

SOME ASPECTS OF FLUENCY IN CHILDREN - 6-7 YEARS

Rajendra Swamy

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1991

MY PARENTS
WITHOUT WHOM I AM NOT
&
Dr .SAVITHRI SR
FOR HER GUIDANCE , LOVE ,& CRITICISM

CERTIFICATE

This is to certify that the Dissertation entitled: "Some Aspects of Fluency in Children 6-7 years" is the bonafide work in part fulfilment for the degree of M.Sc, (Speech & Hearing) of the student with Register No.M8915.

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Director
All India Institute
of Speech & Hearing
Mysore-6

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This is to certify that this
Dissertation entitled: Some aspects
of fluency in children 6-7 years has
been prepared under my supervision
and guidance.

Mysore
1991

Savithri SR
Dr.S.R.Savithri
Guide

DECLARATION

This Dissertation entitled: "Some Aspects of Fluency in Children 6-7 years" is the result of my own study undertaken under the guidance of Dr.S.R.Savithri, Lecturer in 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.

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INTRODUCTION

"In literature much of information is found on the development of normal articulation, language and voice". (Starkweather, 1987). But regarding fluency no conclusions have been made. In communication, the encoded speech should be fluent. 'Fluency' refers to the effortless production of long continuous utterances at a rapid rate; be it the first language or second language (Starkweather, 1980). Fluency according to ordinary usage is the ability to speak a second language rapidly and continuously and without any particular effort or thought. The fluent speaker does not think about how to say what he wants to say and about the relations of his listeners. He has learned the language so well that he automatically produces it with correct semantics, syntax and phonology (Starkweather, 1980).

Starkweather (1987) considered fluency as a multidimensional behaviour, and the dimensions of fluency suggested are; the continuity or smoothness of speech the rate of speech and the effort a speaker makes in producing speech (Starkweather, 1981) and rhythmic structure (Starkweather, 1982).

These three elements of fluency are related to each other, first, the pauses and hesitations that break up the smooth continuous flow of speech determine the length and influence the rate of each utterance. Pauses and hesitations occur in even the most fluent speech and naturally they slow down the rate at which words are produced. Rate refers to how quickly or how slowly the speech may flow. It is influenced by the type of syllable, length of utterance type of speech (Whispered speech). Speaking situation (masking). Syllabic rate and utterance length show developmental trends (Starkweather, 1980). The duration of speech sound is directly related to fluency (Starkweather, 1980). Fluent speech is effortless, and yet speaking requires some minimal effort (Starkweather, 1980). Effort, in fluency is categorised into mental and muscular effort. Mental effort refers to the speech coding and muscular effort to the effort of the muscles concerned with speech. The type of speech sound produced, the position of a consonant in a word, sex, age, rate, loudness and coarticulation affect effort (Starkweather, 1980).

Growth in the capacity for fluent speech comes from several areas. As the child grows, there is increasing control over the movements of the vocal tract. Children

become more fluent as there is increase in their syntactic, semantic phonologic and pragmatic knowledge. Also, the people with whom children communicate-their parents, siblings,peers, teachers- place demands on the child's speech. Disfluency is a characteristic of the speech of young children. As the children mature, their speech becomes increasingly fluent. Also,children learn to deal with the lack of fluency in more sophisticated ways. (Starkweather, 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 lacks fluency in speech.

Shapiro and Decicco (1982) point out two views regarding the relationship between the so called "normal disfluency" and the more pathological 'dysfluency' of the stutterer. The first view suggested is that normal disfluencies have a place on the same continuum as stuttering and that, the latter is simply a more severe and a more frequent manifestation of the former (Froeschels, 1969). The second view held is that, stuttering is a distinctly different entity from the disfluencies produced by non-stuttering speakers stuttering and cluttering are the two disorders of fluency.

To evaluate dysfluencies in a stutterer or a clusterer one should know about the disfluencies normal children exhibit. Knowledge about disfluencies helps clinician in better diagnosis and management of the disfluent speaker.

Dejoy and Gregory (1985) purforth that normative data on childhood disfluency is also vital for a better understanding of how disfluency may reflect symbolic and motor demands of spontaneous formulation. In this regard, several studies have been conducted in the past by Dejoy and Gregory, 1985; Haynes and Hood, 1977; Kowal '0' Connell and Sabin, 1975; Yairi and Lewis, 1984; Wexler and Mysak, 1982; Indu, 1990; Yamini, 1990; Nagapoornima, 1990.

The results of all these studies indicate that children acquire fluency as they grow. At younger ages, they have disfluencies like filled pauses and repetitions and as they grow up they tend to use more of parenthetical remarks and false starts.

In Kannada, disfluencies in normal children have been studied and tests of fluency are proposed in the age group of 3-4 years (Nagapoornima, 1990); 4-5 years (Indu, 1990); and 5-6 years (Yamini, 1990). This study is an extention

of the earlier studies and it aims at evaluating the disfluencies in Kannada speaking normal children in the age range of 6-7 years on a story description task and intends to propose a test of fluency for the age group 6-7 years which will be helpful as a tool for diagnosis and management of patients with fluency disorders.

REVIEW OF LITERATURE

This review covers the following topics in subsections.

- I. Terminologies used in the area of fluency and their definitions.
- II. Factors affecting fluency.
- III. a) Studies in the area of fluency development
b) Studies in the area of fluency development in 6-7 years.

I. Terminologies used in the area of fluency and their definitions:

Johnson (1961) classified the following types of speech behaviour as disfluencies:

1. Interjection of sounds, syllables, words or phrases - Extraneous sounds such as 'uh', 'er', 'hmm'; 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 example, '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 repetitions - 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' 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 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 a word repetition; for example, 'going uh going' or 'guh-going going' is classified as word repetition. In any 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. Example: I was I was going.

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 pronunciation of a word is also counted as a revision. 'Iwas- I am going' is an example of this category.

6. Incomplete phrases - An incomplete phrase is one where in the thought or content is not completed and which is not an instance of phrase repetition. Example: 'She was - and after she got there he came'.

7. Broken words - 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 what definitely interferes with the smooth flow of speech are characterized by this category. ' 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 tension pauses (Williams, Darley and Spriesterbach, 1978). Williams, Silverman and Kools (1968) presented a revised version of Johnson's disfluency classification system which includes: part-word repetitions, whole word repetitions, phrase repetitions, interjections, revisions, tense pauses and dysrhythmic phonations. Dysrhythmic phonation is identified only with words. It refers to that kind of phonation which disturbs or distorts the so-called normal rhythm or flow of speech. The disturbance or distortion may or may not involve tensing and may be attributable to prolongation of a phoneme, an accent or timing which is notably unusual, and improper stress, a break, or any other speaking-behaviour infelicity not compatible with fluent speech and is not characterized in another category. Tension pause - "Tension is a disfluency phenomenon judged to exist between words, part-words, and nonwords (that is, an interjection) when at the between point in question there are barely audible manifestations of heavy breathing or muscular tightening. The same phenomena within a word would place that word in the category of dysrhythmic phonation" (Williams, Darley and Spriesterubach, 1978).

Davis (1939) considered repetitions a bit more extensively than in terms of exact duplications.

1. A repetition is defined as the utterance of the same syllable, word or group of words more than once. For example, "I want, I want to go".
2. The addition of "yes" or "no" to the repeated phrase does not vitiate the repetition. For example, "put it in her wagon. No, put it in her wagon".
3. The inclusion of "too" or "hey" still preserves the repetition. For example, "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 example, "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 example. May, 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 a rapid speech. For example, "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 repetition. For example, "Oh, look what he's doing. He's putting his feet in the dog house. Oh, look what his doing. He's putting his feet in the dog house".
10. The insertion of the name does not offset the repetition. For example, "let's rock onthe rocking horse. Timmy let's rock on the rocking horse".

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 example, "That's all I need. That's all we need".
2. Repetition of "what" or "huuh" 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 house etc. were not marked as repetitions, since the child was attempting to imitate a continuous sound. For example "Errrrrrrn. Errrrrrrn" (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, definite recurrence of pitch pattern, a regular cadence or emphasis.

Yairi (1981) putforth two types of word repetitions - single -syllable word repetition and polysyllabic word repetition. The other six categories of disfluencies included part-word repetition, phrase repetition; inter-

jection, revision-incomplete phrase, disrhythmic phonation (primarily sound prolongation or broken words), and tense pause (audible tense vocalization between words).

Janssen and Kraaimaat (1980) 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.

Manning and Monte (1979) suggested two types of disfluency: "motoric" and "formulative". Rudmin (1984) reports of a speech phenomenon labelled "articulation oscillation" - that is, when the final word of an expression ended in an unvoiced plosive (t,k,p), then one or two repetitions of the same phoneme was produced.

Goldman-Eisler (1968) provided evidence that 40-50% of speaking time is spent pausing. Carrell and Tiffany (1960) refer to the pauses, during encoding, as oral punctuations. Carrell and Tiffany (1960); Lieberman (1967) and scholes (1968) consider pauses which do not perceptually disrupt the smooth flow of speech, that is, fluent pauses. However, pauses can disrupt communication. Martin and

Strange (1968) consider hesitation pauses -that is, 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 hesitation or uncertainty over word choice, style or syntax.

Kowal et al. (1975) considered unfilled pause as a category of disfluency. They define unfilled pause as any silence beyond 270 m.sec.

DeJoy and Gregory (1985) have analyzed nine types of disfluencies. They are (1) part-word repetitions; (2) word repetitions, (3) phrase repetitions, (4) revisions, (5) interjections, (6) incomplete phrases, and (7) disrhythmic phonations (Williams, 1968), (8) grammatical pauses, (9) ungrammatical pauses. Grammatical pauses are silent pauses that occur at such grammatical junctures as (a) immediately preceding co-ordinating or subordinating conjuncture; (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). Ungrammatical 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 a unit of speech and a revision of the unit or between an injection and the following word of a 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 categorized disfluencies into more than two types, Minifie and Cooker (1964) have suggested that disfluencies can be broadly classified into two basic categories - 'disfluencies of syllable insertion' including repetitions, revisions 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. They 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 repetitions per instance of disfluency. Silverman (1969) refers to the oscillation phenomenon as duration of fluency.

Silverman (1973) considered runs in the speech disfluency of children. "A run was defined as two or more identical and/or consecutive numbers of disfluencies" (Silverman, 1973).

II. Factors influencing fluency:

Several factors - continuity, rate, effort, rhythm, physiological framework of fluency, motor and linguistic factors, language complexity, grammatical categories, rate sex, situation and environmental factors;- seems to affect fluency.

Starkwether (1987) suggested that the four dimensions of fluency include continuity or smoothness of speech the rate of speech and the effort a speaker makes in the production of speech (Starkweather, 1981) and the rhythmic structure of speech (Starkweather, 1982).

Continuity: It seems evident that pauses whether filled or unfilled, are a common feature of speech. "We pause on the average every 4.8 words and our perception of speech seems to be more continuous than the reality of it. Presumably this happens because we focus on the content of communication. We listen to the ideas not to the means for conveying them, and any sound or variation that does not contribute to these ideas is filtered out by our perceptual mechanism that is not to say that pauses never convey information, but the information sometimes they convey has to do with the process of communication or with the speaker's level of uncertainty, rarely with the content" (Starkweather, 1987).

There has been a presumption, from the earliest days of research in this area, that the pauses were occasions at which language was being formulated, and although it seems likely that this is true for some pauses it may not be true for all pauses.

In support of the idea that the two types of pauses are different in kind, Clark notes that idiosyncratic pauses convey no information, and tend to be overlooked and concludes that the "Conventional pauses are information bearing elements of the sentences".

Rate of speech: The rate at which continuous syllables can be produced in a function of speed of articulatory movement and the degree of coarticulatory overlap (Gay, 1978; Starkweather, 1981).

Females produce utterances that are more variable in rate and longer utterances and they are more fluent than males. (Malecot, Johnson and Kizziar, 1972). Syllables are produced consistently faster in longer utterances than in shorter ones (Jones, 1944; Lindblom, 1968).

Rate depends on the type of syllables produced, CCV and CVC syllables are produced at a faster rate than VCC syllables.

Effort: Speech being produced effortlessly is characteristic of fluent speech (starkweather, 1987). The two types of efforts are; mental effort or concentration where the thoughts are focussed on the content rather than on the processes of utterances and muscular effort, where the effort provides a flow of air, opens and closes the glottis and moves the tongue, lips, jaw, velum and pharynx (starkweather, 1987). Among the speech sounds stops and fricatives require more effort than nasals and glides (Malecot, 1955; Subtelny, Worth and Sakuda, 1966).

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 intra oral air pressure for various speech sounds (Malecot, 1955; Subtenly, et al. 1966) also varies with the position of a sound in the word, with the rate and loudness of utterance (Subtenly, et al.1966) with stress (Umeda, 1977) and with coarticulation (Arkebauer, 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 (Subtenly. et al. 1966).

Rhythm: Rather than being a dimension of fluency, rhythm seems to promote or enhance fluency. Specifically, it seems that speech rhythm serves fluency by making it easier for us to talk faster. It does this in several ways - unstressed syllables are shorter and thus require less time. In addition, rhythm assists in rapid speech production by providing a means for us to anticipate upcoming movements. Martin (1972) says that "rhythmic patterning carries a heavy information load in ordinary connected speech".

Physiological factors: DeJoy and Gregory (1985) indicated that during the later preschool years, children become more

accomplished in the symbolic/motoric selection. They added that the forward flow of speech becomes relatively more automatic and disfluency declines in frequency. The reduction in frequency may well reflect increased temporal precision and control, and simplification of the control process (Sharkey and Folkins, 1985).

Van Riper (1971) indicated that disruption of proper programming of the physiological movements necessary for fluent speech causes stuttering. Coordination;- spatial and timing are essential physiological aspects of fluency (Starkweather, 1987).

Muscles that contract during a speech gesture will receive a high frequency neural impulses at the proper movement. Muscles which are relaxed will receive a low frequency neural impulse the capacity to relax antagonistic muscles has more to do with frequency than the capacity to contract against muscles, which is proved in stutterers (Freeman and Ushijima, 1978). Along with the mass and stiffness of the peripheral mechanism. Certain neural mechanisms also have an important influence on the timing of movements.

Language maturity: is one of the important factor which is related to fluency. Increased ability in phonology, semantics, syntax and pragmatic knowledge influence fluency. As these abilities grow, sentences become longer and more complex. Increase in the pragmatic ability also has a role in fluency of speech.

Language complexity: Analysis of language samples by Haynes and Hood (1978) who studied 20 male and 20 female children between 5 to 6 years supported that language influences disfluency especially in the complex modeling condition. Significant increase in word repetition, revision, incomplete phrases and dysrhythmic phonations occurred in the complex modeling situation.

Grammatical category: It is found that the frequency of occurrence of both unfilled and filled pauses is more before content words than function words (MacClay and Osgood, 1959; Fagen, 1982). The words following filled pauses are difficult to predict and filled pauses occur mainly before words which are highly uncertain. Filled pauses are much more common at the beginning of clauses than within clause (Boomer, 1965; Cook, 1971; Hawkings, 1971) and they tend to occur before longer and more complex sentences (Cook, Smith and Lallijee, 1974).

Sex: Children in both sex have been studied by several investigators (Branscom, Hughes and Oxtoby, 1955; Bjerkan, 1980; McLaughlin and Cullian, 1989).

Branscom, Hughes and Oxtoby (1955) in their report suggested that there were no statistically significant sex differences with respect to repetition instances. They observed greater incidence of phrase repetition for free play situation than in the test situation.

While some studies (Fisher, 1932; Kowal et al. 1975; Haynes and Hood, 1977; Yairi, 1981; Waxier 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.

Environmental factors: The person to which child is speaking is also an important factor which influences fluency. It has been found that the child speaks more fluently when asked to speak with a puppet than with an experimenter (Martin and Haroldson, 1972).

III. a) Studies in the area of fluency development:

Smith (1926) studied the spontaneous speech of 88 children between two to five years and found that the average

repetition decreased from 2-5 years. Fisher (1932) reported similar results. He studied 72 children of both sex in the age of 2-5 years and he reported that repetition of syllables, words and phrases was characteristic of the speech of the children studied. Repetition between 2-5 years decreased with increase in age.

Davis (1940), in the spontaneous speech of 62 children between 2-5 years, found that the repetition of words and phrases decreased with age. Syllable repetition occurred least between 2-5 years.

Metraux (1950) analysed the spontaneous speech of 207 children from 18 months to 54 months. Children used /a/ before many words at 24 months of age. At 54 months of age interjections increased and was used greater at the beginning of a phrase. He observed repetitions of syllables and words in 18 months old children. At /24 months, repetition of words or phrases were noticed. At 30 months occasional repeats of words or phrases, at 24 months repetitions used in relation to another person is demand for attention and at 18 months repetitions decreased notably.

Branscom et al. (1955) studied the spontaneous speech of 193 children aged 2-6 years and noticed that repetitions of syllables was less than word repetition Which was less than phrase repetition as the age increased.

MacLay and Osgood (1959) in their study revealed that unfilled pauses occurs before content words such as nouns, pronouns, verbs, adverbs and adjectives, rather than on functional word like conjunctions and articles etc.

Goldman-Eisler (1968) in the spontaneous speech of normal pre-schoolers, found that the pauses, remained constant and did not decrease significantly across the preschool years. However, repetitions, false starters and dysrhythmic phonation declined significantly across the preschool years.

McDearman (1968) found similar results. In the spontaneous speech of preschoolers between 2-5 years, except that of filled pauses which was greater between 4-5 years of age, the other disfluencies like unfilled pauses was not significantly different between 2-5 years and repetition of word, phrases and sentences decreased at 5 years. When compared to the 2 year old.

Cook (1971) said filled pauses occurs before pronouns, prepositions and conjunctions and before words such as "well" yes and no.

Martin et al (1972) elicited speech samples of normal children between 3.5 to 4.5 years by visual presentation of

puppets and general conversation and found no significant changes in disfluencies observed. Puppetry elicited more speech output.

Silverman (1972) elicited speech samples from 10 subjects between 4-5 years through structured interview. Speech sample in classroom story telling and narrating was included. He found that among repetitions, part-word repetition decreased at 5 years of age with respect to 4 years and audible inspiration or tense pause occurred rarely in normal speaking children between 4-5 years of age. Also, clustering of interjections, phrase repetition and tense pauses was seen.

Helmerich and Bloodstein (1973) observed increased disfluencies on pronouns and conjunctions not on nouns and verbs, greater in initial position, in the free speech of 4 year old children.

Kowal et al. (1975) analysed the different disfluencies, in detail, of 165 children of both sex from kindergarten to 12 th grade. The results indicated that unfilled pauses were greatest in kindergarten, with a slow decrease upto 12th grade and there was a mild peak in the 6th grade.

Filled pauses showed less change, except with a slight increase in second grade. Among repetitions word repetitions were less and found repetition was greater in the kindergarten children with a general decline at 12th grade.

Parenthetical remarks increased in the fourth grade decreased slightly in grade, six and increased again with a peak at grade 10.

False starters were prevalent in kindergarten and decreased slightly in grade 2 and peaked at grade 4.

Bjerkan (1980) observed that repetitions of syllable, phrase and word were greater in the younger age groups and false starters were observed occasionally in the children studied. For the analysis he used spontaneous speech of 110 nursery school children.

Susan Zuckerman (1986) studied normal children at 3 and 4 years of age. He studied the spontaneous speech elicited by using passive sentence types. He observed that filled pauses increased from 3-4 years where as repetitions decreased, and false starters were not significant in the age group studied.

Yairi (1981) studied the fluency of 33 preschool children in their spontaneous speech and noticed, that filled pauses were less. Repetitions of syllables, words, part word and phrases were common and even the revision and incomplete phrases occurred more in the speech of the preschoolers. Audible inspirations and tensed pauses were less and dys-rhythmic phonation was not significant, in the age group studied.

Fagan (1982) - in the spontaneous speech of normal preschool children noted that the filled pauses and false starters were evident. Wexler and Mysak (1982) analysed the spontaneous speech of 36 males at 2, 4 and 6 years they found that filled pauses were greater in the 4 years 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. False starters showed no significant difference between 2 and 4 years. Audible inspirations and tensed pauses remained constant from 2-4 years and decreased at 6 years. Dystfhythmic phonation decreased from 2-6 years.

DeJoy and Gregory (1985) studied the spontaneous speech of 160 males between the ages 3.3 - 3.9 and 4.9-5.3 years.

Grammatical pauses was greater in older children and no significant differences between the two groups were observed

with respect to ungrammatical pauses and for the filled pauses, there was no difference between the two groups. Among the repetitions, part word repetitions and phrase repetitions were greater in the younger age group. Dysrhythmic phonation and false starters were also greater in the younger age group.

Nagapoornima (1990) studied 12 normal speaking children of both sex in the age group of 3-4 years and the results indicated that all the subjects had more of unfilled and filled pauses. All the types of disfluencies, except prolongations, occurred more in the initial positions and disfluencies occurred more before content words especially nouns.

Indu (1990) studied 12 normal Kannada speaking children, in the age group of 4-5 years of both sex and reported indicated that the subjects had more filled pauses, repetitions and parenthetical remarks. Audible inspirations were seen 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.

Yamini (1990) studied 12 normal Kannada speaking children in the age group of 5-6 years and the results of her study indicated that filled pauses, parenthetical remarks and audible inspirations increased in this age group. Also, part-question repetitions were noticed. More disfluencies occurred on/after content words and in the initial position.

b) Disfluencies in 6-7 year old children:

Davis (1939) opined that although repetitions of words and phrases decreased with increasing age syllable repetition were not affected by age. Syllable repetition occurred much less frequently than others at all the ages.

Branscom, et al. (1955) studied the spontaneous speech of 193 children aged 2-6 years and noticed that repetitions of syllables was less than word repetition which was less than phrase repetition as the age increased.

Davis (1940) studying the repetition in the speech sample of preschool children opined that the child repeats because he is not adapt at using language in the conventional manner. Syllable repetitions occurred less than half as often as word repetitions and less than a third as often as phrase repetitions. In the speech sample of 193 non-stuttering preschool children aged two to six years (Branscom, Hughes and Oxtoby, 1955) and they also showed that boys had more syllable repetitions than girls.

Kools and Berryman (1971) - studied the differences in disfluency behaviour between male and female non-stuttering children in the age range of 6 years 6 months and 9 years 9 months.

They examined the following categories of disfluencies
1. Interjections of sounds, syllables; words or phrases (2) part word repetitions; (3) word repetitions; (4) phrase repetitions; (5) revisions; (6) tension (tense pauses) (7) incomplete phrases and (8) dysrhythmic phonation.

The number of disfluencies per 100 words was used as the score value in each category. The results showed that the male subjects mean score was significantly greater than female subjects only for the category of "incomplete phrases"

subjects of both sex did not differ significantly in the mean number of disfluencies of all types combined.

Kowal, O'Connell and Sabin (1975) conducted a study of speech disfluency in 168 normal children involving 12 males and 12 females age ranged from kindergartn through senior year of high school. Analysis of the speech sample revealed that an increase in the false starters occurs at fourth grade thus indicating a reversal in the developmental trend. It could be because when they try to edit their speech, they become more hesitant and correct themselves more often. 'PR', 'FP' which increases by second grade while repeats and false starts decreases by fourth grade false starts and 'PR' increased dramatically, while filled pauses and repeats increased slightly. At sixth grade all types decreased except filled pauses which showed only a moderate decline. Reagarding the repeats at kindergarten many repeats were syllable repetitions by second grade there was a decline in this type and by fourth grade all disappeared.

Haynes and Hood (1977) studied five male and five female children each at 4, 6, and 8 years. These investigators counted disfluencies only from the utterances scored

in "Developmental sentence analysis" (Lee, 1974) and analysed them. Results revealed word repetitions to be a predominant disfluency type in children under age 6, and that they tended to decrease as the youngsters approached the age of 8. Also, they found that filled pauses increased very minimally. Frequency of phrase repetitions increased from 4-6 years. Revisions and incomplete phrases increased and dysrhythmic phonation increased greatly from 4-6 years.

In a study by Ratner and Sih (1987) the children were required to imitate 70 sentences (seven version of each of 10 sentence type+). Stimulus sentences were designed to represent utterances of varying length as well as a developmental hierarchy of syntactic complexity. In the order of increasing difficulty suggested by "the child language development literature" (Brogan, 1968; Hamburger, and Crain, 1982; Klima and Bellugi, 1966; Lust and Merris, 1980; Menyuk, 1969; Tager-Flusberg, Deviliers and Hakuta, 1982; Wells, 1985).

These sentences were: (a) simple active affirmative-declarative (SAAD); (b) Negative (NEG); (c) Question (QUES) (d) Passive (PASS); (e) Dative (DAT); (f) a simple sentence expanded with a terminal prepositional phrase (PREP); (g) coordinate sentence with forward reaction (COOR); (h) right

embedded relative clause (RERC); (i) left embedded complement clause (LBCC); (j) centre embedded relative clause (CERC);.

All subjects were required to repeat the stimulus sentences after the examiner. Subjects were allowed to request repetition of the stimuli and stimuli were repeated a maximum of two additional times. All the responses were recorded and analysed.

The following analysis were performed upon the data. 1) the percentage of sentences with atleast one dysfluency; (SDYS) was calculated for each subject group and sentence type; (2) The percentage of disfluent syllable was determined (SYLLDYS); (3) the percentage of sentence changed (CHANGED) was determined.

For the stuttering group alone the percentage of stuttered syllables (SYLLSTUT); and the number of sentences containing atleast one stuttered moment (SSTUT) were determined.

For each sentence type repetitions of words and phrases were counted as dysfluent syllables. ie..If a child repeated "the man was... the man was, the man was..." he was accorded

three dysfluent syllables and the incidence of unfilled pauses was proportioned over the length of the child's utterance in syllables. An examination of stutterers 'SYLLDYS' and 'SYLLSTUT' patterns showed that 'COOR' (coordination with forward reaction) was the least dysfluency produced sentence type for this group, despite the fact that it was matched for syllable length with four additional sentence types in the stimulus set.

Gordan and Luper (1989) studied speech disfluencies in nonstutterers by counting disfluencies from the utterances of three different syntactic constructions.

(1) simple active affirmative declarative with copulating (SARD); (2) future (FUT); (3) Passive (PAS). The stimuli for the 'sentence modelling' task were made up of 30 randomly arranged sentence stimulation; pictures representing the three syntactic constructions.

The results revealed that the 5 year olds had an overall mean of 14.58 disfluencies for the two experimental tasks with a mean of 2.83 disfluencies/subject on the "sentence imitation task" and 11.75 disfluency on the sentence modelling task.

The 7 year olds had an overall mean of 9.50 disfluencies for the two experimental tasks. The total and mean number of disfluencies/syntactic construction of the 5 year olds had a mean of 4.58 disfluencies on the 'SAAD'. 4.08 on the 'PUT', and 5.92 on the 'PAS' construction. The 7 year olds had a mean of 3.17 disfluencies on SAAD. 2.83 on 'FUT' and 3.50 disfluencies on the 'PAS' construction the total and mean number of sentence production errors/syntactic constructions were higher in 5 year olds than the 7 year olds in both the tasks. The mean number of disfluencies of the 3 year olds was significantly greater than the means for both the 5 and 7 year olds.

In general, the review indicates that there are several factors affecting fluency and there is a developmental trend in the fluency of children. The present study is an attempt to evaluate the disfluencies in Kannada speaking children between 6-7 years of age.

METHODOLOGY

Subjects: The subject for this study were twelve Kannada speaking normal children studying in Ist standard in the age group of 6 to 7 years and were from low-socio-economic group. Two children (one male and one female) each in the age range of two months interval were selected as shown in Table-1.

Age range	Male	Female
6 - 6.2	6.2	6.0
6.2 - 6.4	6.4	6.3
6.4 - 6.6	6.5	6.5
6.6 - 6.8	6.6	6.6
6.8 - 6.10	6.9	6.9
6.10 - 6.12	6.12	6.10

Table-1: Age of the subjects selected for the study.

They were tested for oral mechanism and were screened for speech and language and only those subjects who had normal oral mechanism and normal speech and language and had no reported history of and hearing loss were aecteded as the subjects.

Material: Initially a pilot study was conducted to select the appropriate stories in which eleven panchatantra*

*Panchatantra is a world famous story book written originally in Sanskrit by Vishnu Sharma in which moral is taught using stories of animals.

stories were selected. Pictures (ranging from 5-14) were drawn to suit the stories appropriately. Pictures for a given story were visually presented to a six year old normal Kannada speaking child and the responses were audio-recorded. Of these eleven stories, only six were included and five were deleted as either the child had difficulty with the familiarity of the story or had difficulty in making a story on combining the pictures. Pictures ranging from (5-14) depicting these stories formed the material for the study and are presented in Appendix-I.

Test environment: Each child was tested individually in the home environment where the disturbance was minimum.

Procedure: Initially, support was built up by the tester by conversing with the subject to enable easy elicitation of speech. Each child was tested individually and the child was instructed to narrate stories with the help of pictures presented visually. All the pictures belonging to a particular story were visually presented to the child at the same time. The stories were ordered from simple to complex and pictures belonging to simple stories were presented first followed by those of complex. All the stories were elicited in a single testing. If the child posed any difficulty in narrating the

story or stopped in between, the tester prompted him to start or to continue. When the subjects expressed discomfort they were provided with a rest period. All the narrations were audio recorded on cassettes.

Analysis: The speech samples were transcribed verbatim and the utterances/words were, used as a basis for analysis. An utterance refers to a minimum linguistic meaningful unit.

Seven categories of disfluencies were considered for the study. They include:

(i) Filled pauses (FP) - Characterized by extraneous sounds such as /a/, /am/, /u/.

(ii) Unfilled pauses (UFP) - Characterized by silence, judged to affect the smooth flow of speech.

(iii) Repeats (R) - This category included syllabic repetitions (repetitions of a syllable in a bisyllabic word's? part-word repetitions (Repetition of a part of the polysyllabic word); word repetitions (repetitions of whole words including words of one syllable) phrase repetitions (repetitions of two or more words/utterances) and sentence repetitions (repetition of the whole of a meaningful unit).

(iv) Parenthetical remarks (PR) - This was characterized by fillers like /matte/ /a:me:le/ /a:va:ga/ /gotta/ /adu:/ idu/.

(v) False starts (FS) - This category included content Modification, grammatical correction change in pronunciation, incomplete utterance/phrases, precision/addition of an adjective, adverb etc. Change in the meaning and negation, exclamation. For example:

- a) Content modification: /eradu bekku/ /mu:r bekku/
- b) Grammatical correction: /barta:ne/ /barta:re/
- c) Change in pronunciation: /corolu/ /color/
- d) Incomplete utterance/phrase: /ho/ /baratte/
- e) Precision: /bassu/ /kempu bassu/
- f) Change in meaning: /hinde/ /edru:gade/
- g) Negation exclamation: /amma/ /ayyo/, /appa/

(vi) Sound prolongations (P): This category was identified with words/utterances wherein the phonation disturbs or distorts the so called normal rhtyhm or flow of speech.

(vii) Audible inspirations (AI): This was judged to exist between werds, part words, utterances and non-words(that is, an interjection).

Each instance of disfluency was considered as one disfluency, for example, 'mm nm' 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 'bareee' was considered as a disfluency in the final part of the utterance. If the disfluency occurred after a grammatical category it was considered to occur 'after' a grammatical category for example /koti/ /u/ - the filled pause occurs after a noun. It was considered to occur 'on' a grammatical category in such conditions as /mo... mola/.

To check inter-subject reliability, two samples/were; transcribed and evaluated by another evaluator who was a student of speech pathology and Spearman's rank correlation test was administered to find out the inter-subject reliability. The disfluencies were calculated as described below. The percentage of disfluency was calculated as the ratio of the number of disfluencies to the total number of utterances; multiplied by 100.

$$\text{Percentage of disfluency} = \frac{\text{Number of disfluencies}}{\text{Total number of utterances}} \times 100$$

Within the disfluencies the percentage of each disfluency was calculated by the following formula.

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

Within the types of repetitions, various types of repeats were calculated as:

$$\frac{\text{No. of a particular type of repeat}}{\text{Total no. of disfluencies}} \times 100$$

Percentage of disfluencies on, after grammatical categories were calculated as:

$$\frac{\text{No. of disfluencies on after a grammatical category}}{\text{Total no. of disfluencies}} \times 100$$

The same type of measurement was performed for different positions also.

The percent of different types of disfluencies for position, age, sex and grammatical category was analysed to describe the disfluencies in children (6-7 years) the disfluencies thus observed are highlighted to propose a test for fluency where in the cut off scores and the age range for different types of disfluency are given.

RESULTS

Transcribed speech samples which were obtained from story narration were analysed for repetition, filled pauses, unfilled pauses, audible inspiration, false starters, and parenthetical remarks. Samples were also analysed for prolongations and hesitations.

The results were also analysed for grammatical category. In the grammatical category the disfluencies on/after the grammatical category, and the position of occurrence of disfluencies were computed.

The following notations have been used in the results and discussion.

S ₁ - Subject one	Rv - Revisions
M - Male	PR - Parenthetical remarks
UFP - Unfilled pause	ICU - Incomplete utterance
FP - Filled pause	P - prolongations
R - Repeats	BW - Broken words
SyR - Syllable repetitions	H - Hesitations
PWR - Part word repetitions	S ₂ - Subject two
WR - word repetitions	F - Female
PhR - Phrase repetition	
SR - Sentence repetition	
A1 - Audible inspiration	
Fs - False Starts	

6.0 - 6.2 years:

S₁ had greater number of utterances and the overall percentage of disfluencies of S₁ was greater than S₂ (Table-1a)

	S ₁ (M)	S ₂ (F)
Total no. of utterances	481	338
Total no. of disfluencies	106	59
Percentage of disfluency	22.03%	16.86%
Average percentage of disfluency	20.14%	

Table-1a: Showing the total number of utterances disfluencies and percentage of disfluencies.

Both subjects had parenthetical remarks (PR) as the most frequently occurring type of disfluency followed by FP. H was the least occurring type of disfluency in both the subjects. In general, the order of occurrence of disfluencies were PR; FP; R; UFP; Fs; P; BW; AI, H and PR; FP; Fs; R; UFP; BW, AI, H. for S₁ and S₂ respectively (Table-2a).

The disfluency R was more in S₁ than S₂. Among the different types of repetitions S₁ had more SyR's (Table-3a).

With respect to the grammatical categories, more disfluencies occurred after the grammatical category than

	Percentage of disfluencies		
	S ₁ (M)	S ₂ (F)	Average percentage
PR	19.81	49.15	34.48
FP	18.86	15.25	17.05
R	18.86	8.47	13.66
Fs	13.77	15.24	14.50
UFP	14.15	6.77	10.46
P	12.26	-	6.13
BW	1.88	1.69	1.78
AI	0.94	1.69	1.31
H	-	1.69	0.84

Table-2a: Different kinds of disfluencies in percent (6.00 - 6.2 years).

Types of repeats	S ₁ (M)	S ₂ (F)	Average percentage
SyR	15.09	1.69	8.39
PWR	0.94	1.69	1.31
WR	1.88	3.38	2.63
PhR	-	1.69	0.84
SR	0.94	-	0.47

Table-3a: Showing different types of repeats in percentage in 6.0 - 6.2 years.

'ON' in both the subjects. In S₁ - maximum disfluencies occurred on/after the 'noun' category followed by 'verb' category -and the disfluencies were least on/after the

'adverb' category. In S_2 , maximum disfluencies occurred for 'conjunction' category followed by other and disfluencies were least for the adverb category.

The order of occurrence of disfluencies on/after the grammatical categories were noun-verb-interjection-conjunction-adjective-pronoun-preposition, adverb and conjunction-verb-noun-pronoun-interjection-adjective-preposition, adverb respectively for S_1 and S_2 (Table-4a).

Grammatical category	Subjects	After	On	Percentage	Average percentage
Noun	S1	50.81	49.19	30.34	22.82
	S2	70.58	29.41	15.31	
Pronoun	S1	44.44	55.55	4.97	7.89
	S2	25	75	10.81	
Verb	S1	90	10	23.38	24.75
	S2	75.86	24.13	26.12	
Adverb	S1	-	-	-	0.45
	S2	100	-	0.90	
Adjective	S1	50	40	5.47	5.88
	S2	57.14	42.85	6.30	
Preposition	S1	75	25	3.98	3.34
	S2	-	-	2.70	
Interjection	S1	33.33	63.33	17.91	13.90
	S2	66.66	33.33	9.90	
Conjunction	S1	42.85	57.14	13.93	20.92
	S2	32.25	67.74	27.92	

Table-4a: Percentage of disfluencies. on/after grammatical categories -6.0 - 6.2 years.

Regarding the position of occurrence of disfluencies, the position for Fs was considered at sentence level whereas the position of R, P are considered at word level.

S₁ showed maximum disfluencies in the initial position followed by medial position and S₂ showed maximum disfluencies in medial position followed by initial position. No disfluencies were exhibited in the final position by S₂ and in S₁ it was least (Table-5a)

	Initial		Medial		Final	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
Fs	20.0	11.11	60.0	88.88	20.0	-
R	94.11	100	5.88	-	-	-
P	92.0	-	-	-	8.0	-
Average Percentage	69.5	27.2	19.5	72.7	8.69	-

Table-5a: Showing the disfluencies in different positions 6.0-6.2 years.

When individual disfluencies were taken for the positions, Fs occurred maximally in the medial position, maximum R occurred in the initial position in both the subjects, and maximum P occurred in the initial position (Table-5a).

6.2-6.4 years: S₂ had greater number of utterances, disfluencies and overall percentage of disfluencies than S₁ (Table-1b).

	S ₁ (M)	S ₂ (F)
Total no.of utterances.	458	613
Total no.of disfluencies	155	263
Percentage of disfluency	33.84	42.9
Average Percentage of disfluency	39.02	

Table-1b: Showing total no.of utterances, disfluencies and percentage of disfluencies.

While S₁ had R as the most frequently occurring disfluency followed by filled pauses, S₂ had PR as the most frequently occurring dysfluency followed by FP and AI. BW was the least occurring type of disfluencies in both S₁ and S₂ and both the subjects did not show any H. In general the order of occurrence of disfluencies were R-FP-PR-P-UFP-AI-BW-Fs-H and PR-FP-AI-R-Fs-P-UFP-BW respectively for S₁ and S₂ (Table-2b).

The disfluency R was more in S₁ than in S₂ of the repetitions, SyR and WR were the most frequently occurring disfluencies and SR was not exhibited by any of the subjects.

	Percentage of disfluencies		
	S ₁ (M)	S ₂ (F)	Average percentage
PR	21.29	24.71	23
FP	23.22	23.19	23.2
R	26.45	20.91	23.6
AI	4.51	23.19	13.8
P	12.90	1.52	7.2
FS	4.51	4.56	4.5
UFP	5.16	1.52	3.3
BW	1.93	0.38	1.1
H	-	-	-

Table-2b: Different kinds of disfluencies in percent 6.2-6.4 years.

Types of repeats	S ₁ (M)	S ₂ (F)	Average percentage
SyR	12.90	11.40	12.1
WR	6.45	5.32	5.8
PWR	5.80	3.42	4.6
PhR	1.29	0.76	1.0
SR	-	-	-

Table-3b: Showing different types of repeats in percentage in 6.2 -6.4 years.

With respect to the grammatical categories in general, maximum disfluencies occurred on/after the conjunction category followed by 'verb' category disfluencies were least

Grammatical category	Subjects	After	on	Percentage	Average percentage
Noun	S ₁	66.66	33.33	17.57	18.26
	S ₂	61.36	38.63	18.96	
Pronoun	S ₁	35.0	60.0	8.36	6.87
	S ₂	60.0	40.0	5.38	
Verb	S ₁	87.0	13.0	25.94	23.74
	S ₂	82.0	18.0	21.55	
Adverb	S ₁	50.0	50.0	1.67	0.94
	S ₂	100.0	-	0.21	
Adjective	S ₁	-	100.0	0.83	3.64
	S ₂	66.66	33.33	6.46	
Preposition	S ₁	-	-	-	0.64
	S ₂	83.33	16.66	1.29	
Interjection	S ₁	25.0	75.0	23.43	21.95
	S ₂	31.57	68.42	20.47	
Conjunction	S ₁	39.62	63.37	22.17	23.90
	S ₂	42.85	57.14	25.64	
Total percentage	S ₁	52.7	47.2		
	S ₂	55.60	44.39		

Table-4b: Percentage of disfluencies and average on/after the grammatical categories 6.2 -6.4 years.

on/after the preposition. The order of occurrence of disfluencies on/after the grammatical category were verb-interjection-conjunction-noun-pronoun-adverb-adjective and no disfluencies occurred on/after the preposition category for S₁ and for S₂ the order was conjunction-verb-interjection-

noun-adjective-pronoun-preposition-adverb (Table-4b).

Regarding the position of occurrence of disfluencies, in general, disfluencies were maximum in initial followed by medial and least in the final position (for both S_1 and S_2).

However, Fs occurred more in the medial position and R and P occurred more in the initial position Table-5b.

Disfluencies	Initial		Medial		Final	
	S_1	S_2	S_1	S_2	S_1	S_2
Fs	16.66	-	50	66.66	33.33	33.33
R	79.31	92.30	13.79	5.12	6.89	2.55
P	72.22	75.0	22.22	25.0	5.55	-
Total percentage	69.8	70.9	20.7	20	9.4	9.0

Table-5b: Showing the percentage of disfluencies in different positions.6.2-6.4 years.

6.4 - 6.6 years: When total utterances and total disfluencies were calculated they are more in S_1 than in S_1 . However, the total percent of disfluencies were more in S_1 than in S_2 (Table-1c).

	S_1 (M)	S_2 (F)
Total no.of utterances	441	567
Total no.of disfluencies	185	219
Percentage of disfluency	41.95	38.62
Average percentage of disfluency	40.07	

Table-1c: Showing the total no.of utterances, disfluencies and percentage of disfluencies.

In general, PR was the most frequently occurring disfluency in the age range of 6.4 - 6.6, followed by R and UFP was the least occurring disfluency. H were not exhibited by any of the subjects. For S_1 the order of occurrence of disfluency was PR-FP-R-Fs-P-UFP-AI and for S_2 it was R-FP-Fs-AI-PR-P-UFP in both the subjects FP was the second most frequently occurring disfluency (Table-2c).

Disfluencies	Percentage of disfluencies		
	S_1 (M)	S_2 (F)	Average percentage of disfluencies
PR	28.10	11.87	19.9
R	14.5	22.42	18.4
FP	19.45	16.42	17.93
Fs	12.97	15.06	14.01
AI	8.1	11.8	9.45
P	8.64	7.76	8.2
UFP	8.10	4.10	6.1
BW	-	0.91	0.45

Table-2c: Showing different types of disfluencies in percent 6.4-6.6 years.

Among the repetitions, SyR occurred most frequently followed by WR-PWR-PhR and SR and SyR had higher percentage of occurrence in S_2 compared to S_1 . When each disfluency was considered, PWR and SyR were the most frequently occurring disfluency in S_1 and S_2 respectively (Table-3c).

Types of repeats	S ₁ (M)	S ₂ (F)	Average percentage of disfluencies
SyR	1.0	10.95	5.97
WR	5.94	5.47	5.70
PWR	6.48	3.65	5.06
PhR	1.0	2.28	1.64
SR	-	0.45	0.22
Total percentage of repeats.	14.5	22.83	18.66

Table-3c: Types of repeats in percentage 6.4 -6.6 years.

In general, maximum disfluencies occurred on/after the conjunction followed by verb and disfluencies were least on the adverb category. However, for S₁ maximum-disfluencies occurred on/after conjunction and maximum disfluencies occurred on/after verbs in S₂. The order of occurrence of disfluencies 'on/after' different grammatical categories were conjunction-verb-interjection-noun-adjective-pronoun-preposition and no disfluencies on/after adverb category were observed for S₁, and for S₂ it was verb-conjunctions-noun-pronoun-interjection-preposition-adjective and adverb (Table-4c).

Grammatical category	Subjects	After	On	Percentage	Average percentage
Conjunction	S ₁	50.90	49.09	31.88	26.5
	S ₂	54.05	45.94	21.20	
Verb	S ₁	74.24	25.75	19.13	25.03
	S ₂	69.44	30.55	30.94	
Noun	S ₁	58.33	41.66	13.91	14.54
	S ₂	60.37	39.62	15.18	
Interjection	S ₁	28.84	71.75	15.07	13.90
	S ₂	24.44	75.55	12.89	
Pronoun	S ₁	52.17	47.82	6.66	10.63
	S ₂	43.13	56.86	14.61	
Adjective	S ₁	56.09	43.90	11.88	7.08
	S ₂	66.66	33.33	2.29	
Preposition	S ₁	80.00	20.00	1.44	2.00
	S ₂	66.66	33.33	2.57	
Adverb	S ₁	-	-	-	0.014
	S ₂	100.0	-	0.28	
Total percentage	S ₁				
	S ₂	54.78	45.21		
		54.72	45.27		

Table-4c: Percentage of disfluencies on/after grammatical categories - 6.4-6.6 years.

Considering the position of occurrence of disfluencies of Fs, R and P, in general, disfluencies were maximum in the initial position followed by medial and final position. However, Fs occurred more in the medial position followed by final

position and least in the initial position, R occurred more in the initial position and P occurred only in the initial position and not in other positions. R and P did not occur in the final position and for S₁ R and P did not occur in the medial position S₁ (Table-5c).

Disfluencies	Initial		Medial		Final	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
Fs	4.0	20.0	68.0	60.0	28.0	20.0
R	69.23	100.0	30.76	-	-	-
P	100.0	100.0	-	-	-	-
Total percentage	49.09	81.25	38.18	14.06	12.72	4.68

Table-5c: Showing the disfluencies in different positions 6.4 - 6.6 years.

6.6 - 6.8 years: S₂ had greater no. of utterances and disfluencies than S₁ (Table-1d).

	S ₁ (M)	S ₂ (F)
Total no. of utterances	449	499
Total no. of disfluencies	137	145
Percentage of disfluency	30.5	29.05
Average percentage	29.74	

Table-1d: Showing total number of utterances, disfluencies and percentage of disfluencies.

When the types of disfluencies were considered, FP was found to occur frequently followed by R and PR. The disfluencies P and BW occurred minimally. The order of occurrence of disfluencies were R-FP-PR-Fs-H-UFP-BW with no AI and P for S₁ and FP-PR-R-FS-AI-UFP-P-H and no BW occurred for S₂(Table-2d).

Disfluencies	Percentage of disfluencies		
	S ₁ (M)	S ₂ (F)	Average
FP	33.57	28.27	30.92
R	35.76	24.13	29.94
PR	20.43	26.20	23.31
Fs	8.75	11.03	9.89
AI	-	6.89	3.44
H	3.64	0.68	2.16
UFP	0.72	2.06	1.39
P	-	0.68	0.34
BW	0.72	-	0.36

Table-2d: Types of disfluencies in percentage 6.6 - 6.8 years. Among the repetitions, WR occurred most frequently and PhR occurred least and no SR occurred in both the subjects. In general, total repeats of all kinds were more in S₁ than in S₂. In S₁ the order of occurrence of repetitions were PWR-WR-SyR-PhR and in S₂ it was WB-SyR-PWR-PhR (Table-3d).

Types of repeats	S ₁ (M)	S ₂ (F)	Average
WR	10.21	8.96	9.58
SyR	7.29	8.96	8.12
PWR	10.94	4.13	7.53
PhR	3.64	2.06	2.85
SR	-	-	-
Total percentage of repeats.	32.08	24.13	28.60

Table-3d: Types of repeats in percentage 6.6 - 6.8 years.

Considering the grammatical category, generally disfluencies occurred more after the grammatical category than on the category. Disfluencies occurred more frequently on/after noun category followed by verb category and was least on/after preposition. The order of occurrence of disfluencies were noun-interjection-verb-conjunction-pronoun-adjective-adverb and no disfluencies occurred on/after the preposition category for S₁ and for S₂ the order was verb-pronoun-noun-interjection-conjunction-adverb-preposition-adjective (Table-4d).

The disfluencies, in general occurred maximally in initial, followed by medial and final positions. Fs occurred maximally in the medial position. Whereas R occurred maximally in the initial position in both S₁ and S₂. S₁ did not exhibit P and in S₂ P occurred only in the initial position (Table 5d).

Grammatical category	Subjects	After	on	Percentage	Average percentage
Noun	S ₁	58.02	41.97	30.45	24.59
	S ₂	59.25	40.74	18.94	
Verb	S ₁	72.88	27.11	22.18	22.66
	S ₂	74.24	25.75	23.15	
Interjection	S ₁	25.0	75.0	24.06	20.1
	S ₂	19.56	80.43	16.14	
Conjunction	S ₁	36.58	63.41	15.41	15.07
	S ₂	40.47	59.52	14.73	
Pronoun	S ₁	52.94	47.05	6.39	14.07
	S ₂	54.83	45.16	21.75	
Adjective	S ₁	100.0	-	1.12	1.26
	S ₂	50.0	50.0	1.40	
Adverb	S ₁	100.0	-	0.37	1.23
	S ₂	66.66	33.33	2.10	
Preposition	S ₁	-	-	-	0.87
	S ₂	80.0	20.0	1.75	
Total Percentage	S ₁	50.37	49.62		
	S ₂	52.98	47.01		

Table-4d: Percentage of disfluencies on/after the grammatical category

Disfluencies	Initial		Medial		Final	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
Fa	8.33	7.14	58.33	42.85	8.33	50.00
R	90.0	100.0	4.54	-	4.54	-
P	-	100.0	-	-	-	-
Average Percentage	61.7	61.7	32.3	17.6	8.8	20.5

Table-5d: Showing the disfluencies in different positions 6.6 - 6.8 years.

6.8 - 6.10 years: S₂ had more number of utterances and less percentage of disfluencies compared to S₁ (Table-1e).

	S ₁ (M)	S ₂ (F)
Total no.of utterances	351	527
Total no.of disfluencies	99	125
Percentage of disfluency Average	28.20	23.71
		25.51

Table-1e: Showing total no.of utterances, disfluencies and percentage of disfluencies.

When types of disfluencies were considered PR occurred most frequently followed by AI and then FP. BW was the least occurred disfluency and no H occurred in both the subjects. High variations in the occurrence of various types of disfluencies between S₁ and S₂ were noticed. The order of occurrence of

disfluencies were AI-PR-FP-Fs-UFP-R-P-BW and PR-FP-Fs-P-R-UFP-AI for S_1 and S_2 respectively. (Table-2e).

Disfluencies	Percentage of disfluency		
	S_1 (M)	S_2 (F)	Average
PR	14.14	25.6	19.87
FP	14.14	21.6	17.87
Fs	14.14	20.0	12.7
AI	34.34	3.2	18.68
R	8.08	12.0	10.04
UFP	12.12	4.8	8.10
P	2.02	12.8	7.04
BW	1.0	-	0.5
H	-	-	-

Table-2e: Different types of disfluencies in percentage 6.8 - 6.10 years.

In general R occurred more in S_2 than in S_1 . When each type of R was considered WR occurs maximally for S_1 and SyR occurs maximally for S_2 . PhR was the least type of R and no SR was observed (Table-3e).

Types of repeats	S_1 (M)	S_2 (F)	Average percentage of disfluencies
WR	5.05	2.4	3.54
SyR	1.0	5.6	3.3
PWR	1.0	2.4	1.7
PhR	1.0	1.6	1.3
SR	-	-	-
Total percentage of repeats.	8.08	12.0	10.04

Table-3e: Types of repeats in percentage 6.8 - 6.10 years.

Considering the grammatical category more disfluencies have occurred after than on the grammatical categories. Most frequently disfluencies occurred on/after verb category followed by conjunctions and least disfluencies occurred on/after the adverb category. The order of occurrence of disfluencies on/after different grammatical categories have been listed in the order in the average column in Table-4e. For both S_1 and S_2 the order of occurrence was verb-conjunction-noun-interjection-pronoun-adjective-preposition and adverbs.

In general, maximum disfluencies occurred in the initial, followed by medial and final position. However, in S_2 more disfluencies occurred in the medial position. Fs occurred more in the medial position. P and R occurred more in the initial position in S_1 . P occurred more in S_2 it occurred equally in the medial and final positions (Table - 5e).

Grammatical category	Subjects	After	On	Percentage	Average percentage
Verb	S ₁	88.15	11.84	42.07	32.99
	S ₂	72.22	27.77	23.92	
Conjunction	S ₁	45.09	54.90	28.41	23.34
	S ₂	45.45	54.54	18.27	
Noun	S ₁	51.85	48.14	18.03	15.32
	S ₂	60.52	39.47	12.62	
Interjection	S ₁	11.11	88.88	6.01	9.31
	S ₂	15.78	84.21	12.62	
Pronoun	S ₁	66.66	33.33	4.91	5.94
	S ₂	33.33	66.66	6.97	
Adjective	S ₁	-	-	-	0.83
	S ₂	60.0	40.0	1.66	
Preposition	S ₁	-	-	-	0.33
	S ₂	50.0	50.0	0.66	
Adverb	S ₁	100.0	-	0.54	0.25
	S ₂	-	-	-	
Total percentage	S ₁	63.38	36.61		
	S ₂	50.64	49.35		

Table-4e: Percentage of disfluencies on/after grammatical category 6.8 - 6.10 years.

Disfluencies	Initial		Medial		Final	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
Fa	42.85	11.11	57.14	66.66	25.0	22.22
R	75.0	100.0		-		-
P		100.00			50.0	-
Total percentage	42.10	65.20	47.36	26.08	10.52	8.69

Table-5e: Showing disfluencies on different positions in percent 6.8 - 6.10 years.

6.10 - 6.12 years: S₁ and S₂ had almost same number of utterances but overall number and percentage of disfluency was higher in S₁ than in S₂ (Table-1f).

	S ₁ (M)	S ₂ (F)
Total no.of utterances	421	419
Total no.of disfluencies	135	103
Total percentage of disfluency	32.06	24.93
Average	28.33	

Table-1f: Showing total number of utterances, disfluences and percentage of disfluencies.

In considering the different types of disfluency, in general, FP occurred maximally followed by R. AI was the least disfluency occurred in this age range. The order of occurrence

of disfluencies is as tabulated in Table-2f. The order of occurrence of disfluencies in S_1 was Fp-R-PR-Fs-P-UFP-AI and in S_2 it was FP-R-P-PR-FS-AI-UFP. No BW and H were observed in either of the subjects.

Disfluencies	Percentage of disfluency		
	S_1 (M)	S_2 (F)	Average
FP	35.55	43.68	39.61
R	31.85	19.41	25.63
PR	16.29	9.70	12.99
Fs	8.88	9.70	9.29
P	2.96	12.62	7.79
UFP	2.96	1.94	2.45
AI	1.48	2.91	2.19
BW	-	-	-
H	-	-	-

Table-2f: Types of disfluency in percentage 6.10-6.12 years.

In general, S_1 showed more R than S_2 . SyR occurred most frequently followed by WR and the order of occurrence of different kinds of R are as given in Table-3f.

The order of occurrence of kinds of R were SyR-PWR-WR-PhR- and syR-WR-SR-PhR respectively for S_1 and S_2 .

Types of repeats	S ₁ (M)	S ₂ (F)	Average percentage of disfluencies.
SyR	14.81	7.76	11.28
WR	5.92	6.79	6.35
pWR	8.14	-	4.7
PhR	2.96	1.94	2.45
SR	-	2.91	1.45
Total percentage of repeats	31.85	19.41	25.63

Table-3f: Types of repeats in percentage 6.10-6.12 years.

Among the grammatical categories, more disfluencies occurred on the grammatical categories than after the grammatical categories in S₁ and in S₂ more disfluencies occurred after the categories than on the categories. In general, most of the disfluencies occurred in the interjection category followed by verb and disfluencies were least in adverb category (Table-4f).

Disfluencies decrease from initial to medial to final position. R occurred maximally in the initial position, Fs in the medial position and P occurred equally in the initial and medial position in S₁ and maximally in the initial position in S₁ (Table 5f).

Grammatical category	Subjects	After	On	Percentage	Average percentage
Interjection	S ₁	32.43	67.56	28.35	31.94
	S ₂	26.66	73.33	35.54	
Verb	S ₁	78.18	21.81	21.07	21.19
	S ₂	82.22	17.77	21.32	
Noun	S ₁	50.0	50.0	23.75	19.22
	S ₂	54.8	45.1	14.69	
Conjunction	S ₁	46.34	53.65	15.70	13.06
	S ₂	77.27	222.72	10.42	
Pronoun	S ₁	40.0	60.0	5.74	7.60
	S ₂	35.0	65.0	9.47	
Adjective	S ₁	60.0	40.0	3.83	5.70
	S ₂	56.25	43.75	7.58	
Preposition	S ₁	50.0	50.0	0.76	0.61
	S ₂	100.0	-	0.47	
Adverb	S ₁	-	100.0	0.76	0.38
	S ₂	-	-	-	
Total percentage	S ₁	49.80	50.19		
	S ₂	51.18	48.81		

Table-4f: Percentage of disfluencies on/after categories
6.10 - 6.12 years.

Disfluencies	Initial		Medial		Final	
	S ₁	S ₂	S ₁	S ₂	S ₁	S ₂
R	96.77	100.0	3.22	-	-	-
Fs	18.62	10.0	81.81	60.0	-	30.0
P	50.0	100.0	50.0	-	-	-
Total percentage	73.91	65.38	26.08	23.07	-	11.59

Table-5f: Showing disfluencies on different positions
6.10 - 6.12 years.

Interjudge reliability:

To check inter subject reliability, speech samples of two subjects (one male and one female) were selected randomly and were transcribed and analysed by another evaluator. The results of the Spearman's rank correlation test indicated a high correlation of 0.7 and 0.9 respectively for the two subjects indicating high inter judge reliability.

DISCUSSION

In general, the results indicated the following trends:

1. The percentage of disfluencies increased from 6 - 6.4 years and declined therein. While males exhibited a peak between 6.4 - 6.6 years females exhibited peak at between 6.2 - 6.4 years. (Fig.1).
2. Males showed higher percentage of disfluencies than females except at 6.2 - 6.4 years (Fig.1)
3. FP, PR, Fs and R were the disfluencies which occurred maximally in the age group of 6-7 years and AI, BW and P UFP & H were the minimally occurring disfluencies (Fig.2).
4. Among the various kinds of repetitions syllable and word repetitions occurred maximally (Fig.3)
5. Disfluencies were more on/after verbs, nouns, conjunctions and interjections and were less on/after adverbs and preposition.
6. Disfluencies occurred most often in the initial position of the utterance than the medial or final .
7. Compared to earlier studies in the age range of 3-6 years, in the present study the percentage of FS, PR increases in the age range of 6-7 years.

In the present study, overall disfluencies of all the types in the age range of 6-7 years were found to be slightly higher in males than in females. This partly agrees with the

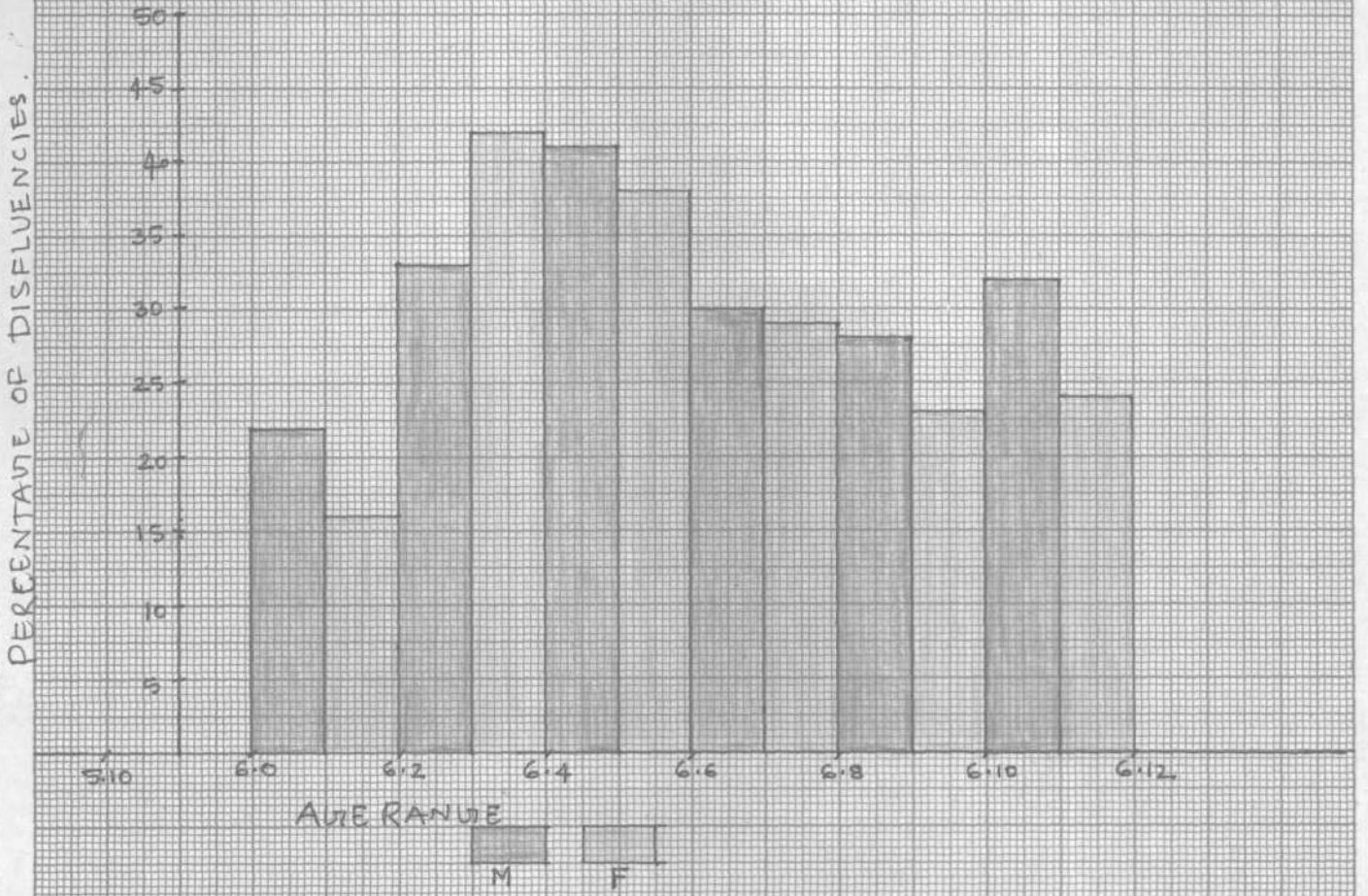


Fig. 1.

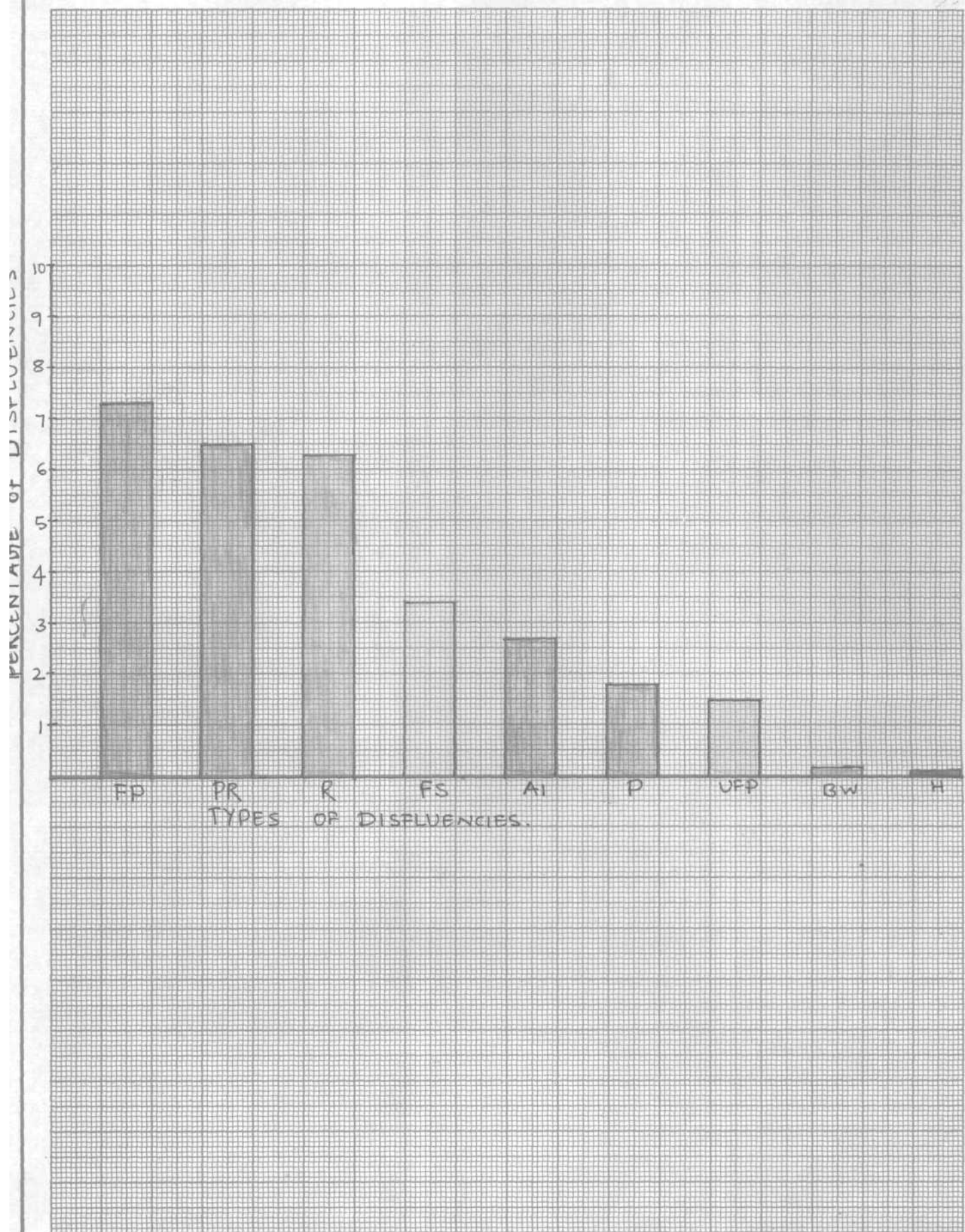


Fig. 2.

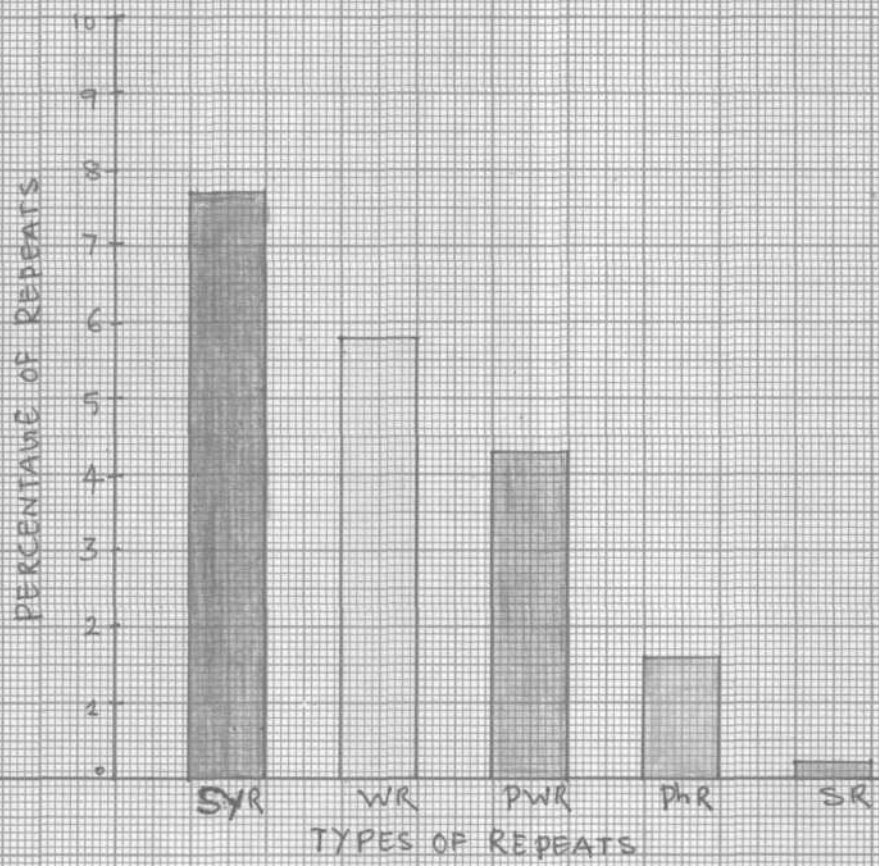


Fig. 3.

results of the study by Kools and Berryman (1971) who found male subjects mean score to be significantly greater, than female subjects only for the category of incomplete phrases.

Also, this is in accordance with the studies by Fisher, 1932; Kowal, et al, 1975; Haynes and Hood, 1977; Yairi, 1981 and Wexler and Mysak, 1982) who reported higher percentage of disfluencies in males than in females in various age ranges. As the children grow they use more PR and revisions which indicate the usage of more sophisticated forms of nonfluency (Starkweather, 1987). The present study also indicated the frequent usage of PR. It seems that the frequency of discontinuities does not show much of a developmental trend. Certain types of discontinuities like false starts and repetitions are more in younger than older children and as children grow these immature types are replaced by more sophisticated types like parenthetical remarks (Starkweather, 1987).

Prolongations were noticed minimally in the speech of 6-7 years in the present study. Indu (1990) also noticed minimal prolongations in the age group of 4-5 years.

According to Davis (1939) syllable repetitions were not affected by age and syllable repetitions occurred much less frequently than others at all ages - contradicting to

this in the present study among all the repetitions syllable repetitions were found to occur predominantly constituting about 25.3% of all the types of repetitions.

The results of the study by Haynes and Hood (1977) revealed word repetitions to be the predominant disfluency type under the age of 6 and decreased therein as the child approached the age of 8. according to Kowal et al (1975) PR and FP increases by second grade while repeats and false starts decreases. This is supported by the present study that the repetitions decreased when compared to the results obtained in the speech of 3-6 years (Nagapoornima* 1990; Indu, 1990; Yamini, 1990).

Repetitions have been explained in various ways it has been associated with the development of speech and language abilities. Kirkpatrick (1915), believes that children repeat because they do not have tangible evidence that they have been understood.

Froeschels (1921) opines that a child repeats a word or a syllable/s in the event of searching towards thoughts or grammatical forms to follow course of conveying information. The repetition at least include intentional repeating of larger verbal groups in the manner of play(Wingate,

1962). 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 (Starkweather, 1981).

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'.

The the present study it was noted that disfluencies occurred more 'on' the content words nouns and verbs and in the initial positions. This is in part agreement with the reports of McClay and Osgood (1959); Cook (1971); Helmerich and Bloodstein (1973). It has been opined that content words are the high information bearing elements in speech and that uncertainty is maximum in the initial position. This explains the higher percentage of occurrence of disfluencies on content words and in the initial position.

A TEST FOR FLUENCY - A PROPOSAL

Based on the results of the present study a fluency test has been proposed. Story narration task is used for this purpose. Panchatantra story pictures (Appendix-I) could be used to elicit responses. However, this should not be confused as a standardized test. It should be administered on large normal and clinical population to find out its validity.

Procedure: It is suggested that the tester has an informal conversation with the child, to be tested, and visually presents the first picture series and instructs the child to narrate the stories, pictures belonging to simple stories should be presented first followed by those of complex ones. If the child posed any difficulty in narrating the story or stops in between, the tester should prompt and encourage him to come out with the response. The speech sample should be audio-recorded so that no part of the child's speech is missed out. The recorded speech sample should be translated verbatim and the number of utterances, number and types of disfluencies should be counted. Appropriate formula (as mentioned in the methodology) should be applied to delineate the percent of disfluency. The

cutoff scores and ranges for the different subgroups in the age range 6-7 years as obtained in this study are presented in Table-6.

This study has contributed in the area of fluency development and provides the cutoff scores obtained from the data. This data could be clinically used to differentiate normal and stuttering children. Further, the therapy could be focussed on a specific diffluency.

Types of disfluencies	Age range					
	6.0-6.2	6.2-6.4	6.4-6.6	6.6-6.8	6.8-6.10	6.10-6.12
PR - Range COS	4.36-8.58 6.47	7.20-10.60 8.9	4.58-11.79 8.18	6.23-7.61 6.92	3.98-6.07 5.02	2.38-5.22 3.8
FR - Range COS	2.66-4.15 3.40	7.86-9.95 8.90	6.34-8.16 7.25	8.21-10.24 9.22	3.98-5.12 4.55	10.73-11.40 11.06
R - Range COS	1.48-4.15 2.81	8.95-8.97 8.96	6.12-8.81 7.46	7.01-10.91 8.96	2.27-2.84 2.55	4.77-10.21 7.49
UFP - Range COS	1.18-3.11 2.14	0.65-1.74 1.19	1.58-3.45 2.49	0.22-0.60 0.41	1.13-3.41 2.27	0.47-0.95 0.71
FS - Range	2.66-4.36 3.51	1.52-1.95 1.73	5.44-5.82 5.63	2.67-3.20 2.93	3.98-4.74 4.36	2.38-2.85 2.61
P - Range COS	0.0 -2.70 1.35	0.65-4.36 2.50	2.99-3.62 3.30	0-0.20 0.1	0.56-3.03 1.79	0.95-3.10 2.02
AI - Range COS	0.20-0.29 0.24	1.52-9.95 5.73	3.40-4.58 3.99	0-2.0 1.0	0.75-9.68 5.21	0.47-0.71 0.59
BW - Range COS	0.29-0.41 0.35	0.16-0.65 0.40	0-0.35 0.17	0-0.22 0.11	0-0.28 0.14	-
H - Range COS	0-0.29 0.14	0-0	0-0	0.20-1.11 0.65	-	-
Total	19.74	38.37	40.28	29.77	25.95	28.49

Table- : Showing ranges, total disfluencies and cut off scores for different disfluencies in the age range of 6-7 years.

SUMMARY AND CONCLUSION

The differentiation of normally nonfluent children and stuttering children remains a matter of controversy. In this regard much is needed in the area of speech fluency in normal children. In this context an attempt has been made to evaluate the disfluencies of 12 Kannada speaking normal children between six to seven years.

The subjects for this study were twelve Kannada speaking normal children in the age group of 6-7 years from the low socio-economic group. Two children (one male and one female) each in the age range of two months interval were selected using story narration task. Six panchatantra familiar stories were selected and were picturized. These pictures were visually presented to the child one at a time and he/she was asked to narrate the stories. Pictures belonging to simple stories were presented first followed by those of complex and all the stories were elicited in a single testing. The speech samples were audio-recorded and were transcribed verbatim and analysed for different types of disfluencies.

In general the overall disfluencies were found to be more for male subjects. Except in the age range 6.2 to 6.4

years. The overall percentage of disfluencies gradually increased from 6.0-6.2 years to 6.4-6.6 years, and overall disfluencies reached its peak in this age range of 6.4-6.6 years? and then declined. However, again in the age range 6.10-6.12 the percentage of disfluencies increased slightly.

Among the different types of disfluencies, FP was the most frequently occurring with a percentage of 24.2% followed by PR and R. The order of occurrence of types of disfluencies in the age range were FP (24.2%); PR(21.6%); R(21.2%); Fs(10.8%); AI(9.4%); P(6.1%); UFP(4.7%), BW(0.6%); H(0.4%).

In R many types of repeats were observed in the subjects and in general, SyR was found to be most commonly occurring in this age range which constituted about 25.3% followed by WR-16.8% and sentence repetition were least. The order of occurrence of types of R were Sy.R (25.3%); WR(16.8%); PWR (12.6%); PhR (4.8); SR(0.8); Maximum disfluency occurred on/after the verb category with a percentage of (24.98%) followed by conjunction (20.69%). The order of occurrence of disfluencies on the grammatical categories were on the
 conjunction (20.69%); Noun(19.32%); interjection (19.16%); Pronoun (9.05%); Adjective (4.35%), Preposition (1.30%); Adjective (0.54%).

Maximum disfluencies occurred in the initial position which constituted about 65.8% followed by disfluencies in the medial position (25.5%) and in the final position disfluencies occurred least (8.8%).

Based on these results a test for fluency was proposed and story narration task is proposed for the purpose of speech elicitation. The percent disfluency and ranges in each age group is provided with as a cut off score for the differentiation of children as normally nonfluent/stuttering. However, this is only a proposed test and it has to be administered with children to validate and thus to utilize in diagnosis and rehabilitation of fluency disorders.

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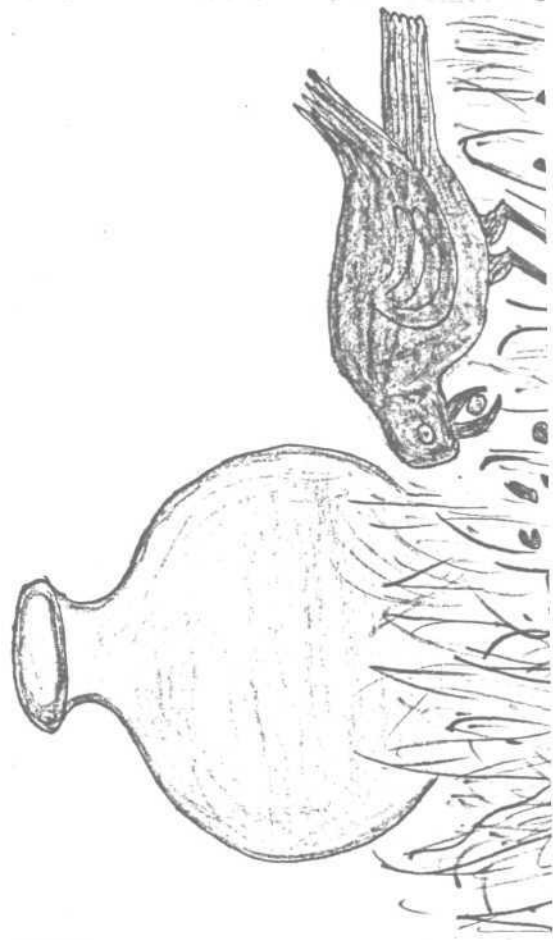
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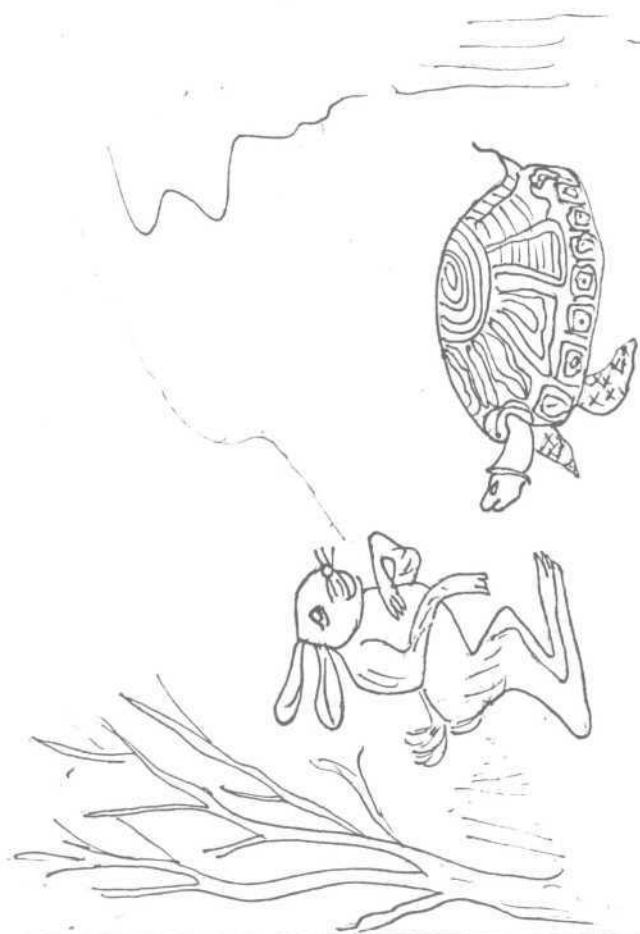
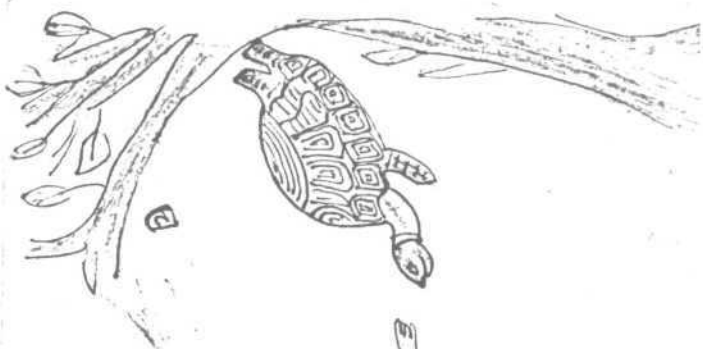
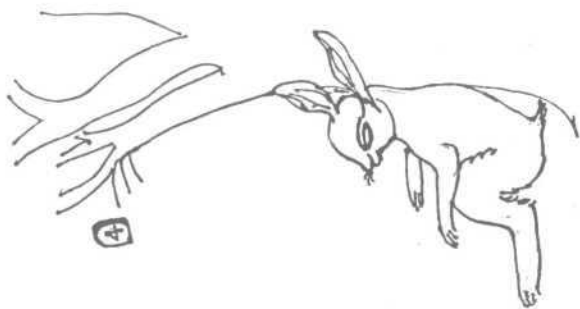
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