

SOME ASPECTS OF FLUENCY IN CHILDREN - (4-5 YEARS)

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DEDICATION

INCARNATE OF INTELLIGENCE AND SOBRIETY

AN AMALGAMATION OF AMITY, AMENITY, ARDOUR
AND BENEVOLENCE.

A COADJUTOR LIKE A FRIEND AND GUIDE

A DULCET COAGULATION OF UNFLINCHING PERSONALITY
AND MIND


A CONVERGENCE OF CREDIABILITY AND COMPASSION

"MY GUIDE" - DR. SAVITHRI

CERTIFICATE

This is to certify that the Dissertation entitled "Some aspects of fluency in children - (4-5 years)" is the bonafide work in part fulfilment for the degree of M.sc, (Speech and Hearing) of the student with Register No.M8804.

Mysore
May 1990


Director
All India Institute of
Speech and Hearing
Mysore-6.

CERTIFICATE

This is to certify that this
Dissertation entitled: "Some aspects
of fluency in children - (4-5 years)"
has been prepared under my supervi-
sion and guidance.

Savithri.S.R
Dr.S.R.Savithri 5.5.90
GUIDE

DECLARATION

I hereby declare that this Dissertation entitled: "Some aspects of fluency in children - (4-5 years) is the result of my own study under the guidance of Dr.s.R.Savithri, Lecturer in Speech Sciences, All India Institute of Speech and Hearing, Mysore-6, and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore.

Register No.M8804

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INTRODUCTION

"Fluency is the effortless production of long, continuous utterances at a rapid rate. These three elements of fluency are related to each other. The pauses and hesitations break up the smooth, continuous flow of speech and this determines the length and influences the rate of each utterance. These slow down the rate at which words are produced" (Stark Weather, 1987).

Other factors that can influence fluency are stress, which is dependent on the language and the environment, the duration of sounds (vowels and consonants), coarticulation, effort (muscular and mental effort). The anatomical and physiological constraints can also affect fluency in children.

"We use the speech mechanism to produce speech and some people produce speech more fluently, more easily, smoothly and rapidly than others. The ease with which some people speak may result from characteristics present in the mechanisms they use" (Stark Weather, 1987). The coordination and timing of speech segments can affect the articulation which in turn affects fluency. Others such as reaction time for speech, changes in the feedback, gestural synchrony during speech can also affect fluency.

Certain anatomical constraints on the child's vocal system may also influence fluency. A younger child shows a smaller vocal tract, less control of the movements of the vocal tract, coordination, planning and execution of the speech action which also disrupts fluency. The acoustic basis of fluency include rhythm. Some languages are syllable timed and some are stress timed where some kind of a rhythm is maintained. Hence this should also be considered while evaluating fluency.

"Children's speech becomes increasingly fluent as they mature. When children first begin to use speech to convey ideas, their speech lacks fluency. It is produced slowly and many of the features of normal rhythm are missing. As their fluency increases, children also learn to deal with lapses of fluency, such as discontinuities in a more sophisticated way" (Stark Weather, 1987).

Some children do not develop the capacity for fluent speech as rapidly as others and at times the demands for fluency made by their environments are too much for them to handle. Since their environmental demands are greater than their capacity to produce, the child lack fluency in speech. Conditions that arise as a result of fluency disruptions include stuttering and cluttering.

"To understand dysfluency it is necessary to know what fluency is. The development of fluency in children, a topic with a more obvious relevance to stuttering, has also been slighted" (Stark Weather, 1987). In spite of extensive research in the area of stuttering, very little has been explored on fluency development. A strong emphasis was made on the idea that discontinuities existed in preschool children (Johnson, 1961). Few studies (Branscom et al. 1955; Silverman, 1972, 1973; Helmreich and Bloodstain, 1973; Kowal, et al. 1975, Haynes and Hood, 1977; Suzan, Zuckerman, 1980 and Dejoy and Gregory, 1985) have been conducted to explore the fluency development in children. Of these, that by Kowal et al. (1975) illustrates some aspects of fluency development. They asked 168 children, 24 (12 boys and 12 girls) at each of the seven different age levels, to describe a series of cartoons. They considered five categories of nonfluencies viz.

1. Unfilled pauses - silence less than 270 msec.
2. Filled pauses - 'uh, ah, hm'
3. Repeats - repetition of an element (syllable part-word, word or phrase)
4. False starts - corrections of phrases or words and incomplete utterances.
5. Parenthetical remarks - 'well, you know and other fillers'.

Their study indicated that vocal hesitations, in general, do not decrease with age but fluctuate with development increasing

between kindergarten and fourth grade, then declining by sixth grade, increasing again through eighth grade and sophomore year and then declining at senior year to the same level as kindergarten.

In the early ages, children exhibit more of unfilled pauses, filled pauses and repeats which predominate, which decreases in frequency with increasing age. However an increase in false starts and parenthetical remarks is noticed in the older age groups.

This and the other studies (Branscom, Hughes and Oxtoby, 1955; and Haynes and Hood, 1977) imply that some nonfluencies prevail in the speech of young children which is referred to as normal non-fluency. Also they provide some kind of guidelines towards the differential diagnosis of stuttering and normal non-fluency. However, these are not sufficient and clear. Further, from the results of these, no fluency test has been constructed so far. A clinician needs to differentially diagnose normal nonfluency from stuttering and his goal in treating a stutterer should be the achievement of speech that is as normal as possible, not just normal sounding but normal in all aspects. An understanding of the multidimensionality of normal fluency will help the clinician to differentially diagnose normal nonfluency children from stuttering children.

Also, it will make the selection of the goals for therapy easier and more satisfying to the client. (Stark Weather, 1987).

This warrants a study of fluency development and types of disfluencies in normal children which will also provide a base for constructing a fluency test. In this context, the present study aims at evaluating the types of disfluencies found in normal Kannada speaking children between the age of 4-5 years. Also an/attempt has been made to suggest a test of fluency.

REVIEW OF LITERATURE

Speech has to be rapid and effortless as well as smooth in order to be fluent. Although smoothness is a dimension of fluent speech, normally fluent speakers show many pauses, hesitations and interjections etc. However, lack of smoothness is most readily overlooked by listeners and it is often the rate of speech and the visible effort which draws listeners attention. In this regard, researchers have been arguing about the diagnosis of fluency disorders in children. Several attempts have been made to study the disfluencies in children to enhance diagnosis and rehabilitation of fluency disorder. However, there seems to be no good agreement among researchers on the definition of different kinds of non-fluencies. This review deals with the classificatory system defining the various types of disfluencies, studies on fluency development between the age groups of 4-5 years and the influences of other factors on fluency development.

Classification of disfluencies - reported in literature:

The disfluencies in children have been categorized by many researchers. Johnson (1961) classifies the following types of speech behaviours as disfluencies:

1. INTERJECTION of sounds, syllables, words, or phrases - extraneous sounds such as 'uh' , 'er' and 'hmmm' ; extraneous

words such as 'well', which are distinct from sounds and words associated with the fluent text or with phenomena, included in other categories. An instance of interjection may include one or more units of repetition of the interjected material; for eg. 'uh' and 'uh uh uh' are each counted as one instance of interjection. The number of times the interjection is repeated (units of repetition) within each instance is also noted; 'uh uh' is an example of an interjection repeated once and 'uh uh uh' is an example of an interjection repeated twice.

2. PART-WORD REPITITIONS - This category has repetitions of parts of words - that is syllables and sounds. Within each instance of repetition the number of times the sound or syllable is repeated is counted; 'buh-boy' involves one unit of repetition and 'guh-guh-girl' involves two units. This does not distinguish between sound and syllable repetitions. 'Ruh-ruh-run', 'cuh-come', 'ba-ba-baby' and 'a-bou-bout' are examples of part-word repetitions.

3. WORD-REPETITIONS: This category includes repetitions of whole words including words of one syllable. Both the number of instances and the number of repetition units within each instance are counted. 'I-I-I-', 'was-was' and 'going-going' are samples of instances of word repetition; the first involves two units of repetition and each of the other

two involves one unit. A word repeated for emphasis, as in 'very, very clean", is not counted as a disfluency. A part-word repetition, or an interjection, does not nullify or word repetition; for eg. 'going uh going' or 'guh-going going' is classified as word repetition. In any such case, the interjected or associated disfluency is also tabulated in the appropriate category.

4. PHRASE REPETITIONS: This category includes repetitions of two or more words, for example, 'I was I was going'.

Silverman (1973) - have considered repetitions as a run which was defined as two or more identical and or consecutive numbers of disfluencies. Rudmin (1984) has considered repetitions as 'Articulation Oscillation' where in the final word of an expression ended in an unvoiced plosive (p, t, k) there is repetition (one or two) of the phoneme. Manning and Monte (1979) have referred phrase repetitions word or syllable repetition as 'motoric' and hesitations such as interjections and revision as 'formulative' disfluencies.

5. REVISIONS: Instances of revision include those in which the content of a phrase is modified, or in which there is grammatical modification. Change in the pronunciation of a word is also counted as a revision. 'I Was-I am going' is an example of this category.

6. INCOMPLETE PHRASES: An incomplete phrase is one in which the thought or context is not completed and which is not an instance of phrase repetition. Example - 'She was - and often she got there he came'.

7. BROKEN WORDS: This category is characterized by words which are not completely pronounced and which are not associated with any other category, or in which the normal rhythm of the word is broken in a way that definitely interferes with the smooth flow of speech. 'I was g-(pause) -oing home' is an example of a broken word.

8. PROLONGED SOUNDS: This category includes sounds judged to be unduly prolonged. If a sound is prolonged twice, it is counted both as a prolonged sound and a part-word, repetition. Johnson and Moeller in an unpublished manuscript have suggested that the categories of broken words and prolonged sounds may be replaced by categories of dysrhythmic phonation in words and tense pauses (Williams* Darley and spriesterbach, 1978).

Davis (1939) explained repetitions a bit more extensively than in terms of exact duplication.

1. A repetition is defined as the utterance of the same syllable, word or group of words more than once for eg. 'I want, I want to go'.

2. The addition of 'yes', 'no' to the repeated phrases does not vitiate the repetition, for eg. 'put it in her wagon. No, put it in her wagon'.
3. The inclusion 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 a repetition within a repetition which counts as a total of two repetitions, for eg. 'put it in her wagon. 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. For example, '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. For example, 'What are these things? What are these things?' or 'what are these, what are these things?'.
7. The calling of an individual's name over and over is considered as a repetition. For eg, Mary, Mary, Mary.
8. The absence of the definite or the indefinite article does not vitiate the response as a repetition, because of the difficulty in detecting it in rapid speech. For 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 two repetitions. For 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 offset the repetition. For eg. 'Let's rock on the rocking horse. Timmy let's rock on the rocking horse.

Though most of the investigators have utilized the above classificatory system to analyse speech disfluency, few of them have putforth their original views on one or more types of the above mentioned disfluencies. Williams, Silverman and Kools (1968) present a revised version of Johnsons disfluency classification system. They include part-word repetition, whole-word-repetition, phrase-repetition, interjections, revisions, tense-pauses and disrhythmic, phonation.

Tense pauses: It is an event that occurs before the 1st word in an utterance or between words. The occurrence of a tense-pause is indicated by the presence of audible manifestation of heavy breathing or muscle tension.

Disrhythmic phonation: It is a within a word event that may constitute "a prolonged sound, an accent or timing. It is notably unusual, an improper stress, a break, or any other speaking behaviour not compatible with fluent speech and not included in another category". This may or may not involve tension.

Limitations on repetitions were also established.

1. Changes of a word which bring about a change in the meaning of the response nullify it as a repetition. For eg. "that's all I need. That's all we need"
2. Repetition of 'what' or 'hunh' were not marked as repetitions as their presence could indicate the child's inability to hear a remark made to him by another.
3. The introduction of a nonidentical remark between identical remarks cancel the repetition. For example, "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. were not marked as repetitions, since the child was attempting to imitate a continuous sound. For example, "Errrrrn. Errrrrn" (a motor).
5. A change of sentence structure invalidates repetition. For example 'You can't. You cannot'.

Unintelligible repeated syllables were scored as repetitions on the basis that they may have carried meaning to the child if not to the ear of the adult recorder. Since, the study concerned considered repetitions as a part of communicative speech, repetitions of either meaningful or nonsensical syllables, words or phrases for the apparent enjoyment of rhythm were eliminated. The elimination was made on the basis of detection of rhythmical form in which the word or group of

words repeated presented a chanting quality, a definite recurrence of pitch pattern, a regular cadence or emphasis.

Yairi (1981) classified disfluencies into eight categories which included part-word repetition, 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 were further classified into single-syllable word repetition and multi-syllable word repetition.

Janssen and Kraaimaat (1980) has categorized disfluencies into ten types which include fast repetition of a sound, syllable or monosyllabic word, slow repetition of a sound, syllable, word or phrase. The other disfluencies are prolongation of a sound, tense block and interjection of a sound.

Goldman-Eisler (1968) provide evidence that 40-50% of speaking time is spent pausing. Carrell and Tiffany (1960) refer to the pauses, during encoding, as oral punctuation. Carrell and Tiffany (1960), Liberman (1967) and Scholes (1968) consider pauses which do not perceptually disrupt the smooth flow of speech-fluent pauses. Pauses can disrupt the communication. Martin and Strange (1968) consider hesitation pauses.- Pauses can, or pauses that disrupt the smooth flow of speech.

Clarke (1971) differentiates between conventional pauses and idiosyncratic pauses. Conventional pause is one that a competent speaker makes for emphasis or to signal something linguistically important while an idiosyncratic pause is an aspect of performance, reflecting resitiation of uncertainty over word choice, single or syntax style.

Kowal et al (1975) considered unfilled pause as a category of disfluency. They define unfilled pause as any silence less than 270 msec. Dejoy and Gregory (1983) have analysed nine types of disfluencies. They are : (1) part-word repetition (2) word repetition (3) phrase repetition (4) revision (5) interjection (6) incomplete phrase and (7) disrhythmic phonation (Williams et al 1968), (8) grammatical pause (9) ungrammatical pause. Grammatical pauses are silent pauses, that occur at such grammatical junctures as (a) immediately preceding co-ordinating or subordinating conjunction (b) before relative and interrogative pronouns (c) before all adverbial clauses of time, manner and place, and (d) when complete parenthetical references are made (Goldman-Eisler 1968). Unfilled grammatical pauses are silent pauses that occur at non-grammatical points in the flow of speech. They are pauses occurring between repeated units of speech between an interjection and the following word of the meaningful text.

Most of the investigators incorporate Johnson's (1961) classification of disfluency. But some recent studies (Yairi, 1981; Wexler and Mysak, 1982) have grouped revision and incomplete phrases into a single category.

Although Johnson (1961) and other investigators have considered/categorized disfluencies into more than two types, Minifie and Cooper (1964) have suggested that disfluencies can be broadly classified into two basic categories - 'disfluencies of syllable insertion' including repetitions, revision and interjections, and 'disfluencies of deliberation' including pauses and prolongation. The authors put forth that 'disfluencies of deliberation interrupt patterns of fluency by adding to the total amount of time required to read a given passage and the disfluencies of syllable insertion' not only consume time but also add to the total number of sounds uttered while reading a given passage.

Disfluencies may not occur singly. Two or more types of disfluencies can occur successively. These are referred to as compound disfluencies. There are two types of compound disfluencies. (1) clustering: A term used by Silverman (1969) to describe the occurrence of more than one disfluency on the same word or consecutive words, or both; (2) Oscillation - A term used by Mysak (1978) to describe the number of repetition per instance of disfluency.

Silverman (1969) refers to the oscillation phenomenon as duration of fluency.

Development of fluency in children (4-5 years):

Several researchers have attempted to study the fluency patterns in children. However, most of these studies deal with the types of disfluencies used by children. All the studies pertaining to fluency development in the age group 4-5 years are described in Table-1, which gives information about the author, year in which the study was conducted, materials used, number of subjects studied, the procedures employed and the disfluencies reported. Major disfluencies at 4-5 years includes filled pauses, parenthetical remarks and audible inspirations. Unfilled pauses, repeats and false starts were minimal. The increment or decrement of the specific disfluencies are in relation to the other age groups as indicated in the table.

In the table the following notations have been used:

UFP - Unfilled pause, R-Repetitions; FP-Filled pause;

PR - Parenthetical remarks; FS - False starts; Prol-Prolongations

AI -Audible inspirations, TP -Tensed pause and

DP - Dysrhythmic phonation.

However under repetition - SR - Syllable repetition,

WR - word repetition, PWR - Part word repetitions

PHR - Phrase repetition are considered.

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED. | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROL | AI/TP | DP | REMARKS | |
|--------------------|---------------|---|--------------------------------------|-----|----|---|----|----|------|-------|----|---------|--|
| SMITH (1926) | - | 88 children between 2-5 years | Spontaneous speech elicitation | - | - | + | - | - | - | - | - | - | The average repetition decreased from 2-5 years |
| FISHER (1932) | - | 72 children males and females between 2-5 years | spontaneous speech elicitation | - | - | + | - | - | - | - | - | - | Repetition of syllables, words and phrases was characterized in the speech of the children studied. These repeti- tion between 2-5 years decreased with increase in age |
| DAVIS (1940) | - | 62 children between 2-5 years | spontaneous speech elicitation | - | - | + | - | - | - | - | - | - | Repetition of words and phrases decreased with age. Syllable re- petition occurred least between 2-5 years |

Table of studies on the disfluencies of children aged 4-5 years

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROL | A1/TP | OP | REMARKS |
|-----------------------|---------------|--|--------------------------------|-----|----|--|----|----|------|-------|----|---------|
| METRAUX (1950) | - | 207 children from 18 months to 54 months | spontaneous speech elicitation | - | + | + | - | - | - | - | - | - |
| | | | | | | children used /a/ before many words at 24 months of age. At 54 months interjections increased and was used greater at the beginning of a phrase | | | | | | |
| | | | | | | Repetition of syllables and words in 18 months. At 24 months repetition of words or phrases noticed. At 30 months occasional repeats of words or phrases. At 24 months repetitions used in relation to another person in demand for attention, at 48 months repetitions decreased notably. | | | | | | |
| BRANSCOM et al (1955) | - | 193 children aged 2-6 years | spontaneous speech elicitation | - | - | + | - | - | - | - | - | - |
| | | | | | | Repetitions of syllables was less than word repetition which was less than phrase repetition as the age increased | | | | | | |

Table of studies on the disfluencies of children aged 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROL | AI /TP | DP | REMARKS |
|---------------------------|---------------|---------------------------------------|--------------------------------|---|---|---|----|---|------|--------|---|---------|
| McClay AND Osgood (1959). | - | - | - | + occurs before content words such as nouns, pronouns, verbs, adjectives rather than on functional word like conjunctions and articles etc. | - | - | - | - | - | - | - | - |
| GOLOMAN-EISLER (1968). | - | + Normal pre-schoolers | Spontaneous speech elicitation | + Remained constant, did not decrease significantly across the pre-school years | + Did not decrease significantly across the pre-school years. | + Declined significantly across the pre-school years. | - | + Declined across the pre-school years. | - | - | + Decreased across the pre-school years | - |
| Mc DEAR-MON. (1968). | - | PRE-school children between 2-5 years | spontaneous speech elicitation | + was not significantly different between 2-5 years | + was greater between 4-5 years of age. | + Repetition of word, phrases and sentences decreased at 5 years when compared to the 2 year olds | - | - | - | - | - | - |

Table of studies on the disfluencies of children aged 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED. | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROL | AD/TP | DP | REMARKS. |
|---------------------|-----------------------------------|--|--|-----|---|---|----|----|------|---|----|--|
| COOK (1971) | - | - | - | - | + Occurs before pronouns, prepositions and conjunctions and before words such as "well, yes and no." | - | - | - | - | - | - | - |
| MARTIN et al (1972) | Puppets and general conversation. | Normal children between 3.5 - 4.5 years. | Visual presentation and speech elicitation | - | - | - | - | - | - | - | - | + No. significant changes in displacements observed. Puppets elicited more speech output. |
| SILVERMAN (1972) | - | 10 subjects between 4-5 years | structured interview and speech sample in classroom. story-telling and narration was included in the former. | - | - | Part word repetition decreased at 5 years of age with respect to 4 years. | - | - | - | + Occurred rarely in normal speaking children between 4-5 years of age | - | - |

Table of studies on the displacements of children aged 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED. | PROCEDURE EMPLOYED. | UFP | PP | R | PR | FS | PROL | AI / rP | OP | REMARKS. |
|---------------------------------|---|--|---------------------------------|-----|--|--|----|--|------|---|---|--|
| SILVERMAN (1973) | N.A. | 10, 4 year old non-stuttering boys. | spontaneous speech elicitation | - | + Interjection was greater in the age group studied | + Part word repetition was most frequent in this age. | - | - | - | + was not frequent at this age. | - | + clustering of displacements noted. Interjections phrase repetition and tense words seen as clusters of displacements. |
| YAIRI (1981) | Picture cards, from children's perception test, questions and toys. | 33 pre-school children | spontaneous speech elicitation. | - | + Was less in the pre-schoolers. | + Repetition of syllable, word, part word repetition and phrase repetition common in the early pre-schoolers. | - | + and incomplete phrase occurred more in the speech of pre-schoolers. | - | + Was less in the pre-schoolers studied. | + Not seen in the age group studied. | - |
| HELMERICH AND BLOODSTEIN (1973) | - | Age studied was 4 year old. | Free speech elicitation | - | - | - | - | - | - | - | - | + Increased displacements on pronouns and conjunctions. Not on nouns & verbs. Greater in initial position. |

Table of studies on the displacements of children aged 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED | NO. OF SUBJECTS AND AGE RANGE STUDIED. | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROL | AI/TP | OP | REMARKS |
|------------------------|---------------------|---|--|---|---|--|---|--|------|-------|---------------------------------------|---------|
| KOWAL et al (1975) | carbons. | 168 children of both sexes from kindergarten to 12th grade. | Visual presentation and speech elicitation | Was greatest in kg. with a slow decrease up to 12th grade. There was a mild peak in the 6th grade on UFP. | + Showed less change over time with a slight increase in second grade. | + Increased word repetition and fiction sound repetition was greater in the kindergarten children with a general decline at 12th grade. | + Increase in the fifth grade decreased slightly in grade 2 and peaked at grade 4. | + Prevalent in kindergarten. Decreased slightly in grade 2 and peaked at grade 4. | - | - | - | - |
| HAYNES AND HOOD (1977) | Spontaneous speech. | normal pre-school children between 4-6 years | spontaneous speech elicitation | - | + Increased very minimally from 4-6 years. | + Frequency of phrase repetitions increased from 4-6 years. | - | + Revisions and incomplete phrases increased from 4-6 years. | - | - | + Increased greatly from 4-6 years | - |
| BERTEL BERKAM (1980) | - | 110 nursery school children. | Spontaneous speech elicitation | - | - | + was greater in the younger age groups and included syllable, phrase and word repetitions. | - | + Observed occasionally in the children studied. | - | - | - | - |

Table of studies on the disfluencies of children aged 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED | No of subjects and age range studied. | PROCEDURE EMPLOYED. | UFP | FP | R. | PR | FS | PROV | JA/TP | DP | REMARKS |
|------------------------|--|--|--|-----|--|--|----|--|------|------------------------------------|--|---------|
| SUSAN ZUCKERMAN (1980) | Passive sentence type. | Normal children at 3 and 4 years of age. | Spontaneous speech elicitation | - | + Increased from 3-4 years. | + Decreased from 3-4 years. | - | + Not significant in the age group studied. | - | - | - | - |
| YAIRI (1981) | Picture cards from children's perception test, questions and toys. | 33 pre-school children. | Spontaneous speech elicitation through materials used. | - | + Less in pre-schoolers. | + Repetition of syllables, words, parts word and phrases was common in the speech of pre-schoolers. | - | + Revision and incomplete phrases occurred more in the speech of the pre-schoolers. | - | + Less in the Not pre-schoolers | + Significant in the age group studied. | - |
| FAMIAN (1982) | - | Normal pre-school children. | Spontaneous speech elicitation | - | + Evidenced in the speech of pre-schoolers. | - | - | + Evidenced in the speech of pre-schoolers. | - | - | - | - |

Table of studies on the disfluencies of children between 4-5 years.

| NAME OF THE AUTHOR | MATERIAL USED. | NO OF SUBJECTS AND AGE RANGE STUDIED. | PROCEDURE EMPLOYED | UFP | FP | R | PR | FS | PROU | AI/TP | DP | REMARKS |
|--------------------------|----------------|---|--------------------------------|--|---|---|----|---|------|---|--|--|
| WEXLER AND MYSAK (1982) | - | 36 males at 2, 4 and 6 years | Spontaneous speech elicitation | - | + Greater in the 4 year old than the other two ages. | + Word and phrase repetitions decreased between 2-4 years. Part-word repetitions and interjections were seen between 2-6 years with a dip at 4 years. | - | + No significant difference between 2 and 4 years. | - | + Remained constant from 2-4 years and decreased at 6 years. | + Decreased from 2-6 years | - |
| DEJOY AND GREGORY (1983) | - | 60 males between the ages 3.3 - 3.9 and 4.9 - 5.3 years | spontaneous speech elicitation | + Grammatical pauses were greater in older children. No significant difference between the two groups with respect to ungrammatical pauses. | + No difference between the two groups studied. | + Part-word repetition and phrase repetition was greater in the younger age group. | - | + Was greater in the younger age group. | - | - | + Was greater in the younger age group. | + Disfluencies decrease as age increases. This may be related to factors such as syntactic structure, the automaticity in the children's speech & information processing. |

Table of studies on disfluencies of children between 4-5 years.

In general, the major kinds of disfluencies at 4-5 years as observed in these studies were, filled pauses, interjections, audible inspirations or tense pause, parenthetical remarks, repeats and false starters and the major tasks used were speech elicitation, story telling, cartoon description, puppetry and description of picture cards and toys.

Fluency development has also been studied in age groups other than 4-5 years. The findings indicate that as the children grow older there is a difference in the disfluencies noticed when compared to the younger age group. Disfluencies fluctuate from younger age to older age groups and also exhibit variations in the kind of disfluent patterns, during the course of fluency development. The fluency development in the early age group is marked by disfluencies such as repetitions and filled pauses which are later replaced by more complex patterns like false starters, and parenthetical remarks in the older age groups. There is a clear cut difference in the fluency patterns of children at various ages. However as this study is aimed at highlighting the development of fluency in the age group of 4-5 years, a description of the fluency development in other age groups is beyond the scope of this review.

Factors affecting fluency development:-

There are four main factors viz. rate, duration, stress, and effort, affecting fluency.

RATE: Syllabic rate and utterance length show clear developmental trends. Rate is measured by the number of syllables uttered persecond (Dawson, 1929). One of the earliest studies by Dawson(1929)on 200 children at 12 different grade level indicated that the rate developed quickly in the lower grades 1-3 around 4 syllables/second and the development slowed down at grades 4, 6, 8, 9 and 11 (Fig.a)

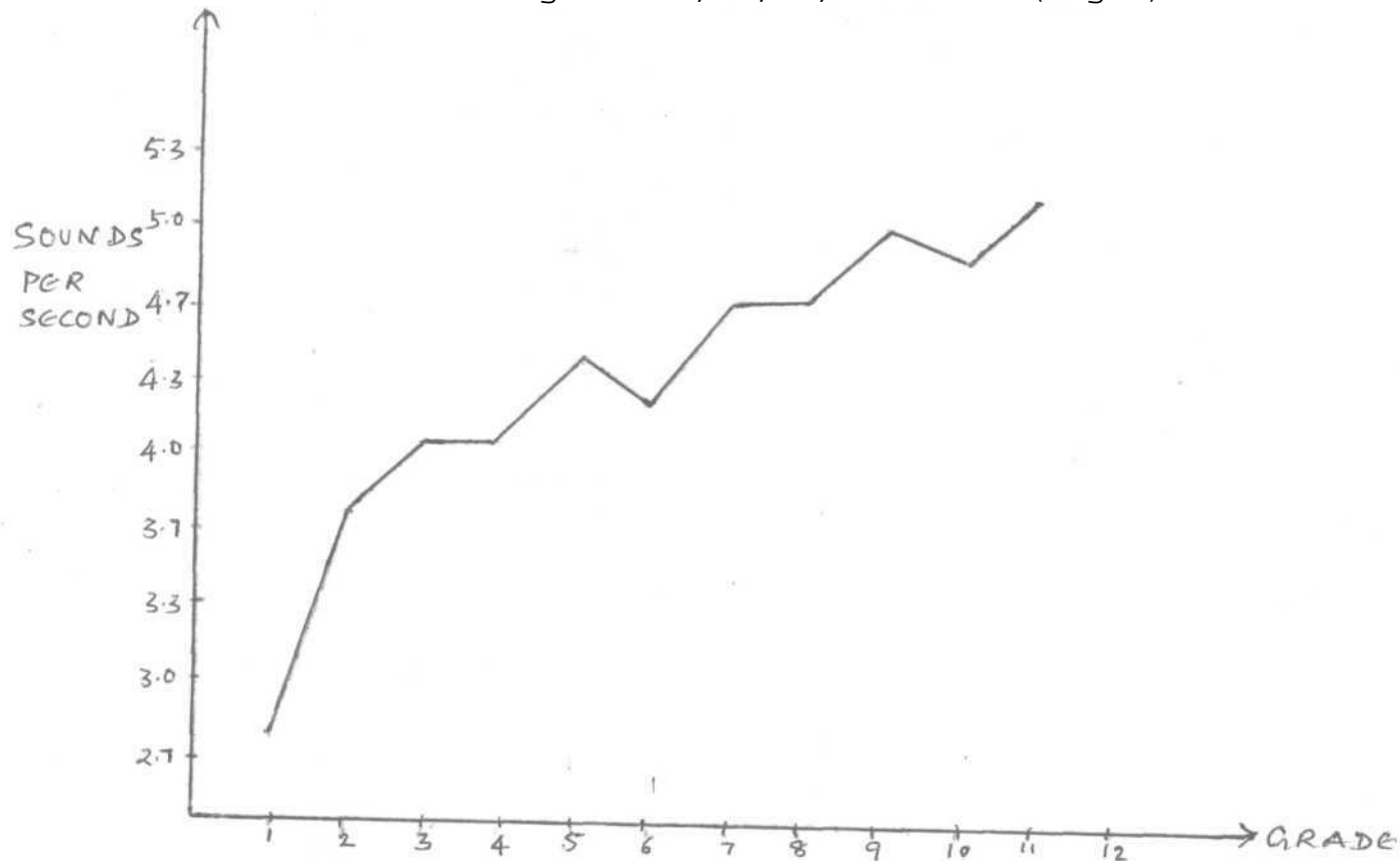
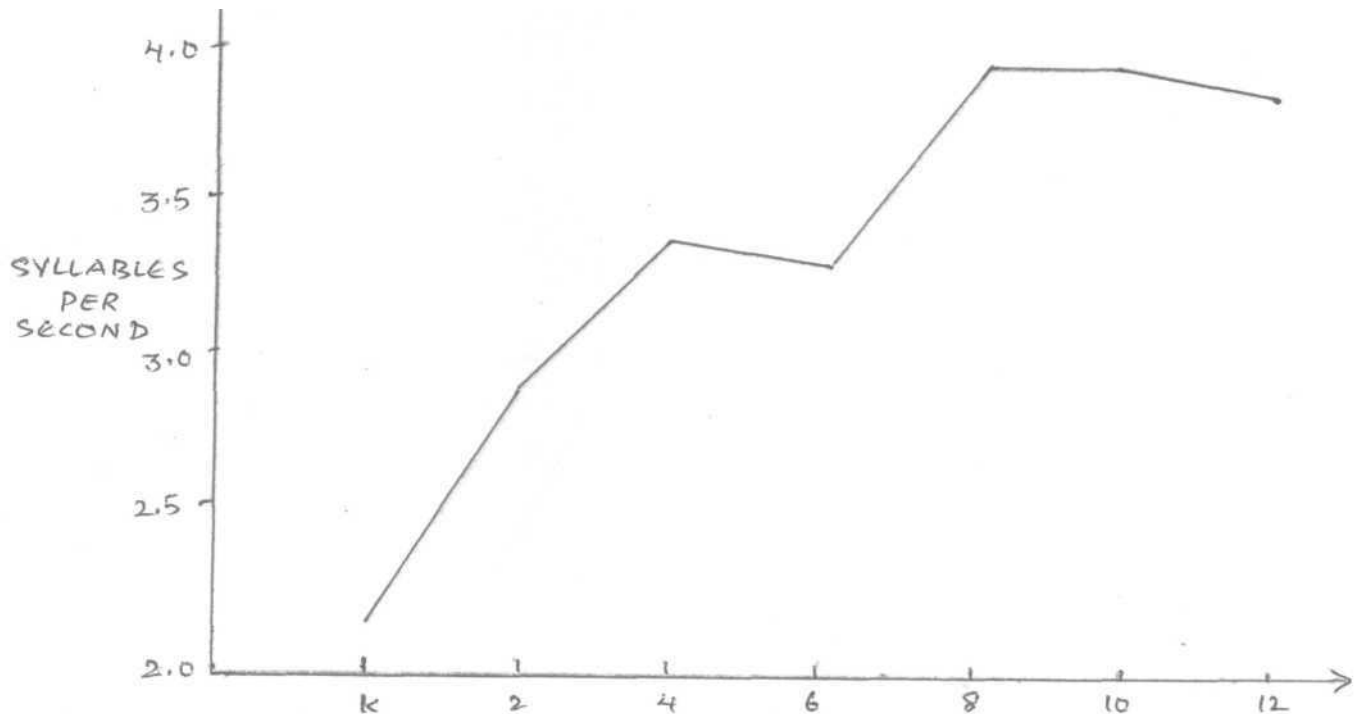


Fig-a- SPEECH RATE As A Function OF AGE

Dawson used a variety of speech tasks such as counting, repetition of word, saying a nursery rhyme, a tongue twister and an ordinary sentence as fast as they could. The study also indicated sex differences where girls talked faster than

boys upto age 12, across all speech tasks and between 12-19 years a minor see-sawing between the two sex with a final change where in the boys seemed to talk much faster at 20 years.. (Fig.B) .



F16-B- SYLLABLES PER SEC AS A FUNCTION OF AGE

In a study on the development of rate incorporating subjects from kindergarten through senior year of high school Kowal et.al (1975) indicated a discontinuity in the development between 4th and 6th grades after which the rate continued to increase until the 10th grade with a slight decrease in the rate at high school (Fig.b)

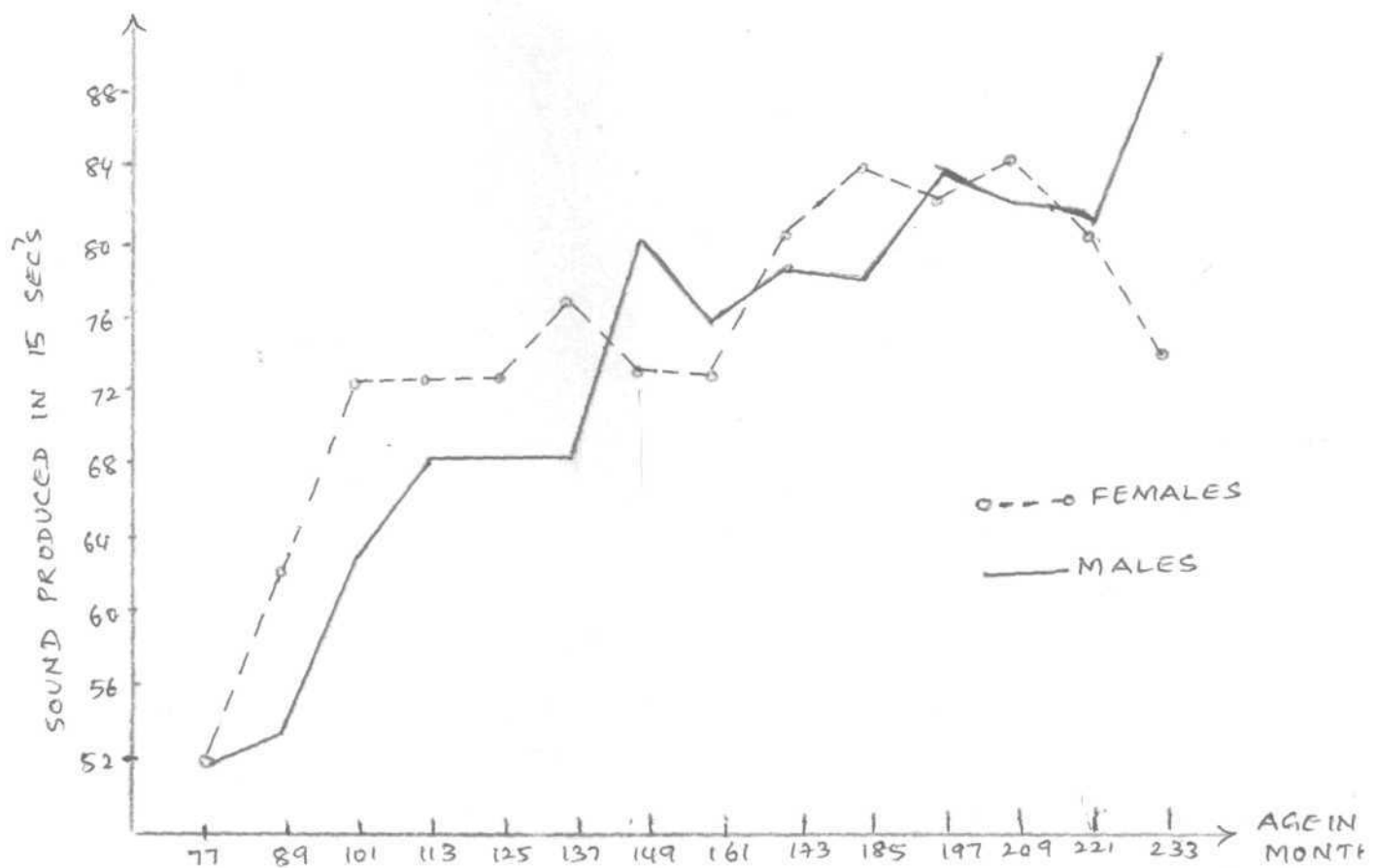


FIG-C - RATE OF SPEECH AS A FUNCTION OF AGE AND SEX

"As children grow, rate and utterance length both increase. Development is more rapid in the early years. When there is also a difference in rate between the sexes favouring girls, spurts and lags in the development of fluency are accompanied by increases and decreases, respectively, in the frequency of pause and hesitations, suggesting that these non-fluencies may in fact be a behaviour for achieving faster rate or longer utterances in growing children. After age 20, the rate of utterance gradually declines (Kowal et al. 1975).

DURATION, The duration of speech sounds is directly related to fluency in several ways. The less time individual sounds take up, the more can be produced in the same period of time (Umeda, 1975). The relationship of stress.

pauses and syllabic rate influence the duration of speech sounds. Apart from these, influences of nearby sounds i.e. vowels or consonants and of pauses (Fairbanks, 1953). on the duration of a sound, sentence boundaries in which they occur (Umeda, 1975) should be considered. Language can also affect the duration of speech sounds used (Umeda, 1975).

The duration of speech sounds changes in the growing children. Oiler and Smith (1977) on examining the babbling of infants found a lengthening of final syllables. As children grow, the average duration of both vowels and consonants decreases along with variability of duration (DiSimoni, 1974a, 1974b). Disimoni also found a tendency for speech sounds to be shorter in longer utterances between 6-9 years and not in the speech of the 3 year old. On studying the VOT in children between 3 and 4 years Menyuk and Klatt (1975) found that children showed proportionately much greater shortening in the voiced than in the unvoiced category.

STRESS; The other factor which affect fluency is stress. Children seem to acquire the ability to perceive and produce stress contrasts before they use stress meaningfully (Spring and Dale, 1977). In the one word stage, dissyllabic words are often produced with the unstressed syllable omitted or

distorted or with the stressed syllable substituted for it (Atkinson-King, 1973), Once stress contrasts have been mastered, the preschool child's speech rhythms become more adult in form, although development continues during school years as control over timing and rate of syllable production increase (Tingley and Allen, 1975). At Normal speeds, stress is likely to be found on words that carry more information moreover, stressed syllables require more time and more effort and are consequently less fluently produced than unstressed syllables (Kowal et al. 1975). At older ages, children learn the use of linguistic stress, comprehension preceding production and the girls outperform boys in the stage of stress development at the age studied (Kowal et al. 1975).

EFFORT: Effort is consequently related to rate, stress and duration of speech sounds. Effort of mind and effort of muscle are both aspects of fluency. It is difficult to measure the former, However, the latter has been measured in terms of intraoral airpressure for various speech sounds and with the age and sex of the speaker (Malecot, 1955; and Subtelny, et al 1966) also varies with the position of a sound in the word, with the rate and loudness of utterance (Subtelny et al.1966) with stress (Umeda, 1977) and with coarticulation (Arkeebauer, 1964). These effects are attributable to the influence of vocal tract length and the duration of constrictions in the tract on the aerodynamics of speech sound production(Subtelny, et al. 1966).

Apart from these, various other factors affect fluency of which linguistic complexity is one. It has been found that highly disfluent group of children aged 4 years use language that was less complex (Muma, 1967) and fewer discontinuities were observed in the speech of 4 years old who had good comprehension (Caldwell, 1971).

The relationship between syntactic complexity and disfluencies has also been highlighted by several researchers. It was noticed that an increase in syntactic complexity increased the disfluency in children aged 3.11 years to 6.4 years on an imitation task (Soderberg, 1963, Bernstein and Catherine (1981)).

Sex has been identified as yet another factor."While some studies (Fisher, 1932, Kowal et al 1975, Haynes, and Hood, 1977; Yairi, 1981, Wexler and Mysak, 1982) have indicated males as showing greater disfluencies than females in the age groups 2-6 years, others (Kools and Berryman, 1971) have indicated no sex differences in the disfluent pattern or in the total number of disfluencies.

The influence of variables like ANS and stress (Myers, 1977), the synchrony of laryngeal adjustments (Freeman and Ushijima, 1975), the integrity of the coarticulatory mechanisms

(Stromstq, 1965; Stromstq and Fibiger, 1980) and the child's phonological, syntactic, semantic and pragmatic development should also be considered as factors that can affect fluency (Dalton and Hardeastle, 1976).

The occurrence of disfluencies on various grammatical categories has also been the subject of several studies. It has been observed that filled and unfilled pauses, occur more often before content words (nouns, pronouns, verbs, adverbs, adjectives) than before function words (prepositions, conjunctions, articles) (Maclay and Osgood, 1969). They also occur at other locations where word choice or phrase or clause boundaries indicate high uncertainty (Boomer 1970; Goldman-Eisler, 1968; Rochester, 1973). Filled pauses occur before pronouns, prepositions and conjunctions and before words such as well, yes and no (Cook, 1971).

In general, it is evident that several factors affect fluency and the development of fluency follows some trend. Though, these studies conducted so far provide information for the differential diagnosis of normal non-fluency from stuttering, no formal testing have been suggested for this as yet and the differential diagnosis of normal non-fluency from stuttering is still a controversial issue. In this

context, the present study is aimed at analyzing the disfluencies in Kannada speaking children between 4-5 years of age in spontaneous speech, rhymes, picture description and story narration tasks. Also, it is intended to suggest a formal test for fluency to aid in the differential diagnosis of normal non-fluency and stuttering.

METHODOLOGY

SUBJECTS: The subjects for this study were twelve Kannada speaking children in the age range of 4-5 years, who were from middle socioeconomic status. This age range was divided into six groups of two months interval (4-4.2 years, 4.2-4.4 years etc...). Two children were studied under each age group.

TASKS: Totally there were four tasks in this study, viz. conversation, recitation of rhymes, story telling and picture description.

Task-1: Conversation: Common questions related to day-to-day activities were used. Mother, experimenter and the child were present in this task and the child was encouraged to answer the questions.

Task-2: Rhyme recitation: The child was instructed to recite the rhymes he/she knew.

Task-3: Story narration: The child was instructed to narrate as many stories as he knew.

Task-4: Picture description: A pilot study in which cartoons and connected pictures were used, was conducted to select the material for this study. Of these, as it was found that the children responded to connected pictures, they were selected as the material. The connected pictures used are in Appendix.

PROCEDURE: Each child was individually tested in home situation and was accompanied by one of the parents. Each child was provided with pictures, one at a time and were stimulated to respond for the same. One picture was used for trial and the picture was described to the child by the tester or the mother. Conversation story telling and nursery rhymes were also elicited. All the speech sample were recorded on audio-cassettes.

ANALYSIS: These speech samples were transcribed and analyzed for the disfluencies. The disfluencies analyzed are defined as follows:

1. Filled pauses: A pause filled by sounds like 'mm, er, a, etc.
2. Unfilled pauses: Silent pauses.
3. Repeats: Repetition of syllables, part-words, words, part utterances and phrases.
4. Parenthetical remarks: 'Matte' 'aavaaga' 'gothe', 'aameley' 'andrey' and 'adaa' and other fillers.
5. False starts: Correction of phrases/words and incomplete utterances, change in pronunciation, change in structure of sentence and revision of words and content.
6. Audible inspiration: Audible inspirations during the speech.
7. Prolongation: Prolongation of initial, medial and final syllable.

8. Utterances An utterance was considered as a meaningful unit of speech which may consist of one or multiple words eg. 'Maradmele' is considered as one utterance.

Each instance of disfluency was considered as one disfluency for eg. 'mm mm' was considered as two filled pauses, 'mathey mathey' was considered as two parenthetical remarks and 'da da dara' was considered as two part word repetitions.

Disfluency like 'da-da dara' was considered to occur in the initial position of an utterance, 'karkon kon kon bande' was considered as a disfluency in the medial position of the utterance and 'bereee' was considered as a disfluency in the final part of the utterance.

The grammatical category of the word following disfluency was noted and the disfluencies occurring before the grammatical category such as Nouns, verbs, adjectives, adverbs, numbers, determiners, prepositions, pronouns and negatives were calculated. Whenever there were doubts, Kannada dictionary was referred.

The total number of words and the number of different types of disfluencies in various tasks were calculated and disfluencies were converted to percent by the using the following formula.

$$\frac{\text{No.of disfluencies} \times 100}{\text{Total no.of words}}$$

The formula used to calculate the percent of disfluencies before various grammatical categories was -

$$\frac{\text{Total no,of disfluencies occuring before each grammatical category}}{\text{Total no.of disfluencies}} \times 100$$

The emerging patterns of disfluencies with respect to different tasks at various age groups are highlighted.

RESULTS AND DISCUSSION

The (disfluencies of 12 children in the age range of 4-5 years were studied with respect to different age groups of two month interval each, tasks, types of nonfluencies and grammatical categories. The results are discussed with respect to different age groups.

4-4.2 years:

In general, it was observed that rhytes and story telling elicited maximum speech output followed by conversation and picture description. Maximum disfluencies were observed in story telling task followed by conversation and picture description. Rhymes showed least number of disfluencies.

| | Conversa- tion | Rhymes | Picture discription | Story telling |
|---------------------------------|-------------------|--------|------------------------|------------------|
| Total no. of utterances | 339 | 585 | 307 | 541 |
| Total no. of disfluencies | 84 | 12 | 80 | 169 |

Table-1a: Total no.of utterances and disfluencies (4-4.2 years).

In this age group filled pause (hence-forth FP) were maximum on all the three tasks (conversation, picture

description and story telling) followed by parenthetical remarks (hence forth PR) and unfilled pauses (hence forth UFP). Repeats had a lower percentage of occurrence. False starts (hence forth FS) were also noticed in one subject in conversation. However, it was about in picture description and story telling tasks. No word repetitions, (hence forth WR), phrase repetitions (hence forth RHR), part question repetition (hence forth PQR) or audible inspirations (hence forth AI) occurred in conversation. However in story telling task, part word repetitions, word repetition and phrase repetitions were noticed and false starts, prolongation, part question repetition and audible inspiration were absent. In story telling task, the two children performed differently. One child showed a high percentage of filled pause followed by UFP with a minimum percentage with no other types of disfluencies and the other child showed a higher FP followed by UFP and PR with syllable repetition, part word repetition having the least percentage of occurrence. (FIG1)

High percentage of disfluencies were associated with nouns followed by verbs, numbers, pronouns, determiners, adjectives and prepositions. Low percentage of occurrence of disfluencies were associated with adverbs. No negatives were used by the children in this speech sample elicited. (Table 2a

GRAPH FOR THE AGE GROUP 4-4.2 YRS

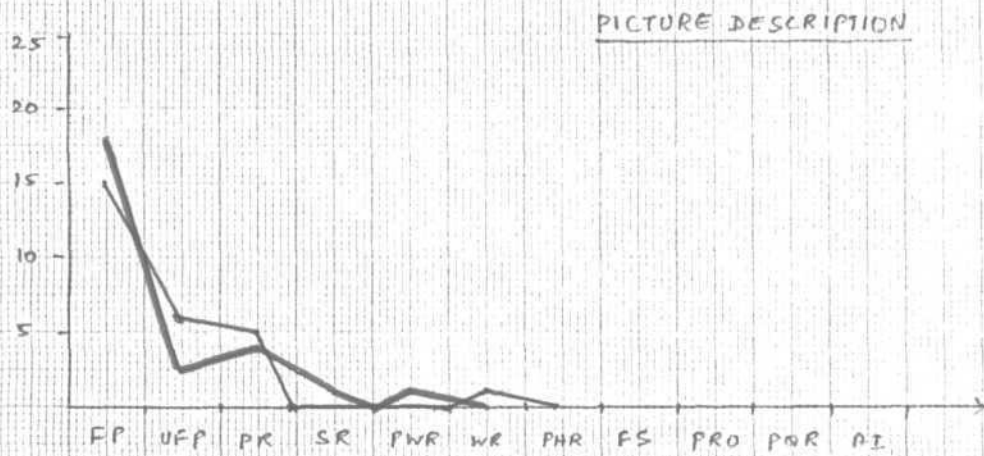
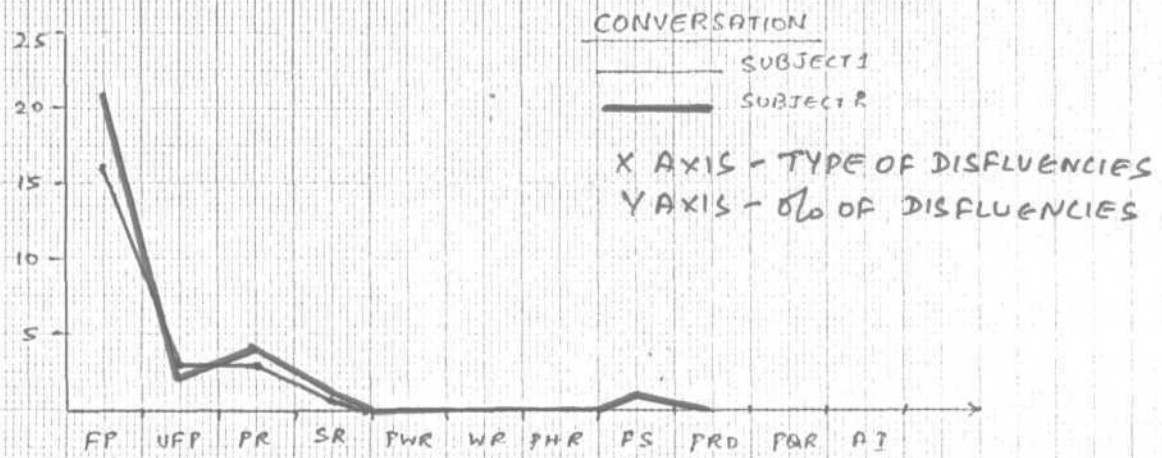


FIG-1: DISFLUENCIES IN DIFFERENT TASKS (4.0-4.2 YRS)

| | Noun | Verb | Adjectives | Adverbs | Determiners | Number | Pronouns | Prepositions | Negatives |
|------------|-------|-------|------------|---------|-------------|--------|----------|--------------|-----------|
| FP | 74 | 37 | 16 | 1 | 20 | 27 | 21 | 10 | 0 |
| UFP | 18 | 17 | 1 | 0 | 1 | 8 | 5 | 0 | 0 |
| R | 10 | 0 | 0 | 0 | 1 | 0 | 5 | 0 | 0 |
| PR | 41 | 6 | 0 | 0 | 9 | 5 | 5 | 6 | 0 |
| FS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PROL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 143 | 60 | 17 | 1 | 31 | 40 | 36 | 16 | 0 |
| Percentage | 41.57 | 17.44 | 4.94 | 0.29 | 9.01 | 11.62 | 10.46 | 0.47 | 0 |

Table 2a: Types and percentage of disfluencies according to grammatical categories (4-4.2 years).

The results indicate that highest percentage of disfluencies occur in the initial part of the utterance followed by a low percentage of occurrence in the medial part with no disfluencies at the final positions.

| Age | Initial | Medial | Final |
|-------------|---------|--------|-------|
| 4-4.2 years | 92.9% | 7% | — |

Table-3a: Position of occurrence of the percentage of disfluencies (4-4.2 years).

4.2-4.4 years:

In this age group, rhymes elicited maximum speech output from the children followed by picture description, conversation and story telling. In picture description and story telling, children exhibited maximum number of disfluencies and least number of disfluencies on rhymes.

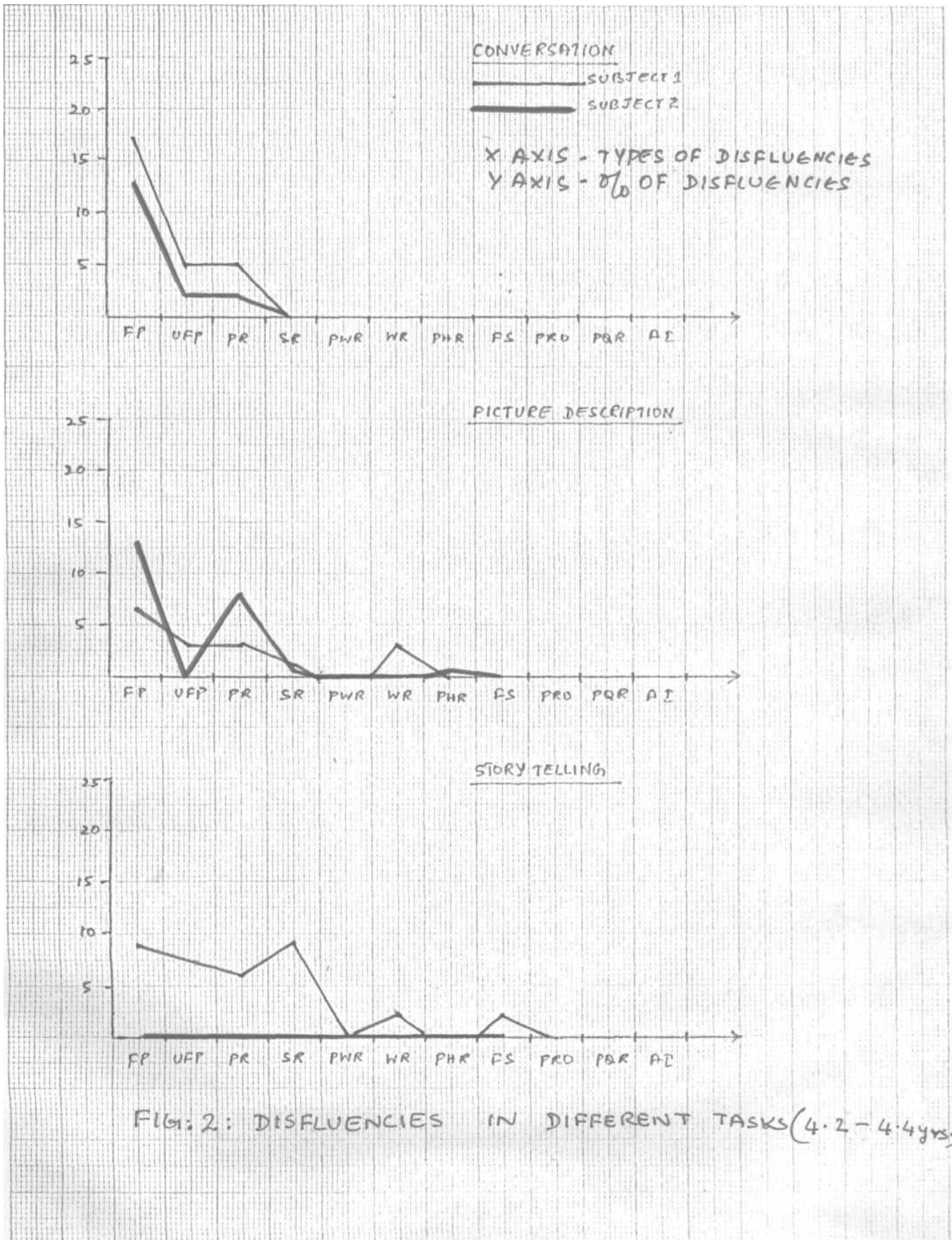
| | Conver- sation | Rhyme | Picture description | Story telling |
|---------------------------------|-------------------|-------|------------------------|------------------|
| Total no. of utterances | 259 | 441 | 329 | 196 |
| Total no. of disfluencies | 61 | 7 | 65 | 65 |

Table-1b: Total no. of utterances and disfluencies (4.2-4.4 years.)

Children showed maximum percentage of FP's in all the tasks. In conversation one child, subject-1 showed UFP and PR of a greater/percentage than the other, subject-2. Neither of them showed any disfluencies of part word repetitions, word repetitions, phrase repetitions, false starts, prolongations, part question repetition and audible inspirations in conversation. In the picture description task subject-1 showed a maximum percentage of FP's followed by UFP, PR and word repetitions. Syllable repetitions showed the least percentage of occurrence. Subject-2 showed a maximum percentage of FP followed by a peak on PR. Neither of them showed any disfluencies of prolongations, audible inspirations, part questions repetitions, false starts and part word repetitions. In the story telling task subject-1 showed equal percentage of disfluencies of FP and syllable repetitions followed by PR, word repetitions and false starts. No disfluencies of part word repetitions, phrase repetitions, prolongations, part question repetitions and audible inspirations were evidenced. It was interesting to note that subject-2 had no disfluencies of any of the mentioned types.(FIG-2)

The total no.of disfluencies/before each grammatical category is in Table 2b. A greater percentage of disfluency occurred before nouns followed by disfluencies before verbs

GRAPH FOR THE AGE GROUP 4.2- 4.4 yrs.



| | Noun | Verb | Adjectives | Adverbs | Determiners | Number | Pronouns | Prepositions | Negatives |
|-------------|------|------|------------|---------|-------------|--------|----------|--------------|-----------|
| FP | 61 | 12 | 1 | 1 | 2 | 12 | 9 | 0 | 3 |
| UFP | 5 | 6 | - | - | 5 | - | - | ½ | - |
| R | 10 | 3 | - | 6 | - | 3 | 2 | 1 | |
| PR | 20 | 5 | 1 | - | 3 | 8 | 6 | 2 | - |
| FS | 3 | - | - | - | - | - | - | - | - |
| PRO | - | - | - | - | - | - | - | - | - |
| AI | - | - | - | - | - | - | - | - | - |
| Total | 108 | 26 | 2 | 7 | 10 | 23 | 17 | 4 | 3 |
| Percentage. | 54 | 13 | 1 | 3.5 | 5 | 11.5 | 8.5 | 2 | 1.5 |

Table 2b: Type and percentage of disfluencies according to grammatical categories.

numbers, pronouns, determiners and adverbs. Before the grammatical categories such as prepositions, negatives and adjectives there were least disfluencies. (Table 3a)

High percentage of disfluencies occurred in the initial part of the utterance followed by the medial and the final part of the utterance.

| Age | Initial | Medial | Final |
|---------------|---------|--------|-------|
| 4.2-4.4 years | 82.5% | 14.5% | 2.83% |

Table 2c: Position of occurrence of the percentage of disfluencies (4.2 - 4.4 years).

4.4 - 4.6 years:

For this age group picture description task elicited maximum speech output followed by story telling, rhymes and conversation. Maximum number of disfluencies were seen in picture description followed by story telling and conversation. Rhymes exhibited the least number of disfluencies.

| | Conversation | Rhymes | Picture description | Story telling |
|----------------------------|--------------|--------|---------------------|---------------|
| Total No.of utterances. | 558 | 600 | 638 | 619 |
| Total no. of disfluencies. | 133 | 20 | 211 | 165 |

Table 1C: Total no.of utterances and disfluencies (4.4 - 4.6 years).

In conversation subject-1 showed a higher percentage of FP's followed by syllable repetition, PR, part word repetition, word repetitions and phrase repetitions. No disfluencies of prolongations, part question repetitions, false starts and audible inspiration was seen. Subject-2 showed FP's followed by UFP, PR, word repetitions and false starts. No disfluencies of syllable repetitions, part word repetitions, phrase repetitions, prolongations, part question repetitions and audible inspiration were noticed. In picture description task FP had the maximum percentage of occurrence followed by PR in both the subjects. Subject-1 showed disfluencies of syllable repetitions, part word repetitions, word repetitions, phrase repetitions, false starts, prolongations and audible inspirations. No disfluency of UFP was noticed in subject-1. Subject-2 showed disfluency of UFP, syllable repetition, phrase repetition and AI, which was minimal. No disfluency of part word repetition (hence forth PWR), FS, prolongations and part question* repetition was observed in the speech of subject-2 on this task. However, in story telling task, subject-1 showed higher percentage of FP followed by PR and AI. Syllable repetitions, part word repetitions, word repetitions, phrase repetitions occurred very minimally. No UFP, FS, prolongations and part questions repetition occurred in the speech of subject-1. Subject-2 showed highest percentage of FP followed by syllable

repetitions. UFP, word repetitions, false starts and prolongations were exhibited but to a minimal degree. No disfluencies of PR, part word repetitions, phrase repetitions, part question repetitions and AI were noted in subject-2 on this task.(FIG-3)

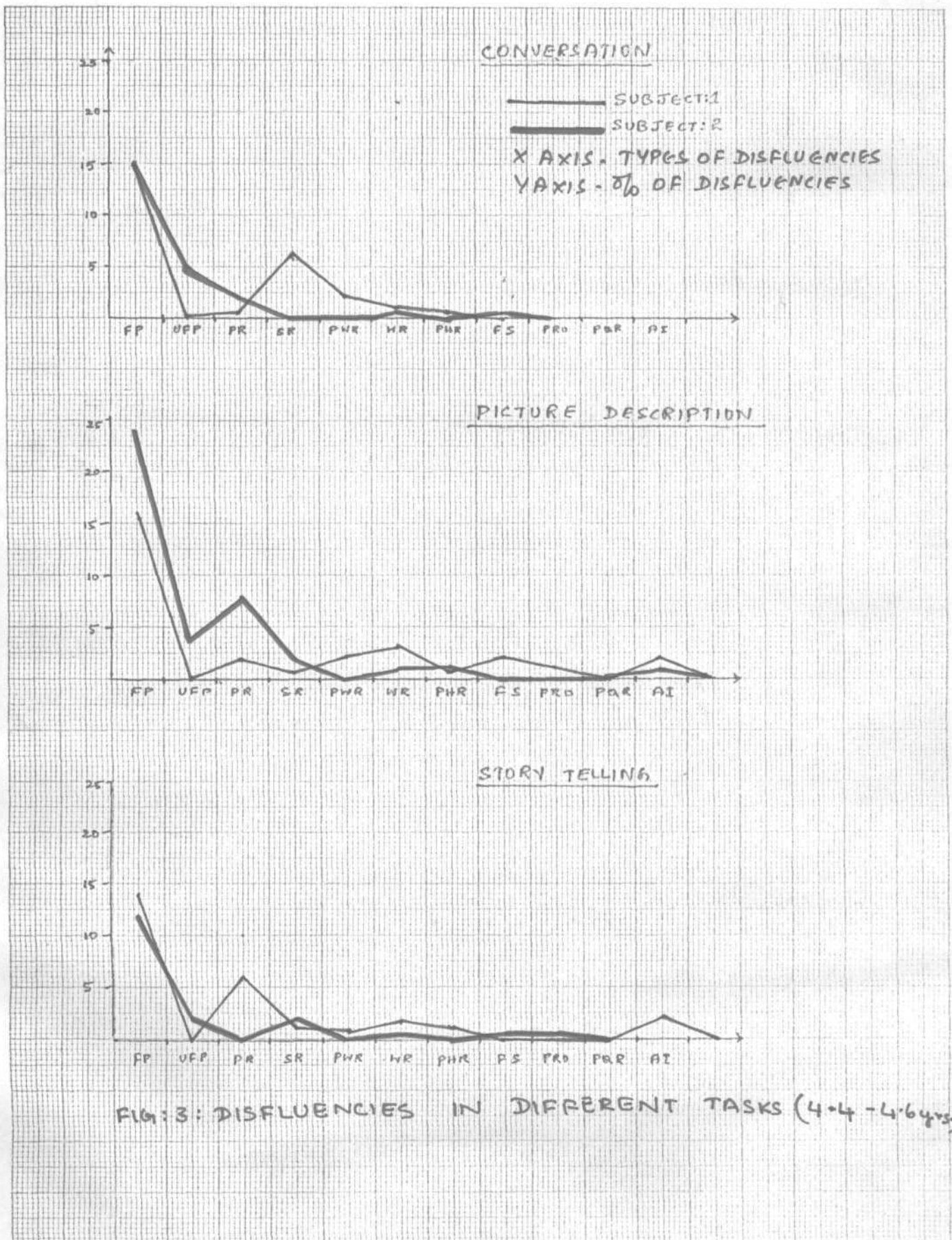
High percentage of disfluencies occurred before nouns followed by disfluencies before verbs, numbers, determiners, prepositions and pronouns, Disfluencies was least before adverbs, negatives and adjectives for this age group.(Table-2c).

Percentage of disfluencies was high in the initial position of the utterance followed by the medial position and the final position had no disfluencies.

| Age | Initial | Medial | Final |
|---------------|---------|--------|-------|
| 4.4-4.6 years | 90.6% | 9.39% | - |

Table-3c: Position of occurrence of the percentage of disfluencies (4.4-4.6 years).

GRAPH FOR THE AGE GROUP 4.4 - 4.6 YRS.



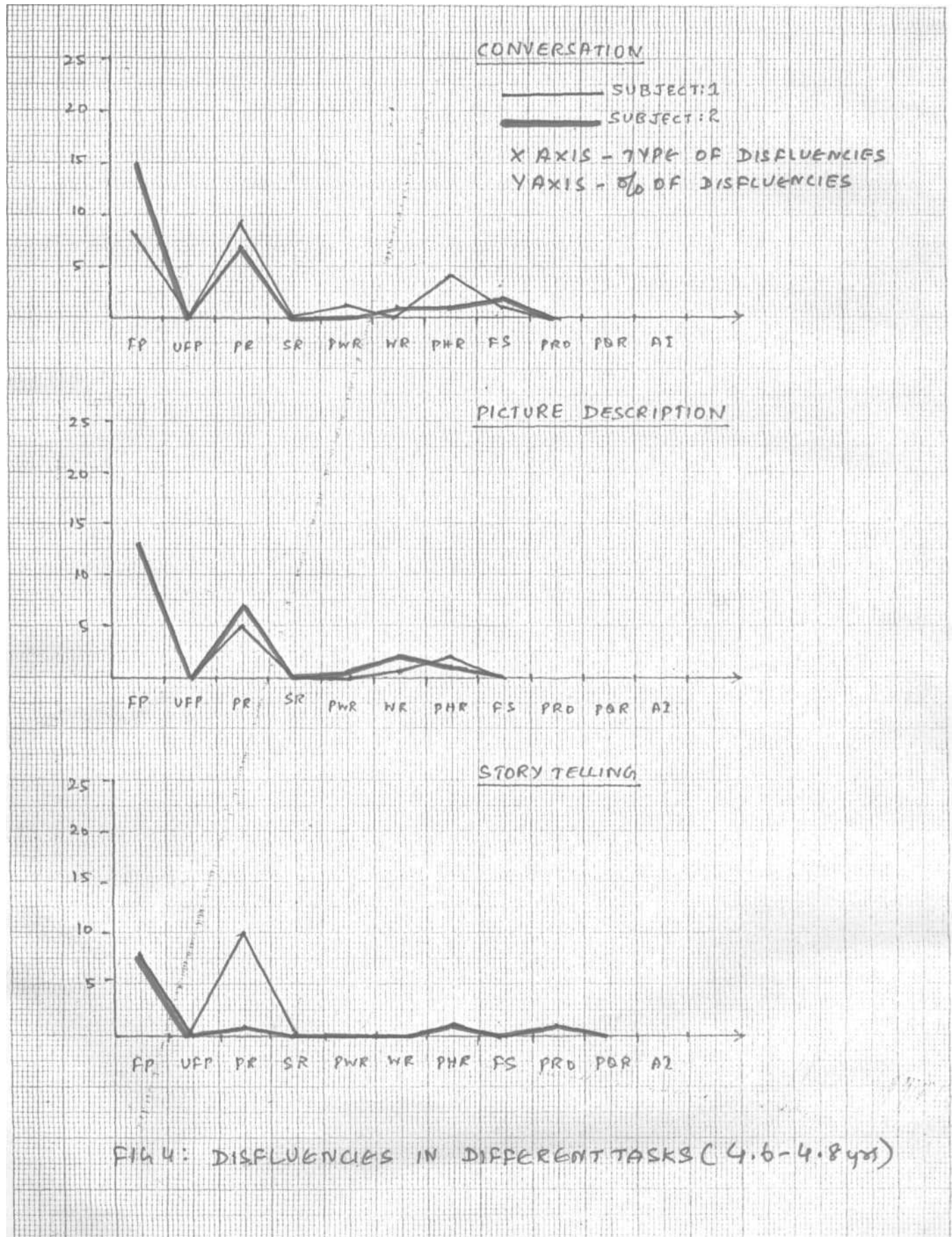
| | Noun | Verb | Adjectives. | Adverbs | Determiners | Numbers | Pronouns | Prepositions | Negatives |
|-------------|-------|-------|-------------|---------|-------------|---------|----------|--------------|-----------|
| pp | 146 | 43 | 3 | 5 | 26 | 38 | 11 | 23 | 2 |
| UFP | 20 | 3 | - | 2 | 2 | 3 | 4 | 2 | 1 |
| R | 38 | 30 | - | - | 3 | 6 | 4 | 3 | 2 |
| PR | 38 | 13 | 1 | 1 | 10 | 11 | 5 | 5 | 2 |
| FS | 2 | 5 | | - | - | - | - | - | - |
| PROL | 4 | - | - | - | - | - | - | - | - |
| AI | 6 | 9 | - | - | - | - | - | - | |
| Total | 254 | 103 | 4 | 8 | 41 | 58 | 24 | 33 | 7 |
| Percentage. | 47.74 | 19.36 | 0.75 | 1.50 | 7.70 | 10.90 | 4.51 | 6.2 | 1.3 |

Table 2c: Types and percentage of disfluencies according to grammatical categories, (4.4 - 4.6 years)

In picture description task it was interesting to note that subject-1 had no FP's. However PR was maximum followed by phrase repetition and word repetition. No other types of disfluencies was seen in subject-1. Subject-2 showed maximum percentage of disfluency in FP followed by PR. Word repetition, phrase repetition and part word Repetition showed minimal percentage of occurrence. No other types of disfluencies/was seen in subject-2. In story telling task subject-1 showed maximum disfluency of PR followed by FP. Phrase repetitions was also seen to a minimal extent in subject-1. Subject-2 showed high percentage of disfluency of FP, PR, phrase repetition and prolongation were also seen but to a minimal degree. No other disfluencies were noted in subject-2.(FIG-4)

Maximum disfluencies were associated with nouns followed by verbs, numbers, determiners, pronouns and prepositions. Disfluencies before adjectives, adverbs and negative occurred were minimum.

GRAPH FOR THE AGE GROUP 4.6 - 4.8 Yrs



| | Noun | Verb | Adverbs | Adjectives | Determiners | Number | Pronouns | Prepositions | Negatives |
|-------------|-------|------|---------|------------|-------------|--------|----------|--------------|-----------|
| FP | 55 | 26 | - | 2 | 12 | 15 | 14 | 12 | 3 |
| UFP | - | - | - | - | - | - | - | - | - |
| R | 13 | 15 | - | - | 3 | 7 | - | 2 | 6 |
| PR | 38 | 19 | 2 | 1 | 13 | 14 | 9 | 10 | 4 |
| PS | 5 | - | - | - | - | 1 | - | - | 1 |
| PRO | 1 | - | - | - | - | - | 2 | - | - |
| AI | | | - | - | | | - | | |
| Total | 112 | 60 | 2 | 3 | 28 | 33 | 25 | 24 | 9 |
| Percentage. | 37.33 | 20 | 0.66 | 1 | 9.3 | 12.3 | 8.3 | 8 | 3 |

Table 2d: Typesadd percentage of disfluencies according to grammatical categories.
(4.6 - 4.8 Years)

High percentage of disfluencies occurred in the initial position followed by disfluencies in the medial position of an utterance and in the final position it was negligible.

| Age | Initial | Medial | Final |
|---------------|---------|--------|-------|
| 4.6-4.8 years | 84.37% | 15.30% | .25%. |

Table-3d: Position of occurrence of the percentage of disfluencies (4.6-4.8 years).

4.8-4.10 years:

Conversation elicited maximum speech output followed by picture description, rhymes and story telling. However, maximum disfluencies were observed in story telling followed by disfluencies on conversation and picture description. Rhymes had minimum disfluencies.

| | Conversa- tion | Rhymes | Picture description | Story Telling |
|---------------------------------|-------------------|--------|------------------------|------------------|
| Total no. of utterances | 503 | 408 | 494 | 303 |
| Total no. of disfluencies | 85 | 17 | 49 | 132 |

Table-1e: Total no.of utterances and disfluencies (4.8-4.10 years).

In conversation subject-1 and subject-2 showed a high percentage of disfluency of FP followed by PR, syllable repetition, part word repetition, word repetition and phrase repetition showed the least number of disfluency. No disfluency of UFP, FS, prolongations, part question repetition and AI was observed in both the subjects. In picture description task FP occurred maximally. However subject-1 showed equal percentage of occurrence of UFP with a less of PR. Subject-2 showed minimal percentage of disfluencies of PR and syllable repetitions. No other types of disfluencies were noticed in either of the subjects. In story telling subject-1 and subject-2 showed maximum percentage of F.P. Subject-1 showed PR and PWR followed by UFP, syllable repetitions, word repetitions and prolongations. Subject-2 showed PR, syllable repetition PWR, word repetition and FStb. a minimal percentage. No other type of disfluencies were observed. (FIG - 5)

The percentage of disfluencies was associated maximally with nouns followed by disfluencies before verbs, pronouns, negatives determiners and numbers. Percentage of disfluencies were least before adjectives, adverbs and prepositions.

GRAPH FOR THE AGE GROUP 4.8 - 4.10 yrs

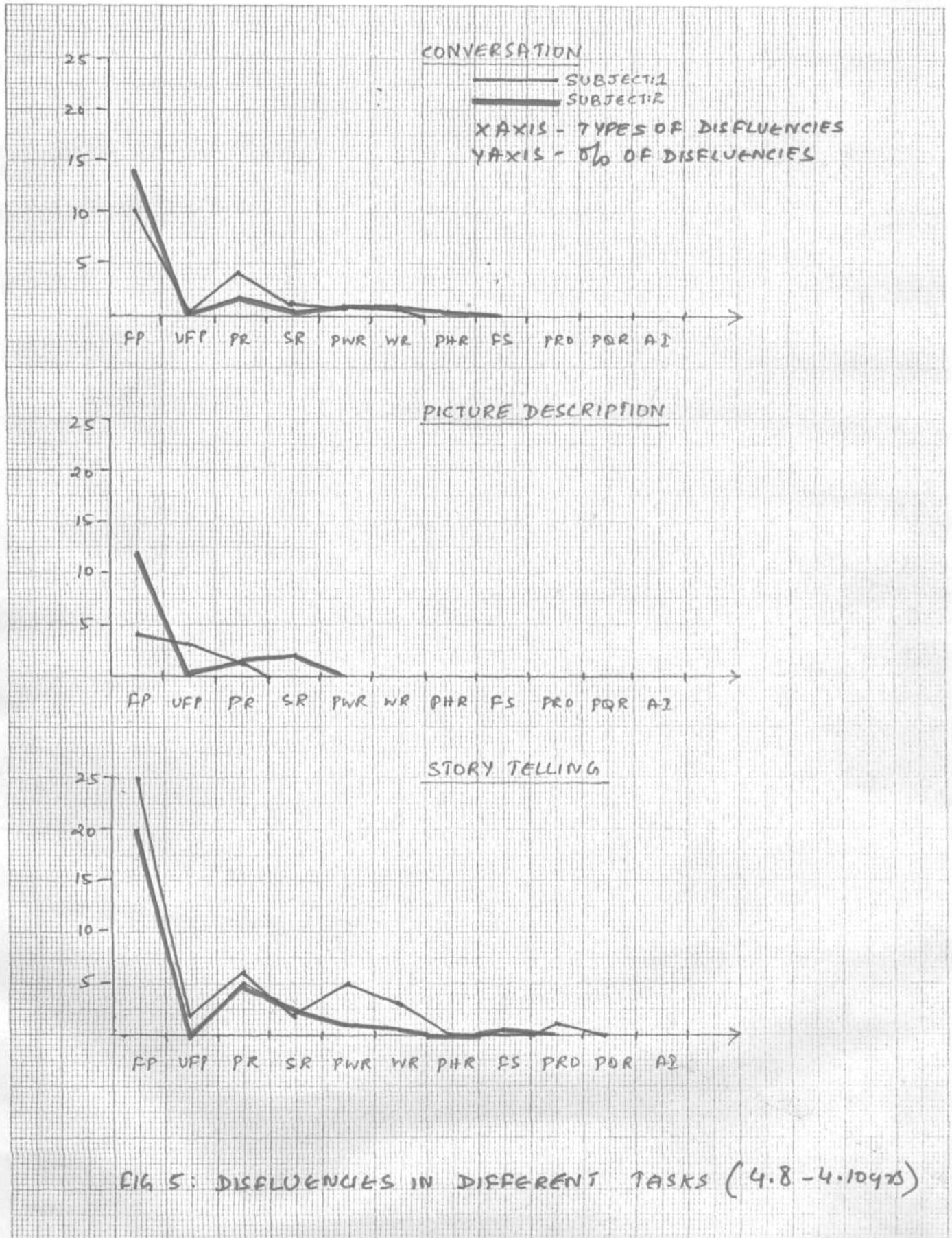


FIG 5: DISFLUENCIES IN DIFFERENT TASKS (4.8 - 4.10 yrs)

| | Noun | Verb | Adjectives | Adverbs | Determiners | Number | pronouns | Prepositions | Negatives |
|------------|------|-------|------------|---------|-------------|--------|----------|--------------|-----------|
| FP | 74 | 32 | 2 | 2 | 7 | 8 | 15 | 3 | 8 |
| UFP | 12 | 5 | - | | - | - | 1 | - | 1 |
| R | 14 | 11 | 1 | 1 | 3 | 2 | 1 | - | 3 |
| PR | 28 | 5 | | - | 2 | - | 1 | 1 | 1 |
| FS | 2 | - | - | - | - | | - | - | 1 |
| PRO | - | - | - | - | - | - | - | - | 1 |
| AI | - | - | - | - | - | - | - | - | - |
| Total | 140 | 53 | 3 | 3 | 12 | 10 | 18 | 4 | 14 |
| Percentage | 54.5 | 20.62 | 1.2 | 1.2 | 4.7 | 3.9 | 7.0 | 1.6 | 5.4 |

Table-2€: Types and percentage of disfluencies according to grammatical categories.
(4.8-4.10 Years)

Greater percentage of disfluencies were observed in the initial part of the utterance followed by disfluencies in the medial position and no disfluencies were noted in the final part of the utterance.

| Age | Initial | Medial | Final |
|----------------|---------|--------|-------|
| 4.8-4.10 years | 91% | 7.59% | - |

Table-3c: Position of occurrence of the percentage of disfluencies (4.8 - 4.10 years).

4.10 - 4.12 years:

Story telling had maximum speech output followed by conversation, picture description and rhymes. Maximum disfluencies were seen in picture description task followed by story telling and conversation. Rhymes had minimum disfluencies.

| | Conver- sation | Rhymes | Picture description | Story Telling |
|---------------------------------|-------------------|--------|------------------------|------------------|
| Total no. of utterances | 764 | 431 | 572 | 810 |
| Total no. of disfluencies | 92 | 8 | 149 | 139 |

Table-1f: Total no.of utterances and disfluencies (4.10-4.12 years).

With reference to the tasks, in conversation subject-1 showed high percentage of disfluencies of FP followed by PR

and PWR. No other types of disfluencies were noticed in the conversation sample of subject-1, subject-2 showed a high percentage of disfluency of FP followed by PR, syllable repetition and part word repetition. Phrase repetitions and false starts showed a minimal percentage of occurrence. No other types of disfluencies were seen in subject-2. On the picture description task subject-1 showed high percentage of FP followed by a peak in PR. Syllable repetitions, PWR, word repetitions, phrase repetitions and FS had negligible percentage of occurrence. Subject-2 exhibited equal percentage of occurrence of FP and PR. Syllable repetitions part word repetitions, word repetitions, phrase repetitions, FS and prolongation were minimal. However no other types of disfluencies were seen in subject-2. In the story telling task subject-1 had high percentage of FP followed by P^R. Minimal disfluencies of PWR, word repetitions and phrase repetition were observed. No other disfluency type was observed in subject-1. Subject-2 showed higher percentage of disfluency of FP followed by PR. Part word repetition and phrase repetitions was seen to a minimal degree. No other types of disfluencies was noticed in subject-2 on story telling task. (FIG - 6)

The disfluencies were maximally associated with nouns followed by disfluencies before verbs, numbers, determiners,

GRAPH FOR THE AGE GROUP 4.10 - 4.12 Yrs

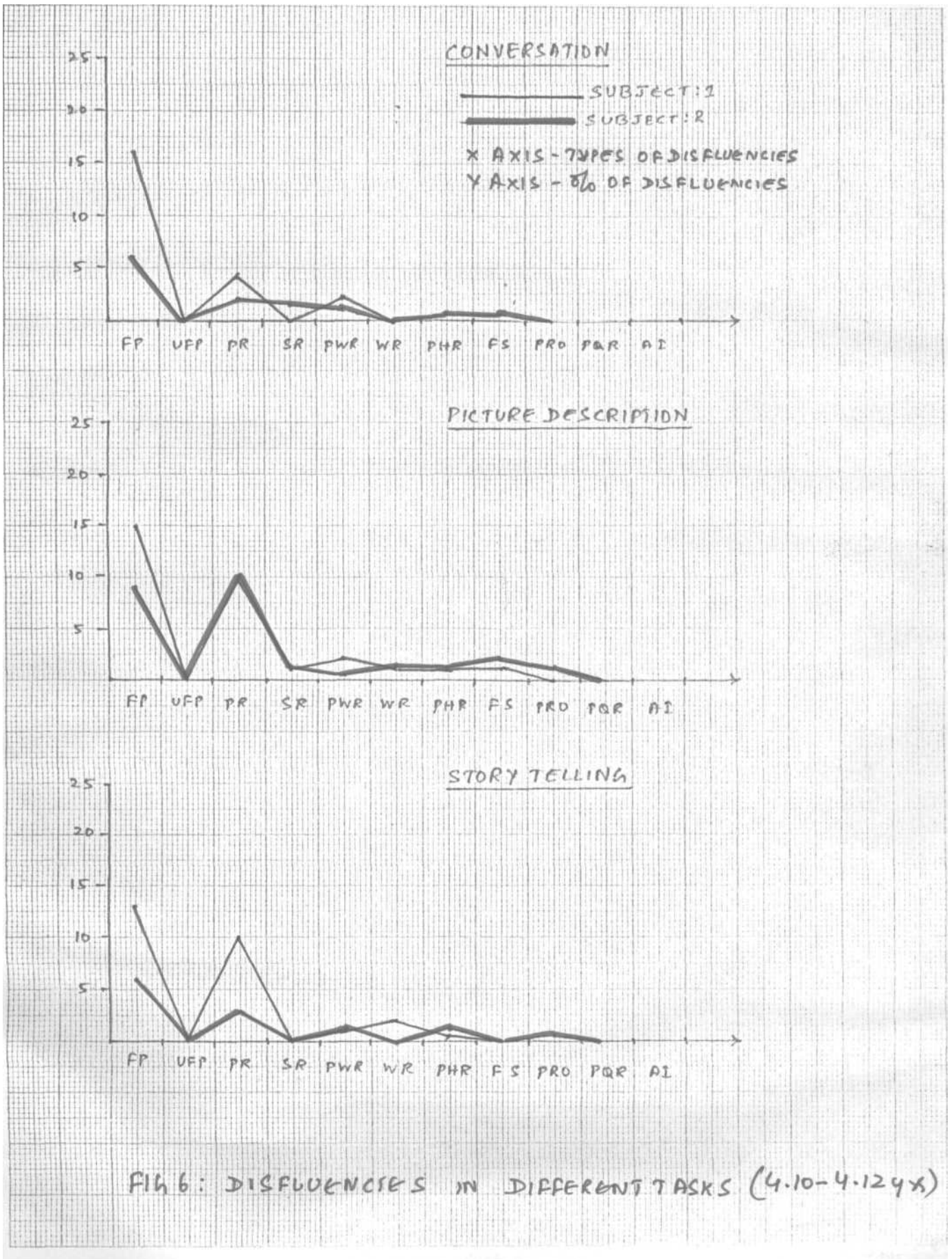


FIG 6: DISFLUENCIES IN DIFFERENT TASKS (4.10-4.12 Yrs)

prepositions and pronouns and disfluencies were minimum before adjectives and negatives. No disfluencies occurred before adverbs. (Table-2f).

The initial part of the utterance showed greater disfluencies followed by those in the medial part with the least percentage of disfluencies in the final part of the utterance in this age group.

| Age | Initial | Medial | Final |
|-----|---------|--------|-------|
| | 94.48 | 4.43% | 1.05% |

Table-3f: Position of occurrence of the percentage of disfluencies (4.10-4.12 years).

Clustering of disfluencies as observed in this study were filled pause + unfilled pause, unfilled pause + filled pause + repetition, repetitions + filled pause, unfilled pause + repetition and audible inspiration + filled pauses. Silverman(1973)also reports of clustering.

In general the following trends were noticed:

1. Among the type of disfluencies seen,FP had the highest percentage of occurrence in all the age group studied and in all tasks (i.e.) conversation, picture description and story telling.
2. The types of disfluencies seen in the early age groups (i.e.) 4-4.4 years were restricted to filled pauses and

| | Noun | Verb | Adverbs | Adjectives | Determiners | Number | Pronouns | Prepositions. | Negatives |
|------------|-------|-------|---------|------------|-------------|--------|----------|---------------|-----------|
| FP | 85 | 40 | - | 4 | 8 | 28 | 8 | 11 | 1 |
| UFP | - | - | - | - | - | - | - | - | - |
| R | 30 | 14 | - | - | 3 | 4 | 8 | 6 | 3 |
| PR | 48 | 20 | - | 1 | 12 | 16 | 7 | 10 | 2 |
| FS | 4 | 13 | - | 1 | - | - | - | - | - |
| PROL | 4 | 7 | - | - | - | 2 | - | - | - |
| AI | - | - | - | - | - | - | - | - | - |
| Total | 171 | 94 | - | 6 | 23 | 50 | 23 | 27 | 6 |
| Percentage | 47.75 | 23.51 | - | 1.5 | 5.75 | 12.5 | 5.75 | 6.75 | 1.5 |

Table-2F: Types and percentage of disfluencies according to grammatical categories (4.10 - 4.12 years).

parenthetical remarks and at 4.4 years the children showed the disfluencies such as FP, UFP, PR, repeats and audible inspirations with fewer false starts and prolongations.

3. PR was seen to fluctuate across the age range studied with a highest percentage of occurrence in 4.6 to 4.10 years of age. All the other age groups showed a minimal percentage of occurrence of PR.
4. Repetitions of all kinds seem to fluctuate between the age groups studied. However percentage of repeats were more in the age groups 4.4 - 4.12 years. Also FP's were less in this age group.
5. With respect to the tasks rhymes elicited the maximum speech output and the disfluencies were more in picture description and story telling.
6. With respect to grammatical categories, children of all age groups showed higher percentage of disfluencies before nouns, verbs and numbers.
7. With respect to the percentage of occurrence of disfluencies in positions, more than 80 percent, disfluencies, occurred in the initial part of the utterance.

The observation that filled pause occurred maximally in the age groups 4-5 years supports the findings of Metraux (1950) McDearmon, (1968), Silverman (1973), Kowal et al (1975)

Haynes and Hood, (1977); Susan Zuckerman (1980); Fagen (1982) and Wexler and Mysak (1982). However it is not in consonance with the result of the study by Yairif 1981), where in FP was less in the speech of the preschool children which could be attributed to methodological variations. The low percentage of occurrence of repeats were also reported by Smith (1926); Fisher (1932), Davis (1940); Metraux (1950), Branscom et al. (1955); Goldman and Eisler (1968); McDearmon (1968); Silverman (1972, 1973); Kowal et al (1975); Haynes and Hood (1977); Susan Zuckerman (1980) and Wexler and Mysak (1932).

Stark Weather (1987) opines that the pauses seen in the speech of a child or an adult can convey information and they are not considered as discontinuities because the flow of information continues including the filled pause. Hence a child uses a FP to convey to the listener that he is continuing or that because of his language formulation he prefers to pause or that he has not understood the listener or that he is trying to cope up with the anatomical or physiological constraints that are acting upon him.

In the present study UFP had a minimal percentage of occurrence in the age groups 4-4.4 years and declined thereby. In the age group of 3-4 years UFP had 5.4 percentage (Naga-

Poornima, 1990) of occurrence and 5-6 years had 5-9 percentage of occurrence (Yamini, 1990) on picture description task. This study is in agreement with the reports of Kowal et al (1975) where UFP had the highest percentage of occurrence in the kindergarten followed by a slow decline upto the 12th grade and also in accordance to the study by Vairi (1981).

Adams(1982) comments that the immature CNS system, a developing phonological, syntactic, semantic, prgmatic and cognitive structures act as physiological constraints and thus/preschoolers speech are characterized by UFP's and FP's.

The result of the present study indicated that PR increased in the age groups between 4.4 - 5 years which is in accordance to results reported by Kowal et al (1975). False starts had a minimal percentage of occurrence in the age group of 4-5 years studied. This supports the findings of Goldman Eislser (1968), Bertil Bjerkan (1980) and Susan Zuckerman (1980).

In the very young age the disfluencies are characterized by repetitions and false starts but these are less sophisticated

usage in the speech of the children and as they grow they use more PR and revisions which indicate the usage of more sophisticated forms of nonfluency (Stark Weather, 1987). The results of the present study suggests' that children between 4-5 years use more of FP and starts which are less mature forms than the older age group and is in agreement with the findings by Haynes and Hood (1977).

Audible inspirations were also noticed rarely in the speech of the children considered in the present study. Silverman (1972); Yairi (1981); and Wexler and Mysak (1982) also report similar findings. These results contrast the findings of Silverman (1973) where greater percentage of AI was seen in the speech of the 4 year old.

Repetitions of all kinds seem to fluctuate between the age groups studied. However percentage of repeats were more in the age groups 4.4 - 4.12 years.

Kirkpatrick (1915) beilevesthat children -repeat because they do not have tangible evidence that they have been understood. According to Fisher (1932) children repeat because they show interest on having things (sayings, stories) repeated to them and also enjoy intentional repetition of nonsense words, sound patterns, new words, humorous remarks etc. Metraux (1950) opines that the repetitions in the

speech of young kindergarten children could be an attempt to make personal social contact and relates to the child's interest in repetition and his demand for repetition from others. The repetitions seen at 4-5 years seemed to be in relation to another person in demand for attention, information or encouragement with respect to somewhat compulsive quality in the early ages. The repetitions at 5 years may be used only for emphasis. Froeschels (1921) states that a child repeats a word or syllable etc. in the event of searching for words, thoughts, or grammatical forms to follow his course of conveying information.

According to Stark Weather (1981), the repetitions in the speech of young children are related to the child's difficulty either in formulating linguistic messages or in the motor execution of newly acquired longer utterances. Wexler and Mysak (1982) have hypothesized a 'motor factor' which reflects the part word repetitions and disrhythmic phonation that characterize the speech of the younger kindergarten children than the older ones which may reflect on a less mature speech motor system in the later preschoolers.

Children begin to push their encoding capabilities/by 3-4 years and thus show greater disfluency. Whereas the 2 year olds may be relatively restricted in the structure they have available for use.

Haynes and Hood (1977) suggest that children repeat in the early ages to gain processing time and later shifts to interjections and revisions because of an increase in language complexity and linguistic rules learnt by the child for encodings. This may also be a relevant explanation to the results obtained in this study where in children have used filled pauses in the early years followed by the usage of repeats and PRs.

Prolongations were also noticed minimally in the speech of the 4-5 years olds in the present study which has not been cited in literature. The results that more disfluencies appear in the initial position are in accordance to the results reported by Metraux (1950) and Helmerich and Bloodstain (1973).

In this study disfluencies (FP's, PR's, Repeats, MFP's) were more (80%) before content words (nouns, pronouns, and verbs) and less before other grammatical categories. This supports the findings of Maclay and Osgood (1959) and Cook (1971). However, it is contradictory to the findings of Helmerich and Bloodstain (1973).

It has been reported that pauses are not distributed throughout the utterances. More pauses occur and the

duration of pauses is longer at points of high uncertainty (Goldman and Eisler, 1968, Boomer, 1970 and Cook, 1971). Because these are locations where the information load is high, it is reasonable to conclude that the time spent during the pause is being used for an activity which is more difficult or at least takes longer when there is more information to transit. Also Cook(1971) and Hawkins(1971) report that the initial part of an utterance has a high degree of uncertainty. Moreover the syntactic structure is not fully developed in the speech of the 4-5 year old children where they use more content words than functional words and hence disfluencies may be high before content words than functional words as observed in this study.

Apart from this subtenly et al. (1966) have also found that the intraoral air pressures values are different for different consonants and vowels and also for stressed sounds which require greater intra oral pressure. Hence, this may reflect as to why children have higher disfluency before content words than functional words as the content words are stressed most often than the functional words.

It has been reported by Broadbent (1974) that there is interference and inraction in the CNS of the various functions which are performed simultaneously. One can assume

that language formulation and speech motor act function simultaneously and there is a potential for a kind of interference with speech production by the language formulation. So there could be an inherent internal CNS interference on the speech and language act and if individuals differ in their abilities to overcome the potentially disruptive effects on speaking of the interference of language formulation, then they may break down in speech due to language formulation or vice-versa. Hence we may presume that such discontinuities in disfluent speakers (children or adults) are likely to be located at place, where language formulation is occurring (Stark Weather and Gordon, 1983).

It may be noticed that in the present study children have shown greater disfluencies before context words which require greater language formulation.

Comparing the disfluencies in normal children in other age groups (Nagapoomima, 1990, 3-4 years; Yamini, 1990, 5-6 years). (fig.7), it appears that initially UFP's are used (3-4 years) more often and then the child shifts to FPs (4-5 years) and PR's (5-6 years).

These results throw light on the speech encoding process in children. It could be postulated that at an earlier age, either the speech encoding is discontinuous or there is a time

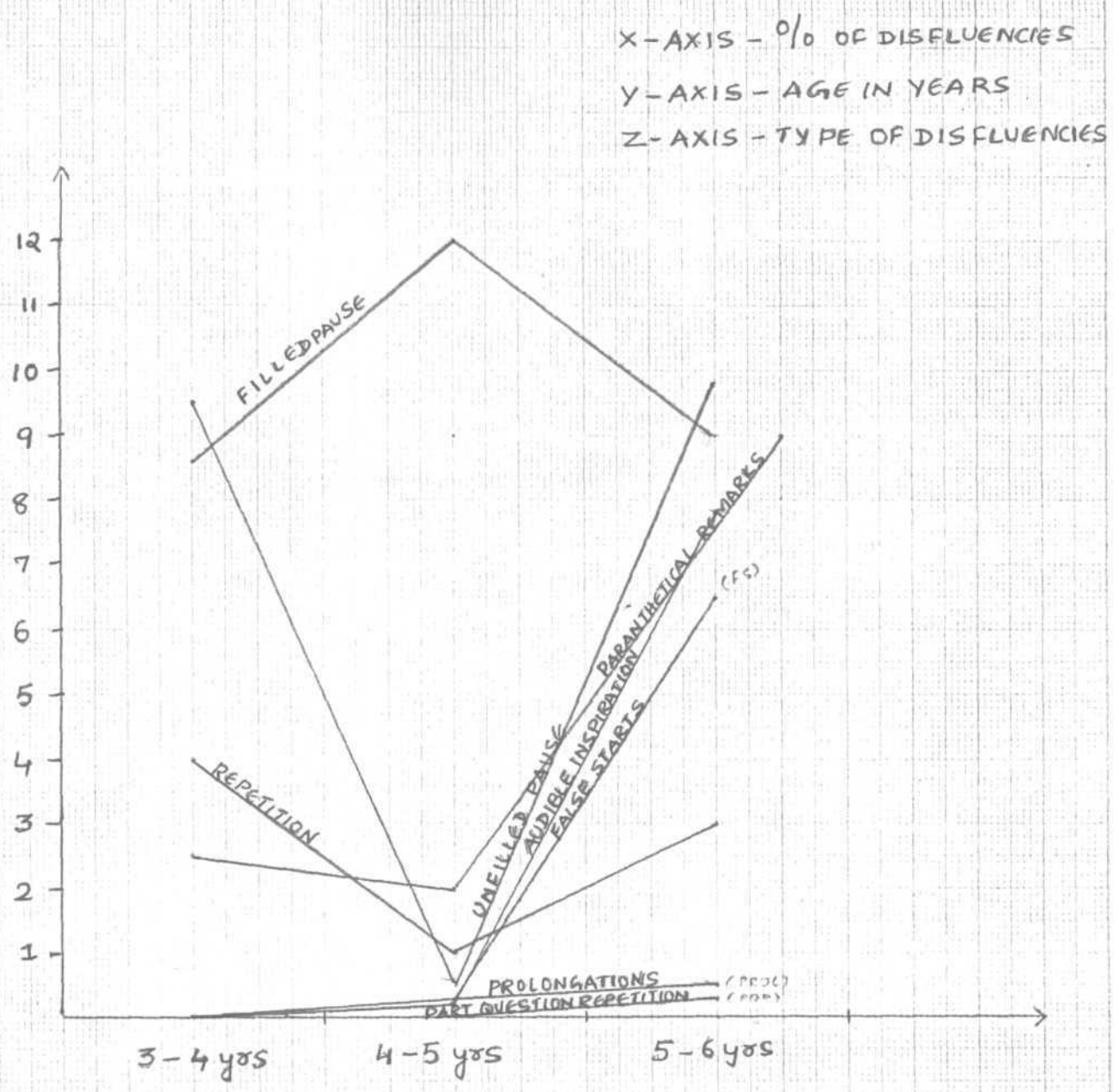


FIG-7- PERCENTAGE AND TYPES OF DISFLUENCIES
ACROSS 3-6 YEARS ON PICTURE DESCRIPTION TASK

delay interposed between the lexicon/memory and speech motor act and this changes as the child grows. The fact that the child shifts from UFP to FP and other disfluencies indicates a change in/the speech encoding process (developmental) in that at a later age there are no pausities between the memory and speech motor act but rather it is continuous. However, the usage of FP's between 4-5 suggest that the encoding, though continuous is not continuous for specific speech task.

PROPOSED TEST: From the results, a test for fluency has been proposed, such a test throws light on the evaluation of children who are normally nonfluent and those who are abnormal and it thereby enhances treatment strategies.

It is recommended that picture description task be used for the test and the following cutoff scores can be adapted at different age levels. (TABLE-4)

Hegde (1990) reportedly used a 5 percent cutoff in all age groups for the selection of clients to therapy. However, the cutoff scores obtained here is higher than that recommended by Hegde. This might be because the percent in this study was calculated as no. of disfluencies x 100 by no. utterance and

Hegde reported that the calculations were performed as no. disfluences x 100 by no. word. However, in Kannada, word

| Types of disfluencies. | AGE | | | | | |
|------------------------|-------------|----------------|---------------|---------------|----------------|-----------------|
| | 4-4.2 years | 4.2-4.4 years | 4.4-4.6 years | 4.6-4.8 years | 4.8-4.10 years | 4.10-4.12 years |
| FP % | 17 15-18 | 10.02 7-13 | 20 16-24 | 6.5 0-13 | 8 4-12 | 12.0 9-15 |
| UFP % | 4.5 3-6 | 03 0-3 | 2 2-4 | - | 1.5 0-3 | - |
| PR % | 4 4-5 | 6 3-8 | 4.5 1-8 | 6 5-7 | 1 0-2 | 10 9-10 |
| SR % | .34 0-68 | .28 0-0.56 | 1.5 1,2 | - | 1 0-2 | 1.0 0-2 |
| PWR % | .3 0-.6 | - | 1 0-2 | 0.26 0-5.2 | - | 1.5 1-2 |
| WR % | .3 0-.31 | 1.5 0-3 | 2 1-3 | 1.5 1-2 | - | 1 0-2 |
| PHR % | - | 0.28 0-0.56 | 1 0-2 | 1.5 1-2 | - | 0-2 0-2 |
| PS % | - | - | 1 0-2 | 0-2.8 | 0.74 0-2.8 | 1 0-2 |
| PROL % | - | - | 1 0-2 | - | - | 1 0-2 |
| AI | - | - | 1.5 1-2 | - | - | - |

TABLE-4: The values at the top indicate the average percent the values at the bottom indicates the range in percentage. cut off scores on picture description task

calculation poses problems. For eg. /marada male/ which are two words are uttered as /marad mele/ and it becomes difficult to split the words. Rather considering this as an utterance would be appropriate.^{*2}

It is suggested that the proposed test be used in those children diagnosed as normal non-fluency and stuttering to ensure the validity of the same. Further, if found useful it could be of importance in differential diagnosis and further management. The cut-off scores/ranges could be used as a reference for further management of these children.

SUMMARY AND CONCLUSIONS

This study aimed at assessing the disfluencies in normal children (4-5 years). Twelve Kannada speaking children (two each in two month interval) from middle socio-economic status were considered for the study. Speech was elicited through four tasks namely conversation, rhymes, picture description and story telling and the speech sample was recorded and a descriptive analysis of their disfluencies was done for each task. The kinds of disfluencies analysed included. Filled pause's, unfilled pauses, parenthetical remarks, repeats (syllable repetitions, part-word repetitions, word repetitions and phrase repetitions), false starts, prolongations and audible inspiration. The percentage of disfluencies, their occurrence before each grammatical category (nouns, verbs, adjectives, adverbs, numbers, prepositions, determiners, pronouns, and negatives) and their position of occurrence (initial, medial and final) was also analysed and the number of disfluencies were converted into percentages. The results indicated that children in the age group 4-5 years had more filled pauses followed by repetitions and parenthetical remarks. Audible inspirations was seen minimally in the age group 4-4.4 years and the other types of disfluencies occurred minimally. More disfluencies occurred before the content words especially

(nouns) than before functional words. More disfluencies occurred on the initial part of the utterance than in the medial or final part.

On the basis of the results, a test has been proposed using picture description task and a cut-off scores and ranges for different disfluencies at each age group has been given.

It is suggested that the test be used with children diagnosed as having normal non-fluency and stuttering and validated so as to assist in diagnosis and management of children with fluency disorders.

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APPENDIX

On this task the child may be prompted with questions such as

"i chitradalli yeinu nadiyathaidhe"?

ಈ ಚಿತ್ರದಲ್ಲಿ ಏನು ನಡೆಯುತ್ತ ಇದೆ?

Modelling of one of the pictures can be used to familiarise the child with the task.

