

**DISFLUENCIES IN MALAYALAM SPEAKING CHILDREN  
(3-8 YEARS)**

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MYSORE**

**MAY 2000**

*Dedicated to  
Achan and Amma*


*for brining me up, the way you have.*

*I owe it all to you*

## CERTIFICATE

This is to certify that this Dissertation entitled :  
**DISFLUENCIES IN MALAYALAM SPEAKING CHILDREN**  
**(3-8 YEARS)** is the bonafide work in part fulfilment for the degree  
of Master of Science (Speech and Hearing) of the student with  
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## CERTIFICATE

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**DISFLUENCIES IN MALAYALAM SPEAKING CHILDREN  
(3-8 YEARS)** has been prepared under my supervision and  
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## **DECLARATION**

This Dissertation entitled : **DISFLUENCIES IN MALAYALAM SPEAKING CHILDREN (3-8 YEARS)** is the result of my own study under the guidance of Dr.S.R.Savithri, Reader in Speech Sciences, Department of Speech Sciences, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other diploma or degree.

Mysore

May, 2000

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# CHAPTER I

## INTRODUCTION

Most of us believe we know what stuttering is; yet when it comes to defining this term, there is a great deal of disagreement. Due to the complex nature of this disorder, no definition provided so far has been able to do justice to this abnormality. One of the most comprehensive definitions is the one provided by Wingate (1964). He defined stuttering as

- I (a) Disruption in the fluency of verbal expression, which is
- (b) characterized by involuntary, audible or silent, repetitions or prolongations in the utterance of short speech elements, namely : sounds, syllables, and words of one syllable. These disruptions
- (c) usually occur frequently or are marked in character and
- (d) are not readily controllable.

II Sometimes the disruptions are (e) accompanied by accessory activities involving the speech apparatus, related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being speech-related struggle.

HI Also there is not infrequently (f) indications or report of the presence of an emotional state, ranging from a general condition of excitement or tension to more specific emotions of a negative nature such as fear, embarrassment irritation or the like (g) The immediate source of

stuttering is some incoordination expressed in the peripheral speech mechanism; the ultimate cause is presently unknown and may be complex or compound.

The difficulty is not only in defining stuttering, but also in differentiating it from normal nonfluency. In adults, it is easy to identify stuttering, because, one becomes increasingly fluent as he grows up and a normal adult's speech is effortless continuous and rapid, or in other words 'fluent'.

However, it is not so with the speech of children. Studies have revealed that the speech of young children is comprised of different types of disfluencies which include, unfilled pauses, repetitions (part word, word and phrase repetitions), incomplete phrases, disrhythmic, phonations, interjections, revisions etc. (Kowal, O'Connell, Sabin (1975); Haynes and Hood, 1977; Yairi, 1981; Dejoy and Gregory, 1985).

These are the very kind of disfluencies one would commonly find in stuttering. Owing to this, differential diagnosis of stuttering from normal disfluency becomes a tedious task. In the past, efforts have been made to identify criteria to differentiate stuttering from normal non-fluency.

Johnson, Branscom, Hughes and Oxtoby (1959) studied two groups (stutterers and non-stutterers) of 68 boys and 21 girls each, between the age range of 2 1/2-8 years. Their samples were analyzed for the occurrence of eight kinds of disfluency. The following were the findings :

- 1) Stutterers had greater frequency of disfluencies,
- 2) No significant difference was found in the case of interjections, revisions and incomplete phrases, between the two groups,
- 3) Stutterers had more number of sound, syllable, word and phrase repetitions, broken words and prolonged sounds than other kind of disfluencies and
- 4) Stutterers also had higher number of units per repetition.

Van Riper (1971) listed a number of behaviours on the basis of which, one could differentiate between stuttering and normal disfluency. These were broadly classified under the following subheadings : syllable repetition, prolongation, silent pauses, phonation (phonatory inflections, arrests, vocal fry) articulatory posture, reaction to stress, evidence of awareness. Under each of these were given a number of features as exhibited by stuttering and normally disfluent children. His work can be regarded as one of the significant contributions in this area.

Yairi and Lewis (1984) found more of syllable repetitions, disrhythmic phonation and part word repetitions in stuttering children whereas the normally disfluent group showed more of interjections and part word repetitions. The frequency of disfluencies were also much greater in the stuttering group. This group also had higher number of units per repetition.

Zebrowski (1995) summarized the findings of various authors. According to him, the following factors would help in differentiating the stuttering group from their normally non-fluent counterparts among young children.

- 1) Children with stuttering were twice as disfluent as nonstuttering children,
- 2) stuttering children produced more within-word disfluencies than the other group. Sound prolongations and sound/syllable repetitions were more frequent in the former group,
- 3) stuttering children produced high proportion of sound prolongations, longer prolongations and slower articulatory speech rate when compared to normally - nonfluent children, who produced greater number of repetitions, few prolongations of relatively short duration and average articulatory' rate,
- 4) number of repeated units within sound, syllable and word repetitions were greater in stuttering children,
- 5) increased duration of sound/syllable repetitions a slowed rate of repetition, or both were clear indications of progression of stuttering in children, and
- 6) stuttering group exhibited a wide number and variety of behaviours in association with their stuttering, which was not seen in the other group.

Apart from perceptual parameters, acoustic parameters have also been studied,

Stromsta (1965) suggested that spectrographic analysis can be made use of in differentiating between stutterers and children with normal disfluency. He suggested the following features to be typical of stutterers' speech - lack of formant transition, abrupt phonatory stoppages in association with prolongation and clonic-type disfluencies. In his study, he found that children who exhibited these features in their spectrograms, when examined ten years later were continuing to stutter, whereas those who did not exhibit these features had become fluent speakers.

It is apparent that majority of the researchers have based the differentiation on the features exhibited in the speech of the subjects.

As Starkweather (1987) opines, knowledge of fluency is a must for the understanding of dysfluency. Only by having a clear and sound knowledge of the fluency development in children, can one identify the disfluent/stuttering group. Therefore, in clinical practice, in order to diagnose a child as having stuttering, it is necessary that the clinician is well aware of the kind of disfluencies seen in normal children of the same age group. Thus, the study of fluency becomes very significant.

Attempts to study fluency in normal children have been made both in English as well as in Indian languages. (Kowal, et al. 1975; Haynes and Hood, 1979; Yairi, 1981;, Dejoy and Gregory, 1981; Nagapoornima 1990; Indu, 1990; Yamini, 1990; Rajendraswamy, 1991;

Sharma, 1991;, Sowmya, 1992; Joby, 1998). These studies have in turn helped in finding the percentage of different types of disfluencies exhibited at various ages by children. Some authors have also proposed tests to distinguish between stuttering and normal non-fluency on the basis of their findings. Unlike the studies in English, those conducted in Indian languages have considered each repetition as one instance, which has resulted in more than 25 percent disfluency in normal children. This has also resulted in large discrepancies between the results of the studies in English (5%) and Indian languages. In this context, the present study is aimed at examining the disfluencies in 3-8 year old Malayalam speaking children. In this study, however, an event of repetition will be considered as one repetition unlike the way it was done in earlier studies in other Indian languages.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Fluency refers to continuous effortless speech at the rapid rate of utterance (Starkweather, 1987). While it is easy to distinguish an adult stutterer from a normal adult it is difficult to differentiate a child who stutters from the one who is normal. In the past, studies on development of fluency have been done which have partly helped in differentiating stuttering from normal nonfluency. These studies have mainly concentrated on the speech continuity aspect of fluency.

Smith (1926) studied groups of pre-school children. He reported repetitions in the speech of these children. However, these were not differentiated by types and were not classified according to age and sex of the subjects. Reports by Fisher (1932) also suggests that non-fluencies of some kind occur among many young children. She studied the speech of 72 pre-school children and found a good correlation between the chronological age and percent of disfluencies.

Davis (1939) studied the repetitions in 62 children whose ages ranged from 24 to 62 months. The sample taken was one hour of extemporaneous speech. The results showed that almost all the children, had syllable, word and phrase, repetitions and in terms of frequency of occurrence, phrase repetitions ranked first followed by word and syllable repetitions. There was a decrease in the amount of repetition with age, but syllable repetitions remained unaffected Also, this type of repetition



was found more in boys than girls. Other types of repetitions did not show any such differences with respect to the sex of the subjects.

Using the same sample, Davis (1940) attempted to relate syllable, word and phrase repetitions to the various measures of language maturity. The results showed that language maturity did not play an important role in determining the repetitions and therefore it cannot be considered as an explanation for the higher frequency of repetitions in pre-school children.

Metraux (1950), Eglund (1955), Branscom, Hughes and Oxtoby (1955), Johnson, Branscom, Hughes and Oxtoby (1959) have also reported that disfluencies like word repetitions, interjections, in complete phrases etc. are common among pre-schoolers. Maclay and Osgood (1959) examined whether there existed any significant relationship between speech pauses and grammatical structure in preschool children. His study revealed that pauses occur more before content words than before function words.

Goldman-Eisler (1968) found that pauses tend to precede high information words, but the pause duration has nothing to do with the syntactic structure. McDearman (1968) examined a set of 300 children (150 experimental group, 150 control group) and out of this group, 28% was found to have normal nonfluency. These children exhibited mainly repetitions of words and phrases, and other such interruptions.

Cook (1971) made an attempt to study the correlation between length of pauses and word complexity/uncertainty. He found that longer

filled pauses occur at moments of higher uncertainty. Martin, Haroldson and Kuhl (1972) studied 20 children between the age group 3.5-5 years. They found dysfluencies of the following kind in these children;- repetitions (sound, syllable, word and phrase), prolongations and interjections;- . Moreover, there was no significant difference in the percentage of dysfluencies and number of words omitted between the two speaking situations (mother-child, child-child). The percent of dysfluencies also did not vary over the sessions. Thus, the disfluencies of children appear to be less environmental variable.

Silverman (1972) compared the percent of disfluencies in two situations; preschool classroom and a structured interview in a pre-school group of 10, 4-year old boys. The following disfluencies were found;- interjection, part-word repetition, word repetition, phrase repetition, revision of incomplete phrase, disrhythmic phonation and tense pauses;- . Tense pauses and disrhythmic phonation were found to be of less frequency when compared to the other types of disfluencies. The disfluencies were also found to be more in the structured interview, suggesting variation of disfluencies with the environment.

Yairi and Clifton (1972) compared the disfluencies in three groups of normal speakers - preschool children, high school seniors and geriatric persons. Each group had 15 subjects; half males and half females. Picture cards were used to elicit responses. It was seen that the total number of disfluencies decreased from preschool to high school subjects. However, there was an increase in the number of disfluencies noticed in the geriatric group. The reason for this is not known.

Interjections, revisions incomplete phrases and word repetitions were the most frequent type of disfluencies noticed in these three groups. The least frequently occurring disfluency type in all the three groups was tense pauses.

Helmerich and Bloodstein (1973) made use of free speech elicitation task to study the disfluencies in a group of four-year old normal speaking children. They found increased disfluencies on syntactical structures such as pronouns and conjunctions and the disfluencies were also more in the initial position. Silverman (1973) studied 10. four year old normally speaking boys. The task was spontaneous speech. He found repetitions, more of part word type, filled pauses and tense pauses in this group. However, tense pauses were not as frequent when compared to other two types of disfluencies.

Kowal, O'Connel and Sabin (1975) conducted an elaborate study in which they investigated 168 children, 24 (12 boys and 12 girls) at each of seven different age levels. The task was describing a series of cartoons. Five categories of nonfluencies were considered - (1) unfilled pauses (2) filled pauses (3) repetitions (4) false starts (5) parenthetical remarks. The results revealed that, disfluencies in general did not decrease with age, but rather fluctuated with development. A detailed examination of data, showed that different types of disfluencies varied differently with development. As children grow, they do not have fewer nonfluencies but they learn more adult ways of being nonfluent. At older ages, they exhibit more of parenthetical remarks and false starts which are more of sophisticated kind of disfluencies when compared to syllable repetitions which are considered to be immature types.

The authors also examined the length of unfilled pauses which was seen to be declining with age; whereas the number of syllables produced between pauses increased, Kowal et al. concluded that pauses and hesitations were commonly found in adult speech; however these convey little information. It only helps in alerting the listener that a large amount of information will follow and thus allows the speaker some additional time to encode it.

Haynes and Hood (1978) examined the disfluencies in a group of 5 year old kindergarten children (20 M and 20 F), in 'modelled' grammatically simple and complex sentences. The examiner modelled the sentences for a group of pictures and the subject was encouraged to produce a sentence describing each of the pictures. These authors noticed that more disfluencies occurred when subjects produced sentences that contained complex grammatical constructions when compared to productions of simple constructions. This finding was, however, in contrast to the findings of Haynes and Hood (1977) where they reported of no relationship between expressive language skills and disfluencies in nonstuttering children.

Bjerkan (1980) studied the spontaneous speech samples of 110 nursery school children, aged 2 years 1 month to 6 years. Mainly two types of disfluencies were studied;- fragmentation and word repetition;- . On analysis, the most frequent type of disfluency noticed in this group was, word repetitions which decreased with age. The other type of disfluency i.e. fragmentation (fragmentation of a word before the whole word is pronounced) was very rarely found in this group.

Pearl and Bernthal (1980) examined the effect of grammatical complexity on the disfluency behavior of nonstuttering 3-4 year old children. The task was repetition of 30 sentences which represented six different grammatical constructions. The subjects had to repeat these after the examiner. The results revealed a relationship between disfluencies and grammatical complexity. Subjects produced significantly more disfluencies on passive sentences than on any other sentence type. Interjections, word repetitions, and revisions were significantly more on this particular sentence type. However, they concluded that other factors like subjective factors, task differences etc. could affect the occurrence of disfluencies in preschoolers.

Yairi (1981) analyzed the spontaneous verbal output of 33, two-year old children to identify disfluencies. The results showed great variability in the total number of disfluencies across subjects, however, no significant sex differences were found. The major types of disfluency found in these subjects were part word repetitions, single-syllable word repetitions, interjections and revisions though other types of disfluencies like disrhythmic phonation tense pauses, phrase repetitions were also found. Of these, the most prominent type was repetition of short segments, one syllable or less. Certain other types of disfluencies, not reported in two year olds by the earlier studies were exhibited by these subjects. These include disrhythmic phonation, tense pauses etc.

Fagan (1982) studied a group of preschool children and the results revealed that these children exhibit higher frequencies of interjections and revisions incomplete phrases than other categories.

These were more so in older children. Also, these were the same kind of disfluencies that are found in adults also.

Wexler and Mysak (1982) examined the fluency characteristics of 36 nonstuttering males aged 2, 4 and 6 years in terms of patterns of disfluency and relationships among disfluency variables. The most frequently occurring disfluency types at all the three age levels were revision - incomplete phrase and interjections. The least noted type was part-word repetitions for 2 and 4 year olds and disrhythmic phonations for 6 year olds. Though the patterns of disfluency were similar at all age levels, the magnitude of disfluency types was greater for the 2 year old group. There was significant correlation between certain disfluency types e.g. revision - incomplete phrase and interjections while certain other types showed no linear relationship e.g. interjection and phrase repetitions. The authors also postulated that a linguistic factor could be responsible for disfluency types like revision- incomplete phrase, interjections and word repetitions, and a motor factor for disfluencies like part word repetitions and disrhythmic phonations.

DeJoy and Gregory (1985) studied the frequencies of nine types, of disfluency in the spontaneous speech sample of 60 nonstuttering males between 3.5 and 5 years of ages. The disfluency types studied are as follows (1) part word repetitions (2) word repetitions (3) phrase repetitions (4) revision (5) interjections (6) incomplete phrases (7) disrhythmic phonations (8) grammatical pauses (silent pauses occurring at grammatical junctures such as before relative and interrogative pronouns, before adverbial clauses etc) (9) ungrammatical pauses (silent pauses occurring at non-grammatical points in the flow of speech i.e.

between repeated units of speech, between a unit of speech and a revision of that unit etc.). The results revealed significantly higher rates of part word, word, and phrase repetitions, incomplete phrases and disrhythmic phonations in the younger group whereas older group evidenced more number of grammatical pauses. The two groups differed mainly in the frequency of phrase repetitions. Thus, the results of this investigation suggest that nonstuttering children begin to show more adult-like disfluency patterns towards the later preschool years as they became more accomplished in the symbolic/motoric selection task,

Ratner and Sih (1989) studied the effects of sentence length and complexity on the disfluencies of children. The subjects were 8 normal and 8 stuttering children between the age range of 3.11 - 6.4 years. The task was imitation of sentences of increasing length and complexity. The findings of their study suggested a good correlation between syntactic complexity and fluency breakdown; whereas no such correlation was found between incidence of disfluencies and sentence length. These findings were true for both stuttering as well as normal speaking children.

Gordon and Luper (1989) examined the differences in the number of disfluencies of 3, 5 and 7 year old nonstuttering children. The number of disfluencies were also studied in correlation with the syntactic complexity. The tasks were (1) sentence imitation task where the subjects repeated 30 sentences and (2) sentence modelling task in which the subjects produced response constructions from 30 pictures after receiving a model from the experimenter. The analysis of results revealed that the number of disfluencies decreased with age. The

disfluencies were significantly greater for the modeling task than the imitation task. Similar to the findings of some earlier studies, this study also indicated a good positive correlation between grammatical complexity and number of disfluencies. It was also noted that later developing syntactic patterns were more likely to contain disfluencies.

Nagapoornima (1990) studied the disfluencies in 12 Kannada speaking normal children between the age range of three to four years (two each (1 boy, 1 girl) in two month intervals). The tasks were picture description, conversation, rhymes and story telling. The following types of disfluencies were studied (1) unfilled pauses (2) filled pauses (3) repetitions (syllable, word, part word and phrase repetitions) (4) false starters (5) parenthetical remarks (6) audible inspiration/ expiration (7) part question repetition (8) prolongations. Results indicated that these subjects had maximum number of unfilled pauses, followed by filled pauses, parenthetical remarks, repetitions and false starters. The disfluencies were more for the picture description task and they occurred more in the initial position, except for parenthetical remarks, which were seen more in the story telling task and in medial position. Disfluencies were also found to be more before content words, especially nouns.

Indu (1990) assessed the disfluencies in twelve Kannada speaking normal children between 4-5 years of age, (two each 1 boy and 1 girl in two month intervals). The tasks given and the disfluency types studied were the same as in the earlier study. The results indicated that children in the age group 4-5 years had more filled pauses followed by repetitions and parenthetical remarks. Other disfluency types occurred



minimally. Similar to the previous study, more disfluencies occurred before content words, especially nouns and the disfluencies were noticed more in the initial position.

Yamini (1990) examined the disfluencies in twelve, normal Kannada speaking children between the age range of 5-6 years (two each (1 boy 1 girl) in two month intervals). Three tasks;- conversation, picture description and story narration;- were given to the subjects. The standard nine-types of disfluencies were studied. Unfilled pauses, filled pauses, parenthetical remarks and audible inspirations were found to be the most frequently occurring disfluencies whereas prolongations, part question repetitions, repetitions and false starts occurred very rarely. These disfluencies occurred maximally in conversation, were more in the initial position and especially before nouns.

Rajendraswamy (1991) evaluated the disfluencies of 12 Kannada speaking normal children in the age range of 6-7 years (two each (1 boy 1 girl) in two month intervals). Story narration task was used. The overall disfluencies were found to be more for male subjects. The percentage of disfluencies increased from 6.0 - 6.2 years to 6.4 - 6.6 years and then declined and again increased slightly between 6.10-6.12 years. The most frequently occurring disfluency in these subjects was filled pauses followed by parenthetical remarks and repetitions. The disfluencies were maximum on verbs and occurred most frequently in the initial position.

Sharma (1991) studied the disfluencies in 12 Hindi speaking normal children between the age range of 6-7 years (two each in two month interval). Story telling was the task chosen. All the eight categories of disfluencies were studied. Two types of analysis were done - one in which an instance of disfluency was defined as a disfluency and another in which an instance of disfluency was measured as a disfluency occurring once irrespective of the number of disfluency in each instance. Results revealed that overall percentage of disfluency was less for females than males. Unfilled pauses, parenthetical remarks and audible inspirations occurred most frequently. These disfluencies were maximum in the initial position and more before content words (nouns, pronouns, verbs and conjunctions) Type II analysis yielded lesser percentage of disfluencies.

Based on their findings, Nagapoomima (1990), Indu (1990), Yamini (1990) and Rajendra swamy (1991) proposed fluency tests for the respective age groups. Sowmya (1992) conducted a study which aimed at differentially diagnosing the children as stutterers and non-stutterers using the fluency test proposed and developed by these authors. The subjects were 25 children in the age range of 3-7 years. Picture description was the task chosen. The results of her study showed that the test was valid and clinically useful for differential diagnosis. She also found that unfilled and filled pauses were more in younger age group and increased percentage of repeats and filled pauses in the older age group facilitated easy diagnosis of stuttering.

Joby (1998) studied, 20 Malayalam speaking children between the age range of 3-5 years (five each in six month intervals). The tasks

chosen were general conversation, recitation and story narration. The following nine disfluency types were analyzed;- unfilled pauses, filled pauses, repetitions, false starts, parenthetical remarks, prolongations, audible inspirations/expiration and unfilled pauses;- Repetitions and prolongations were found to be decreasing with age, whereas filled pauses, false starts, parenthetical remarks increased with age. Audible inspirations were found to be least in the lowest age group (3.0 - 3.6 years) and maximum between 3.6 - 4.0 and 4.6 -5.0 years. Disfluencies were also found to be more in the initial position and more on verbs.

Table 1 shows the summary of the percent dysfluency as reported by various authors.

Sl.No	Author	Year	Percentage
1.	Davis	1939	2-8.5
2.	Cook	1971	1.8-3
3.	Martin et al.	1972	1.8 - 2.8
4.	Silverman	1972	2.64- 16.22
5.	Haynes and Hood	1978	6
6.	Bjerkan	1980	6.3
7.	Yairi	1981	7-9.5
8.	Wexler and Mysak	1982	0.2 - 3.5
9.	DeJoy and Gregory	1985	3.3 - 4.68
10.	Indu	1990	0-24
11.	Nagapoornima	1990	0-30
12.	Yamini	1990	0 - 36.2
13.	Rajendraswamy	1991	0- 11.79
14.	Sharma	1991	0.22 - 13.35
15.	Joby	1998	0-13.24

Table-1: Summary of percent disfluency as reported by various authors.

While the percent disfluency is below 5% as reported in English, it is above 25% in Indian languages. The reason for the discrepancy lies in the way disfluencies have been measured, for example in English r...r.r.r rat has been measured at one instant of repetition, in Indian languages the authors have measured it as four repetitions. In the current study, it is proposed to follow the measurement of investigators in English which would be faster and may be clinically more useful.

## CHAPTER III

### METHODOLOGY

**Subjects:** A total of 60 subjects in the age group of 3 years to 8 years participated in the study. This age range was divided into five intervals of one year each (3-4, 4-5, 5-6, 6-7, 7-8) and 12 subjects (6 boys and 6 girls) were chosen in each age interval. All the subjects were native speakers of Malayalam and had no history of speech, language and/or hearing problems.

**Material:** The task chosen was picture description. The material used were picture of animals for age group of 3-4 years and cartoons for 4-6 years and pictures depicting panchatantra stories for age group of 6-7 years and 7-8 years.

**Procedure :** Children were tested individually. The pictures were presented to the children, one at a time and a response was elicited. The experimenter first gave an example in which she described one picture in order to familiarize the subjects with the task. The procedure was carried out in a natural situation and the responses were audio recorded.

**Analysis :** The recorded samples were analysed for the following dysfluencies after performing a verbatim transcription :

1. Filled pauses (FP) - pauses filled with sounds like 'mm'... 'a...', 'eh...' etc.

2. Unfilled pauses (UP) - silent pauses which had a duration greater than 300 msec.
3. **Repetitions** - This included repetitions of sounds (SoR), syllables (<SR), part-words (PWR), words (WR), phrases (PhR) or sentences (SeR).
4. **Parenthetical remarks (PR)** - This included words like /pinne/, /appo/, /ennittu/etc.
5. **False starts (FS)** - Dysfluencies which represent changes in pronunciation, word, grammatical structure or content of what is said, were included under this.
6. **Audible inspiration (AI)** - Audible inspiration during speech.
7. **Prolongation (P)**- Extended duration of sounds.

Unlike in the other studies conducted in Indian languages, in this study, the whole instance of repetition was considered as one repetition. For example p - p - p - pen would constitute one repetition and not three repetitions. The same was true for filled pauses also i.e., even if there were more than one extraneous sound, it was still considered as a single filled pause. For example em em em would be one filled pause and not three.

The position of the word (initial, medial or final) in which the disfluency occurred and also the grammatical category on which it occurred were also noted. The position in which the disfluency occurred was determined only for sound, syllable and part word repetitions and prolongations.

If there were any extraneous utterances, which did not have any relation to the rest of the sentence, those were discarded.

Eg. bi, su etc.

The percentage of disfluencies was calculated using the formula given below :

Percentage of total number of disfluencies :

$$\frac{\text{Total number of disfluencies}}{\text{Total number of words}} \times 100$$

Percentage of particular type of disfluency :

$$\frac{\text{Total no.of that particular type of disfluency}}{\text{Total no.of disfluencies}} \times 100$$

The data was tabulated to find out the percentdisfluency in each age group.

The results obtained from this study were compared to the results of the studies done in other Indian languages to check for any significant variations.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### **Age Group 3-4 years:**

The subjects of this age group had the highest percentage of disfluencies. The most frequently occurring disfluency type was unfilled pauses, followed by filled pauses. Parenthetical remarks were next in frequency which was followed by audible inspirations, false starts, prolongations, syllable and word repetitions. The least frequently occurring disfluencies were part word repetitions and sentence repetitions. Sound repetitions and phrase repetitions were not seen in this age group (Table 2).



Dis-fluency	Subjects												
	1	2	3	4	5	6	7	8	9	10	11	12	Average
FP	1.20			4.74	2.80	28.57	4.35	9.09	1.37	6.93			7.38
UP	30.12	14.29	9.17	0.86	10.49	10.99	10.43	5.88	34.25	1.98	8.95	21.43	13.24
SoR	-	-	-	-	-	-	-	-	-	-	-	-	-
SR	-	0.79	1.67	1.29	2.10	-	2.6	1.07	1.37	0.99	-	-	1.49
PWR	-	-	-	0.43	-	-	-	-	-	0.99	-	1.79	1.07
WR	1.20	1.59	-	-	1.40	-	-	1.60	-	-	1.49	-	1.46
PhR	-	-	-	-	-	-	-	-	-	-	-	-	-
SeR	-	-	0.83	-	-	-	-	1.07	-	-	-	-	0.95
PR	-	-	-	11.64	-	-	-	2.67	-	-	-	-	7.16
FS	2.41	2.38	4.17	6.90	-	2.20	-	0.53	-	0.99	4.47	-	3.01
AI	19.28	0.79	1.67	4.31	-	12.09	-	1.07	-	-	-	-	6.54
P	-	-	-	-	-	-	-	2.67	-	-	1.49	-	2.08
Total	54.21	19.84	17.5	30.17	16.78	53.85	17.39	25.67	36.99	11.88	16.42	23.21	26.99

Table-2: Percentage of each disfluency type and average disfluency exhibited by each subject (3-4 years)

Filled pauses, unfilled pauses, word repetitions, false starts and prolongations were found to be maximum on nouns. Syllable repetitions, parenthetical remarks and audible inspirations were maximum on numbers. The other disfluency types did not show high percentage on any particular grammatical class. Filled pauses did not occur on adverbs. Unfilled pauses did not occur on adverbs and case markers. Syllable repetitions were seen only on nouns, adjectives and numbers. Parword repetitions were exhibited only on nouns, numbers and prepositions. Word repetitions were seen only on nouns, verbs, numbers and prepositions. Only nouns, numbers and prepositions had sentence repetitions. Parenthetical remarks were observed only on nouns, adjectives, numbers, determiners and case markers. False starts were also seen on the above grammatical classes, but not on determiners. Audible inspirations were found on nouns, verbs, adjectives, numbers, determiners, prepositions and case markers. Prolongations, however, was present only on nouns, numbers and prepositions. None of the disfluency types occurred on place markers, interrogatives and conjunctions. Thus, the maximum number of disfluencies were found to be on nouns in this age group (Table-3).

Dis-fluency	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FP	28	1	8		19	3	3	1	1	1	2			
UP	68	3	25		42	2	2	2	1	1	-	-	-	-
SoR	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SR	5	-	2		6	-	-	-	-	-	-	-	-	-
PWR	1	-	-	-	1	-	1	-	-	-	-	-	-	-
WR	5	1	-	-	2	-	1	-	-	-	-	-	-	-
PhR	-	-		-	-	-	-	-	-	-	-	-	-	-
SeR	1	-	-	-	1	-	1	-	-	-	-	-	-	-
PR	7	-	1		15	4	-	-	-	-	4		-	
FS	17	-	2		12	-	-	-	-	-	2		-	
Al	4	1	2		27	1	1	-	-	-	2		-	
P	3	-	-	-	-	-	1	-	-	-	-	-	-	-
Total	139	6	40		125	10	10	3	2	2	10		-	
%	40.06	1.73	11.53	-	36.02	2.88	2.88	0.86	0.58	0.58	2.88	-	-	

1. Noun, 2. Verb, 3. Adjective, 4. Adverb, 5. Number, 6. Determiner, 7. Preposition, 8. Pronouns, 9. Possessive nouns, 10. Negatives, 11. Case marker, 12. Place marker, 13. Interrogative, 14. Conjunction

Table-3: Percentage of each type of disfluency on different grammatical classes in age group of 3-4 years.

The subjects exhibited maximum number of disfluencies in the initial position followed by medial position and final position (Table-4).

Initial	Medial	Final
86.96%	8.70%	4.35%

Table-4: Percentage of occurrence of disfluencies in different word positions (3-4 years)

### **Age Group 4-5 Years**

Children in this age group had lesser percentage of disfluency when compared to the 3-4 years old children. However, this was greater than the percentage of disfluency seen in children in other age groups. The disfluencies were unfilled pauses followed by audible inspirations and filled pauses, parenthetical remarks, sound repetitions, word repetitions, syllable repetitions and false starts in the descending order of frequency. This was followed by part word repetitions and the least frequently seen disfluency type was sentence repetition. No phrase repetitions and prolongations were noticed (Table 5).

Dis- fluency	1	2	3	4	5	Subjects 6	7	8	9	10	11	12	Average
FP	4.39	2.96		13.08	5.95	7.25	6.90	3.96	5.77	3.17		3.42	5.68
UP		2.22	2.33	1.87	3.57	13.04			13.46	15.87	11.11	0.85	7.15
SoR		2.22			2.38			1.98				3.42	2.5
SR	1.75	2.96	1.16		2.38				1.92	1.59			1.96
PWR	0.43			0.93							1.85		1.07
WR	0.43			1.87	1.19	1.45	4.60	2.97	3.85			0.85	2.15
PhR													-
SeR												0.85	0.85
PR	5.26	0.74	1.16	0.93			6.90	9.90	3.85	3.17	1.85	1.71	3.55
FS	0.44	0.74		1.87	4.76		2.30	0.99		1.59		0.85	1.69
Al P			1.16		2.38	2.90	25.29	5.94				2.56	6.71
Total	12.72	11.11	5.81	19.63	22.62	24.64	45.98	25.74	28.85	25.40	14.85	14.53	20.99

Table-5: Percentage of each disfluency type and average disfluency exhibited by each subject (4-5 years)

Except false starts, all the other disfluency types which were found in this age group occurred most frequently on nouns. False starts occurred more on case markers than nouns. No disfluency type was found on adverbs, negatives, interrogatives and conjunctions. Filled pauses were not found on possessive nouns. Unfilled pauses were found only on nouns, verbs, numbers, prepositions, pronouns and case markers. Sound repetitions were also seen on the same grammatical classes. However, it did not occur on prepositions. Syllable repetitions were found only on nouns, verbs, numbers and case markers. Part-word repetitions were found only on nouns and sentence repetitions only on numbers. Word repetitions occurred only on nouns, verbs, prepositions and case markers. Parenthetical remarks were absent on adjectives, prepositions and possessive nouns. False starts were also absent on all the above grammatical classes and also on pronouns and place markers in addition. Audible inspirations were present on nouns, verbs, numbers, determiners, pronouns, possessive nouns and case markers. Overall, the maximum percentage of disfluencies were found to be on nouns (Table, 6).

Dis-fluency	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FP	18	10	1		5	9	1	5			3	3		
UP	16	13	-	-	2	-	2	1	-	-	10	-	-	-
SoR	4	1	-	-	2	-	-	2	-	-	1	-	-	-
SR	6	2	-	-	1	-	-	-	-	-	2	-	-	-
PWR	3	-	-	-	-	-	-	-	-	-	-	-	-	-
WR	9	4	-		-	-	1	-	-	-	1	-	-	-
PhR	-	-	-		-	-	-	-	-	-	-	-	-	-
SeR	-	-	-	-	1	-	-	-	-	-	-	-	-	-
PR	13	5	-	-	5	2	-	5	-	-	4	3	-	-
FS	4	1	-	-	2	1	-	-	-	-	5	-	-	-
Al	9	3	-	-	5	2	-	6	1	-	6	-	-	-
P	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	82	39	1		23	14	4	19	1	-	32	6	-	-
%	37.1	17.65	0.45	-	10.41	6.33	1.81	8.6	0.45	-	14.48	2.71	-	-

1. Noun, 2. Verb, 3. Adjective, 4. Adverb, 5. Number, 6. Determiner, 7. Preposition, 8. Preposition, 9. Possessive nouns, 10. Negative, 11. Case marker, 12. Place marker 13. Interrogative, 14. Conjunction

Table-6: Percentage of each type of disfluency on different grammatical classes in age group of 4-5 years.

All the subjects of this age group exhibited disfluencies only in the initial position (Table 7).

Initial	Medial	Final
100%	0	0

Table-7: Percentage of occurrence of disfluencies in different word positions (4-5 years)

### **Age Group 5-6 Years**

Children in this age group exhibited the least percentage of disfluency. These subjects exhibited all the types of disfluencies amongst which parenthetical remarks were most frequent. This was followed in frequency by unfilled pauses, false starts, filled pauses, audible inspirations, sound repetitions and syllable repetitions. Word repetitions and prolongations had equal frequency of occurrence and sentence repetitions followed these in frequency. The least frequently seen disfluencies were phrase repetitions and part-word repetitions (Table-8).



Di s- fluency	Subjects												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
FP	1 .82	2.06		2.53	3.85	2.4	4.0	7 .84		0.72	2.22	2.5	2.99
UP		2.06			7 .69	2.4		3 .92	2 .86		2.22		3.52
SoR	0.91		2.38	2 .53	2.56		3 .33	0.98		0.72	3 .33	1 .67	2.04
SR	0.91		0.59	1 .26		0.8	1.33	1 .96	4. 28	2.90	2.22	2.5	1 .87
PWR										0.72			0.72
WR	0.91	1 .03	1.78	0.63	2.56	1 .6	2.0	1 .96		3.62	2.22	1 .67	1 .82
PhR							1 .33				1.11		1 .22
SeR					1 .28				1 .43				1 .35
PR	3.64	3 .09		12.02			5 33	5 88				6.67	6. 10
FS	2.73	2 .06	1 .78	0 63	3 85	2 4	2.67	8 .82	1 .43	2.17	5 55	2.5	3 .05
Al	4.54	3 .09	2.38	1 .90			4 .0	0 .98		0 72	1.11		2.34
P	1 .82												<b>1 .82</b>
<b>Total</b>	17 .27	13.4	8.93	21 .52	21 .79	9.6	24.00	32 .35	10.0	11 .59	20.0	17.5	<b>17 .33</b>

Table-8: Percentage of each disfluency type and average disfluency exhibited by each subject (5-6 years)

The disfluency types seen in this age group occurred maximally on nouns. None of the disfluency types occurred on adjectives, pronouns, possessive nouns, interrogatives and conjunctions. Filled pauses were found only on nouns, verbs, numbers, determiners, prepositions, case markers and place markers. Unfilled pauses were observed on nouns, verbs, adverbs, numbers, determiners and prepositions. Sound repetitions were found on nouns, verbs, numbers, determiners and case markers. Syllable repetitions were found on nouns, verbs, numbers, prepositions, negations, case markers and place markers. Part-word repetitions and sentence repetitions were found only on nouns, and prolongations only on case markers. Word repetitions were found on nouns, verbs, adverbs, numbers, determiners and case markers. Phrase repetitions were observed on nouns and verbs. Parenthetical remarks were exhibited on nouns, verbs, adverbs, numbers, determiners, prepositions and case markers. Same was the case with false starts and audible inspirations. However, these were absent on adverbs. Thus the disfluencies occurred most frequently on the grammatical category of nouns (Table 9).

Dis-fluency	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FP	17	4			4	3	2				2	1		
UP	11	1	-	1	4	1	1	-	-	-	-	-	-	-
SoR	14	2	-	-	2	3	-	-	-	-	2	-	-	-
SR	11	2	-	-	1	-	1	-	-	1	3	1		-
PWR	1	-	-	-	-	-	-	-	-	-	-	-	-	-
WR	10	5	-	3	5	1	-	-	-	-	1	-	-	-
PhR	2	1	-	-	-	-	-	-	-	-	-	-	-	-
SeR	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PR	22	2	-	1	13	3	3	-	-	-	4	-	-	-
FS	23	6	-	-	3	1	3	-	-	-	4	-	-	-
Al	14	2	-	-	3	2	2	-	-	-	1	-	-	-
P	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Total	127	25	-	5	35	14	12	-	-	1	19	2	-	-
%	53.36	10.5	-	2.10	14.58	5.88	5.04	-	-	0.42	7.98	0.84	-	-

I. Noun, 2. Verb, 3. Adjective, 4. Adverb, 5. Number. 6. Determiner, 7. Preposition, 8. Pronoun, 9. Possessive noun, 10. Negative, II. Case marker, 12. Particle marker, 13. Interrogative. 14. Conjunction

Table-9: Percentage of each type of disfluency on different grammatical classes in age group of 5-6 years.

Children in this age group showed disfluencies only in the initial position of the word (Table 10).

Initial	Medial	Final
100%	0	0

Table-10: Percentage of occurrence of disfluencies in different word positions (5-6 years)

### **Age Group 6-7 Years**

Children in this age group had an average disfluency percentage of 18.23%. Audible inspirations were found to be maximum followed by filled pauses, false starts, word repetitions, sound repetitions, parenthetical remarks, unfilled pauses, syllable repetitions, part-word repetitions and prolongations. Phrase repetitions and sentence repetitions were the least occurring disfluencies (Table-11).

Disfluency	Subjects												Average
	1	2	3	4	5	R	7	8	9	10	11	12	
FP	6.67	5.31	6.13	10.93		8.53	4.72	6.63	6.51	5.48	5.78	6.00	6.62
UP										1.37			1.37
SoR	5	0.88	2.36	1.64	2.17	0.77	0.94	1.10	1.77		3.47	5.49	2.33
SR	1.25	1.77	1.89	2.18		0.77	1.42	0.55		1.37	0.58	0.61	1.24
PWR	1.67		2.36		0.72			1.10	0.59		0.58	0.61	1.09
WR	2.08	2.65	0.47	1.09	0.72	3.10	0.47	1.10	1.18	2.74	4.62	6.70	2.40
PhR	0.42			0.55					0.59		1.16	0.61	0.63
SeR											0.58		0.58
PR	3.33			1.09	1.45	0.77						2.44	1.82
FS	2.92	2.65	1.89	2.18	2.17	0.77		2.76	1.77	6.85	5.20	4.88	3.09
Al									1.18		12.72	6.70	6.87
P		0.88			n 72				0.59	1.37			0.89
Total	22.92	14.16	17.45	19.67	7.97	14.73	7.55	13.26	14.2	19.18	33.53	34.15	18.23

Table-11: Percentage of each disfluency type and average disfluency exhibited by each subject (6-7 years)

Overall maximum disfluencies were found on nouns, filled pauses, syllable repetitions, part-word repetitions, word repetitions and parenthetical remarks were found to be occurring in greater frequency on nouns. Sound repetitions and phrase repetitions were more determiners. False starts were exhibited more on verbs and audible inspirations on adverbs. The other disfluency types did not show any such pattern. Filled pauses occurred on all the grammatical classes except prepositions. Unfilled pauses were found only on adverbs. Sound repetitions were found only on prepositions, possessive nouns and negatives. Syllable repetitions were not noticed on adjectives, prepositions, possessive nouns, negatives, place markers and interrogatives. Part-word repetitions were exhibited only on nouns, adverbs, numbers, prepositions, pronouns, case markers, place markers and interrogatives. Word repetitions were not observed on prepositions, possessive nouns, negatives, case markers and interrogatives. Phrase repetitions were found only on nouns, verbs, numbers, determiners, prepositions and case markers. Sentence repetitions were found only on interrogatives and parenthetical remarks only on nouns, verbs, determiners, case markers and interrogatives. False starts were exhibited on nouns, verbs, adjectives, numbers, determiners and pronouns, whereas audible inspirations were seen on nouns, verbs, adverbs, numbers, determiners, prepositions, pronouns and case markers. Prolongations were found only on nouns, verbs and case markers (Table 12).

Dis- fluency	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FP	39	15	5	1	14	8		10	1	1	16	2	2	
UP	-	1	-	1	-	-	-	-	-	-	-	-	-	-
SoR	9	3	2	1	3	16	-	5	-	-	1	1	3	
SR	8	3	-	2	3	1	-	1	-	-	3		-	
PwR	5	-	1	1	-	-	3	2	-	1	1	1	1	
WR	14	8		10	9	1	-	1	-	-	-	1	-	-
PwR	1	1	-	-	1	2	1	-	-	-	1		-	
SeR	-	-	-	-	-	-	-	-	-	-	-		1	
PR	8	2	-	-		3	-	-	-	-	1		2	
FS	16	25	2	-	5	1	-	2	-	-		-	-	-
Al	8	1	-	0	R	5	1	3	-	-	1		-	-
P	1	1	-	-	-	-	-	-	-	-	1		-	-
Total	109	59	10	35	42	37	5	24	1	1	25	5	9	
%	29.78	16.12	2.73	9.56	11.47	10.11	1.37	6.56	0.27	0.27	6.83	1.37	2.45	-

1. Noun. 2. Verb. 3. Adjective. 4. Adverb. 5. Number. 6. Determiner.  
7. Preposition. 8. Pronoun, 9. Possessive noun. 10. Negative.  
11. Case marker, 12. Place marker 13. Interrogative. 14. Conjunction

Table-12: Percentage of each type of disfluency on different grammatical **classes** in age group of 6-7 years.

Children in this age group, had maximum disfluencies in the initial position followed by medial and final positions (Table-13).

Initial	Medial	Final
97.67%	1.16%	1.16%

Table-13: Percentage of occurrence of disfluencies in different word positions (6-7 years)

### **Age group of 7-8 Years**

Children in this age group exhibited the second highest percentage of disfluencies. Filled pauses were the most frequently seen disfluency type followed by audible inspirations, false starts, word repetitions, parenthetical remarks, sound repetitions, syllable repetitions, phrase repetitions, prolongations and part word repetitions. The least frequently seen disfluency type was unfilled pauses. No sentence repetitions were observed in these children (Table. 14).



Disfluency	1	2	3	4	5	6	7	8	9	10	11	12	Average
FP	16.13	2.25	0.94	2.68	2.67		1.28	1.31	13.27	3.72	4.03	8.15	5.13
UP				0.45					0.47				0.46
SoR	2.58	6.18	1.88	0.45	0.89	1.55	3.83	0.44	0.95		0.40	2.22	1.94
SR	1.94	4.49	0.47				0.64				0.81	0.74	1.52
PWR		1.68	0.94		0.89		1.28		0.95	0.41	0.40		0.94
WR	1.94	5.06	1.88	1.34	2.22	1.55	2.87	0.87	2.84	1.24	3.22	2.96	2.33
PhR	0.65			0.89			0.32				2.02	2.22	1.22
SeR													
PR		2.25	5.63	0.45	0.44		1.28					2.22	2.04
FS	4.52	5.06	0.47	1.34	6.22	0.77	2.24	0.87	2.84	2.89	0.81	3.70	2.64
Al				4.02	0.89		2.55	0.44	0.47	2.89	0.40	25.19	4.61
P		0.56	0.94		1.33		0.64		1.42			1.48	1.06
Total	27.74	27.53	13.15	11.61	15.56	3.88	16.93	3.93	22.75	11.16	12.10	48.89	17.93

Table-14 : Percentage of each disfluency type and average disfluency exhibited by each subject (.7-8 years).

Children of this age group exhibited maximum number of disfluencies on nouns. None of the disfluency types occurred on possessive nouns. Of these, no filled pauses occurred on prepositions and were greatest in frequency on nouns. Unfilled pauses occurred only on verbs and conjunctions and in equal frequency. Sound repetitions were absent on numbers, prepositions, case markers and conjunctions and were most frequently seen on determiners. Syllable repetitions were present only on nouns, verbs, adjectives, adverbs and conjunctions and it was maximum on adverbs. Part-word repetitions were found only on nouns, verbs, adjectives, determiners, prepositions and interrogatives, of which it occurred most frequently on verbs.

Word repetitions had largest frequency of occurrence on verbs and were absent on determiners, negatives and place markers. Phrase repetitions were exhibited on nouns and verbs in equal frequency and were also seen on adjectives, numbers and determiners. Parenthetical remarks were absent on adverbs, prepositions, negatives and interrogatives and maximum on nouns. False starts were not seen on negatives, place markers, interrogatives and conjunctions, and were most frequently seen on verbs. Audible inspiration showed a similar pattern. Prolongations were maximum on nouns and were present only on nouns, verbs, case markers and conjunctions (Table-15).

Dis-fluency	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FP	29	11	7	12	13	R		g		2	B	1	4	1
UP		1							-					1
SoR	6	1	1	3		23		4	-	1		1	3	-
SR	5	7	2	2										1
PWR	4	7	1			1	1		-				1	-
WR	8	11	6	12	6		2	5	-		1		5	2
PhR	3	3	2		2	2			-					-
SeR									-					-
PR	10	2	1		4	2		1	-		2	1		2
FS	13	19	7	2	6	fl	1	4	-		4			-
Al	15	12	11	8	5	1		3	-		6		2	-
P	7	2							-		3			1
Total	100	76	38	39	36	45	4	26	-	3	24	3	15	8
%	23.98	18.22	9.11	9.35	8.63	10.79	0.95	6.23	-	0.72	5.76	0.72	3.5	1.92

1. Noun, 2. Verb, 3. Adjective. 4. Adverb 5. Number, 6. Determiner.  
7. Preposition. 8. Pronoun 9. Possessive noun. 10. Negative. 11. Case marker,  
12. Place marker, 13. Interrogative. 14. Conjunction.

Table-15 : Percentage of each type of disfluency on different grammatical classes in age group of 7-8 years.

Maximum number of disfluencies was in the initial position, followed by final position. No disfluencies were seen in the medial position (Table-16).

Initial	Medial	Final
97.78%	0%	2.22%

Table-16: Percentage of occurrence of disfluencies in different positions (7-8 years).

The percent disfluency in various age groups are shown in Table-17.

Age in years	Percentage disfluency
3-4	26.99
4-5	20.99
5-6	17.33
6-7	18.33
7-8	17.93

Table-17: Percentage disfluency in various age groups.

It was observed that the percent disfluency declined from 3 years to 8 years, though not linearly. An increase in percent disfluency between the age group of 6-7 years which declined from 7-8 years was noticed.

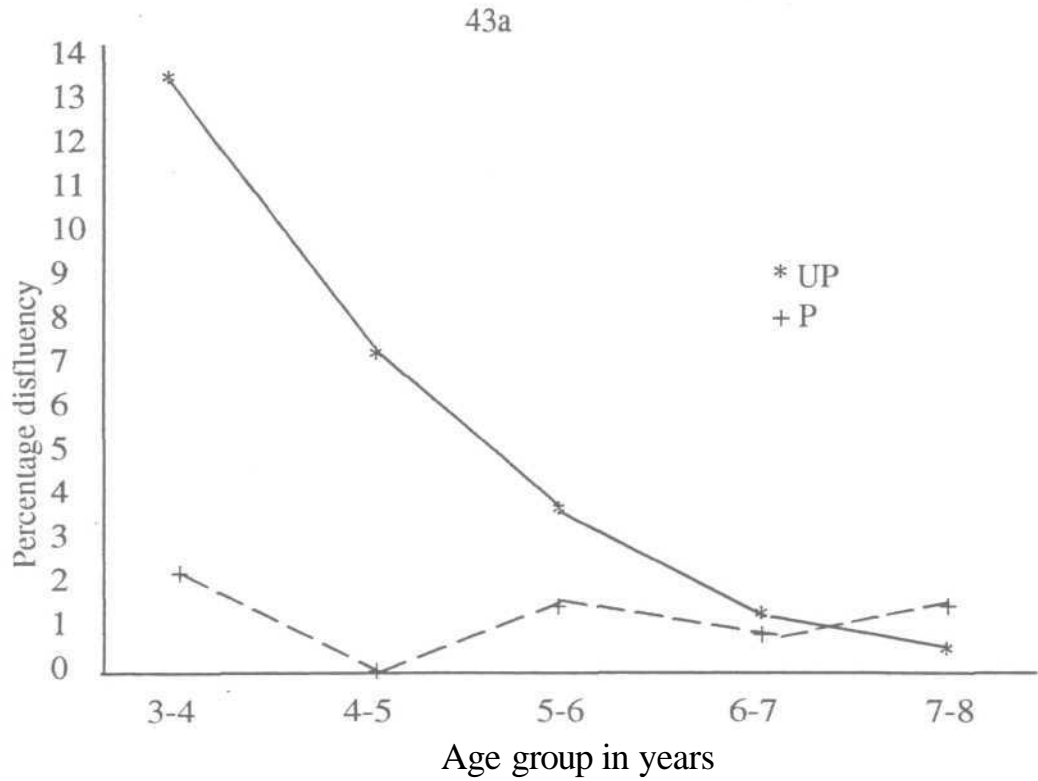


Figure-1: Percentage of UP and P for each age group

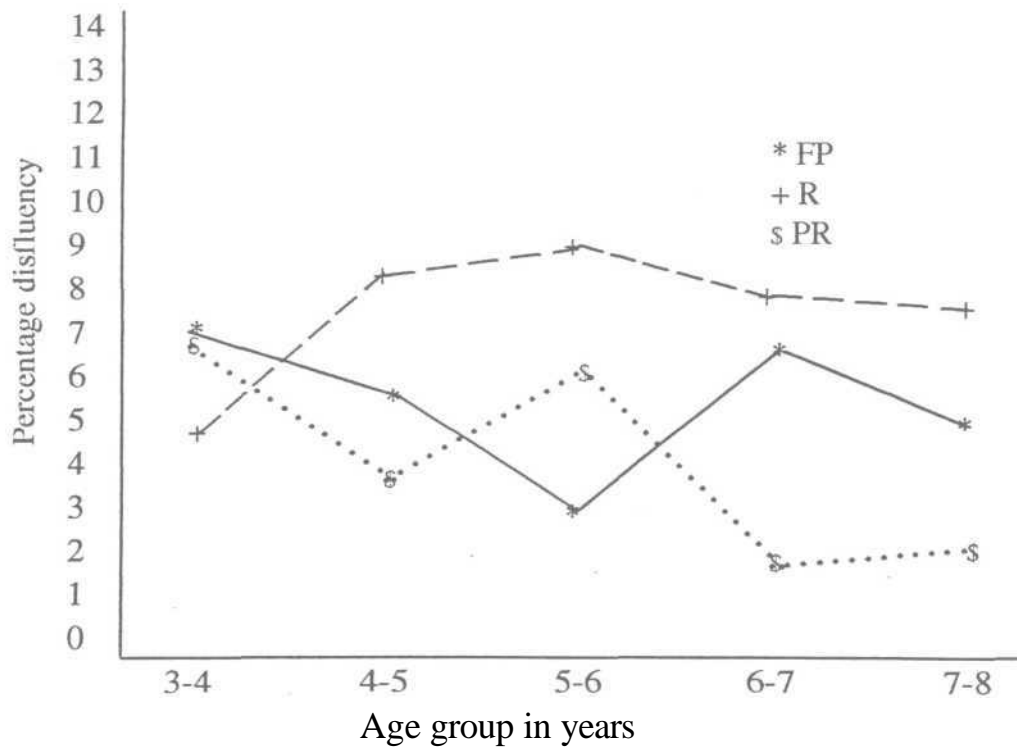


Figure-2: Percentage of FP, R and PR for each age group.

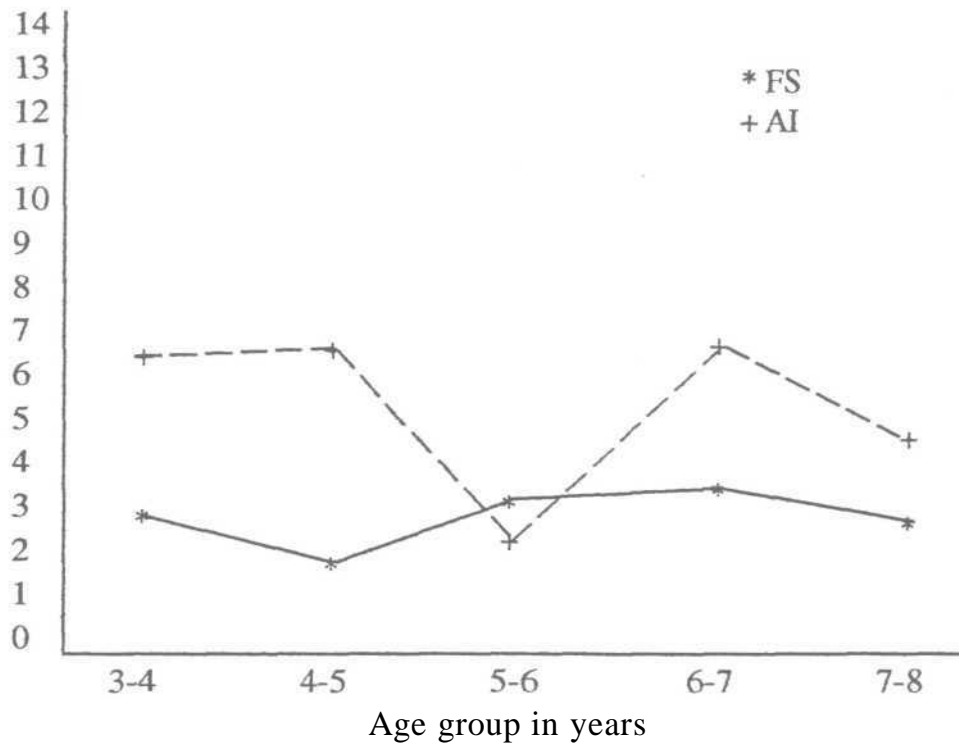


Figure-3 Percentage of FS and AI for each age group.

It was found that unfilled pauses and prolongations declined with age and filled pauses, repetitions, parenthetical remarks, false starts and audible inspirations did not show any change with age (Fig. 1, 2 and 3). Children in the age group of 3-4 years and 4-5 years exhibited maximum unfilled pauses, those in 5-6 years exhibited maximum parenthetical remarks, those in 6-7 years audible inspirations and those in 7-8 years filled pauses.

**To summarise, the following results were observed:**

1. The disfluencies decreased from 3 years till 6 years. In the age group of 6-7 years, there was an increase in the percentage of disfluencies. However, it again decreased from 7-8 years.

2. Unfilled pauses were maximum in frequency in children in the age groups of 3-4 and 4-5 years. Children in the age group of 5-6 years exhibited greater number of parenthetical remarks, whereas audible inspirations were most frequently seen in the age groups of 6-7 years. Children in the age group of 7-8 years had maximum number of filled pauses.

3. Unfilled pauses and prolongations showed a decreasing pattern with age whereas all the other types of disfluencies exhibited a varying pattern across the age groups.

4. The greatest number of disfluencies were observed on nouns followed by verbs.

5. The disfluencies were greatest in number in the initial position (>90%) of the word.

**Discussion:**

This study revealed that disfluencies do not show a linear decrease or increase with age, rather exhibit a varying pattern. This is in

conjunction with the reports of Kowal et al. (1975). However, the pattern of variation is not similar to that seen in their study. In the present study, the percentage of disfluencies decreased from 3-6 years, increased between 6-7 years and further declined from 7-8 years, whereas a different kind of pattern was observed in Kowal et al's study. The results are also in consonance with those of Nagapoornima (1990), Indu (1990), Yamini (1990) and Rajendraswamy (1991) who have studied the development of fluency in Kannada speaking children of various age groups. Wexler and Mysak (1982) and Gardan and Luper (1989) have reported of decrease in disfluencies with advancement in age. This is an exceptional finding and could be attributed to particular sample of subjects chosen for the study.

The disfluency type which was seen most frequently between 3-4 years and 4-5 years was unfilled pause. Kowal et al (1975) and Nagapoornima (1990) have reported of similar findings. However, this is in contradiction to the findings of Davis (1939), Martin et al. (1972), Silverman (1972 and 1973), Bjerkan (1980), Peal and Bemthal (1980), Indu (1990) and few other authors who report of more of filled pauses, repetitions and false starts between 3-5 years of age. This could be probably due to the differences in methodology. Most of these authors have used spontaneous speech samples to study the disfluencies whereas picture description task was made use of in the present study. Also, some of these authors have given more emphasis on repetitions and discarded pauses.

Pauses have been reported to occur frequently in normally fluent speech. These are often to change directions of thought or language



revise statements that have been said incorrectly, or simply stop momentarily in uncertainty. Unfilled pauses are reported to occur more before content words than before function words (Maclay and Osgood, 1959). However, they are reported to be shorter before content words than before function words in the speech of children (Kowal et al. 1975). Goldman-Eisler (1968) found that pause duration has nothing to do with the syntactic structure. According to Boomer (1970), Goldman-Eisler (1961) and Rochester (1973), these unfilled pauses occur at locations where word choice or phrase or clause boundaries indicate high uncertainty. Pauses serve the speaker by providing time for planning or decision making when uncertainty is high, but they may also serve the listener by informing him that a new clause, or some other relatively improbable, and therefore informationally loaded, material is coming up.

In this study, the most frequently seen disfluency type in the age group of 5-6 years was parenthetical remarks. Kowal et al. (1975), Yamini (1990) and Joby (1998) have also reported of parenthetical remarks as a major disfluency type seen in their subjects. Parenthetical remarks are considered to be more sophisticated kind of disfluency type and are rarely seen in the speech of young children. As the age advances, this disfluency type appears and is considered to be a more mature and adult type of disfluency.

The disfluency type most frequently observed between the age group of 6-7 years was audible inspirations. This is in agreement with the findings of Yamini (1990) > Sharma (1991) & Joby (1998) have also

reported of audible inspirations as a commonly exhibited disfluency type in their subjects, though the age groups they studied were different. Most of the western studies do not report of this form of disfluency in their subjects. This could be attributed to methodological differences. Most of the studies conducted in English, have not taken audible inspirations into consideration.

Filled pauses were found to be the most commonly seen disfluency type in the age group of 7-8 years. This agrees with the results of studies conducted by Kowal et al. (1975).

Filled pauses have been described in various ways by various authors. Some described these as the sounds of a mind going into neutral, while others have suggested that the pause is filled with sounds in order to signal to the listener that the speaker wishes to continue without interruption although he is momentarily unable to proceed. Filled pauses are reported to be of greater length than unfilled pauses. When a speaker who is thinking of what to say pauses longer than a certain amount of time, he fills the silence to let the listener know that he is not through talking. Like unfilled pauses, these also occur more before content words (Maclay and Osgood, 1959). These filled pauses are reported to occur more during moments of higher uncertainty (beginning of a clause, complex clauses etc.) and are also of longer duration at such instances (Cook, 1971). Kowal et al. (1975) opines that filled pauses, like parenthetical remarks are more mature kind of disfluency type and is found more frequently in the speech of older children.

Another interesting finding of this study was that, the unfilled pauses showed a steady decline with increase in age. Similar findings have been reported by Kowal et al. (1975), Wexler and Mysak (1982), Gordan and Luper (1989) as well as Joby (1998). Sharma (1991) after comparing the results of the studies conducted by Nagapoornima (1990), Indu (1990), Yamini (1990) and Rajendraswamy (1991) has reported that unfilled pauses decline from 3-5 years after which, it increases. This is a considerably undisputed observation that children tend to exhibit more mature and sophisticated kind of disfluencies with increase in age and tend to show less of unfilled pauses in their speech which is considered to be an immature type of disfluency. This decrease in unfilled pauses has also been attributed to the better continuity in thought process which develops with age.

Prolongations were also found to be decreasing from 3-8 years. This agrees with the findings of Joby (1998). Prolongations, like unfilled pauses, is considered to be an immature type of disfluency and with increase in age, this decreases.

A varying pattern has been found, in this study, for all types of disfluencies except unfilled pauses. This is a very consistent finding and has been reported by various authors in the past (Kowal et al 1975; Nagapoornima, 1990; Indu, 1990; Yamini, 1990; Rajendraswamy, 1991 and Sharma, 1991).

The disfluencies were found to be maximum on grammatical classes like nouns and verbs. Similar findings have been reported by

various authors including Maclay and Osgood (1959); Goldman-Eisler (1968); Nagapoornima (1990); Indu (1990); Sharma (1991) and Joby (1998). This has been attributed to the fact that, these grammatical classes consist of content words which carry high degree of information when compared to the function words which have relatively low degree of information. Experts like Cook (1971), Kowal et al. (1975) have reported that content words are less predictable than function words and hence have greater degree of uncertainty. This is believed to be the cause of greater occurrence of disfluencies on content words.

Helmerich and Bloodstein (1973) found more disfluencies on syntactical structures such as pronouns and conjunctions. This has been an exceptional finding and does not agree with the common observation that disfluencies occur more commonly on grammatical classes like nouns, verbs, etc.

Another finding in this study was that, the disfluencies occurred mostly in the initial position (>90%). This is again a well documented observation. Helmerich and Bloodstein (1973), Nagapoornima (1990), Indu (1990), Yamini (1990), Rajendraswamy (1991), Sharma (1991) and Joby (1998) etc. have also reported of the same finding in the past There have been hardly any studies reporting otherwise. This again could be attributed to the fact that uncertainty is greater at the beginning of a word rather than in the middle or final position.

In the present study, the average percentage of disfluencies for all the five age groups was found to be much greater than 5%. This is in

contradiction to that reported in studies conducted in English. In this study, the whole instance of repetition or filled pause was considered as one repetition or one filled pause respectively. With the adoption of this methodology which is similar to the one used in studies done in English, a much lower percentage of disfluency (near 5%) was expected. However, it was not found to be so. Two main reasons could be attributed to this. First, in majority of the studies carried out in English, repetitions and prolongations alone have been considered and the other disfluency types have been given lesser importance. In the present study, when these two types of disfluencies alone were taken into consideration, the percentage of disfluency was 6,9,11,9,9 percentage respectively for the age groups 3-4,4-5,5-6, 6-7 and 7-8 years. However, this is much more than that in English.

Second, in English, each word is taken as a separate utterance whereas in Malayalam, like in many other Indian languages, two words may be uttered together to form a single utterance. Eg. /muyal/ /kunnu/ maybe uttered as /muyalkunnu/. In such a case, it is considered as a single word or utterance rather than two separate words. This again could lead to the increased percentage of disfluencies.

Thus, only when these factors are controlled can one expect a total disfluency percentage as low as 5% in Indian languages, in other case, it is much higher than 5%.

Dis-fluency	3-4	4-5	Age Groups		7-8
			5-6	6-7	
SoR	-	3 0-3	2 0-3	2 0-5	2 0-6
SR	1 0-3	2 0-3	2 0-4	1 0-2	2 0-4
PWR	1 0-2	1 0-2	1 0-2	1 0-2	1 0-2
WR	1 0-2	2 0-5	2 0-4	2 1-7	2 1-5
PhR	-	-	1 0-1	1 0-1	1 0-2
SeR	1 0-1	1 0-1	1 0-1	1 0-1	-
P	2 1-3	-	2 0-2	1 0-1	1 0-1
Total	6	9	11	9	9

Table-18: Average values and range of different types of disfluencies for each age group (First line average; Second line-range).

Test - Based on the present study, a test can be proposed for the evaluation of disfluency in Malayalam speaking children between 3-8 years. A picture description task can be used and speech samples can be recorded. The different disfluency types can be analysed for the subject

and the cut off scores given in table-18 can be considered for deciding whether the particular child has stuttering or not. Pauses, parenthetical remarks, false starts and audible inspirations have been deleted from test as they do not affect the continuity. Those disfluency types which have not been found in a particular age group in the present study, need not be considered, whereas, those having high percentage of occurrence can be given more weightage. Thus, a decision can be made regarding whether the child is normally nonfluent or has stuttering.

## **CHAPTER V**

### **SUMMARY AND CONCLUSIONS**

The present study aimed at investigating the disfluencies in Malayalam speaking children of 3-8 years. A total of 60 subjects, 12 each (6 boys and 6 girls) in each of the five intervals of one year, participated in the study. These subjects were native speakers of Malayalam with no history of speech, language or hearing problem. A picture description task was given and speech samples were elicited and tape recorded. The samples were analysed for the following seven types of disfluencies (1) Filled pauses (2) Unfilled pauses (3) Repetitions (sound, syllable, part word, word, phrase, sentence) (4) Parenthetical remarks (5) False starts (6) Audible inspirations (7) Prolongations.

During analysis, the whole instance of repetition or filled pause was considered as one repetition or one filled pause respectively. The grammatical category on which the disfluency occurred and the position of the word in which it occurred (initial, medial or final) were found out.

It was observed that, the disfluencies decreased from 3 years till 6 years, increased from 6-7 years and further decreased from 7-8 years. Unfilled pauses were maximum in frequency in the age group of 3-4 and 4-5 years, parenthetical remarks in the age group of 5-6 years, audible inspirations in the age group of 6-7 years and filled pauses in the age group of 7-8 years. Unfilled pauses and prolongations showed a decreasing pattern with age whereas other types of disfluencies showed



a varying pattern. Disfluencies were maximum on the category of nouns followed by verbs and occurred more in the initial position. On the basis of the present study, a test has been proposed which can be utilized for differentially diagnosing normal nonfluency from stuttering. Considering only repetitions and prolongations, the test indicates 6, 9, 11, 9 and 9 percentage of disfluency in the age group of 3-4, 4-5, 5-6, 6-7 and 7-8 years respectively.

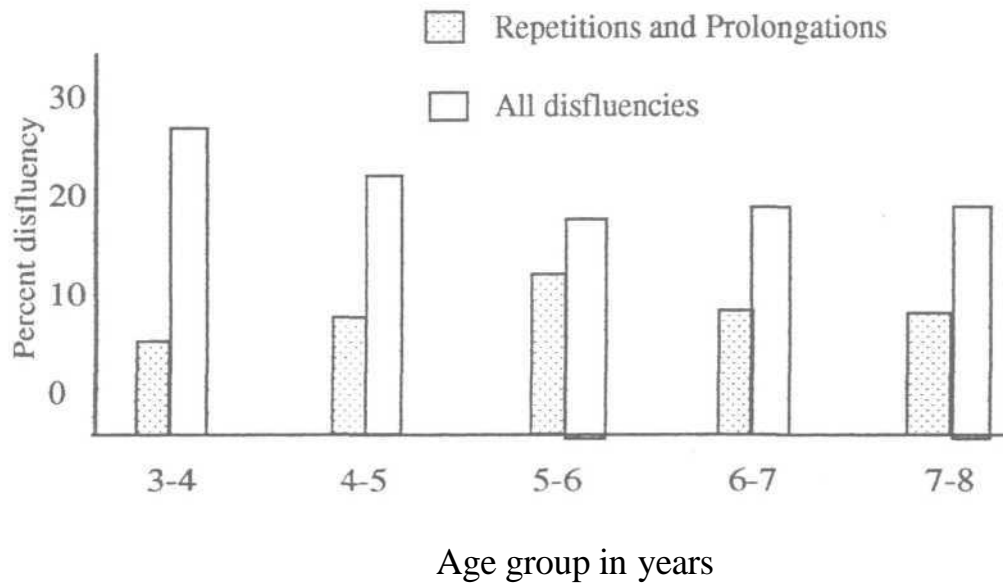


Figure 4: Percentage disfluencies for different age groups

Figure 4 depicts the normative data in conditions where only repetitions and prolongations are considered and where all types of disfluencies are considered. The test needs to be clinically validated to evaluate its potentiality.

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## APPENDIX I

### Classification of dysfluencies

The classification given below is the one proposed by Johnson (1961).

1. **Interjection of sounds, syllables, words or phrases** - Refers to extraneous utterances in the flow of connected speech, such as sounds ("uh", "um", words ("well", "okay"), or phrase ("let me see", "excuse me"). These may be considered as essentially sound filled pauses, for they constitute a temporal interval in the flow of a speech sequence to which they are not integral. Though these occur in normal speech also, in stutterers, these have the character of a prolongation or an elemental repetition. It may also occur at inappropriate places and at grammatically unlikely loci.

2. **Part-word repetitions** - This includes repetitions of syllables and sounds. Ruh-Ruh run p-p pen etc. are examples of part word repetitions.

3. **Word repetitions** - This category includes repetitions of words, including those of one syllable. Eg. saw, saw, but-but etc.

4. **Phrase repetitions** - This refers to repetitions of two or more words i.e. a word string, eg. He gave, He gave this.

5. **Revisions** - These kinds of dysfluencies represent changes in pronunciation, wording, grammatical structure or content of what is said. Eg. He do-He does not know.

**6. Incomplete phrases** - This is one in which the thought or context is not completed and this is neither considered as an instance of phrase repetition. Example - She was and after she got there he came.

**7. Broken words** - This type of fluency disturbance is exemplified in the sentence. This can be considered as an instance of silent prolongation, occurring within a word rather than between words.

eg. I was b.. (pause) usy yesterday

**8. Prolonged sounds** - This is used to refer to extension of sounds beyond its appropriate duration. Temporal length is thus the essential dimension for discriminating these. These are very often associated with visual or auditory cues.

Davis (1939) gave a broader criteria for classifying a block as a repetition. It is as follows:

1. A repetition is defined as the utterance of the same syllable, word, or group of words more than once. Eg. "I want, I want to go".
2. The addition of 'yes' or 'no' to the repeated phrase does not vitiate the repetition. Eg. "put it in her wagon, no, put it in her vagon".
3. The addition of 'too', or 'hey' still preserves the repetition. For eg. "Hey, here's some over here. Here's some over here too".
4. There can be repetition within a repetition, which counts as a total of 2 repetitions. Eg. "Put it in her wagon. Put it, put it, put it in her wagon.

5. A total response which is repeated at the beginning of the following response counts as a phrase repetition. Eg. "You can't. You can't have any".

6. A phrase repetition may occur as part of one response, or involve the repetition of a total response. Eg. What are these things? What are these things? Or "What are these, what are these things"?

7. The calling of an individual's name is a repetition. Eg. "Mary Mary, Mary.

8. Absence of the definite or indefinite article does not vitiate the response as a repetition, because of the difficulty of detecting it in rapid speech. Eg. "You sleep in the dog house. You sleep in dog house.

9. Two complete responses can be repeated as a group in which case they are scored as 2 repetitions. Eg. "Oh, look what he's doing. He's putting his feet in the dog house. Oh! look what he's doing. He's putting his feet in the dog house".

10. The insertion of the name does not cancel the repetition, eg. "Let's rock on the rocking horse. Twiny, let's rock on the rocking horse.

The limitations on repetitions are the following :

1. Changes of one word essential to the meaning of the response nullify it as a repetition. Eg. "That's all I need. That's all we need".

2. "What" or "hunh" when repeated are not scored as repetitions because their presence may be indicative of the inability to hear a remark made to him by another person.

3. Insertion of a non-identical remark between identical remarks cancels a repetition. Eg. We won't go down, will we? Watch. We won't go down, will we"?

4. Sounds made in imitation of motors, gas being put in a car. or water coming out of a hose, etc. are not scored as repetitions for it is the imitation of a continuous sound. Eg. Errrrn.

5. A change of sentence structure nullifies the response. Eg. You can't. You cannot.

- Sanders (1961) classified dysfluencies into sound, syllable or word repetitions, prolongations, broken words and interjections.
- Young (1961) gave another classification. According to him, dysfluencies consisted of syllable or sound repetitions, sound prolongations, broken words, and words involving "apparent undue stress or tension.
- Williams and Kent (1958) reported of syllable repetitions, prolongations, interjections, word or phrase repetitions and revisions as dysfluencies seen in the group of stutterers they studied. The first two were more significant features of stuttering according to them.

- Yairi (1981) classified dysfluencies into eight categories. This included part-word repetitions, phrase repetition, interjection, revision, incomplete phrase, disrhythmic phonation, (primarily sound prolongation within words, unusual stress or broken words) tense pause (barely audible heavy breathing and other tense sounds between words). word repetition included single and multisyllable word repetition.

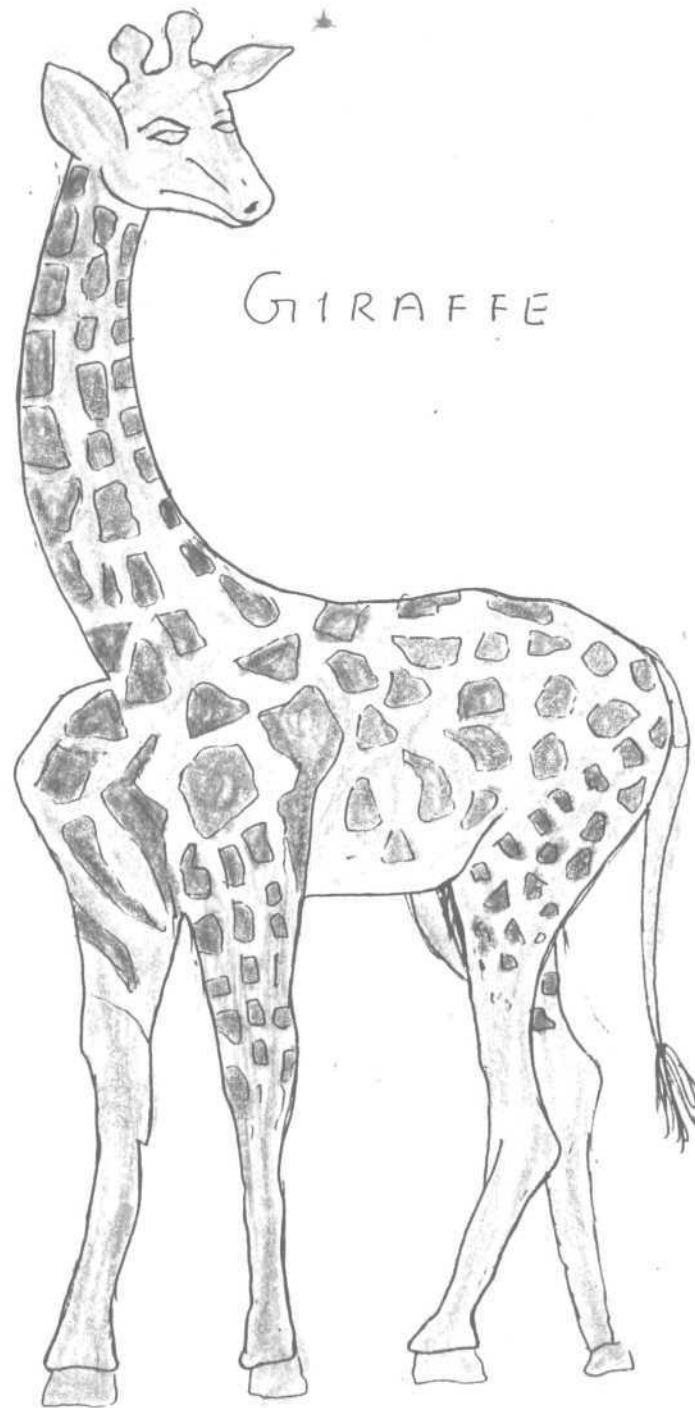
Some authors also take into consideration hesitations, pauses etc. while categorizing dysfluencies. Carrell and Tiffany (1960) Clarke (1971), Kowal et al. (1975) etc. Different authors have categorized dysfluencies differently. Generally, most of the authors agree with Johnson's (1961) classification of dysfluencies.

AGE GROUP - 3-4 YRS

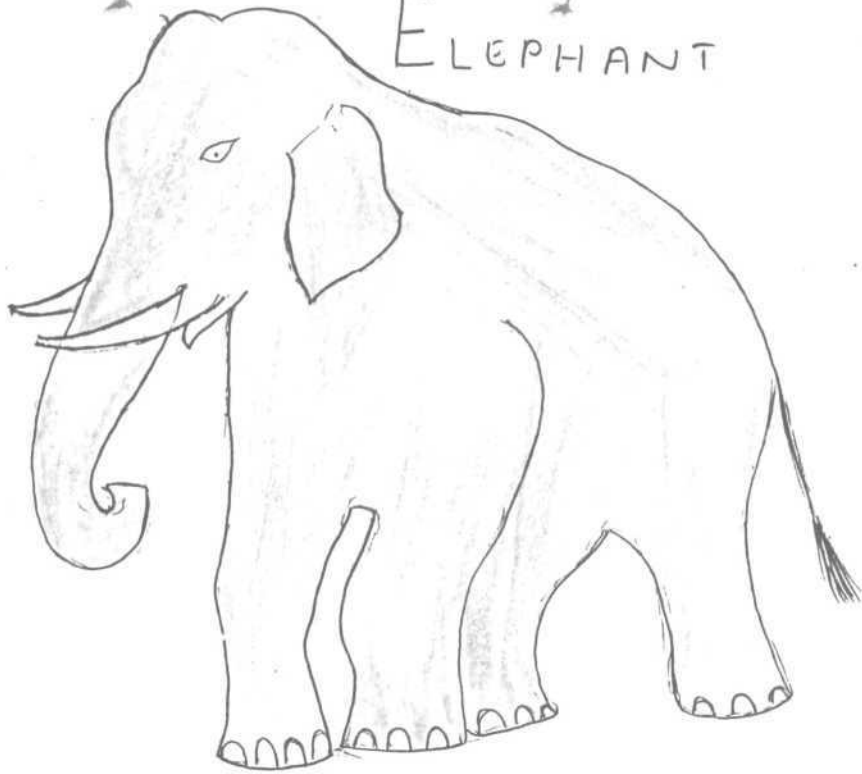
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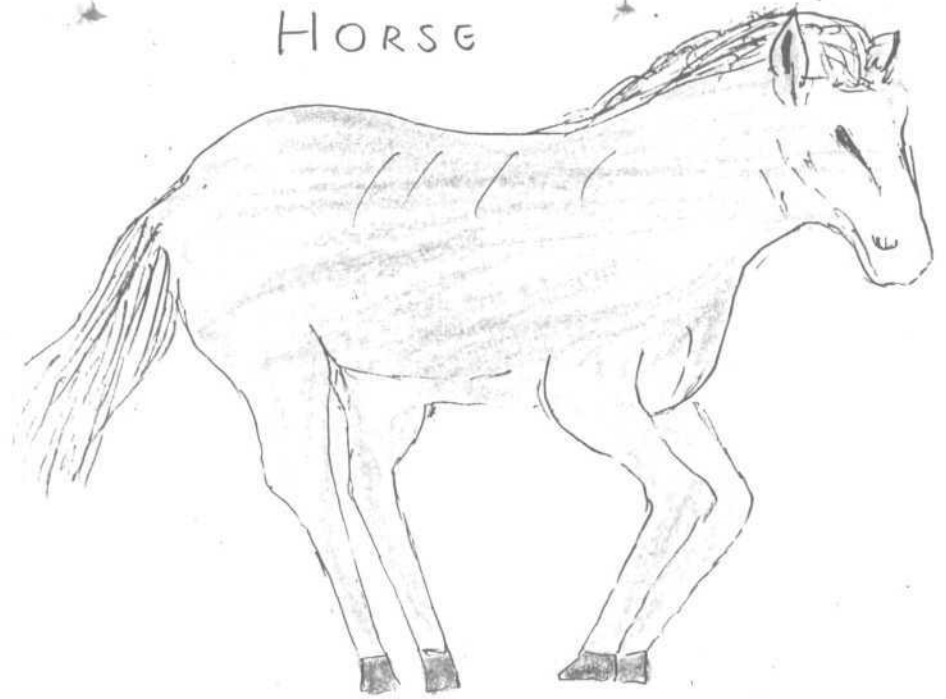
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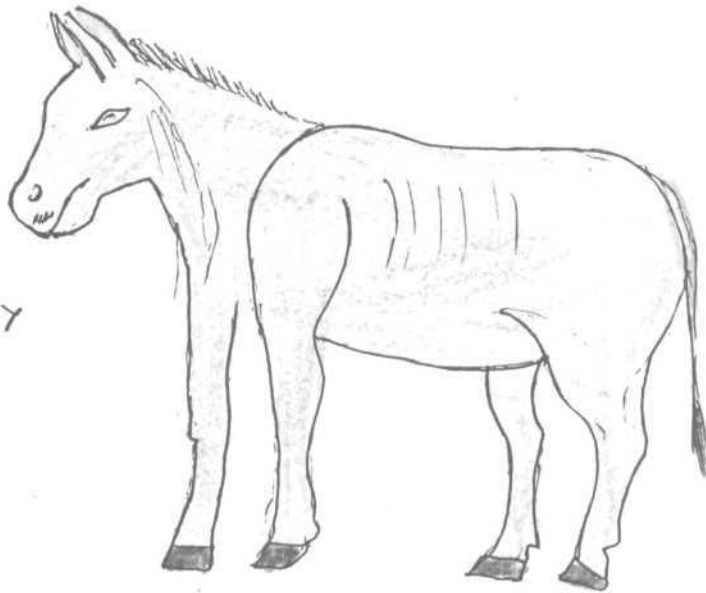
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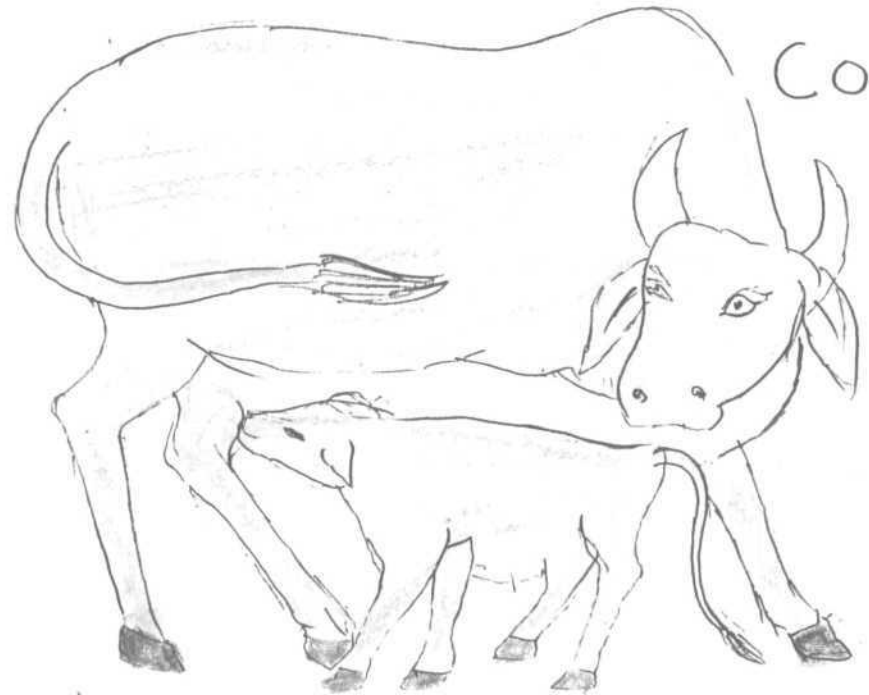
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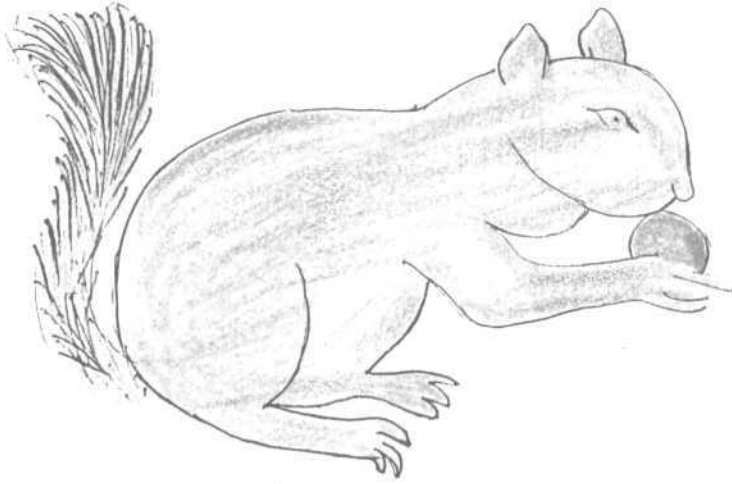
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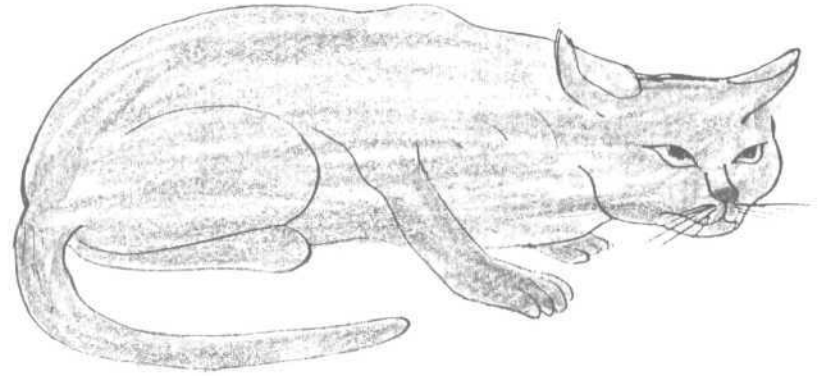
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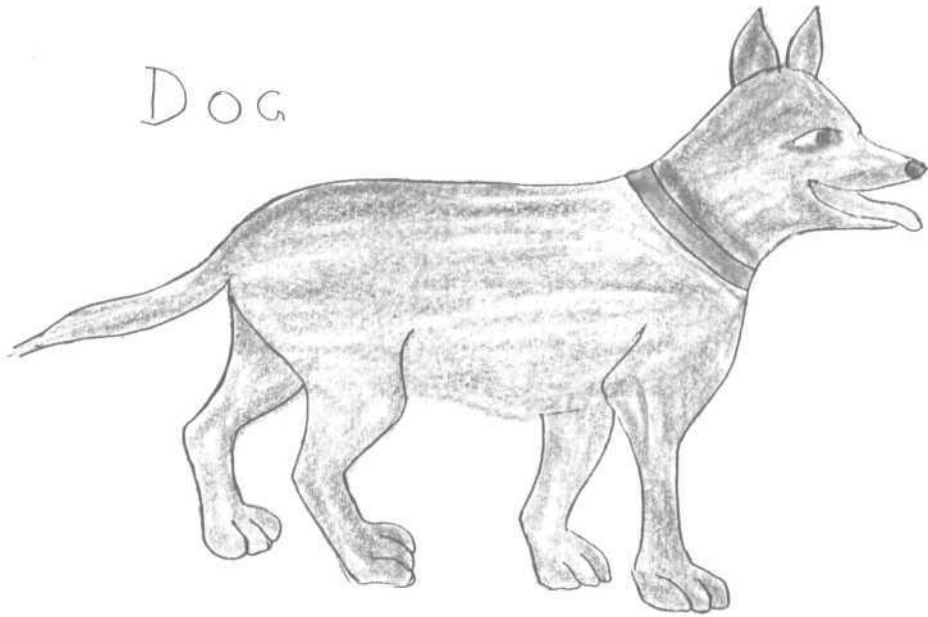
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CAT



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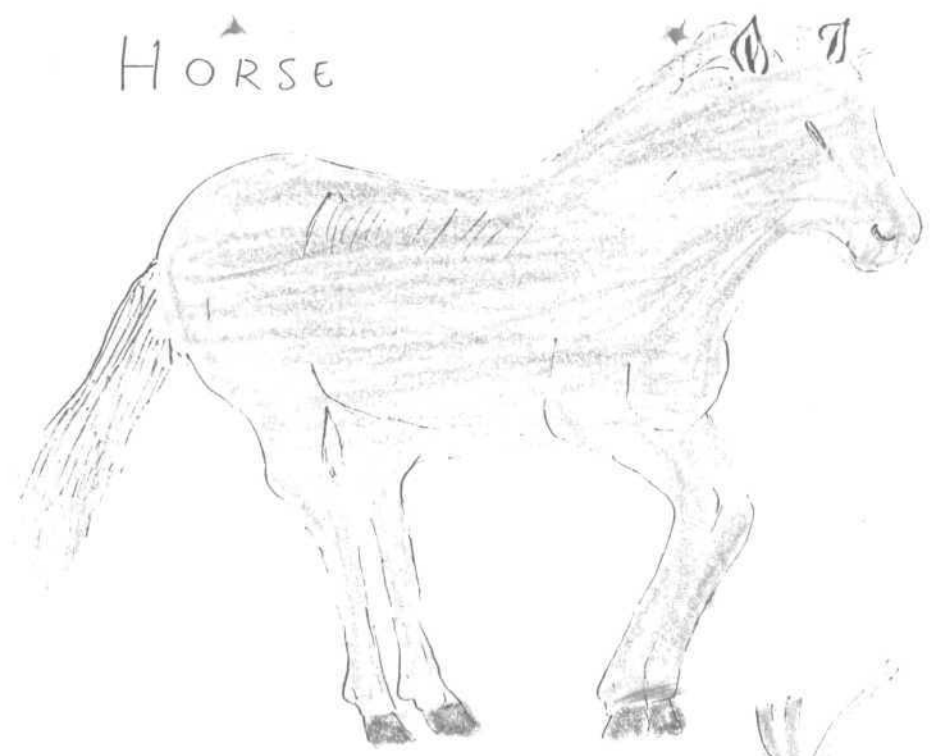


RABBIT

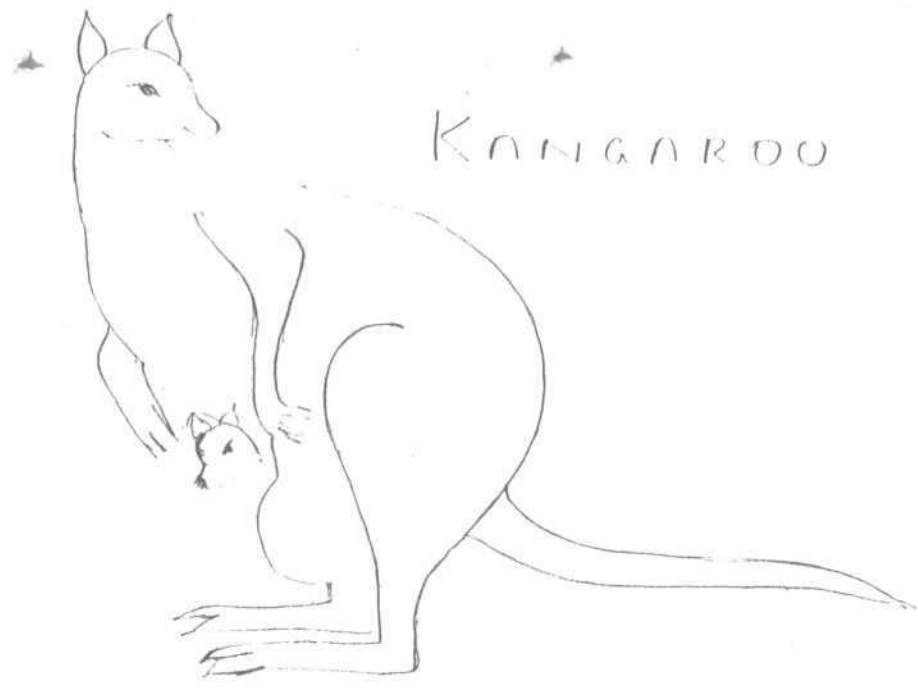




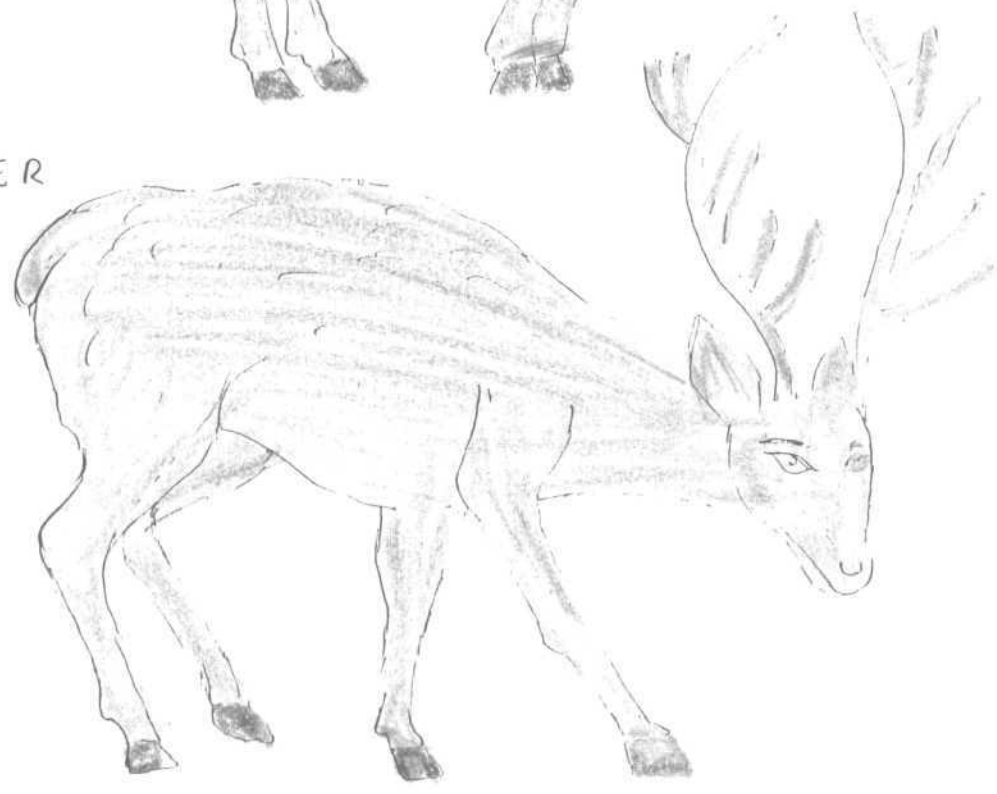
HORSE



KANGAROO



DEER



BUFFALO

