in Branscom's 1942 study and Davis's 1939 study (see Table I). However, this study supported the finding that word and phrase repetitions decrease with age.

In more recent studies, Haynes and Hood (1977) obtained language samples during a structured interview and calculated the frequency of eight types of disfluencies of male and female children at the discrete age levels of four, six, and eight years. Revisions and incomplete phrases were tabulated as separate categories. Through careful inspection of the data gathered from the 5 four-year-old males, disfluencies occurred in the following order beginning with the most frequent: revisions, word repetitions, phrase repetitions, interjections, part-word repetitions, disrhythmic phonations, and incomplete phrases.

There were no occurrences of tense pauses. When the four-year-old means of both sexes were combined, the disfluencies were ranked in the same order. Part-word repetitions occurred significantly less than revisions, word repetitions, phrase repetitions and interjections. In addition, Haynes and Hood's study indicated that the total disfluency was relatively the same for each age group, however, the disfluency types observed at each age level changed markedly.

Wexler and Mysak (1982) investigated seven types of disfluencies of 12 four-year-old male children. Interjections and revision-incomplete phrases occurred at a mean of 2.6 per 100 words. Tense pauses were the next frequently occurring type of disfluency followed by word repetitions, disrhythmic phonations, phrase repetitions and part-word repetitions. The frequency of occurrence of part-word repetitions were the least occurring type of repetition observed in the speech of four-year-old male children.

In Wexler's 1982 study, four-year-old children were observed during a neutral stress situation and stress situation. Revision-incomplete phrases were the most frequent followed by interjections, tense pauses, word repetitions, phrase repetitions, disrhythmic phonations and finally part-word repetitions in the neutral situation. Similar to the neutral situation, revision-incomplete phrases, interjections, tense pauses, and word repetitions

occurred frequently during the stress situation.

Interestingly, disrhythmic phonations and not part-word repetitions were the least frequent. Overall, the frequencies of disfluencies exhibited in both situations by the four-year-old children were lower than that of the two-year-old children also included in the study.

Interestingly, the studies of Haynes and Hood (1977), Wexler (1982), and Wexler and Mysak (1982) support Branscom's 1942 and Davis's 1939 findings that revisions or revision-incomplete phrases and interjections were the most common types of disfluencies observed in the speech of four-year-olds.

#### Disfluencies in Five-Year-Old Children

Branscom's 1942 study (Branscom et al., 1955) included a group of five-year-old male and female children. When compared to the three- and four-year-old children in Branscom's study, the 20 five-year-old children exhibited the lowest frequencies of repetitions. Word repetitions had a mean of 1.97 per 100 words, phrase repetitions of 1.33 per 100 words and finally, part-word repetitions of 0.20 per 100 words (see Table I). Another study by Egland (1955) also focused on the repetitions of five-year-old male and female children. The data indicated that part-word repetitions were the most frequent type of repetitions, followed by word and phrase repetitions.

Two recent studies concerned with the disfluencies of five-year-old children. In the early 70's, Yairi and Clifton (1972) obtained spontaneous speech samples from preschoolers with a mean age of five-and-a-half years, high school seniors with a mean age of 17.8 years, and geriatric individuals with a mean age of 78.1 years of age. Although the sampling of five-and-a-half-year-old children was small ( $n=5$ ), Yairi and Clifton obtained information on seven types of disfluencies. The disfluencies occurred most frequently in the following order: revision-incomplete phrases, interjections, word repetitions, disrhythmic phonations, part-word repetitions, phrase repetitions and tense pauses.

DeJoy and Gregory (1985) conducted a study that looked at the disfluencies of three-and-a-half- and five-year-old children. DeJoy and Gregory reported that their group of 30 nonstuttering five-year-old males demonstrated more grammatical pauses and lower overall instances of disfluencies than the younger children. During spontaneous conversation, they noted that the five-year-old children exhibited frequent revisions, ungrammatical pauses, interjections, word repetitions, phrase repetitions, and incomplete phrases; and low frequencies of disrhythmic phonations, part-word repetition and grammatical pauses. The younger children demonstrated significantly higher frequency of occurrence of part-word, word, and phrase repetitions, incomplete phrases, and disrhythmic phonations.

Interestingly, the five-year-olds demonstrated significantly more grammatical pauses. With regard to the frequency of interjections, ungrammatical pauses, and revisions, the two age groups did not differ. Phrase repetition was the category that discriminated the three-year-olds from the five-year-olds. DeJoy and Gregory summarized their data by stating that specific types of disfluencies decrease with an increase in chronological age, while other types either decrease or increase slightly.

Arnold-Cockburn (1987) studied a group of 30 to 35 month old and 54 to 60 month old female children. Although not statistically significant, the results on the older children indicated that word repetitions were more frequent than revision-incomplete phrases and part-word repetitions, which supported the findings of Branscom's 1942 study (Branscom et al., 1955).

The results of DeJoy and Gregory's (1985) study supported the rank order of occurrence of repetitions in Branscom's 1942 study: word repetitions, phrase repetitions and finally, part-word repetitions. In contrast, Yairi and Clifton's (1972) results indicated that part-word repetitions occurred more than phrase repetitions. However, with the exception of ungrammatical pauses, DeJoy and Gregory (1985) and Yairi and Clifton (1972) found revisions, interjections, and word repetitions to be frequently

occurring disfluencies in the speech of five-year-old children.

### Disfluencies in Six-Year-Old Children

The early investigations of the 1930's and 1940's observed and tabulated repetitions in the speech of six-year-old children (Branscom et al., 1955; Davis, 1939). On the other hand, recent investigations focused on the frequency of various types of disfluencies, repetitious as well as nonrepetitious types, in the speech of six-year-old children. Haynes and Hood (1977) obtained language samples in a structured interview with four-, six-, and eight-year-old male and female children. The six-year-old children did not differ significantly on the total frequency of disfluencies per 100 words when compared with the younger children. In addition, there were no significant differences between males and females in the overall or specific frequencies of disfluencies. For the six-year-old male children, revisions, word repetitions, and interjections were the most common types of disfluencies, followed in order by phrase repetitions, disrhythmic phonations and lastly, incomplete phrases and part-word repetitions. Furthermore, when the means of the six-year-old male and female children were collapsed in Haynes and Hood's study, disfluencies were ranked in the following order beginning with the most frequent: revisions, word repetitions, interjections, phrase repetitions, incomplete

phrases, part-word repetitions, disrhythmic phonations and lastly, tense pauses. Part-word repetitions occurred significantly less than revisions, word repetitions and interjections.

Wexler and Mysak (1982) conducted a study of two-, four-, and six-year-old male children. In the group of six-year-old children, interjections, revision-incomplete phrases, tense pause, word repetitions, phrase repetitions, part-word repetitions and disrhythmic phonations occurred most frequently in that order. Revision-incomplete phrases and interjections were the most frequently occurring at this age level while disrhythmic phonations and part-word repetitions were the least noted type. Wexler and Mysak summarized their study by reporting that although the frequency of occurrence of disfluencies varied among age levels, certain disfluency types occurred more frequently in the speech of each discrete age group.

Wexler (1982) also included a group of six-year-old children while investigating the disfluencies exhibited by two- and four-year-old male children in neutral and stress situation. During the neutral situation, six-year-old children most frequently demonstrated interjections, tense pauses, revision-incomplete phrases and word repetitions. Phrase repetitions, part-word repetitions and disrhythmic phonations occurred less frequently. During the stress situation, the six-year-old children demonstrated

interjections, revision-incomplete phrases, tense pauses and word repetitions most frequently. Phrase repetitions, part-word repetitions, and disrhythmic phonations were again noted as less frequent disfluency types.

Wexler reported that the six-year-old children showed significantly fewer word repetitions, phrase repetitions and disrhythmic phonations than the two-year-old children. In addition, in the stress situation, disrhythmic phonations occurred significantly less in the six-year-old children's speech than in the two-year-old children. Wexler further summarized this study by stating that data supported the concept of fluency development because the younger children were more disfluent than the older children.

Revisions or revision-incomplete phrases, interjections, and word repetitions were common disfluencies observed in the speech of six-year-old male children in recent studies (Haynes and Hood, 1977; Wexler, 1982; and Wexler and Mysak, 1982). Disrhythmic phonations and part-word repetitions were the disfluencies found to be the least occurring among six-year-old children.

#### INCIPIENT STUTTERING CHARACTERISTICS

Because of the paucity of normative data available, differential diagnosis of a normally preschool child from a child who is beginning to stutter is difficult. However, there is substantial agreement among the independent



clinicians about a number of incipient stuttering characteristics (Adams, 1977; Van Riper, 1971).

Part-word repetitions repetition units have been cited in the literature as indicative characteristics of an incipient stutterer (Adams, 1977; Curlee, 1980; Floyd and Perkins, 1974; Gregory and Hill, 1980; Johnson, 1959; Johnson, 1980; and Van Riper, 1971) (see Table II). Davis (1939) and Egland (1955) concluded from their results that part-word repetitions as well as the number of units reiterated per repetition best discriminated the young stutterer from the nonstutterers. In addition, Floyd and Perkins (1974) and Yairi and Lewis (1984) found that part-word repetitions occurred significantly more frequently in a group of young stutterers than in their matched group of nonstutterers. Floyd and Perkins (1974) found no overlap in the frequency of syllable repetitions between preschool children of stutterers and nonstutterers. Therefore, stutterers demonstrate more part-word repetitions than do children who are nonstutterers.

Based on the results of early research (Branscom et al., 1955; Davis, 1939; Egland, 1955; Johnson, 1959), many clinicians have formulated guidelines. Curlee (1980) and Van Riper (1971) decided that part-word repetitions of two or more repetition units on 2% or more of the words spoken were indicative of a young stutterer. Similarly, Adams (1977), based on Egland's 1955 study, provided the guideline

TABLE II  
SPEECH BEHAVIORS OF NORMAL DISFLUENCY  
AND INCIPIENT STUTTERING

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<u>Normal Disfluency</u>	<u>Incipient Stuttering</u>
One to three part-word repetitions units (Johnson, 1980; Adams, 1977): word, phrase repetitions, revision-incomplete phrases, and interjections (Johnson, 1980; Riley & Riley, 1979; Yairi & Lewis, 1984).	More than three part word repetition units (Adams, 1977). Disrhythmic phonations, more than one prolongation per 100 words lasting more than one second (Johnson, 1980).
Less than ten disfluencies per 100 words (Adams, 1977).	Ten or more disfluencies per 100 words (Adams, 1977).
Schwa is not heard; appropriate vowel is used.	Schwa substituted as a starter or actual vowel in repeated units (Adams, 1977; Curlee, 1980; Johnson, 1959; Riley & Riley, 1979; Van Riper, 1971).
Easy, effortless disfluencies; tense pauses present but at very low frequencies (Haynes & Hood, 1977; Yairi, 1981). Pauses for linguistic purposes or communication effect (Riley & Riley, 1979).	Excessive tension in speech musculature (Curlee, 1980; Riley & Riley, 1979; Van Riper, 1971).

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that part-word repetitions of more than one to five reiterations was indicative of an incipient stutterer. Gregory and Hill (1980) asserted in their differential diagnostic tool that four or more repetitions per instance were indicative of an incipient stutterer.

Frequency and duration of prolongations were found in the literature as characteristics of an incipient stutterer (Adams, 1977; Curlee, 1980; Gregory and Hill, 1980; Johnson, 1980; Van Riper, 1971). Research by Yairi and Lewis (1984) indicated that disrhythmic phonations, which include prolongations and broken words, were more frequently occurring in the speech of stutterers than nonstutterers. Some speech-language pathologists contend that prolongations longer than one second on 2% or more of the words spoken are indicative of an incipient stutterer (Curlee, 1980; Gregory and Hill, 1980; and Van Riper, 1971). Van Riper (1971) and Riley (1972) further asserted that if prolongations last longer than one second and are accompanied by a pitch rise and a sudden termination of phonation, the child is an incipient stutterer. Adams (1977), Van Riper (1971) and Curlee (1980) also stated that involuntary blockings or hesitations longer than two seconds in the flow of speech, as well as visible effort in the production of sounds, were indicative of an incipient stutterer.

The substitution of a schwa for an appropriate vowel in a syllable repetition is another characteristic noted in the incipient stutterer's speech (Adams, 1977; Curlee, 1980; Johnson, 1980; Van Riper, 1971). In his case selection strategy, Curlee (1980) asserted that the substitution of schwa for a vowel while being accompanied by visible vocal tension were indications of an incipient stutter.

Visible and physical efforts in vocal production have been cited in the literature as warning signals (Bloodstein, 1960; Curlee, 1980; Gregory and Hill, 1980; Riley and Riley, 1979). Bloodstein (1960) observed that stutterers exhibit visual signs of excessive tensing of the muscles. In addition, Curlee (1980) contended that signs of struggle such as body movements, lip and jaw tremors associated with disfluencies are definite indicators of an incipient stutterer.

The average number of disfluencies observed per 100 words spoken has been another area of concern in determining the incipient stutterer. Gregory and Hill (1980) suggested if the child is exhibiting 2% or more disfluencies per 100 words in a 500 word sample the child may be a beginning stutterer. However, this would include most of the normal studies reviewed in the previous section. Adams (1977), on the other hand, stated that beginning stutterers may have disfluencies averaging 10 or more per 100 words in a 300 to 500 word sample.

## SUMMARY

### Disfluencies at Discrete Age Levels

The discussion of studies inspecting disfluencies at discrete age levels revealed inconsistent results. Possible reasons exist for these inconsistencies. First, the different classification systems of disfluencies in each

study make the results difficult to compare and interpret. Some investigators chose to collapse revisions and incomplete phrases (Wexler and Mysak, 1982) while others (DeJoy and Gregory, 1985; Haynes and Hood, 1977; Yairi, 1981) separated these and tabulated the categories individually. In addition, DeJoy and Gregory (1985) subcategorized tense pauses into two categories: ungrammatical and grammatical pauses; others did not separate tense pauses (Haynes and Hood, 1977; Wexler and Mysak, 1982; Yairi, 1981). A set of operational definitions for each subcategory of disfluencies are in demand so as to gather normative data in a standard manner. Secondly, the procedures for collecting samples and data were different and thus, are another reason for inconsistencies. Some investigators collected samples in interview situations (Haynes and Hood, 1977) while others collected samples in the home (Yairi, 1981) or in a playroom (Wexler and Mysak, 1982). More investigations are needed in this area to determine if there is a relationship between frequency of occurrence of disfluencies and the environment. Another reason for the inconsistencies among these studies is the high degree of variability or large standard deviations reported in each of the studies (DeJoy and Gregory, 1985; Wexler, 1982; Wexler and Mysak, 1982; Yairi, 1981). As a result, cross-sectional studies and longitudinal studies with a big number are necessary to reveal significant

differences and developmental trends between discrete age groups (DeJoy and Gregory, 1985).

Although variabilities among the studies exist and no clear cut developmental trends exist, several consistent patterns have emerged. First, normal preschool children have consistently demonstrated high frequencies of occurrence of revision-incomplete phrases and interjections (DeJoy and Gregory, 1985 Wexler and Mysak, 1982; Yairi, 1981). Secondly, normal preschool children have also consistently demonstrated very low frequencies of part-word repetitions especially between ages four and five (DeJoy and Gregory, 1985; Haynes and Hood, 1977; Wexler and Mysak, 1982). Thirdly, variations in the data exist when absolute frequencies of disfluencies are compared among studies. Some studies reported that developmental patterns of specific disfluencies may be decreasing with advancing chronological age (DeJoy and Gregory, 1985; Wexler and Mysak, 1982) while other show disfluencies increase at certain ages and decrease at other ages. DeJoy and Gregory (1985) stated in their literature review that the reason investigations present data with no clear cut trends is the fact that variability of disfluencies exist in the speech behaviors of preschool children. Thus, they concluded that future investigations should involve a large number of subjects.

### Incipient Stuttering Characteristics

Unlike the normative data gathered thus far, the characteristics of the incipient stutterer have been generally agreed upon and include: a high frequency of part-word repetitions and repetition units; high frequency of prolongations or disrhythmic phonations; initiations or breaks of air flow; visible, physical effort during the act of speaking; and, at least 10% disfluencies exhibited per 100 words spoken (Adams, 1977). The most frequent type of disfluency observed in incipient stutterers is part-word repetitions, specifically syllable repetitions, which tend to occur on initial words of utterances (Curlee, 1980; Egland, 1955). In summary, the incipient characteristics cited by many theorists include high frequencies of part-word repetitions, disrhythmic phonations and tension.

## CHAPTER III

### METHODS

### SUBJECTS

Twenty normal male children were selected from the greater Portland, Hillsboro and Forest Grove, Oregon areas. Subjects were recruited from preschools and from the Northeast and Southeast Indoor Parks. Ten male children ranged in ages from 33 to 39 months ( $\bar{x}=36$ ), and ten male children ranged in ages from 57 to 63 months ( $\bar{x}=60$  months). No attempt was made to control socioeconomic level. The children met the following criteria:

1. English was spoken as a primary language in the home;
2. Speech intelligibility of at least 75%;
3. Mean length of response of at least two and one half words;
4. No history of middle ear infections, allergies or hearing loss as reported by the parent or caregiver;
5. No history of developmental delay, retardation, neurological, or physical impairment as reported by the parent;



6. Received no prior intervention or counseling for fluency problems;
7. Ability to attend to two low stress tasks in 15 minutes;
8. Children between 57 and 63 months passed a hearing screening test for the better ear at 25dB HL for the pure tone frequencies of 500, 1000, 2000, and 4000 Hz.

A puretone hearing screening was not used for criteria selection of the 33- to 39-month-old children due to the age of the subjects in that group. Using the criteria that these children did not have a history of middle ear infection or a cold at the time of the recording session adequately screened out children who might possibly have some degree of hearing loss.

#### SUBJECT ELIGIBILITY PROCEDURES

Each parent was given a cover letter (Appendix A), permission form at the preschool center (Appendix B) and a questionnaire (Appendix C) which addressed the subject's developmental, speech, medical and familial history. The parent or primary caregiver signed the permission form and answered all of the questions. The contents of the questionnaire were not used in this study, but will be used in future research.

After the parent permission forms were signed by the parent and eligibility requirements were determined from the answers on the questionnaire form, the children then participated in the following eligibility procedures at their preschool or at their home. A speech sample of at least three minutes was elicited from each subject and recorded on a portable tape recorder to evaluate speech intelligibility and language development. The speech sample was elicited by the investigator by using toys and asking open-ended questions. By counting the total number of words and dividing by the number of separate responses, the subject's mean length of response was determined to be at least 2.5 words. If 75 out of 100 consecutive words were understood, the subjects were judged to be at least 75% intelligible. The Peabody Vocabulary Test - Revised, Form M (Dunn and Dunn, 1981) was also administered to the child either at the preschool or at the subject's home for future research purposes. In addition, the children between the ages of 57 and 63 months were given a pure-tone hearing screening test at 25 dB at the following frequencies: 500, 1000, 2000, and 4000 Hz.

#### SPEECH SAMPLE PROCEDURES

Each subject was video taped in a 15 minute session at the Portland State Speech and Hearing Clinic during free play and conversation with the investigator. Each session

was conducted with only the child and the investigator present in a carpeted clinic room. The investigator elicited spontaneous speech by presenting the child with a standard set of toys, parallel talk, and open-ended questions (see Appendix D for a list of stimuli). If the child was not verbalizing after 8 minutes of play, the toys were returned to the box and the investigator asked the subject open-ended questions for the remaining seven minutes.

While interacting with the investigator, the subject was video taped by a graduate student in the Speech Communication Department. The video equipment was placed adjacent to the control room behind a one-way mirror and sound amplification system. All sessions were video taped with a Panasonic single camera recording system.

#### SCORING PROCEDURES

The subjects' 300 word samples (see Appendix E for rules for counting words) were transcribed verbatim from the audio and video recordings by the investigator, who then identified and classified specific disfluencies. The disfluencies were classified according to seven categories: part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses (see Appendix F for rules for identifying disfluencies, and Appendix G for coding

symbols). The rules used to identify and classify the disfluencies paralleled those devised by Branscom et al. (1955) and were further modified by graduate students of the Portland State University Speech and Hearing Program. The frequency of occurrence was calculated for each type of disfluency per 300 word sample.

#### RELIABILITY

To assess investigator reliability in identifying and tabulating disfluencies, six samples were randomly selected from the videotaped recordings; three from each age group. These samples were selected by a second year graduate student in the Portland State University Speech and Hearing Sciences program through the use of a random order table. The graduate student then extracted ten episodes from each of the six transcripts and formulated content transcripts (see Appendix H for Instructions for Selection of Content Transcript).

The content transcripts provided the basic information of an utterance demonstrated by the child, deleting any type of disfluency, such as: part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations and tense pauses. The disfluencies omitted from the content transcripts were then identified and coded by the investigator and two other second year graduate students in the Portland State

University Speech and Hearing Sciences program (see Appendix I for Instructions to Reliability Judges). These results were compared to the investigator's original results.

A self-agreement index (Sander, 1961) was calculated to determine interjudge and intrajudge reliability. The agreement indexes were .96 and .99 respectively.

#### DATA ANALYSIS

After the seven types of disfluencies were identified and tabulated, the mean and standard deviation of the percentage of disfluencies were calculated for each type of disfluency as well as for the total disfluencies per 100 words. The Mann-Whitney U Test (Siegel, 1956) was used to evaluate the degree of difference between all types of disfluencies in the two different age groups. All U-values were compared at the 0.05 level of probability.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### RESULTS

The purpose of this study was to compare the frequency of occurrence of disfluencies in the speech of three-year-old male children and five-year-old male children in terms of part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses. The spontaneous speech samples were used to gather the data on the disfluencies from 10 three-year-old and 10 five-year-old male children. The results of the study will be used to answer the questions sought in this investigation.

The first research question was: Do three-year-old children exhibit a higher overall frequency of disfluencies than five-year-old children? Table III presents the mean ( $\bar{x}$ ) and standard deviations (SD) for both groups. The three-year-old children exhibited a mean of 5.47 disfluencies per 100 words while the five-year-old children a mean of 6.87 disfluencies. By inspection of the total standard deviation of both groups, this investigator noted that the three-year-old children demonstrated consistency of

TABLE III  
SUMMARY OF MEANS AND STANDARD DEVIATIONS FOR  
SEVEN INDIVIDUAL TYPES OF DISFLUENCIES  
PER 100 WORD SPOKEN FOR 3 AND 5  
YEAR OLD MALE CHILDREN

Disfluency Type	<u>3 yr. olds</u>		<u>5 yr. olds</u>	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Part-word Repetitions	0.30	0.23	0.17	0.22
Word Repetitions	1.47	0.73	1.03	0.85
Phrase Repetitions	1.13	0.43	0.57	0.78
Interjections	0.97	1.37	2.93	2.39
Revision-Incomplete Phrases	1.47	0.90	1.77	0.52
Disrhythmic Phonations	0.03	0.10	0.23	0.50
Tense Pauses	0.10	0.21	0.10	0.21
Total Disfluency	5.47	1.84	6.87	3.71

disfluencies as evidenced by a standard deviation of 1.84, whereas the five-year-old children exhibited much greater variability as reflected by a standard deviation of 3.71.

The Mann-Whitney U Test (Siegel, 1956) was used to analyze data of the overall frequency of specific disfluencies for the two groups. This non-parametric test was chosen because this study employed two independent and randomly selected samples and contained a small sample size. After an analysis of the data, a U-value of 41.0 was revealed indicating that although the five-year-old children demonstrated more total disfluencies than the three-year-old children, a statistically significant difference was not apparent at the 0.05 level of probability (Table IV).

The second question posed in this investigation was: Do three-year-old children exhibit a higher frequency of specific disfluencies than five-year-old children? The means and standard deviations for the frequencies of the seven disfluency types are reported in Table III. Close examination of the data revealed that the three-year-old children were more disfluent in the categories of part-word repetitions, word repetitions, and phrase repetitions, but the Mann-Whitney U Test indicated that no significant difference appeared in those categories of the disfluencies at the 0.05 level of confidence (Table IV). Children from the three-year-old group exhibited a mean of 1.13 phrase



TABLE IV  
SUMMARY OF THE MANN-WHITNEY U TEST FOR THE EFFECT  
OF AGE ON THE DISFLUENCIES PER 100 WORDS  
OF SEVEN INDIVIDUAL TYPES OF  
DISFLUENCY AND THEIR TOTAL

Disfluency Type	U-Value	Confidence Level
Part-word Repetitions	34.5	0.05
Word Repetitions	28.5	0.05
Phrase Repetitions	23.5	0.05
Interjections	20.5	0.05*
Revision- Incomplete Phrases	38.0	0.05
Disrhythmic Phonations	39.5	0.05
Tense Pauses	50.0	0.05
Total Disfluency	41.0	0.05
* Significant at 0.05 level of probability		

repetitions per 100 words while the five-year-old children exhibited a mean of 0.57 phrase repetitions per 100 words (Table III).

The three-year-old children demonstrated a mean of 0.97 interjections per 100 words, with a standard deviation of 1.37, whereas the five-year-old children demonstrated a mean of 2.93 with a standard deviation of 2.39 (Table III). The older children exhibited more interjections than the younger children as well as a wider variation in the frequency of occurrence of interjections. The Mann-Whitney U Test revealed a U-value of 20.5 which was significant at the 0.05 level of confidence (Table IV). Male children from the five-year-old group demonstrated significantly more interjections than the three-year-old children.

In the category of revision-incomplete phrases, the younger children exhibited a mean of 1.47, with a standard deviation of 0.90 (Table III), while the older children exhibited a mean of 1.77, with a standard deviation of 0.52. The mean scores for both groups were similar, but the older children evidenced slightly more revision-incomplete phrases. The Mann-Whitney U Test revealed a U-value of 38.0 which was not significant (Table IV).

The three-year-old children exhibited a mean of 0.03 disrhythmic phonations per 100 words, with a standard deviation of 0.10, while the five-year-old children exhibited a mean of 0.23, with a standard deviation of 0.50 (Table III).

The results of the Mann-Whitney U Test yielded a U-value of 39.5 at the 0.05 level of confidence which was not significant (Table IV).

With regard to tense pauses, the three-year-old and the five-year-old exhibited the same mean scores of 0.10 per 100 words. A U-value of 50.0 was found by the Mann-Whitney U Test which was not significant.

These results indicate that no statistically significant differences exist between the specific disfluency types of part-word repetitions, word repetitions, phrase repetitions, revision-incomplete phrases, disrhythmic phonations, and tense pauses. Results do indicate, however, that the older children demonstrated significantly more interjections than the younger children.

For each age group, the data were further analyzed according to subgroups with different amounts of disfluency because of the variability noted among both age groups. The subjects were divided into quartiles after being arranged in rank-order, based on total disfluency, from least to most disfluent. The first and fourth quartiles included two subjects each; the second and third included three subjects (see Table V and Table VI).

Table V showed that there was a small but progressive increase from quartile to quartile of total disfluencies and interjections in the group of three-year-old children. The data on word repetitions and revision-incomplete phrases

TABLE V  
MEANS OF DISFLUENCY OF 3-YEAR-OLDS  
ACCORDING TO QUANTILES

Disfluency Type	1st	Quartiles		4th
		2nd	3rd	
Part-word Repetitions	0.33	0.33	0.22	0.34
Word Repetitions	1.00	1.33	1.00	2.84
Phrase Repetitions	0.67	1.22	1.33	1.17
Interjections	0.00	0.55	1.00	2.50
Revision-Incomplete Phrases	1.17	0.89	2.55	2.00
Disrhythmic Phonations	0.00	0.00	0.00	0.17
Tense Pauses	0.00	0.11	0.00	0.33
Total Disfluency	3.17	4.45	6.11	8.33

TABLE VI  
MEANS OF DISFLUENCY OF 5-YEAR-OLDS  
ACCORDING TO QUARTILES

Disfluency Type	1st	Quartiles		4th
		2nd	3rd	
Part-word Repetitions	0.17	0.11	0.22	0.17
Word Repetitions	0.17	1.22	1.00	1.67
Phrase Repetitions	0.00	0.22	0.89	1.17
Interjections	0.33	1.56	1.67	2.67
Revision-Incomplete Phrases	1.33	1.56	1.67	2.67
Disrhythmic Phonations	0.17	0.56	0.00	0.17
Tense Pauses	0.00	0.22	0.00	0.17
Total Disfluency	2.17	5.33	7.22	13.00

contained the two most disfluent children. Tense pauses were exhibited by the children in the first and third quartiles. In addition, the data showed that the total disfluency of the fourth quartile alone was less than the sum of the total disfluency of the other three quartiles combined.

The data from the five-year-old children (Table VI) showed a systematic increase from quartile to quartile for all disfluencies except for part-word repetitions, disrhythmic phonations and tense pauses. In addition, the total disfluency of the fourth quarter alone almost equaled the sum of the total disfluency of the other three quartiles combined.

## DISCUSSION

The first research question posed in this study was: Do three-year-old children exhibit a higher overall frequency of disfluencies than the five year old children? No statistically significant difference in the overall frequency of disfluencies was found between the three- and five-year-old normal male children. Computed means and standard deviations (see Table III) for total disfluency indicated that the five-year-olds demonstrated a higher overall frequency ( $\bar{x}=6.87$ ) than the three-year-olds ( $\bar{x}=5.47$ ). Interestingly, the standard deviation for the three-year-olds' (SD=1.84) total disfluency reflect

consistency among the younger children whereas the standard deviation for the five-year-olds' ( $SD=3.71$ ) showed a higher degree of variability. These findings on the five-year-olds may be attributed to the two children in the fourth quartile who exhibited a higher rate of disfluencies during their conversational speech (see Table VI).

The total frequency of disfluency indicated in the current study was markedly lower for both age groups than the results from DeJoy and Gregory's 1985 study. DeJoy and Gregory reported a total disfluency mean of 11.40 per 100 words with a standard deviation of 4.68 for the 3 1/2 year olds and a total disfluency mean of 9.30 with a standard deviation of 3.31. Although DeJoy and Gregory's sample was larger than the current study for both age groups, there was a smaller degree of variability noted in the current investigation for the younger children. The older children, however, of the current study showed a slightly greater degree of variability as reflected by the standard deviation of 3.71.

The second question posed in this study was: Do three-year-old children exhibit a higher frequency of specific disfluencies than five-year-old children? Although not statistically significant, the data revealed that the younger children exhibited higher rates of part-word, word and phrase repetitions when compared to the older children. These results support the findings of repetition in DeJoy

and Gregory's 1985 study that repetitions decrease with advancing age.

The only statistically significant difference existed with the five-year-old male children who had more interjections than the younger children. These results may be attributed to the five-year-old male children in the fourth quartile who demonstrated three times as many interjections than the three-year-old male children in the fourth quartile (see Tables V and VI). It is important to note that although the mean frequency of interjections was 2.93 per 100 words, there was considerable variability within this age group, as determined by the fact that the standard deviation of 2.39 was almost as large as the mean. The data also indicates that the older children demonstrated more revision-incomplete phrases than the younger children, although statistical differences were not found.

Analysis of the data also revealed other findings. For example revision-incomplete phrases, word repetitions, phrase repetitions and interjections were the most frequently occurring types of disfluencies among the three-year-olds. Whereas interjections, revision-incomplete phrases and word repetitions were the most frequently occurring types of disfluencies among the older children. In addition, the least occurring types of disfluencies in both groups were part-word repetitions, disrhythmic phonations and tense pauses. No significant differences



were found between the three-year-old and five-year-old male children in terms of part-word repetitions, word repetitions, phrase repetitions, revision-incomplete phrases, disrhythmic phonations, and tense pauses.

There were many similarities and differences in the frequencies and patterns of the disfluencies in the current study when compared to other studies. Three main factors were considered to account for the differences. Because of the small number used in the current study, there exists a high degree of variability. DeJoy and Gregory (1985) used 60 children, 30 within the three years, three months to three years, ten month old range and 30 within the four years, nine months to five years, three months of age range for the older group. The present study used 10 children within the two years, nine months to three years, three months olds for the younger male group and 10 children within the four years, nine months to five years, three months for the older male group.

In addition, the samples were collected and recorded differently in each investigation. Davis (1939) collected data while children were at play and had an assistant manually record the different types of repetitions. DeJoy and Gregory (1985) elicited spontaneous speech by presenting toys, pictures and sequence story pictures, and recorded the speech with a tape recorder. The current investigation used a standard set of toys and open ended questions, and video

and audio taped the language sample which provided aural as well as visual observations.

Lastly, the studies varied in the tabulation of the various categories. Although the studies used the categories implemented by Williams, Silverman, and Kools (1968), variations exist. For example, the early studies focused primarily on repetitions, while recent studies such as DeJoy and Gregory's 1985 study examined repetitions, interjections, grammatical and ungrammatical pauses, revisions, incomplete phrases, and disrhythmic phonations. DeJoy and Gregory did not specify how they obtained their data. Variations in recognizing and tabulating data may have considerable effect on the overall results such as inflated frequency of occurrence of the specific disfluency. The findings of the current study will be discussed in the order of: rank order patterns observed in three-year-old children, rank order patterns observed in five-year-old children, patterns with advancing age, and the occurrence of part-word repetitions, disrhythmic phonations and tense pauses in the speech of the normally disfluent children and the incipient stutterer. For a comparison of the specific means of disfluencies for three- and five-year-old children from other investigations compared with the present study refer to Table VII.

TABLE VII

COMPARISON OF RECENT STUDIES AND THE PRESENT STUDY  
SHOWING THE MEANS OF SPECIFIC DISFLUENCIES  
PER 100 WORDS FOR THREE- AND FIVE-  
YEAR-OLD CHILDREN

## THREE-YEAR-OLDS

	Branscom (1942)	Oxtoby (1943)	DeJoy & Gregory (1985)	Arnold-Cockburn (1987)	Present Study
PW	0.45	1.03	0.43	1.50	0.30
WR	2.62	1.48	1.37	1.30	1.47
PHR	1.08	2.23	1.16		1.13
I			1.78		0.97
RIP/REV			REV 2.73	0.73	1.47
IP			0.88		
DP			0.90		0.03
UGP			1.93		
TP					0.10
GP			0.22		
Total	4.15	4.94	11.40	3.53	5.47
Disfluency	per 100 words	per 100 words	per 100 words	per 100 words	per 100 words

LEGEND: PW = part-word repetition    WR = word repetition    PHR = phrase repetition  
 I = interjection    RIP = revision-incomplete phrase    REV = revision  
 IP = incomplete phrase    DP = disrhythmic phonation    TP = tense pause  
 UGP = ungrammatical pause    GP = grammatical pause

TABLE VII (Continued)

## FIVE-YEAR-OLDS

	Branscom (1942)	Egland (1943)	Yairi & Clifton (1985)	DeJoy & Gregory (1987)	Arnold-Cockburn (1987)	Present Study
PW	0.20	0.41	0.60	0.48	0.63	0.17
WR	1.97	0.34	1.24	0.78	1.37	1.03
PHR	0.92	0.17	0.59	0.66		0.57
I		0.03	1.90	1.66		2.93
RIP/REV			2.40	REV 2.40	0.73	1.77
IP				0.60		
DP			0.74	0.50		0.23
UGP				1.82		
TP			0.09			0.10
GP				0.41		
Total	3.75	0.95	7.65	9.30	2.73	6.87
Disfluency	per 100 words	per 100 words	per 100 words	per 100 words	per 100 words	per 100 words

LEGEND: PW = part-word repetition    WR = word repetition    PHR = phrase repetition  
 I = interjection    RIP = revision-incomplete phrase    REV = revision  
 IP = incomplete phrase    DP = disrhythmic phonation    TP = tense pause  
 UGP = ungrammatical pause    GP = grammatical pause

### Rank Order Patterns Observed In Three-Year-Old Children

Revisions, word repetitions and interjections were among the top four highest ranking disfluencies noted in the only prior comparable study of three-year-old children (DeJoy and Gregory, 1985). The results of the current were consistent with DeJoy and Gregory's (1985) study. Revision-incomplete phrases were the highest in this study and in the study by DeJoy and Gregory (1985). Word repetitions were the second highest ranking disfluency in this study and the fourth in DeJoy and Gregory's study. Interjections were the third highest in both studies (see Table VIII). On the other hand, part-word repetitions and disrhythmic phonations were noted to be one of the least occurring types of disfluencies.

Upon examining the rank orders of repetitions more closely, replications of the patterns of repetitions in both Branscom's 1942 study (Branscom et al., 1955) and DeJoy and Gregory's 1985 study were noted. Word repetitions were more frequent than phrase repetitions while part-word repetitions occurred the least (see Table VII). In contrast, Davis's 1939 and Oxtoby's 1942 (Branscom et al., 1955) data indicated more phrase repetitions than word repetitions. However, part-word repetitions were again observed to be the least frequently occurring type of repetitions.

TABLE VIII  
COMPARISON OF RECENT STUDIES AND THE PRESENT STUDY  
SHOWING RANK ORDERS OF TYPES OF DISFLUENCIES  
FROM MOST FREQUENT TO LEAST FREQUENT IN  
OCCURRENCE FOR THREE- AND FIVE-  
YEAR-OLD CHILDREN

THREE-YEAR-OLDS

Branscom (1942)	Oxtoby (1943)	DeJoy & Gregory (1985)	Arnold-Cockburn (1987)	Present Study
WR PHR PW	PHR WR PW	REV UGP I WR PHR DP IP PW GP	PW WR RIP	RIP WR PHR I PW TP DP

FIVE-YEAR-OLDS

Branscom (1942)	Egland (1955)	Yairi & Clifton (1972)	DeJoy & Gregory (1985)	Arnold-Cockburn (1987)	Present Study
WR PHR PW	WR PW PHR I	RIP I WR DP PW PHR TP	REV UGP I WR PHR IP DP PW GP	WR RIP PW	I RIP WR PHR DP PW TP

LEGEND: PW = part-word repetition    WR = word repetition    PHR = phrase repetition  
 I = interjection    RIP = revision-incomplete phrase    REV = revision  
 IP = incomplete phrase    DP = disrhythmic phonation    TP = tense pause  
 UGP = ungrammatical pause    GP = grammatical pause

Rank Order Patterns Observed  
In Five-Year-Old Children

In the previous studies cited concerning disfluency in five-year-old children, interjections and revision-incomplete phrases were among the highest ranking disfluencies (see Table VIII). All studies that looked at all the different types of disfluencies cited these two types of disfluencies. Revision-incomplete phrases were ranked the highest in the studies of Yairi and Clifton (1972) and DeJoy and Gregory (1985), and the second highest in this study. Interjections were ranked the second highest in Yairi and Clifton's study, third highest in DeJoy and Gregory's study and the highest in this study.

On the other hand, tense pauses were found to be the least frequently occurring in this study and with Yairi and Clifton's five-year-old children. Disrhythmic phonations were observed as one of the least frequently occurring in the studies by Yairi and Clifton (1985), DeJoy and Gregory (1985) and in this study.

With regard to the pattern of repetitions found in this study's five-year-old children, word repetitions occurred more frequently than phrase repetitions which in turn occurred more frequently than part-word repetitions. These results supported the rank order of repetitions reported in DeJoy and Gregory's study. In contrast, Egland's (1955) five-year-old children showed that part-word repetitions occurred more frequently than word repetitions

and phrase repetitions. In addition, the data on Yairi and Clifton's (1972) five-year-old children showed a different pattern in the occurrence of repetitions. Word repetitions were more frequent than part-word repetitions which in turn occurred more than phrase repetitions. The rank order of repetitions found in both Egland's (1956) and Yairi and Clifton's (1972) studies contradicted the results of this investigation and DeJoy and Gregory's (1985) study in that word repetitions occurred more frequently than phrase repetitions.

#### Patterns with Advancing Age

Interestingly, the findings of the present investigation support the pattern on repetitions collected by Branscom (1942 as cited by Branscom et al., 1955) and DeJoy and Gregory (1985) in their observations of three- and five-year-old children. The mean frequencies of part-word, word and phrase repetitions in these studies showed a decrease with advancing chronological age (Table VII and Table VIII). The current investigation, however, contradicted DeJoy and Gregory's 1985 study in that interjections, revision-incomplete phrases, and disrhythmic phonations did not decrease but instead increased. In fact in the current investigation, interjections occurred significantly more frequent in the speech of the five-year-olds than in the speech of the three-year-olds. More



research is warranted in the area of patterns of disfluencies with advancing age.

Part Word Repetitions, Disrhythmic Phonations, and Tense Pauses in Normally Disfluent Preschoolers and Incipient Stutterers

In the previous investigations cited concerning normal disfluency in three- and five-year-olds, part-word repetitions, disrhythmic phonations and tense pauses were among the four least occurring disfluencies (see Table VIII). The findings of the current study are consistent with recent investigations. Except for the high occurrence of part-word repetitions found in Arnold-Cockburn's 1987 study, disrhythmic phonations, part-word repetitions and tense pauses were relatively infrequent in the speech of normal three- and five-year-old male children.

These three types of disfluencies, however, are considered indicators of early stuttering. Higher rates of part-word repetitions, disrhythmic phonations (i.e., prolongations lasting more than one second) and excessive tension are exhibited by beginning stutterers (Adams, 1977; Van Riper, 1971). These target disfluencies were the least occurring types of disfluencies in the three- and five-year-old male children of the current investigation.

There were many similarities and differences in the frequencies and patterns of the disfluencies in this study when compared to other studies. This investigator considered three main factors which may account for the

differences when comparing the data. First, there was a high degree of variability reported in all the studies, including this investigation, because of the small numbers studied. Second, each investigation used a different procedure to collect samples. Davis (1939) gathered data while the children were at play and recorded speech samples manually while DeJoy and Gregory (1985) presented a variety of toys and pictures and implemented a tape recorder. Finally, the studies varied in the identification and tabulation of the different types of disfluencies (DeJoy and Gregory, 1985).

In spite of the above limitations, two meaningful outcomes need to be considered. One, in the speech of normal three- and five-year-old children, part-word repetitions, disrhythmic phonations and tense pauses occurred at very low frequencies of occurrence. These findings, in conjunction with previous investigations, suggest that when disrhythmic phonations, part-word repetitions and tense pauses increase in frequency of occurrence, they should be considered as indicators of incipient stuttering. Adam's (1977) criteria for diagnosing stuttering is at least ten disfluencies per 100 words. The results of the present study revealed a total mean of 5.47 disfluencies per 100 words for the three-year-old children and 6.87 disfluencies per 100 words for the five-year-old children which is within the limits established by Adams.

In addition, findings of the present study suggest that high frequencies of part-word repetitions, disrhythmic phonations and tense pauses five-year-olds are reliable indicators of incipient stuttering. Finally, the older normative studies did not take into consideration some of the critical targets for determining whether or not a child was an incipient stutterer. For example, Davis (1939) and Branscom et al. (1955) did not consider disrhythmic phonations and tense pauses in their studies.

## CHAPTER V

### SUMMARY AND IMPLICATIONS

#### SUMMARY

Just as a speech-language pathologist uses knowledge of normal language development to make a diagnosis of language delay, normative data on fluency development can be used to make a differential diagnosis of normal disfluency from fluency disorders. Data at each discrete age level on normal disfluency is an important aspect in understanding the development of fluency.

The purpose of this study was to compare the frequency of specific disfluencies in three-year-old and five-year-old normal male children in terms of part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations and tense pauses. The disfluencies were observed while each child spontaneously interacted with an investigator in a clinical room. Two questions were addressed:

1. Do three-year-old male children exhibit a higher overall frequency of disfluencies than five-year-old male children?

2. Do three-year-old male children exhibit a greater frequency of certain disfluencies than five-year-old male children?

Twenty normal preschool male children comprised the subjects of this study. All children were randomly selected from the greater Portland area and passed the selection criteria. The children were of two groups: 10 three-year-old male children ( $\bar{x}$ =36 months) and 10 five-year-old children ( $\bar{x}$ =60 months). After spontaneous speech samples were obtained and recorded from each subject, the investigator transcribed the text verbatim and categorized seven types of disfluencies. The Mann-Whitney U Test (Siegel, 1956) was used to analyze the data. The results indicated that a statistically significant difference on the total disfluency did not exist between the two age groups. Results indicated that at the 0.05 level of confidence, a statistical significance did exist for interjections. Male children in the five-year-old age group evidenced a higher number of interjections than the three-year-old children. No other statistically significant differences were found.

The results yielded the following conclusions:

1. The three-year-old children did not exhibit a higher overall frequency of disfluencies than the five-year-old children. Although no statistical difference was found, the data indicated that the

five-year-old children exhibited a higher overall frequency than the three-year-old children.

2. There was no statistically significant difference in the frequency of occurrence of part-word repetitions, word repetitions, and phrase repetitions exhibited by the two age groups of normal male children.
3. There was no statistically significant difference in the frequency of occurrence of revision-incomplete phrases, tense pauses, and disrhythmic phonations.
4. Both age groups evidenced low frequencies and small standard deviations of the disfluency types most often considered to be indicators of incipient stuttering: part-word repetitions, disrhythmic phonations and tense pauses.

The results of the current study indicate that interjections, revision-incomplete phrases, word repetitions and phrase repetitions are the most common types of disfluencies occurring in the speech of three- and five-year-old normal male children. Part-word repetitions, disrhythmic phonations and tense pauses, however, were the least frequently occurring type of disfluencies observed in three- and five-year-old children. The findings of the current study are also consistent with results of recent studies which found that the occurrence of part-word

repetitions, tense pauses and disrhythmic phonations is infrequent in the speech of normal three- and five-year-old male children. This supports theorists who contend that part-word repetitions, disrhythmic phonations and tense pauses should be indicators of incipient stuttering.

## IMPLICATIONS

### Clinical

The results of this study provide additional information on the normal disfluencies observed in the speech of three- and five-year-old children. This data can be especially useful to the speech and language pathologist who is faced with making a differential diagnosis between the normally disfluent child and the child who is a beginning stutterer. The findings of this study lend support to the guidelines provided by Adams (1977), Riley and Riley (1983), Curlee (1980) and Van Riper (1982). In conjunction with previous studies, the results of the current study suggest that when the frequency of occurrence of disrhythmic phonations, part-word repetitions and tense pauses increase, they should be considered as indicators of incipient stuttering. In addition, by providing data about the disfluency trends observed in preschool children, the speech and language pathologist can also better alleviate abnormal or unjustified concerns felt by parents of the normally disfluent child.

## Research

Further research on normal disfluencies involving discrete age levels is important to establish and replicate normative data. There exists several reasons. First, there is a paucity of normative data on normal disfluency at all age levels (DeJoy and Gregory, 1985; Haynes and Hood, 1977; Wexler, 1982; Wexler and Mysak, 1982; Yairi, 1981; and Yairi and Clifton, 1972).

Second, because the sample size of this study was small, the results were more difficult to interpret and generalize to the greater population. Therefore, research involving a larger sample sizes at discrete age levels is needed to further develop information on the development of fluency.

Third, there is only one longitudinal study thus far (Yairi, 1981) to provide information on the disfluencies of preschool children, specifically two-year-olds. More longitudinal studies are needed so that patterns of disfluencies can be firmly established and more hypotheses regarding fluency development can be developed. Therefore, this investigator suggests the possibility of this group of children be videotaped and their disfluencies retabulated within the next year.

Fourth, this investigator suggests the possibility of tabulating nine disfluencies: part-word repetitions, word repetitions, phrase repetitions, interjections, revisions,



interjections, ungrammatical pauses, grammatical pauses and disrhythmic phonations as implemented by DeJoy and Gregory's 1985 study. It would be interesting to see whether or not similar findings would occur.

Lastly, further research on normal disfluency at discrete age levels would allow other clinicians to formulate theories on the development of fluency and possibly answer the question, "Why is it that some children are normally disfluent while others become incipient stutterers?"

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## APPENDIX A

LETTER TO PARENTS AND PERMISSION  
TO PARTICIPATE IN STUDY FORM

Dear \_\_\_\_\_,

I am a graduate student at Portland State University in the department of Speech Communication, and I am conducting a study on the different types of disfluencies in preschool children's speech.

I would like to video tape your child during 15 minutes of play and conversation with me. This would be done at Portland State University at a time that is good for both you and our department. Before the video tape session, your child would be given a brief test of word meanings, called the Peabody Picture Vocabulary Test - Revised. I will also tape a short conversation with your child at your child's nursery school or day care center. In addition to the taped conversation, your child will receive a free hearing screening test if he is between the ages of 57 to 63 months. You will also be asked to complete a short questionnaire about your child's speech and language development, medical history, the size of your family, and any stuttering you have observed in family members.

Your child's name will not be used in reporting the results and the video tapes will only be available to authorized University personnel. Your child may be withdrawn from this study at any time without penalty.

If you are willing to participate in this study, please complete the attached form and return it to me as soon as possible in the envelope provided. After I receive this form, I will call you to schedule a taping session. Please call me if you have any questions (357-7826). I would greatly appreciate your cooperation.

If you have any questions as a result of your participation in this study, please contact Victor D. Dahl, Office of Graduate Studies and Research, 105 Neuberger Hall, Portland State University 229-3423.

Sincerely,

Pamela Paguia

Enclosure

## APPENDIX B

## CONSENT FORM

Child's Name: \_\_\_\_\_ Nickname: \_\_\_\_\_

Birthdate: \_\_\_\_\_ Age: \_\_\_\_\_

1. Is the primary language spoken in your home English?  
Yes \_\_\_\_\_ No \_\_\_\_\_
2. Has your child had an ear infection within the last six months?  
Yes \_\_\_\_\_ No \_\_\_\_\_
3. Has your child ever been diagnosed as demonstrating any of the following:  
  
Developmental delay Yes \_\_\_\_\_ No \_\_\_\_\_  
Neurological impairment Yes \_\_\_\_\_ No \_\_\_\_\_  
Hearing loss Yes \_\_\_\_\_ No \_\_\_\_\_  
Mental retardation Yes \_\_\_\_\_ No \_\_\_\_\_  
Orthopedic or physical handicap Yes \_\_\_\_\_ No \_\_\_\_\_
4. Has your child ever received speech therapy for stuttering?  
Yes \_\_\_\_\_ No \_\_\_\_\_
5. Is your child able to attend to 2 low stress tasks of 15 minutes each?  
Yes \_\_\_\_\_ No \_\_\_\_\_

I hereby give my permission for my child, \_\_\_\_\_ to participate in this study. My child may attend a video taping session and participate in the above mentioned evaluation at an agreed upon date and time.

I will complete the questionnaire and I understand I may withdraw my permission at any time during this study without a penalty.

\_\_\_\_\_  
Signature Relationship Date

## APPENDIX C

## QUESTIONNAIRE

Child's Name: \_\_\_\_\_ Birthdate: \_\_\_\_\_

Address: \_\_\_\_\_ Telephone (day) \_\_\_\_\_

Relationship of person completing the questionnaire \_\_\_\_\_

What language is spoken mostly in your home? \_\_\_\_\_

Does your child speak another language? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, what language? \_\_\_\_\_

What is your child's ethnic background? \_\_\_\_\_

I. List the children and adults living in your home.

NAMES

AGE

RELATIONSHIP TO CHILD

II. Does your child stutter? Yes \_\_\_\_\_ No \_\_\_\_\_ (If no, go to Section III)

When did you first notice that your child stutters? \_\_\_\_\_

Has anyone else commented on this? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, who? \_\_\_\_\_

---

What things have you tried, if any, to change your child's speech?

Does your child's speech change when he talks with:  
(Answer Yes or No)

A friend \_\_\_\_\_ A younger sibling \_\_\_\_\_ An older sibling \_\_\_\_\_

A parent \_\_\_\_\_ A familiar adult other than parent \_\_\_\_\_

A teacher (or authority figure) \_\_\_\_\_ In a small group \_\_\_\_\_

Describe other times when you notice changes in your child's speech:

When is your child's speech the best? \_\_\_\_\_

When is your child's speech the worst? \_\_\_\_\_

When your child stutters, what do you do? \_\_\_\_\_

When your child stutters, what does he do? \_\_\_\_\_

Describe what your child does when he stutters? \_\_\_\_\_

Does it bother your child? Yes \_\_\_\_\_ No \_\_\_\_\_

Does it bother anyone else? Yes \_\_\_\_\_ No \_\_\_\_\_

Does your child ever do any of the following when stuttering?

a. Stretch sound out?  
(Ex. mmmmy ball) Yes \_\_\_\_\_ No \_\_\_\_\_

b. "Get stuck" in the middle of words?  
(Ex. b aseball) Yes \_\_\_\_\_ No \_\_\_\_\_

c. Repeat words?  
(Ex. I-I-I- want the ball) Yes \_\_\_\_\_ No \_\_\_\_\_

d. Repeat sounds?  
(Ex. I want b-ball) Yes \_\_\_\_\_ No \_\_\_\_\_

e. Repeat phrases?  
(Ex. I want I want the ball) Yes \_\_\_\_\_ No \_\_\_\_\_

f. Change a sentence?  
(Ex. I seen, I saw the cat) Yes \_\_\_\_\_ No \_\_\_\_\_

Does your child repeat: a lot \_\_\_\_\_ a little \_\_\_\_\_ never \_\_\_\_\_



Does your child repeat easily or with effort?

Easily \_\_\_\_\_ With effort \_\_\_\_\_

III. Does your child do any of the following when speaking?  
(Yes or No)

Make faces \_\_\_\_\_ Move the head \_\_\_\_\_ Move arms/legs \_\_\_\_\_

Noisy breathing \_\_\_\_\_ Lip smacking \_\_\_\_\_ Tongue clicking \_\_\_\_\_

Other (describe) \_\_\_\_\_

When did your child say his first word? \_\_\_\_\_

What was your child's first word? \_\_\_\_\_

When did your child first walk? \_\_\_\_\_

When was your child toilet trained? \_\_\_\_\_

Describe how your child learned to talk compared to other children in your family.

Early \_\_\_\_\_ Late \_\_\_\_\_ Slow \_\_\_\_\_ Easy \_\_\_\_\_ Hard \_\_\_\_\_

Has your child ever attended school? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, where? \_\_\_\_\_

How long has your child attended school? \_\_\_\_\_

IV. Does any other member of your family stutter now or have they ever stuttered? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, who? NAME RELATIONSHIP TO CHILD

(OPTIONAL)

What was the last grade completed in school by the primary caretaker of this child? \_\_\_\_\_

Occupation of caretaker? \_\_\_\_\_

APPENDIX D  
LIST OF STIMULI

TOYS

1 telephone  
2 cars  
2 medium-sized rubber toys  
1 wind-up toy  
2 puppets  
2 dolls  
Fischer Price Play House  
Tea and plate set  
Fischer Price Farm Set

QUESTIONS

Who lives at your house?  
Tell me about them.  
What is your bedroom like?  
Do you have any pets?  
Tell me about them.  
What do you do to take care of a pet?  
What do you do at school?  
Tell me about your friends.  
What did you do for your last birthday?  
Tell me about your favorite TV show.  
Tell me how to make a peanut butter and jelly sandwich.

PROMPTS

Tell me more.  
What else?  
Why?  
MMM HMMM  
Tell me about it.  
Oh WOW.  
Pretend you are.....  
I wonder if.....

## APPENDIX E

## RULES FOR CALCULATING 300 WORD SAMPLES

1. Contractions of a verb form and "not" such as "won't" and "can't" are counted as one word. Contractions of a noun or pronoun and a verb, such as "I'm" and "they're" are also counted as one word (Branscom et al., 1955).
2. Hyphenated words which must occur together to convey thought are scored as one word, such as "tetter-totter" Branscom et al., 1955).
3. Nonsense syllables are not counted as words.
4. Interjections, such as "ah," and "um," and extraneous words such as "well" and "you know" are not included in the total word count. Interjections are referred to as "stallers" by Branscom et al. (1955).
5. For each instance of repetition, only the last complete form is included in the total word count. For example: "can-can-can" or "c-c-can" is counted as one word: "I can go, I can go" is counted as 3 words.
6. For each instance of revision-incomplete phrase, all words are included in the total word count. Part-words are also counted in this instance when the production was intentionally revised. For example: "She I mean he ran away" is counted as 6 words; "You ca-could do that" is counted as 6 words.
7. Isolated "yes," "yeah" and "no" responses are deleted from the total word count to prevent inflating the speech samples with single word utterances. "Yes," "yeah," or "no" followed immediately by another word or phrase, however, are retained (Yairi and Lewis, 1984).
8. Utterance segmentation should be based on terminal intonation contour, rising or falling.
9. Words that are used to initiate more than two utterances in succession and are not associated with meaningful text, are not included in the total word count. Examples: "Hey," "oh," "and."

10. Words used to represent animal noises, such as "meow," "moo," or "oink" are only included in the total word count when used within phrases. Examples: "Buck, buck" would not be counted: "the cow says moo" would be counted.

## APPENDIX F

## RULES FOR IDENTIFYING DISFLUENCIES

1. The insertion of any nonidentical remark between identical remarks cancels the repetitions. This includes words such as "yes," "no," and personal names. For example: "Put it in the wagon, no, put it in the wagon," or "We won't go down. Watch. We won't go down."
2. A phrase repetition may occur as part of one response, or may involve the repetition of a total response. For example: "What are these things, what are these things?" or "What are these, what are these things?" (Branscom et al., 1955).
3. The calling of an individual's name over and over does not count as a repetition. For example: "Mary, Mary, Mary!"
4. The absence of the definite or indefinite article does not cancel the response as a repetition, because of the difficulty of detecting it in rapid speech. For example: "You sleep in the doghouse, you sleep in doghouse" (Branscom et al., 1955).
5. A neutral vowel interjected or any interjections between two utterances of a part-word repetitions, word repetitions, phrase repetitions, or revision-incomplete phrases does not negate the disfluency. The neutral vowel is counted as an interjection. With or without the interjection, it is still an instance of disfluency. For example: "Are you, uh, are you going?" "Are you, uh, were you going to the store?" (Johnson, 1961).
6. Repetition of words of one syllable, such as "I" and "a" is considered word repetition rather than syllable repetition (Branscom et al., 1955).
7. Repetition of part of a contraction is considered a part-word repetition. For example: "I-I-I'm."

8. Sounds made in imitation of motors, rushing water, etc., are not scored as repetitions, since the child is attempting to imitate a continuous sound (Branscom et al., 1955).
9. Repetitions which are obviously part of a quotation are scored as repetitions. For example: "Ba, ba black sheep, have you any wool? Yes sir, yes sir, three bags full" (Branscom et al., 1955).
10. Repetitions that are definitely self-corrections as far as they involve a change of thought or word are not counted as repetitions but as revision-incomplete phrases. For example: "Thirth...thirty-four" (Branscom et al., 1955).
11. Repetitions of either meaningful or nonsensical syllables, words, or phrases for the apparent enjoyment of rhythm are not counted as repetitions. Due to the fact that this is a subjective judgement on the part of the investigator, the context will be the deciding factor.
12. Words that are repeated for emphasis are not counted as repetitions. Example: "very, very clean" (Johnson, 1961).
13. Extraneous sounds such as "um," "er," "hm," or words such as "well" and "you know" which are produced unintentionally within the flow of speech and are not part of the phrase or sentence are identified to as interjections. No matter how many times an interjection is repeated during one instance, it is only credited as one interjection. Examples: "Um-um, can I go to the store?" contains only one instance interjection while "uh, I went to the park and um-um, we saw some dogs" contains two instances of interjections.
14. Instances in which the content or grammar of a phrase or pronunciation of a word is modified are considered as revision-incomplete phrases. Example: "you go-you want to go to the store?" "My do-there's another car."
15. Audible or silent continuations of a sound or articulatory posture which interrupts the rhythmic flow of speech are considered disrhythmic phonations. Broken words, hard attacks and sound prolongations are synonymous with disrhythmic phonations.
16. Tension existing between words, part words, and interjections is identified as tense pause.

## APPENDIX G

## CODING SYMBOLS

Part-word repetition	PW
Word repetition	WR
Phrase repetition	PHR
Interjection	I
Revision-incomplete phrase	RIP
Disrhythmic phonation	DP
Tense pause	TP

## APPENDIX H

INSTRUCTIONS FOR SELECTION OF CONTENT  
TRANSCRIPTS FOR RELIABILITY TESTING

Video tapes have been made of a child and an adult interacting in a parallel play situation. The children's conversations on these video tapes have been transcribed verbatim, and these transcripts are what you will be working from. You are responsible for extracting ten episodes from each of the six transcripts you are given and forming a content transcript for each one. A content transcript is defined as the basic information of an utterance provided by the child, omitting any type of disfluency such as: part-word repetitions (PW), word repetitions (W), phrase repetitions (PHR), interjections (I), revision-incomplete phrase (RIP), disrhythmic phonations (DP) and tense pauses (TP), without the addition of any words that the child did not specifically speak. The following are specific guidelines that you need to use when developing these content transcriptions.

## A. Guidelines

1. Use episodes ten through nineteen from each of the five transcripts to form content episodes.



2. Only use those words that are present in the transcripts.
3. It may be necessary with some episodes to include the full episode that was presented on the transcript, especially if the episodes are very short and do not include any disfluencies. The following are examples that are to be included in the content transcripts:
  - a. maybe
  - b. hi
  - c. just go away
4. Words such as "yeah," "no" and "yes" that appear in the transcripts with nothing immediately followed are to be omitted from the content transcription.
5. Disfluencies in the basic transcript should not be included in the content transcript, this includes: part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses. For example, "I-I-I want cookies" would be written "I want cookies," and "Well, he went um, he went to the store" would be written "He went to the store."
6. In transcribing revision-incomplete phrases into content episodes only include the most complete form of the episode. For example, "But this one-but that

one not the same" would be written "But that one not the same" and "I have five-no six toys" would be written "I have six toys."

7. An unintelligible episode would be labeled as an unintelligible episode. If part of the episode is unintelligible, label the unintelligible segment but include the transcribed section in its complete form.
8. Any additional sounds or pulses at the beginning, middle or end of the episode should not be included in the content transcription.

B. Examples of Full Transcription and Corresponding Content Transcription:

<u>Full Transcription</u>	<u>Content Transcription</u>
1. You mean up here?	1. You mean up here?
2. Um nope, white and brown I think.	2. white and brown I think.
3. But it but it-it doesn't have chicks on top.	3. But it doesn't have chicks have chicks on top.
4. Nowhere	4. Nowhere.
5. Nobo-nobody broke this one.	5. Nobody broke this one.
6. w-when-when you put	6. when you put this on.
7. He (unintelligible) transformer.	7. He (unintelligible) transformer.
8. It's-it's fruit.	8. It's fruit.

## APPENDIX I

## INSTRUCTIONS TO RELIABILITY JUDGES

PART ONE: Instructions for Selection of Content Transcripts  
for Reliability Testing.

Read the attached instructions to the individual responsible for preparation of content transcription for reliability testing.

## PART TWO: General Instructions

You will be given six partially complete transcripts randomly selected from a group of 33 to 39 month old children and a group of 57 to 63 month old children. These transcripts contain 10 episodes, and are only partially complete. The transcripts do not include any type of disfluency such as: part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses. The transcripts contain only the content of the episodes. Remember that these transcripts may not be perfect and that mistakes can be made even in determining the content of the episodes. Listen to the entire episode and see if you agree with all the words that have been given

to you, then add the additional words you are hearing along with all disfluencies.

The purpose of this reliability testing is to determine the investigators accuracy at identifying part word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses. The following are operational definitions:

1. Part-word Repetitions: refer to the unintentional repetitions of parts of words, either syllable or sound. An interjection between sound or syllable units does not negate the repetition. One repetition instance is credited even though a sound or syllable unit may be repeated several times.

Examples: b-b-ball

nobo-nobody

down-um-downtown

2. Word Repetitions: refer to the unintentional repetitions of whole words, including words of one or more syllables. An interjection between word units does not negate the repetition. One repetition instance is credited even though a word is repeated several times.

Examples: one-one-one more candy

can-um-can-um-can I go now

3. Phrase Repetitions: refer to the unintentional utterance of two or more words or part of word. An

interjection between phrase units does not negate the repetition.

Example: and can, um, and can I go?

he was g-, he was going.

4. Interjections: refer to extraneous sounds such as "um," "er," "hm," or words such as "well" and "you know" which are inserted within the flow of speech and are not part of the phrase or sentence. No matter how many time an interjection is repeated, it is only credited as one interjection.

Examples: "um-um, can I go to the store?" contains only one instance of interjection.

"uh, I went to the park and um-um, we saw some dogs" contains two instances of interjections.

5. Revision-incomplete Phrases: refer to instances in which the content of a phrase is modified or in which there is a grammatical modification. Changes in the pronunciation of a word is also counted as a revision-incomplete phrase. An interjection uttered between a revision-incomplete phrase does not negate the disfluency. This term is used synonymously with false start.

Examples: you g- you can go to the store

my dog-there's the other car

they have the same names, um, why

6. Disrhythmic Phonations: refer to audible or silent continuation of a sound or articulatory posture which is

of such excessive duration as to interrupt the rhythmic flow of speech. This disfluency occurs within words and includes broken words and prolongations.

Examples: dri-i-ve the car

b---ut

y---your home

7. Tense Pauses: also referred to as tension and exists between words, part words, and nonwords when at the between-point in question there are barely audible manifestations of heavy breathing or muscular tightening. The same phenomena within a word would place the word in the category of disrhythmic phonation.

Examples: can we go to the zoo?

I am going to the store.

#### PART THREE: Procedures for Transcription and Identification of Disfluencies.

Five transcripts were randomly selected by an individual not involved with the study and were then prepared into content transcripts. Reliability raters were given these transcripts. The investigator then played the corresponding segment of the video tape that matches the content transcripts and showed all ten episodes in their entirety to the reliability raters. The investigator then played the video tape segment again only showing the raters one episode at a time. The raters were responsible for filling in all missing parts of the transcripts, including words and

disfluencies that were deleted. The raters identified the target disfluencies. Raters were responsible for making any changes in the transcripts due to errors made by the individual selecting content transcripts.

The raters were allowed to review the episodes when requested. There was no talking or discussion during reliability testing except when a request was made to review an episode.

The following rules were used when transcribing and identifying disfluencies:

1. Raters were responsible for the identification of part-word repetitions, word repetitions, phrase repetitions, interjections, revision-incomplete phrases, disrhythmic phonations, and tense pauses.
2. The disfluencies were identified by encircling the following notations above the disfluency:
  - PW: for part-word repetitions
  - W: for word repetitions
  - PHR: for phrase repetitions
  - I: for interjections
  - RIP: for revision-incomplete phrases
  - DP: for disrhythmic phonations
  - TP: for tense pauses
3. Any interjection between two utterances of a part-word repetition, word repetition, phrase repetition, or

revision-incomplete phrase does not negate the repetition. Interjection repetitions were not counted as either part word or word repetitions.

Examples: They um, um they

We went uh I bought chocolate cookies

What is this um, what is this?

4. No matter how many units of part-word, word or phrase repetitions occurs, only one was credited as an instance of disfluency.
5. An episode may have a combination of any of the seven disfluences and therefore were credited as separate disfluencies.

Examples: Th-the-the table-the table  
(1 part-word, 1 word and 1 phrase)

The-the cat-the dog ate a bond um, she went  
to the doctor  
(1 word, 2 revision-incomplete and 1  
interjection)

6. Repetitions of the first part of a contraction such as: "she-she's" and "I-I'm" was credited as part-word repetition since the contraction functions as a single word for the young child and was calculated as one word when determining the 300 word count for the initial transcripts.



#### PART FOUR:

A training session was conducted by the investigator prior to the actual reliability testing, using the same procedures outlined above. The training session included practice identification of three different content transcripts. The reliability raters were 100% in agreement with each other before starting the reliability testing. Differences were discussed with all members of the reliability team until everyone was in agreement over the disfluency identification.