DISfluencies in Children (5-6 years)

Register No.M8805

A DISSERTATION SUBMITTED AS PART FULFILMENT OF FINAL YEAR M.Sc. (SPEECH AND HEARING) TO THE UNIVERSITY OF MYSORE.

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE - 570 006.

May 1990

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APPA, AMMA

and

Dr. SAVTTHRI

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CERTIFICATE

This is to certify that the Dissertation entitled: DISfluencies in Children (5-6 years) is the bonafide work in part fulfilment for the degree of M.sc., (speech and Hearing) of the student with Register No.M8805.

Mysore
May ,1990

Director
ALL INDIA INSTITUTE OF SPEECH AND HEARING, MYSORE-6

CERTIFICATE

This is to certify that this Dissertation entitled: DISfluencies in Children (5-6 years) has been prepared under my supervision and guidance.

Savithri. S.R

Mysore
May, 1990

(Dr.S.R.Savithri)
GUIDE

D E C L A R A T I O N

This Dissertation entitled: DISfluencies in Children (5-6 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.

Mysore
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INTRODUCTION

In communication, the encoded speech should be fluent. 'Fluency' refers to effortless production of long, continuous utterances at a rapid rate; be it the first language or second language (starkweather, 1980). However, the phenomenon of speech is not always without disruptions, which inturn lead to breaks in fluency. Shapiro and DeCicco (1982) point out the two views regarding the relationship between the so-called "normal dysfluency" and the more pathological dysfluency of the stutterer. The first view suggested is that normal dysfluencies 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 dysfluencies produced by non-stuttering speakers. Quesal (1988) indicated that, the prefix dis is used in the formation of words that define the opposite of something and, hence, in this aspect, the word disfluency implies a lack of fluency in speech? the prefix dys means bad and dysfluency refers to abnormal speech.

The speech features involved in an assessment of fluency have been subsumed under a general concept of "transition smoothness" (Dalton and Hardcastle, 1977). These features include:'pausing (that is, discontinuities of

gaps in the speech audio signal due for example to articulatory closures; hesitation and juncture pauses); rhythmical patterning (the regular succession of stressed 'beats' in a speech utterance), regulation of tempo; intonation and stress patterns? and other features including interactions, interruptions etc, which cannot be easily included under the other categories" (Dalton and Hardcastle, 1977). They add that these features could affect normal speech in various ways.

Stark weather (1987) considered fluency as a multi-dimensional 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).

The flow of speech is affected by discontinuities (Starkweather) or disfluencies (Branscom, Hughes and Oxtoby, 1955; Yairi and Clifton, 1972; Kowal et al, 1975; Haynes and Hood, 1977; Bjerkan, 1980). The type of discontinuities/disfluencies include filled pauses, unfilled pauses, repeats, parenthetical remarks, revisions-incomplete phrases, dysrhythmic phonation and tense pauses.

Rate refers to how quickly or how slowly the speech may flow. It is influenced by the type of syllable, length

* Speech Foundation of America Publication No.20.

"Fluent speech is effortless, and yet speaking requires some minimal effort" (Starkweather, 1980). "Effort, in fluency, is categorized into mental and muscular effort. The type of speech sound produced, the position of a consonant in a word, sex, age,rate loudness and coarticulation affect effort (Starkweather, 1980). Stress, a suprasegmental feature, is related to fluency in a complex manner. Stressing requires additional effort. Hence, for this reason alone, stressed syllables may be considered as momentary decrease in the fluency of speech production (starkweather, 1980). Stark-weather added that perception and production of stress con-trasts are likely to be acquired by children before using stress meaningfully.

Rhythmical patterning refers to temporal sequencing of similar events (Dalton and Hardcastle, 1977). The rhythm of speech is an essential perceptual cue to recog-nize speech as meaningful stimuli (starkweather, 1987).

Perkins (1977) refers to fluency as : "A barometer for the entire speech system...(with its) limits ...apparently set by adequacy of performance of the other dimensions of speech". The other dimensions of speech essential in fluency include the anatomical structures, physiological basis and acoustic basis. Some other factors influencing fluency are the speaking situations, age and sex.

of utterance, type of speech (whispered speech), speaking situation (masking) and perception of information transmission. In the development of speech rate, syllabic rate and utterance langth show developmental trends (Starkweather 1980).

The duration of speech sounds is directly related to fluency (Starkweather, 1980). Stress, pausing, syllabic rate and the nearby sounds influence the duration of a speech sound (Starkweather, 1980). Much of the contribution to the vowel and consonant durations in spontaneous speech comes from two studies by Umeda (1975, 1977). Other investigators include Klatt (1973, 1974) and Oiler (1973). The duration of the speech sounds change with age in a child. As children grow, DoSimoni (1974a, 1974b) found the average duration of both vowels and consonants to decrease along with variability of duration.

Coarticulation implies that adjacent speech gestures can influence and interfere with each other (Starkweather, 1987). Coarticulation affects fluency by influencing the rate of speech. The notion that coarticulation is an aspect of syllabic rate is justified on the basis of several observations that coarticulation increases with increased rate (Gay, 1978b; Gay and Hirose, 1973; Gay et al. 1974).

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Whether it is the anatomical and physiological insufficiencies during the developmental stages or any other reasons, young children show stuttering like behaviour which has been referred to as Normal Nonfluency (Johnson etal 1959) or disfluency and is considered Normal. Parents panic on observing the disruptions in the speech of their children and seek professional guidance. Hence it is an obligation on the part of the Speech Pathologist to effectively differentially diagnose the 'disfluency' from 'dysfluency'. Although, the investigators have agreed upon certain descriptive characteristics (prolongations, repetitions and blocks) to support their diagnosis, misinterpretations can occur. This necessitates that the Speech Pathologist be oriented about the disfluencies. In this regard, quantified data on the disfluencies in children have been reported by several investigators (Branscom, Hughes and Oxtoby, 1955; Yairi and Clifton, 1972; Kowal, et al. 1975; Haynes and Hood, 1977; Bjerkan, 1980; Wexler and Mysak, 1982) in the Wast. DeJoy and Gregory (1985) putforth 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. However, no formal test has been proposed so far. Further, in India, quantitative data on disfluency is not available and it is not possible to adopt the Western norms because of

cultural variations. This necessitates the study on fluency development in children. In this context, the present study has been undertaken to evaluate the disfluencies in children between 5-6 years. Also, a fluency test, which hopefully will be of use in the diagnosis and management of children with fluency disorders is proposed.

REVIEW OF LITERATURE

Records pertaining to speech fluency hold a history of about a century. As early as 1891, Kirpatrick advocated that repetition is seen in children as they do not have tangible evidence that they have been understood. With the onset of the twentieth century, as early as 1904, Conradi considered speech disfluency to occur due to the playful pleasure children take in repeating certain sounds. Brandenburg (1915) and Nice (1920) studied a single child and putforth the incidence of repetition of word and/or sentence. Later on, Adams (1932), Fisher (1932) and smith (1926) studied preschool children in groups and reported on the extent of repetitions but, systematic definitions and the different types of repetitions were not indicated; and no distinctions were made in terms of age and sex groups (Yairi, 1981). Quantification of disfluency began at the University of Iowa in the late 1930s and early 40s as the issue of diagnosogenic theory of stuttering by Johnson (1942) was emerging (Yairi, 1981).

Johnson (1948) indicated that nonfluencies decrease in general from infancy to adulthood. Johnson et al (1959) have shown that disfluencies like word repetition, inter-jections, phrases etc... are a common phenomenon in child's speech.

Examining this basic work on the phenomenon of normal disfluency, Yairi (1981) has recognized several limitations which include: the sampling adopted, the number of subjects included in the study and the type of recording adopted. Iowa studies and the later investigators have been criticised on the basis that:

1. Sampling of several age groups were adopted rather than longitudinal sampling.
2. There were only twenty-five 2-year-old children.
3. Investigators were forced to count disfluencies instantaneously due to the not readily available electronic recording.

Fluency characteristics in children have been studied by calculating the disfluencies in their speech sample. Investigators have classified disfluencies which have been highlighted below:

Definition of different types of disfluencies -

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','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 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'-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 repeitions.

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. 'I was-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 that 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-wprd 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, 19Z8). 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 —-953: 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 andible 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 Spriesterbach, 1938).

Davis (1939) considered repetitions a bit more extensively than interms 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 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 individuals name over and over is considered as a repet'tion. For example, Mary, Mary, Mary.
8. The absence of the definite or the indefinite article does not vitiate the response as a repeitition, 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 on the 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 "hunh" were not marked as repetitions as their presence could indicate the childs 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, "Errrrrrm. Errrrrrn" (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) 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; Interjection, Revision-Incomplete Phrase, Disrhythmic Phonation (primarily sound prolongation or broken words),and Tense Pause (audible tense vocalization between words).

Janssen and Kraaimaat (1980) categorized disflueicies into ten types which include fast repetition of a sound, syllable or monosyllabic wordy 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 uncertainity 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 paused. Grammatical pauses are silent pauses that occur at such grammatical junctures as (a) immediately preceding co-ordinating or subordinating conjunctions-(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 occuring 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, nevisions and interjections, and 'disfluencies of deliberation' including pauses and prolongation. The authors putforth 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 refered 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 bothy (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 identicial and/or consecutive numbers of disfluencies" (Silverman,1973).

Studies on Fluency Development in Children 5-6 years:

Several studies (Davis, 1939, 1940a, 1940b; Voelker, 1944; Me'trauz, 1950; Egland, 1955; Branscom, Hughes and Oxtoby, 1955; Johnson et al. 1959; Yairi, 1972) have delineated that disfluencies like word repetition, interjections, incomplete phrases, etc. are common phenomenon in child speech (Bjerkan, 1980). Disfluencies are also seen in adults. Few investigators have compared the disfluencies seen in children with adults.

Johnson (1948) suggested that nonfluencies decrease in general from infancy to adulthood. However, results of the study by Yairi and Clifton (1972) contradicts the above findings. These investigators indicated that the total disfluency decreased from preschool to high school age but with further advances along the age, in the geriatric group, an apparent increase in the total speech disfluency was observed.

Repetitions, as disfluencies, have been more extensively investigated than any other type of disfluency. Kowal et al. (1975) putforth that the repetitions at senior year reduced to about one-sixth of kindergarten level and was very low in

absolute terms; the part-word repetitions were made up of sizable proportion of repetitions in the kindergarteners and second graders but had all but dropped out of picture by fourth grade. Haynes and Hood (1977) and Wexler and Mysak (1982) putforth that repetitions (part-word, word and phrase repetitions) increased from 4 to 6 years age in children. However, not all studies support this. Bjerkan (1980) pointed out that the frequency of word repetitions decrease from 2 years to 6 years.

Egland (1955) found sound or syllable repetitions to be more, followed in order by word repetitions and phrase repetitions? in nonstuttering children between 65-72 months. However, Branscom et al. (1955) suggested that syllable repetitions occurred less than half as often as word repetitions? and less than a third as often as phrase repetitions in the 193 children (2-6 years) studied. Haynes and Hood (1977) indicated that word repetitions are a predominant disfluency type in children under age 6 and that they decrease as the youngsters approached the age of 8. The two, latter studies, seem to contradict the study by Egland (1955).

Research on wide age ranges of children to quantify the disfluencies include those by Branscom et al (1955); Yairi and Clifton (1972); Kowal et al (1975); Haynes and Hood (1977) and Bjerkan (1980). England (1955) studied the speech behaviour in children only in the age range 65-72 months.

Branscom, Hughes and Oxtoby (1955) studied 193 children in the age range 2 to 6 years for the disfluency in two different contexts - free play and fluency test. Analysis of the results revealed that syllable repetitions occurred less than half as often as word repetitions; and less than a third as often as phrase repetitions.

Yairi and Clifton (1972) compared the disfluent speech behaviours of preschool children, high school seniors, and geriatric persons, all of whom were considered as normal speakers. Each of the three groups consisted of 15 subjects, approximately half male and half female. Three picture cards were used for each subject to elicit spontaneous speech samples. Findings support the view that total disfluency decreases from preschool to high school age. However, disfluencies were found to increase in the geriatrics. This developmental trend of increased disfluency from young adulthood (high school) to old age may be due to some undertermined factors, physiological or psychological, which affect the quality of speech output of geriatric persons and result in disfluency rates. Interjections, revisions - incomplete phrases and word repetition typically regarded as characteristic of normal speakers were the three types of disfluencies present most frequently in each of the three groups- Tense pause was the least occurring disfluency in all the

three groups. Scanning the percentage profiles revealed that the category of interjection was the main factor distinguishing pattern in the three groups.

Kowal, O'Connell and Sabin (1975) conducted a stratified study of speech disfluency In 168 normal children, involving twelve boys and twelve girls at each of seven age groups from kindergarten through senior year of high school. Analysis of the recorded speech samples for "Snoopy" series description revealed only a modest change in the frequency of discontinuities from kindergarten to high school. This does agree partially with the study by Yairi and Clifton (1972). The type of discontinuities observed in the study were filled pauses ("urn", "uh", "hm"), false starts, repeated words or parts of words, and parenthetical remarks. The frequency of filled pauses only declined 7 per 1000 (0.7 percent) during 12 years of development. False starts started from 31 per 1000 in kindergarten to 10 per 1000 in senior year, or a net change of 2.1 percent. Repetitions decrease abruptly from 25 per 1000 in kindergarten to 15 per 1000 (a change of 1 percent), and further to 4 per 1000 in senior year, an additional 1.1 percent change. By senior year, repetitions were about one-sixth of the kindergarten level (thus very low in absolute terms). The frequency of repetitions was negligible after second grade. The

category of repetitions include whole and part-word repetitions. Part-word repetitions made up a sizable proportion of the total number of repetitions in the kindergarteners and second graders but dropped out of the picture by fourth grade. An increase in the false starts occurs at fourth grade, thus indicating a reversal in the developmental trend. This may be at this time in development, that children start trying to talk more correctly, under the influence of the formal teaching of grammar to write compositions. It could be that as they try to edit their speech, they become more hesitant and correct themselves more often. Regarding parenthetical remarks, it increases from only 2 per 1000 syllables in kindergarten to 25 per 1000 syllables in senior year. Figure-1 shows speech fluency development as given by Kowal, 0'Connel.and Sabin (1975).

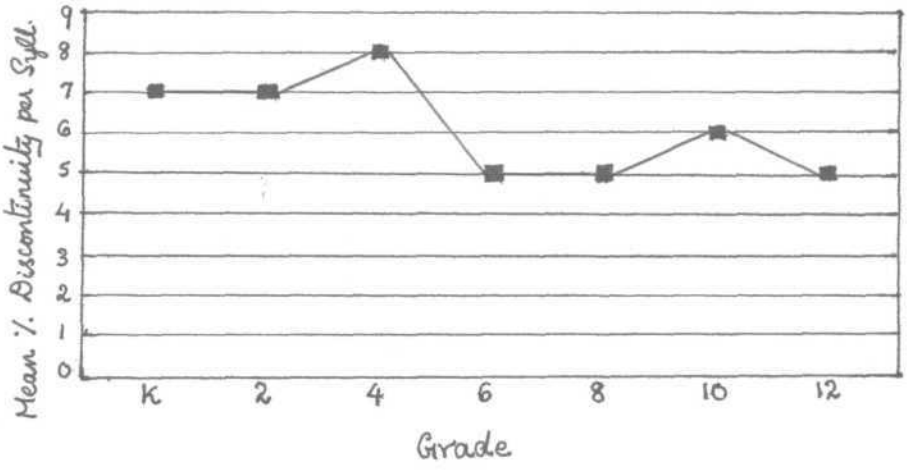


Figure 1: The development of speech fluency: the frequency of all types of discontinuities. ★

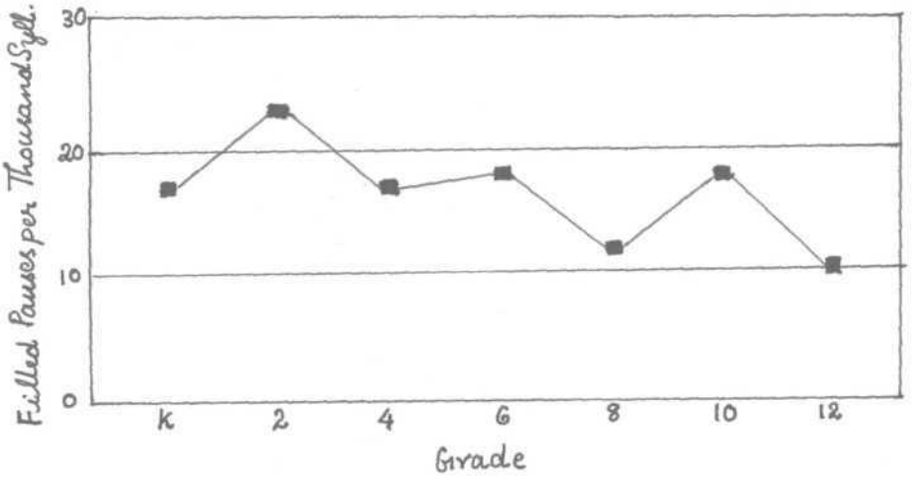


Figure 1: The development of speech fluency: the frequency of filled pauses by grade level in school children. ★

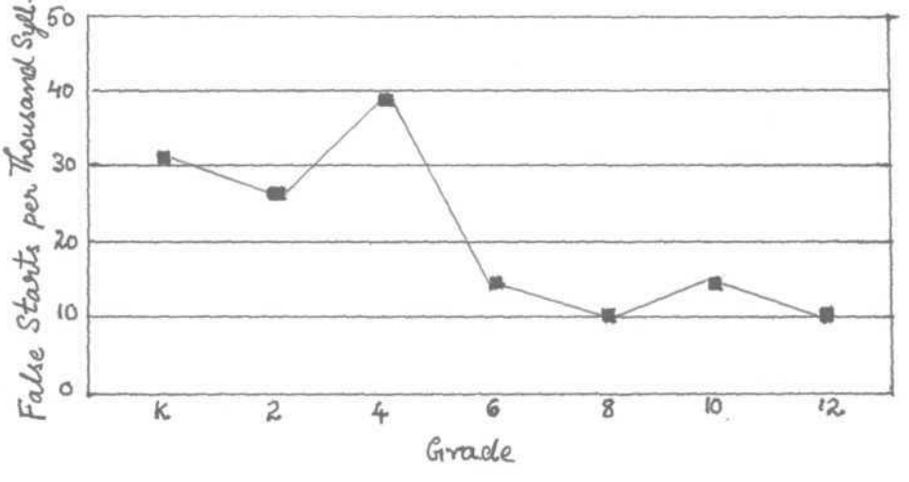


Figure 1: The development of speech fluency: the frequency of false starts by grade level in schod children. ★

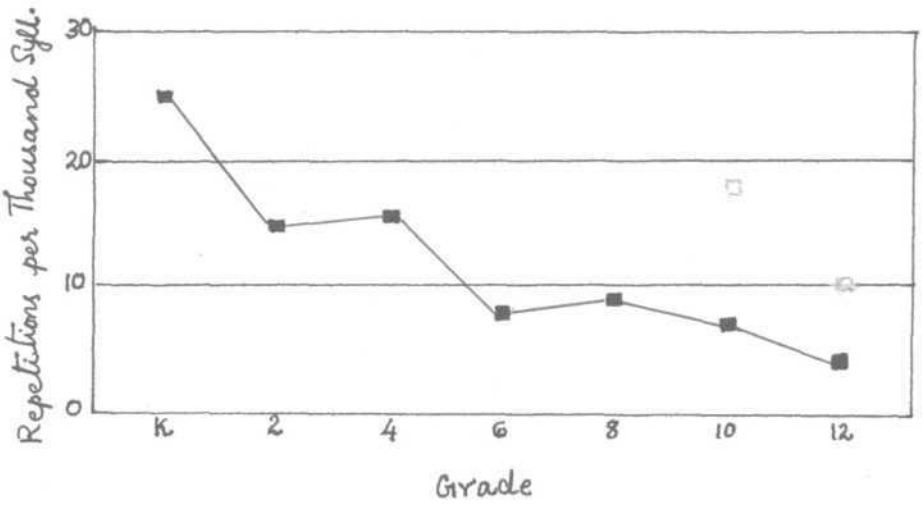


Figure 1: The development of speech fluency: the frequency of repetitions by grade level in school children. ★

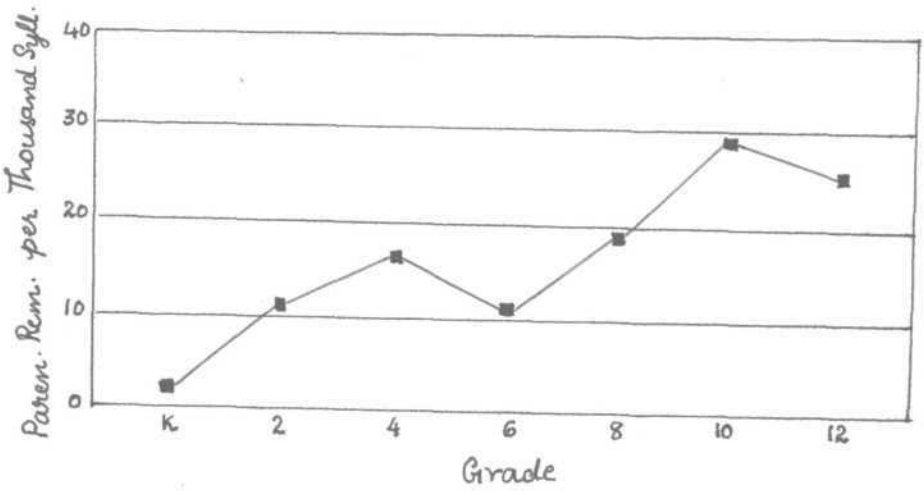


Figure 1: The development of speech fluency: the frequency of parenthetical remarks by grade level in school children. ★

★ FIGURE 1: Speech fluency development as given by Kowal, O'Connell and Sabin (1975), extracted from C.W. Starkweather, (1987): "Fluency and Stuttering", pp 80 - 82.

Haynes and Hood (1977) studied five male and five females 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. Between the ages 4 and 6, the repetitions (part-word repetitions, word repetitions and phrase repetitions) were found to increase. Regarding the interjections, disrhythmic phonation, revisions and incomplete phrases, Hayes and Hood (1977) found them to increase between 4 and 6 years.

Word fragmentation interrupts communication in stutterers (Bjerkan, 1980). Bjerkan (1980) investigated the occurrence of word fragmentations and word repetitions in normal 110 nursery school children in the age range 2 years 1 month to 6 years. Analysis of instances of disfluency indicated that these nonstuttering children had an average frequency of word repetition of 6.3% and that its frequency decreased with age. When MLU (mean length of utterance) increased, repetitions were found to decrease and this was larger between the age range 2-3 years. Word fragmentation was virtually nonoccurrent in these children.

Factors Affecting Fluency:

Several factors; - continuity, rate, effort, rhythm, speech sound duration, anatomical and physiological framework of fluency, motor and linguistic factors, aerodynamic factors, lexicon, language complexity, sex, situation; - seem to affect fluency.

Starkweather (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).

Rate refers to how quickly or slowly the speech may flow according to the speed with which syllables are produced (Starkweather, 1980). Syllables beginning with consonants, even with clusters of consonants are produced faster than syllables beginning with vowels (Starkweather, 1980). The rate is faster in longer utterances (Malecot, Johnston, Kizziar, 1972) and is slower during whispered speech (Brown and Brandt, 197; Parnell, Amerman and Well, 1977) and in noisy conditions (Hanley and Steer, 1949; Ringel and Steer, 1963; Winchester and Gibbons, 1958). A perceived failure of information is consequently a signal to the speaker that if he slows down there is a better chance of successful communication (Longhurst and Siegel, 1973). Coarticulation influences

rate (Starkweather, 1980) and hence fluency is affected by rate. Investigators (Dawson, 1929; Kowal et al. 1975) have conducted large scale studies on the development of rate in children. It is found that the rate and the utterance length increase as the child grows, with more rapid development in early years when there is also a difference in the rate between sexes, favouring girls (starkweather, 1980). Spurts and lags in the development of fluency are associated with increases and decreases, respectively, in the frequency of pauses and hesitations, suggesting that these nonfluencies may infact be a behaviour for achieving faster rate or longer utterances in growing children (starkweather, 1980). The rate of utterance gradually declines after age 20. The duration of speech sounds (consonants and vowels) is directly related to fluency (starkweather, 1980). As children grow there is a decrease in the average duration of both vowels and consonants along with variability of duration (DiSimoni, 1974a, 1974b).

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). Stress is related to fluency in a complex manner, where the most important one is that it takes additional effort to produce stress. Hence, the stressed syllables may be considered as momentory decreases in the fluency of speech production (Starkweather, 1980).

Rhythmical patterning refers to temporal sequencing of similar events (Dalton and Hardcastle, 1977). Eilers (1975) reported that young children (eighteen to thirty six months) were tnable to imitate sentences lacking normal rhythm. The rhythm of speech is an essential perceptual cue to recognize speech as meaningful stimuli (starkweather, 1987).

The anatomical framework of fluency include the vocal tract and the CNS (starkweather, 1987). In children, motor and linguistic factors also influence fluency (Wexler, and Mysak, 1982). 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) leading to a greater automaticity (Starkweather, 1989). Van Riper (1971) indicated that disruption of proper programming of the physiological movements necessary for fluent speech causes stuttering. Adams (1982) provided the physiologic and aerodynamic requirements thought to be integral to fluent speech production. Coordination? spatial coordination and timing coordination are essential physiological aspects of fluency (starkweather, 1987). Physiological weakness of coordination in speaking could manifest itself as a lack of fluency - slowed rate, repeated elements, hesitation, perhaps unusual amounts of effort in speaking (Starkweather, 1987).

Mean length of utterance for a sentence considers the number of words (lexicon) used to convey information. The usage of the lexicon reflects the linguistic performance of that individual. Disfluencies arise; in the speech of normal speakers during communication. Clubbing these in a nutshell, it is possible to speculate that language could influence disfluency.

Davis (1940), Silverman (l972) and Haynes and Hood (1977) found little or no relationship between language behaviour - and disfluency in children. Similarly, Gordon, Luper and

Peterson (1986) who replicated Pearl and Bernthal's (1980) study with 5-year old nonstutterers, generally found little support for complexity/disfluency hypothesis.

Analysis of language samples by Haynes and Hood (1978) who studied 20 male and 20 female children between 60 and 72 months supported that language influences disfluency. They found that the percentage of disfluency was significantly higher in the complex modeling condition. Significant increase in word-repetition, revision-incomplete phrases and disrhythmic phonations occurred in the complex modeling situation. Significantly higher developmental sentence score was observed during complex modeling condition.

McLaughlin and Cullian (1989) studied the spontaneous language samples and elicited utterances using modeling procedures in 10 males and 10 females between 60-71 months. Two levels of utterance length and two levels of linguistic complexity constituted the four sets of utterances. Analysis delineated significantly greater rates for overall disfluencies and "stutterings" (part-word repetitions, word-repetitions, disrhythmic phonations and tense pauses) occurred in those modeling tasks that evoked linguistically more complex utterances.

Gordan and Luper (1989) studied disfluencies on modeling task and imitation task. Three different syntactic construe-

tions: 1) simple affirmative declarative with copula + ing (SAAD), (2) future (FUT), and (3) passive (PAS) were considered. 35 children, 12 in each age group of 3-, 5-, and 7-year old nonstuttering children were asked to repeat 30 sentences from the imitation task stimuli and produced response construction from 30 pictures from the modeling task stimuli. 3-year-olds showed significantly more disfluencies than the 5-year-olds, and the latter showed significantly more disfluencies than the 7-year-olds. Significantly more disfluencies on the modeling task than on the imitation task was found in all the three age groups. A significant complexity effect was seen for the PAS construction.

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.

Attempts have been made to control some of the factors in studying disfluency in children. However, no such attempts were made in the present study to control any of the factors.

Analysis Methods: Several analysis methods have been used in studies on fluency. The report of Branscom et al.(1955) also includes the studies of Davis (1939, 1940) and Oxtoby (1943). The remarks of the subjects verbatim were written out by Davis (1939, 1940) and Branscom (1942). Hughes (1943) and Oxtoby (1943) who were working in collaboration, employed an encoding system. They used a dot to indicate each word spoken by the child. Repetitions were written out verbatim whenever possible. Where time was insufficient for this, a numerical manuscript was written above the dot which indicated the number of times a syllable was repeated, and numerical subscript below the dot was written to indicate the number of times a whole word was repeated. Repetition of phrases were represented by dots enclosed in brackets with a vertical line indicating the end of the phrase and the beginning of the subsequent repetition of it. The Johnson (1945-46) data was also recorded utilizing this procedure Nothing significant has been reported about the tape recording technique used by a few investigators like Kowal et al. (1975) and McLaughlin and Cullian (1989).

Structured and/or unstructured situations have been used to elicit speech samples. Telling stories in response to CAT cards, a structured speaking task, was adopted by Johnson (1959); free-play observation was employed by Davis

(1939, 1940) and Oxtoby (1943) while Hughes (1943) and Branscom (1942) utilized speech fluency test to measure speech repetition in children (Branscom, Hughes and Oxtoby, 1955); nursery school speech was employed by Bjerkan (1980); conversation alone with the experimenter in a playroom which had a table on which toys and materials were placed was selected by Wexler and Mysak (1982); and McLaughlin and Cullian (1989) used a set of 30 pictures to elicit atleast 60 utterances containing subject predicate relationships.

Thus, this review highlights that there have been few efforts to study disfluencies in children where the speech samples have been elicited in various tasks using different methods. In the present study, the speech samples were elicited from three tasks; conversation, picture description and story narration, and audio recording was performed.

METHODOLOGY

Subjects: 12 Kannada speaking normal children in the *g* range of 5-6 years in Middle socio-economic status were selected for the study. Of these, there were two subjects each in two-month age interval.

Tasks: Three tasks:- Conversation (C), Picture Description (PD) and story Narration (SN);-were included in this study.

Conversation: Question pertaining to family members, school and recreation were asked to elicit conversation.

Picture Description: A pilot study w*s conducted to choose the pictures. In this study, eleven sets of cartoon series were used (Appendix-1).

Story Narration: Narration of a story of his/her choice.

For all these, Kannada was used as a medium of communication.

Test environment: Home environment or a school situation was used. The interaction was only between the experimenter and the child throughout the tasks.

Procedure: Initially rapport was built-up with the subject to enable easy elicitation of speech. Each child was tested individually and the child was instructed to describe the cartoons presented visually one at a time. They were also

instructed to narrate stories of their choice. A minimum of 30 minute speech sample was audio-recorded for each child.

Analysis: The speech sample was transcribed and the utterances/words were used as a basis for analysis. An utterance refers to a minimum linguistic meaningful unit. Transcription of one of the subject's is in Appendix-II.

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

(i) Filled Pauses (FP) - characterized by extraneous sounds such as /a/, /am/, / /.

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

(iii) Repeats (R) - this category involved syllabic repetitions (repetitions of a syllable in a bisyllabic word); part-word repetitions (repetitions of a part of the polysyllabic word); word repetitions (repetitions of whole words including words of one syllable); part-utterance repetitions (repetition of a part of an utterance); utterance repetitions (repetitions of a whole utterance); and phrase repetitions (repetitions of two or more words/utterances).

(iv) Parenthetical Remarks (PR) - this was characterized by fillers like /m a t t a/, /a:me:le/, /a:va:ga/, /g o t t a/, /ada:/.

(v) False Starts (FS) - this category included content modification, grammatical correction, change in pronunciation, incomplete utterance/phrase; precision/addition of an adjective, adverb etc, change in the meaning and negation, exclamation. For example!

a) Content modification:- /eradu bekku/ .... /mu:r bekxu/,

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 is identified with words/utterances wherein the phonation disturbs or distorts the so-called normal rhythm or flow of speech.

(vii) Part-Question Repetitions (PQR) - this category is characterized by repetition of part of a question putforth by the experimenter.

(viii) Audible Inspirations (AI) - this was Judged to exist between words, part-words, utterances, part-utterances and non words (that is, an interaction).when at the

Between point in question there are audible manifestations of inspiration.

(ix) Clusters - characterized by instances of different disfluency types occurring on the same utterance/word and/or consecutive utterances/words.

An instance of disfluency was defined as a disfluency occurring once and this was measured as one disfluency, while two disfluencies of the same type occurring successively or between other diefluency (ies) were considered a* two disfluencies. /ma/ /mara/ is an example of one disfluency (repetition) while /ma/ /ma/ /mara/ and /ma/ /u/ /ma/ /mara/ are examples of two disfluencies (repetitions).

If the disfluency occurred prior to and in between a word/utterance, than the disfluency was said to occur in the initial and medial position respectively, /ma/ /mara/ is an example of disfluency (syllabic repetition) occurring in the initial position. In /e:ɲi/, if /e/ was abnormally prolonged, then the diafluency (sound prolongation) was said to occur in the medial position. If the disfluency occurred at the end of a word/utterance, then the disfluency was said to occur in the final position. For example, in /adu/ /baratve/ /te/; the disfluency (false starter) occurred at the end (final position) of a sentence.

The percentage of disfluency was calculated as the ratio of the number of disfluencies to the total number of utterances, multiplied by 100.

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

If the disfluency occurred prior to a grammatical category, it was considered to occur '<u>before</u>' a grammatical category. For example, in /u/ /pennu/, the filled pause occurs prior to a noun. If the disfluency occurred in a grammatical category, it was considered to occur 'on' a grammatical category. For example, in /barta:ne/ /ɭe/, the false start (grammatical correction) occurs on the verb. The percentage disfluency on/before a grammatical category was calculated as the ratio of number of disfluencies on/before a grammatical category to the total number of disfluencies* multiplied by 100.

The percent of different types of disfluencies for position, task,age and grammatical category were analysed to describe the disfluencies in children (5-6 years). The disfluencies thus observed are highlighted to propose a test for fluency wherein the cut-off scores for different/ types of disfluency are given.

RESULTS AND DISCUSSION

The different types and percent of disfluencies were calculated and the results are discussed with respect to the task, type of disfluency, grammatical category on/before which disfluencies occurred and the position of occurrence of disfluencies for each age group.

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

Sl - Subject one

S2 - Subject two

C - Conversation

SN - story Narration

PD - Picture Description

UFP - Unfilled Pauses

FS - False starts

FP - Filled Pauses

PQR - Part-Question-Repetition

R - Repeats

P - Prolongations

PR - Parenthetical remarks

AI - Audible Inspirations

Sy.R - Syllabi* Repetitions

P.U.R. - Part-Utterance Repetitions

P.W.R - Part-Word Repetitions

U.R. - Utterance Repetitions

W.R. - Word Repetitions

Ph.R. - Phrase Repetitions

a - content modification

e - Precision/addition of adjective, adverb, etc.

b - Grammatical Correction

f - Change in meaning

c - Change in Pronunciation

g - Negation exclamation.

d - Incomplete utterances/ phrases

Age: 5-5.2 years:

Both the subjects had maximum utterances for C, followed by PD and SN. However, S2 had greater number of utterances than Si in all the three tasks. S1 and S2 had maximum percent of disfluencies on SM and PD task respectively and minimum percent of disfluencies in C and SN respectively. The overall percent of disfluencies of Sl was greater than S2 (Table-1).

	Number of utterances		Percent of dizfluencies	
Subjects→ / Tasks↓	S1 (Male)	S2 (Female)	S1	S2
C	355	530	39.7	24.2
PD	212	242	47.2	30.6
SN	24	60	62.5	21.7
Total	591	832	43.3	25.8

Table-1: The number of utterances and percent of disfluencies in S1 and S2.

Both subjects had UFP as the most frequently occurlng type of disfluency. The least occuring type of disfluency for s1 was P and for S2, it was PQR. In general, the otder of occurrence of disfluencies were UFP-AI-PR-PS-R-P-P and UFP-PR-FS-P-R-FP-PQR, respectively for S1 and S2. S1 exhibited

UFP, AI and AI maximally in C, PD and SN tasks respectively and showed minimum of P, FP and R, UFP and R respectively in these three tasks. S2 showed UFP, UFP and PR maximally in C, PD and SN tasks respectively and showed minimum of PQR, R and UFP respectively in these three tasks (Fig.2).

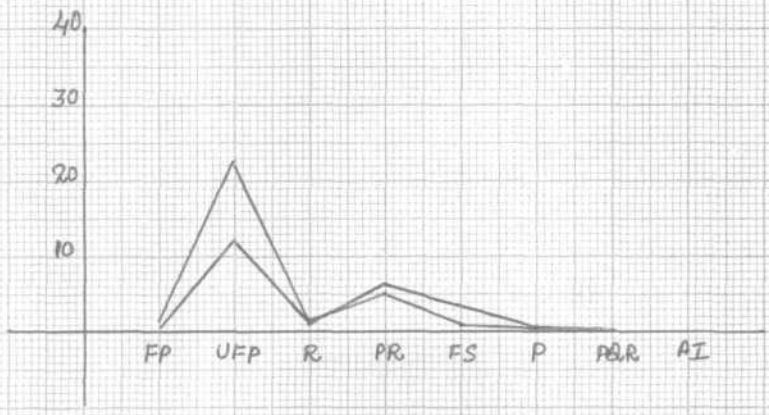
Both the subjects exhibited repeats in all the three tasks. Overall s1 showed more number of repeats than S2. In conversation, s1 exhibited greater number of repeats than S2. Word repetitions and part-utterance repetitions occurred maximally in S1 and S2 respectively. Part-word repetitions and word repetitions occurred minimally in S1 and S2 reapectively. In PD and SN tasks, only word repetitions were noticed. Considering the sex difference, the male exhibited more repetitions than the female in all the three tasks (Table-2).

Tasks --->	C			PD			SN		
Subjects--> / Types of repeats |	S1	S2	Ave-rage	S1	S2	Ave-rage	s1	S2	Ave-rage
Sy.R.	-	-	-	-	-	-	-	-	-
P.W.R.	0.28	-	0.14	-	-	-	-	-	-
<t.R.	1.13	0.19	.66	0.94	.83	.89	8.33	3.33	6.83
P.U.R.	-	0.38	.19	-	-	-	-	-	-
P.R.	-	-	-	-	-	-	-	-	-
Ph.R.	—	-	-	—	-	-	—	—	-

Table-2 : Different types of repeats in percent in 5-5.2 yrs

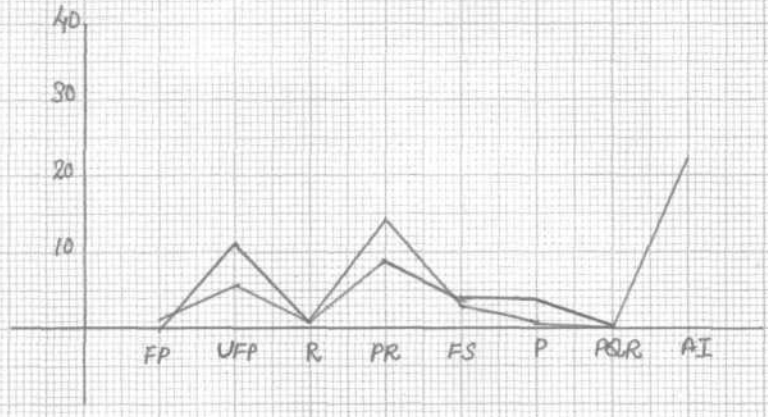
- indicates no repeats

AGE: 5 – 5·2 years



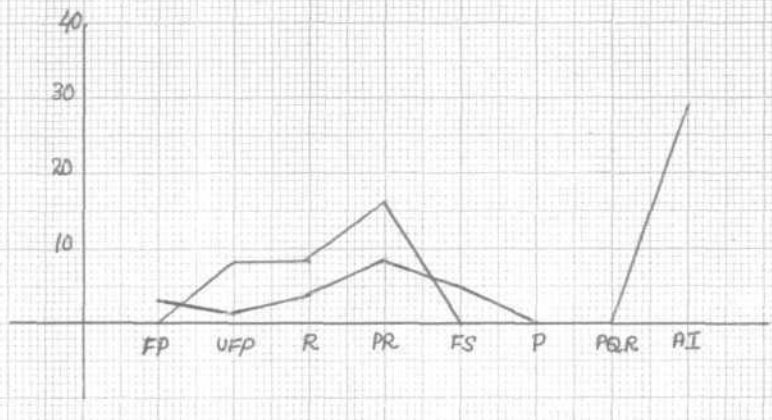
KEY
Conversation
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
____ S1
____ S2

AGE: 5 – 5·2 years



KEY
Picture Description
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
____ S1
____ S2

AGE: 5 – 5·2 years



KEY
Story Narration
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
____ S1
____ S2

FIGURE 2: Percent of types of disfluencies in 5 – 5·2 years.

False starts were exhibited by both the subjects in C and PD tasks. Overall, S2 exhibited more false starts than S1. In C, s1 showed precisions as the only false start. S2 showed more precisions and less incomplete utterances. The order of the FS for S2 was precision - content modification - incomplete utterance. S2 exhibited more FS than S1. In PD task, precisions occurred the most and incomplete utterances occurred least. Also, S1 and S2 showed least number of grammatical corrections and change in meaning respectively. S1 exhibited precisions - content modifications grammatical corrections, incomplete utterances and S2 showed precisions - content modifications, grammatical corrections - incomplete utterances, change in meaning as the order of occurrence of the false starts. S2 exhibited greater false starts than S1 in PD task. In SN task, only S2 exhibited false starts Which included content modifications, incomplete utterances and precisions (Table-3).

Tasks →	C			PD			SN		
Subjects → / Types of FS ↓	S1	S2	Average	S1	S2	Average	S1	S2	Average
a	-	.57	.29	.9	.8	.85	-	1.6	.8
b	-	-	-	.5	.8	.65	-	-	-
c	-	-	-	-	-	-	-	-	-
d	-	.38	.19	.5	.4	.45	-	1.6	.8
e	1.4	2.4	1.9	1.4	2	1.7	-	1.6	.8
f	-	-	-	-	.4	.2	-	-	-
g	-	-	-	-	-	-	-	-	-

Table-3: Percent of the types of FS in 5-5.2 years.
- indicates absence of FS.

With respect to the grammatical categories on/before which the disfluencies occurred, in general, on/before nouns, the disfluencies were maximum and least on/before locatives in S1 andoon/before interjection in S2. The disfluencies were maximum on/before nouns, adverbs and verbs in C, BD and SN tasks in S1 .and were maximum on/before nouns in all the three tasks in S2. Disfluencies on/before interjections were negligible (Table-4).

Tasks		Percent of disfluencies			Net percent of disfluencies.
Graml cate. |	Subjects |	C	PD	SN	
Mouns	S1	49.65	24	20	37.89
	S2	64.06	36.49	76.92	55.35
Verbs	S1	7.09	17	33.33	12.5
	S2	3.13	22.97		9.77
Adjectives	S1	6.38	2	6.67	4.69
	S2	6.25			3.72
Advetbs	S1	6.38	35	13.33	17.97
	S2	4.69	18.92	-	9.3
Pronouns	S1	14.18			7.81
	S2	11.72	1.35	23.08	8.84
Locatives	S1	.71	2	-	1.17
	S2		5.41	-	1.86
Negatives	S1	2.84		—	1.56
	S2	3.91	-		2.33
Conjuntions	S1	8.51	3	26.67	7.72
	S2	3.13			1.86
Interjections	Si				
	S2		1.35		.47
Determiners	SI	4.26	17	-	8.98
	S2	3.13	13.51		6.51

Table-4; Percent of disfluencies on/before grammatical categories(Graml.cate)5-5.2yrs

- indicates absence of disfluenciez.

Regarding the position of occurrence of disfluencies, both subjects showed maximum percent of disfluencies in initial position followed by medial position. Negligible percent of disfluencies occurred in the final position (Table-5).

	Number of disfluen-ciea		Percent of disfluen-ciea	
Subjecta---> Positional	S1	S2	S1	S2
Initial	252	199	98.44	92.56
Medial	4	13	1.56	6.05
Final	-	3	-	1.4

Table-5: Number and percent of diafluenciea in the three positions in 5.0-5.2 years

- indicates absence of disfluencies.

S1 had equal number of clusters in C and PD tasks, followed by SN task, S2 had more number of clusters in C task followed by PD and SN tasks. In conversation, S2 had greater number of clusters than S1. UFP and PR combinations were predominant in both the subjects. UFP occurred frequently in the initial part in the clusters in S1. UFP or PR occurred frequently in the initial part, in S2. In picture description. S1 exhibited more clusters than S2.

PR-AI combinations and UFP-PR combinations were predominant in S1 and S2 respectively. The initial part of the cluster was characterized by PR or AI in S1 and UFP in S2. In story narration task. S1 exhibited greater number of clusters than S2. However, no single cluster type predominated in any of the subjects.

Age: 5.2-5.4 years;

S1 and S2 had maximum utterances on PD and C respectively. Minimum utterances were exhibited in SN by both the subjects. Overall, S2 had greater number of utterances than S1. Both the subjects had maximum and minimum perscent of disfluencies on PD and SN respectively. Overall, S1 showed a higher percent of disfluencies than S2 (Table-6).

	Number of diafluenciea		Percent of diafluenciea	
Subjects--> Tasks	S1 (Female)	S2 (Female)	S1	S2
C	231	532	23.81	27.82
PD	271	291	42.07	29.21
SH		163	21.43	33.74
Total	530	986	33.02	29.21

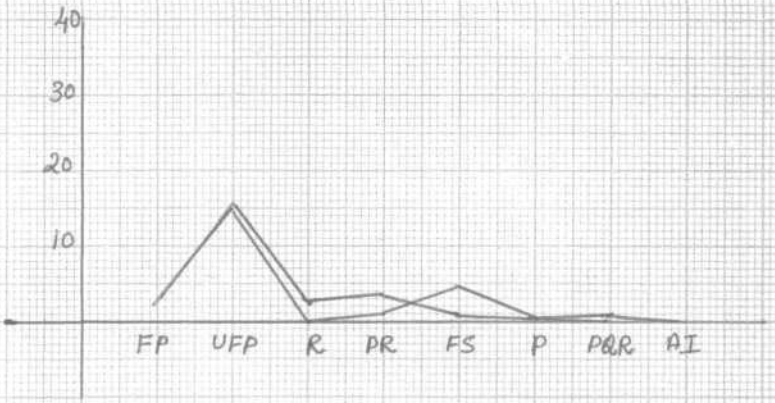
Table-6; The number of utterances and percent of disfluencies in S1 and S2 between 5.2-5,4 years.

Both the subjects had UFP as the most frequently occuring type of disfluency and prolongation (P) as the least

frequently occurring type of disfluency. In general, the order of occurrence of disfluencies were UFP-PR-FS-FP-R-P and UFP-FP-R-PR-FS-PQR-P for S1 and S2 respectively. S1 showed UFP, PR and UFP maximally in C, PD and SN tasks respectively and showed minimum of P, P and FP respectively in these three tasks. S2 exhibited UFP, UFP and FP maximally in C, PD and SN tasks respectively and minimum of Py PR and Py R in, PD and SN tasks respectively. (Fig.3).

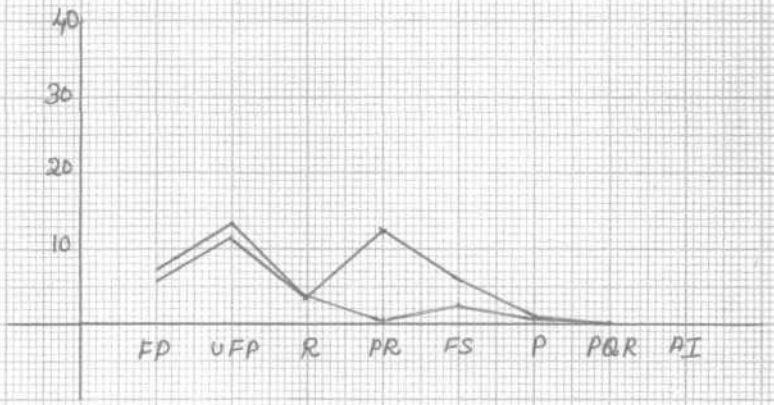
Both the subjects exhibited repeats in PD. However, S2 also showed repeats in C and SN tasks. Overall, S2 showed more repeats than s1. In PD task, both the subjects showed equal number of part-word repetitions. However, part-utterance repetitions and word repetions were more often seen in S1 and S2 respectively than any other types of repeats. Utterance repetition were least for S1 and syllable repetitions were least for s2. The order of occurrence of the repeats were part-utterance repetitions- part-word repetitions - utterance repetitions for S1 and word repetitions - part-word repetitions - syllabes repetitions for S1. S2 showed more part-word repetitions and word repetitions and less syllable repetitions in conversation. In SN task, S2 showed more word repetitions and less part-word repetitions and phrase repetitions (Table-7).

AGE : 5·2 – 5·4 years



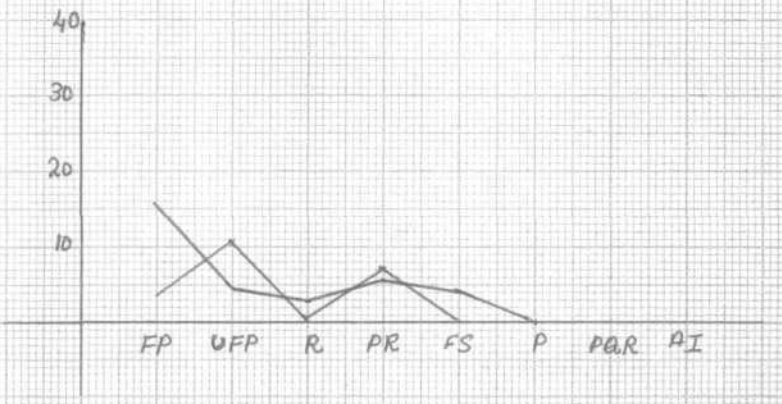
KEY
Conversation
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies

AGE : 5·2 – 5·4 years



KEY
Picture description
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies

AGE : 5·2 – 5·4 years



KEY
Story Narration
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies

FIGURE : 3 Percent of types of disfluencies in 5·2 – 5·4 years

Taaks--->	C			PD			SN		
Subjected / Types of repeats	S1	S2	Ave-rage	S1	S2	Ave-rage	S1	S2	Ave-rage
Sy.R	-	.37	.19	-	.34	.17	—		
P.W.R.	-	1.13	.57	1.11	1.03	1.07	-	.61	.31
W.R.	-	1.13	.57	-	2.41	1.2	-	1.84	.92
P.U.R.	-	-	-	2.21	-	1.1	-	-	-
U.R.	-	-	-	.37	-	.19	-	-	-
Ph.R	-	-	-	-	-	-	-	1.84	.92

Table-7: Different typea of repeats in percent, in 5.2-5.4 years - indicates no repeats.

Only 52 exhibited false starts in all the three tasks. S1 showed false starts only in C and PD tasks.. In general. S1 showed greater number of false starts than S2. In C, S1 had more false starts than S2. Precisions and content modifications occurred more in the speech of s1 and S2 respectively. Incomplete utterances were rarely observed. However, grammatical corrections, precisions and negation exclamations were also equally leas in S2. The order of occurrence of false starts were precisions - content modificationa, grammatical corrections - incomplete utterances for S1 and content modifications - grammatical corrections, incomplete utterances, precisions, negation exclamationa for S2. In PD task, both the

subjects showed more content modifications. However, s2 also showed more incomplete utterances,precision. Incomplete utterances; change in meaning and negation exclamations were least in the speech of s1 and S2 respectively. The order of occurrence of the FS was content modifications - grammatical corrections, precisions, negation exclamations - incomplete utterances for S1 and content modifications, incomplete utterances, precisions - change in meaning, negation exclamations for S2. S1 had more FS than S2 in PD task. In SN task only S2 exhibited FS and their decreasing order of occurrence was grammatical corrections - precisions - content modifications, negation exclamations (Table-8).

Tasks --->	C			PD			SN		
Subjects / Types of FS	S1	S2	Average	S1	S2	Average	S1	S2	Average
a	1.3	.6	.95	3.7	.7	2.2	-	.6	.3
b	1.3	.2	.75	0.7		.35	-	1.0	.9
c	-	-	-	-	-	-	-	-	-
d	.4	.2	.3	.4	.7	.55	-	-	-
e	1.7	.2	.95	.7	.7	.7	-	1.2	.6
f	-	-	-	-	.3	.15	-	-	-
g	-	.2	.1	.7	.3	.5	-	.6	.3

Table-8: Percent of types of FS in 5.2-5.4 years.

- indicates absence of FS.

Regarding grammatical categories on/before which the disfluencies occurred, in general. S1 and S2 had maximum disfluencies on/before determiners and nouns respectively. Minimum disfluencies occurred on/before adjectives and locatives for S1 and on/before conjunctions for S2. However, both the subjects had maximum percent of disfluencies on/before nouns in C and SN tasks and on/before determiners in pD task. S1 had minimal disfluencies on/before locatives but S2 did not have any disfluency on/before locatives. There were no disfluencies on/before interjections in both the subjects (Table-9).

Tasks-->		Percent of disfluencies			Net percent of disfluencies
		C	PD	SN	
Graml cate.	Subjects				
nouns	S1	45.45	26.32	50	33.14
	S2	54.73	38.82	36.36	46.53
Verbs	S1	7.27	5.26	16.67	6.29
	S2	7.43	4.71	10.91	7.29
Adjectives	S1	5.45	-		1.71
	S2	4.05		9.09	3.32
Adverbs	S1	7.27	13.16		10.36
	S2	7.43	12.94	10.91	9.72
Pronouns	S1	21.82			6.86
	S2	10.81		1.73	7.99
Locatives	S1		2.63		1.71
	S2			—	
Negatives	S1	7.27	.88		2.86
	S2	3.38	2.35	10.91	4.51
Conjunctions	S1				
	S2	3.38	—	-	1.14
Interjections	S1				
	S2				
Determiners	S1	5.45	51.75	33.33	36.57
	S2	8.11	41.18	9.09	18.06

Table-9: Percent of disfluencies on/before grammatical categories (Graml.cate)5.2-5.4 years -indicates absence of disfluencies.

With respect to the position of occurrence of disfluencies, both the subjects exhibited maximum percent of disfluencies in the initial position followed by medial position. Negligible percent of disfluencies occurred in the final position (Table-10).

	Number of disfluencies		Percent of disfluencies	
Subjects—> positions^	S1	S2	S1	S2
Initial	160	277	91.43	96.18
Medial	15	4	9.57	1.39
Final		7		2.43

Table-10: Number and percent of disfluencies in the three positions in 5.2-5.4 years.

-indicates absence of disfluencies.

In both the subjects, clusters were exhibited maximally in PD task followed by C and SN tasks. In conversation, S2 showed more clusters than S1. The combination of UFP-FP-UFP and PR-UFP occurred most frequently in S1 and S2 respectively. UPP or Fs characterized the initial part of the cluster most frequently in S1. However, S2 showed predominantly UFP in the initial part of the clusters. In PD task S1 showed greater number of clusters than S2. s1 and S2 exhibited PR-UFP and UFP-Fp combinations respectively most

UFP or PR occupied the initial part in the cluster predominantly in S1, but in S2, UFP predominantly occurred in the initial part. In SN task, S2 exhibited more clusters than S1. The pattern of PR-UFP occurred most frequently in both the subjects in this task.

Age: 5.4-5.6 years:

Maximum utterances were seen in C followed by PD and SN in both the subjects. However, S2 had more utterances than S1 in C while S1 had more utterances than S2 in both PD and SN tasks. Overall S1 and S2 had maximum percent of disfluencies or PD followed by SN and C. Overall, higher percent of disfluencies occurred in S1 than in S2 (Table-11).

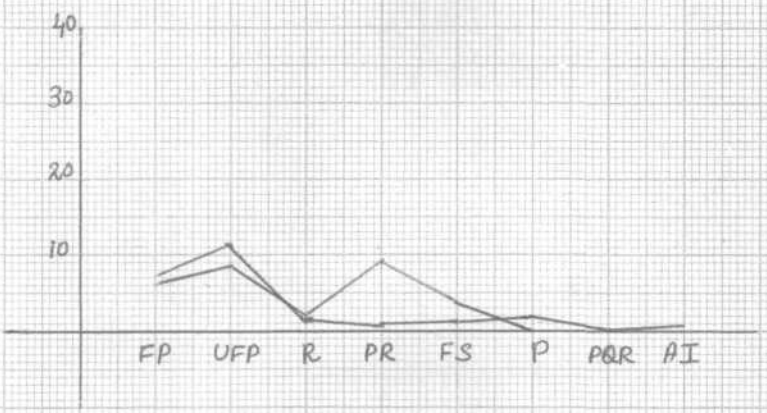
	No.of utterances		Percent of disfluencies.	
Subjects-> Tasks^	S1 (Female)	S2 (Female)	S1	S2
C	404	768	24.75	31.77
PD	298	279	53.36	49.46
SN	140	90	47.14	35.56
Total	842	1137	38.6	36.41

Table-11: The number of utterances and percent of disfluencies in S1 and S2 between 5,4-5.6 years.

FP and UFP were the most frequently occuring type of disfluency in S1 and S2 respectively. The least frequently occuring type of disfluency was AI in both the subjects. In general, the order of occurrence of disfluencies were FP-UFP-FS-PR-R-P-AI ior S1 and UFP-FP-PR-FS-R-AI for S2. However, SI exhibited more UFP, FP, FP on C, PD and SN respectively and minimum percent of FS, P, AI on C, PD and SN respectively. S2 had PR, UFP and FP maximally in C, PD and SN tasks respectively and showed minimum of AI, R and FS respectively in these three tasks (Fig.4).

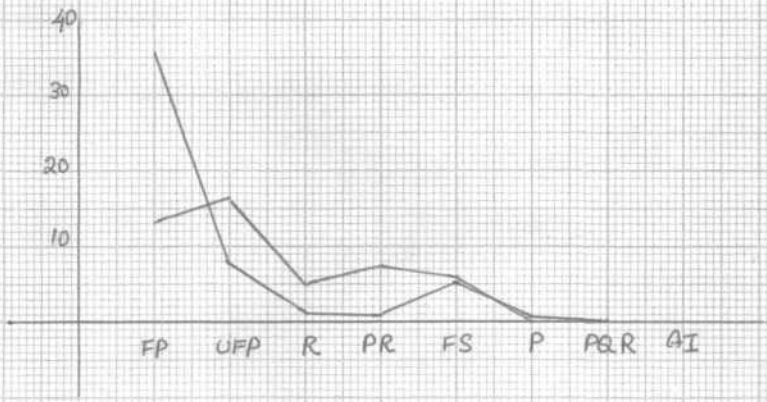
Both the subjects exhibited repeats in C and PD tasks. However, in SN, only S1 showed repeats. S2 showed more repeats in C and PD tasks, than S1. In C, word repetition and part utterance repetition were maximum for S1 and S2 respectively. Part-word repetition and utterance-repetition occurred least in S1 and S2 respectively. The order of repeats were word repetitions-part word repetitions - part utterance repetitions for S1 and part-utterance repetitions - word repetitions- part-word repetitions - utterance repetitions for S2. In PD, more word repetitions and less syllabic repetitions were noticed. The order of occurrence of repeats were word repetitions - syllabic repetitions, part-utterance repetitions for S1 and

AGE: 5.4 - 5.6 years



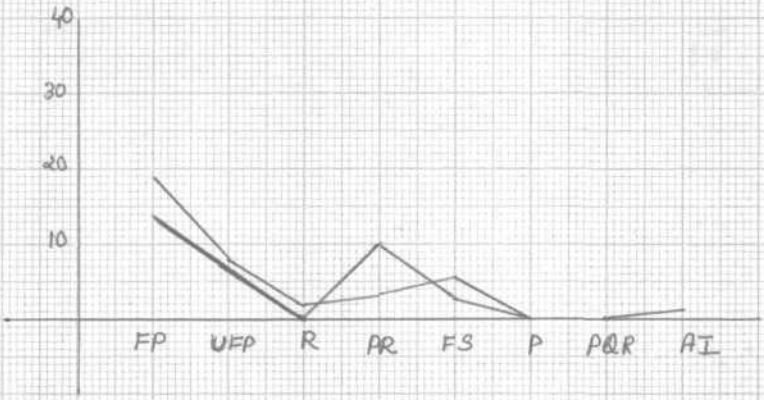
KEY
Conversation
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

AGE: 5.4 - 5.6 years



KEY
Picture Description
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

AGE: 5.4 - 5.6 years



KEY
Story Narration
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

FIGURE: 4 Percent of types of disfluencies in 5.4 - 5.6 years

word repetitions - part-utterance repetitions - part word repetitions - syllabic repetitions for S2. In SN task, S1 had more word repetitions and less part-word repetitions Table-12).

Tasks->	C			PD			SN		
Subjects / Types of repeats	S1	S2	Ave-rage	S1	S2	Ave-rage	S1	S2	Ave-rage
Sy.R		-	-	.34	.36	.35	-	-	-
P.W.R.	.5	.39	.45	-	L.06	.53	.71	-	.35
W.R.	.74	.65	.69	1	2.51	1.76	1.43	-	.77
P.U.R.	.25	1.17	.71	.34	1.43	1.89	-	-	-
U.R.	-	.26	.13	-	-	-	-	-	-
Ph.R	-		-		-	-	-	-	-

Table-12: Different types of repeats in percent in 5.4-5.6 years. (- indicates absence of disfluencies).

Both the subjects exhibited flase starts in all the three tasks. Overall, S2 had more FS than Si. In C, precisions were maximum in both the subjects. Incomplete utterances and change in pronunciation occured the least in S1 and S2 respectively. S2 showed more FS than S1. The order of occurrence of FS was precisions - incomplete utterances and precisions - incomplete utterances - grammatical corrections - content modifications - change in pronunciation for

S and S2 respectively. In PD task, incomplete utterances were maximum in both the subjects. Precisions and change in meaning were the least in SI. Grammatical corrections were the least in S2. S2 showed more FS than S1. The order of occurrence of FS was incomplete utterances - grammatical corrections - precision change in meaning for S1 and incomplete utterances - content modifications - precisions - grammatical corrections for S2. In SN task, S1 had more FS than S2. Incomplete utterances/phrases and precisions were maximum in S1 and S2 respectively. Content modifications were the least in both the subjects. Grammatical corrections and negation exclamations were also the least in Sl. The order of occurrence of FS was incomplete utterances - precisions - content modifications, grammatical corrections, negation exclamation for S1 and precisions - content modifications for s2.(Table-l3).

Tasks-->	C			PD			SN		
Subjects / Types of FS	S1	S2	Average	S1	S2	Average	S1	S2	Average.
a	—	.4	.2	-	2.2	1*1	.7	1.1	.9
b	-	.7	.35	.7	.7	.7	.7	-	.35
c	-	.1	.05	-	-	-	-	-	-
d	.2	1.6	.9	1.3	2.5	1.9	5.7	-	2.85
e	.7	1.8	1.25	.3	1.1	.7	3.5	2.2	2.85
f	-	-	-	.3	-	0.15	-	-	-
g	-	-	-	-	-	-	.7	-	.35

Table-13: Percent of the types of FS in 5.4-5.6 years.
- indicates absence of FS.

With respect to the grammatical categories on/before which the disfluencies occurred, in general, the disfluencies occurred maximally on/before nouns for both the subjects and minimally on/before conjunctionyfor S1, on/before interjections for S2. Both the subjects had disfluencies maximally on/before nouns in C and SN; while in PD S1 and S2 had maximum disfluencies on/before nouns and determiners respectively Disfluencies were negligible on interjections (Table-14).

		Percent of disfluencies			Net percent of disfluencies
T a s k — - >		C	PD	SN	
Graml. cate.	Subjects				
Nouns	S1	53	35.85	30.3	40.0
	S2	45.9	24.64	56.25	39.81
Verbs	S1	10	13.84	22.73	14.46
	S2	7.4	10.74	12.5	8.10
Adjectives	S1	8			2.46
	S2	3.28	0.72		2.17
Adverbs	S1	4	17.61	18.18	13.54
	S2	8.6	17.4	6.25	11.35
Pronouns	S1	9	1.26	7.58	4.92
	S2	18.44	2.9	3.13	12.08
Locatives	S1	1	.63	4.55	1.54
	S2	.4	4.35		1.69
Negatives	S1	7	1.89	—	3.08
	S2	1.64			.97
Conjunctions	S1	3	-	-	.92
	S2	5.33			31.5
Interjection	S1			—	
	S2	.82	.72		.72
Determiners	S1	3	28.93	16.67	18.46
	S2	8.2	39.13	21.88	19.67

Table-14: Percent of disfluencies on/before grammatical categories (Graml. cate) 5.4-5.6 years. (- indicates absence of disfluencies).

Regarding the position of occurrence of disfluencies, both the subjects had maximum percent of disfluencies in initial position followed by medial position. Minimal percent of disfluencies occurred in the final position (Table-15).

	Number of disfluencies		Percent of disfluencies	
Subjects-->	S1	S2	S1	S2
Positions				
Initial	303	401	93.23	96.86
Medial	18	9	5.54	2.17
Final	4	4	1.23	.97

Table-15: Number and percent of disfluencies in the three positions in 5.4-5.6 years, (-indicates absence of disfluencies).

Clusters were maximum in PD followed by SN and C for S1. They were maximum in C followed by PD and SN in S2. In conversation, S2 had greater number of clusters than S1. The combination of PR and UFP were maximum in both the subjects. But, the order was UFP-PR in Sl and PR-UFP in S2. S1 exhibited UFP or FP frequently in the initial part and S2 showed UFP predominantly in the initial part in a cluster. In PD S2 exhibited greater number of clusters than S1. The combination of FP and UFP were most frequently exhibited by both the subjects. In S1, the order of occurrence was UFP-FP while in S2 it was FP-UFP. In SN, clusters were more in S1

than in S2. The cluster FP-FS occurred frequently in S1, but no specific cluster pattern occurred frequently in S2. However, the clusters in S2 had FP predominantly in the initial part and s1 did not show the occurrence of any specific disfluency type in the same part.

Age: 5.6-5.8 years:

Both the subjects had maximum utterances for C followed by PD and SN. However, s1 had more utterances than S2 in all the 3 tasks. Both the subjects had maximum percent of disfluencies in PD and minimum percent of disfluencies in SN for S1 and in C for S2. Overall, S1 had higher percent of disfluencies than S2 (Table-16).

	Number of utterances		Percent of disfluencies	
Subjects--> Tasks	S1 (Female)	S2, (Female)	S1	S2
C	765	545	a4.58	23.12
PD	261	105	26.44	86.67
SN	83	18	8.43	33.33
Total	1109	668	23.81	33.38

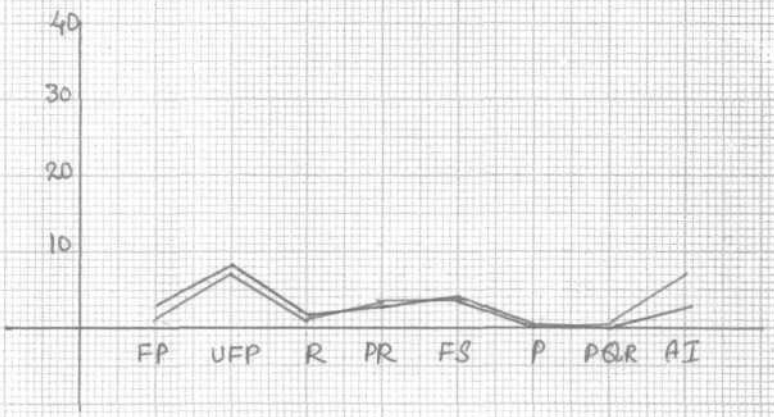
Table-16: The number of utterances and percent of disfluencies in S1 and S2 between 5.6-5.8 years.

Both the subjects had UFP as the frequently occurring types of disfluency. PQR and R were the least occurring type of disfluency for S1 and S2 respectively. In general, the

order of occurrence of disfluency was UFP-AI-FS-PR-FP-R-PQR for S1 and UFP-FS-PR-AI-FP-P-R for S2. UFP, AI and UFP occurred maximally in C, PD and SN respectively and PQR, R and Fs occurred minimally in the three tasks respectively for S1. S2 had UFP, UFP and PR; AI maximally occurring in C, PD and SN respectively and P; R and P; R minimally occurred in the three tasks respectively (Fig.5).

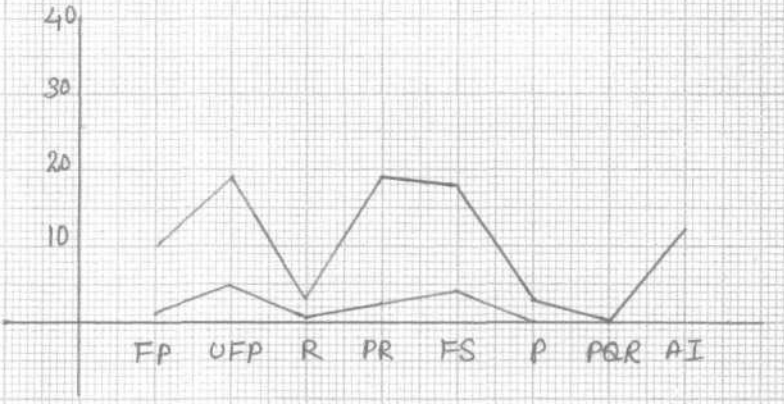
Repeats, were noticed in C and PD tasks of both the subjects. However, S2 also showed minimal repeats in SN task. In both, C and PD tasks, S2 showed more repeats than S1. In C, part-word repetitions occurred more for both the subjects. The least occurring type of repeats were syllabic repetitions and part-occurrence repetitions in S1 and word-repetitions and utterance repetitions in S2. The order of occurrence of the repeats were part-word repetitions-syllabic repetions - part-utterance repetitions for S1 and part-word repetitions - part-utterance repetitions - word-repetitions, utterance repetitions for S2. In PD, part-word repetitions and part-utterance repetitions were exhibited by S1 and they were of equal percent. S2 showed more part-word repetition, least word repetitions and phrase repetitions. In SN, only part-word repetitions were noticed in the speech of S2. (Table-17).

AGE: 5.6 – 5.8 years



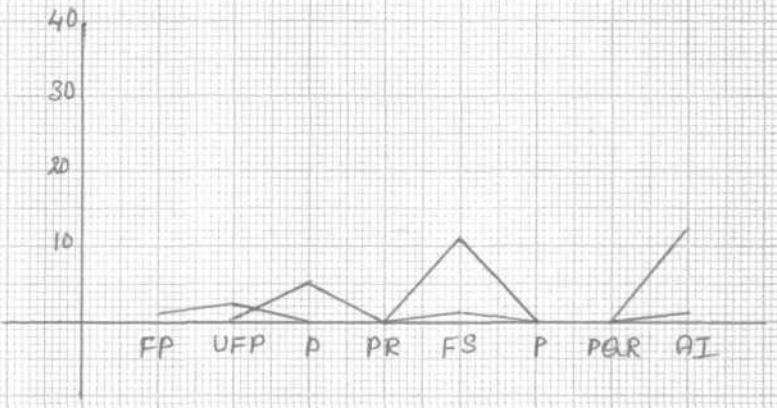
KEY
Conversation
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

AGE: 5.6 – 5.8 years



KEY
Picture description
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

AGE: 5.6 – 5.8 years



KEY
Story Narration
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
____ S1
____ S2

FIGURE 5: Percent of types of disfluencies in 5.6 – 5.8 years

Tasks->	C			PD			SN		
Subjects / Types of repeats	S1	S2	Ave-rage	S1	S1	Ave-rage	S1	S2	Ave-rage
Sy.R	.26	-	.13	-	-	-	-	-	--
P.W.R.	.52	.73	.63	.38	1.9	1.14	-	5.56	2.78
W.R.	-	.37	.19	-	.95	.48	-	-	-
P.U.R.	.26	.55	.41	.38	-	.19	-	-	-
U.R.	-	.37	.19	-	-	-	-	-	-
Ph.R	-	-	-	-	.95	.48	-	-	-

Table-17: Different types of repeats in percent, in 5.6-5.8 years. (- indicates absence of disfluencies.

Both the subjects showed FS in all the three tasks. Overall, S2 showed more FS than S1. In C, S1 had more FS than F2. Precisions occurred most for both the subjects. Minimal FS were content modifications and change in meaning for S1 and negation exclamations for S2. The order of occurrence of the FS was precisions - incomplete utterances/phrases - content modifications, change in meaning for s1 and incomplete utterances/phrases, precisions - content modifications - negation exclamations for S2. In PD tasks, S2 showed more FS than S1. S1 had incomplete utterances/phrases maximally and S2 exhibited content modifications and precisions maximally. Grammatical corrections and incomplete utterances/phrases were least in S1 and S2

respectively. The order of occurrence of the FS were incomplete utterances/phrases - precisions - content modifications grammatical corrections for S1 and content modifications, precisions - incomplete utterances for S2. In SN task, both the subjects showed only precisions (Table-18).

Tasks—>	C			PD			SN		
Subjects / Types of FS	S1	S2	Ave-rage	S1	S2	Ave-rage	S1	S2	Ave-rage
a	.1	.6	.35	.8	7.6	4.2	-	-	-
b	-	-	-	.4	-	.2	-	-	-
C	-	-	-	-	-	-	-	-	-
d	1.3	1.7	1.5	1.6	2.9	2.3	-	-	-
e	1.7	1.7	1.7	1.2	7.6	4.4	1.2	11.1	6.15
f	.1	-	.05	-	-	-	-	-	-
g	-	.2	..1	-	-	-	-	-	

Table-18: Percent of the types of FS in 5.6-5.8 years. (- indicates absence of FS).

With respect to the grammatical categories on/before which the disfluencies occur, in general, maximum disfluencies occurred on/before nouns. Disfluencies occurred least on/before locatives in S1 and on/before negatives in S2. Both the subjects had disfluencies maximally occurring on/before nouns in conversation. However, in PD and SN, S1

had maximum disfluencies on/before determiners and S2 had maximum disfluencies on/before nouns. There were no disfluencies or/before interjections (Table-19).

		Percent of disfluencies			Net per-cent of disfluen-cies
Tasks-->		C	PD	SN	
Graml. cate.	Sub-jects				
	S1	44.15	8.7		33.71
	S2	48.41	32.97	50	42.15
Verbs	S1	7.98	8.7	14.29	8.33
	S2	3.97	17.58	16.67	9.87
Adjec-tives	S1	14.36	-	14.29	10.61
	S2	4.76			2.69
	S1	7.45	15.94	14.29	10.61
verbs	S2	15.87	18.68		16.59
Pro-nouns	S1	10.64	5.8	14.29	9.47
	S2	9.52	2.2		6.28
Loca-tives	S1	-	4.35	-	1.14
	S2				
nega-tives	S1	2.66		14.29	2.27
	S2	3.17			1.79
Conjunc-tions	S1	6.91	1.45	-	5.3
	S2				
Enter-jections	S1	-	-	—	-
	S2				
	S1	5.85	55.07	28.57	19.32
niners	S2	13.49	28.57	33.33	20.18

Table-19: Percent of disfluencies on/before grammatical categories (Graml.cate.) 5.6-5.8 years).

(- indicates absence of disfluencies)

With respect to the positions in which the disfluencies can6ccur, high percent of disfluencies occurred in initial

position. S1 had equal percent of disfluencies in both medial and final position. S2 had a greater percent in medial position followed by that in final position (Table-20).

	Number of disfluencies		Percent of disfluenciea	
Subjects-> / Positions	S1	S2	S1	S2
Initial	258	208	97.73	93.27
Medial	3	8	1.14	3.59
Final	3	7	1.14	3.14

Table-20: Number and percent of disfluencies in the three positions in 5.6-5.8 years.

Clusters were maximum in C followed by PD and SN. In conversation. S1 had more clusters than S2. FS-AI and FP-UFP occurred most frequently in S1 and S2 respectively. FS or AI occupied the initial part in the cluster frequently in S1. FP frequently occurred in the initial part in S2. In picture description, task, S1 exhibited more clusters than S2. AI-UFP combination occurred more frequently in S1 and FP-UFP was frequently Exhibited by S2. AI occurred most frequently in the initial part of the clusters, in S1, but S2 did not show any specific type of disfluency. In SN, only one cluster occurred in both the subjects.

Age: 5.8-5.10 years:

Both the subjects exhibited maximum utterances for conversation followed by picture description and story narration.

h.

S1 had more utterances for C than S2, but S2, had more utterances in PD and SN than S1. Overall, S1 had more utterances than S2. Both the subjects had maximum percent of disfluencies on SN. Minimum percent of disfluencies occurred on C for S1 and PD for S2. The overall percent of disfluencies was higher for S2 than S1 (Table-21).

	Number of utterances		Percent of disfluencies	
Subjects-> / Tasks	Sl(male)	S2(male)	S1	S2
C	509	417	21.22	42.21
PD	217	277	31.80	32.13
SN	28	44	35.71	70.45
Total	754	738	24.8	40.11

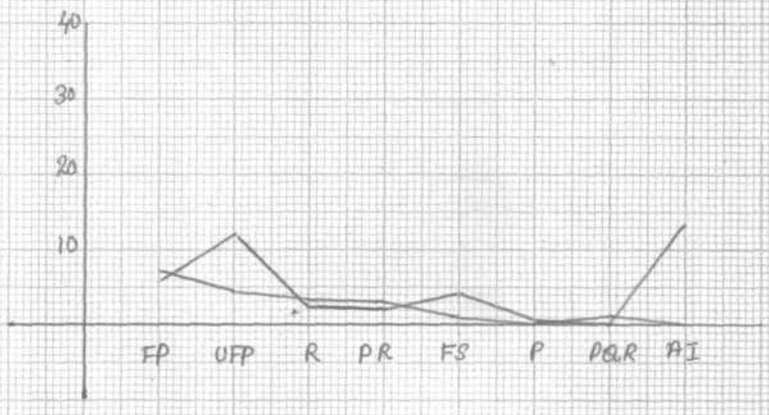
Table-21: The number of utterances and percent of disfluencies in S1 and S2 between 5.8-5.10 years.

S and S2 had FP and UFP respectively as the most frequently occurring type of disfluency. The least frequently occurring type of disfluency was PQR for s and P for S2. In general, the order of occurrence of disfluencies for S and S2 were FP-PR-UFP-R-FS-PQR and UFP-AI-FP-FS-R-PR-P respectively. S showed FP,PR, UFP and R maximally in C, PD and SN tasks respectively and showed FS and PQR, PQR, FP and PR respectively occurring minimally in these three

tasks. S2 showed AI, PFP and AI maximally in C, PD and SN tasks respectively and showed minimum of P, P and FS respectively in the three tasks (Fig.6).

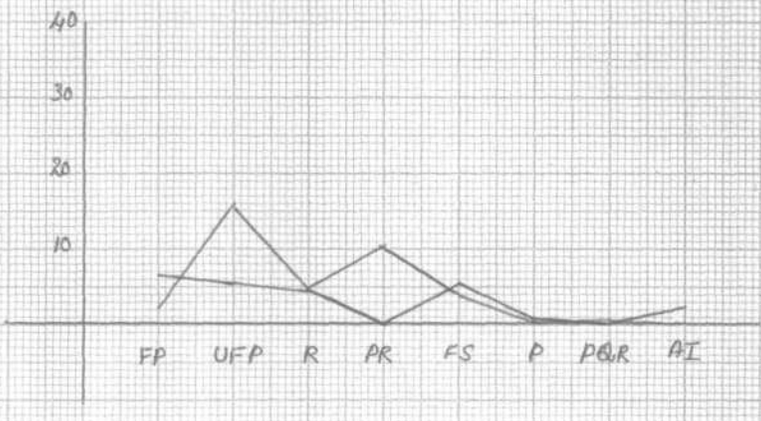
Both the subjects showed repeats in C and PD tasks. However, S1 also showed repeats in SN task. Overall, S1 exhibited more repeats than S2. In C, part-utterance repetitions and part-word repetitions occurred maximally in S1 and S2 respectively. Syllabic repetitions and phrase repetitions occurred the least in S1 and S2 respectively. The order of occurrence of the repeats were part-utterance repetitions - part-wprd repetitions - word repetitions — syllabic repetitions for s1 and part-word repetitions - word repetition, part-utterance repetitions - phrase repetitions for S2. In PD task, word repetitions were found to occur more and phrase repetitions were found to occur less. S2 also showed equal part-word repetitions and word repetitions. The order of occurrence of the repeats were part-word repetitions, word repetitions - syllabic repetitions - phrase repetitions and word repetitions - syllabic repetitions, part-word repetitions - phrase repetitions for S2 and S1 respectively. In SN task, only S1 exhibited repetitions which included part-word repetitions, word repetitions, phrase repetitions, all of which occurred equally (Table-22).

AGE : 5·8 - 5·10 years



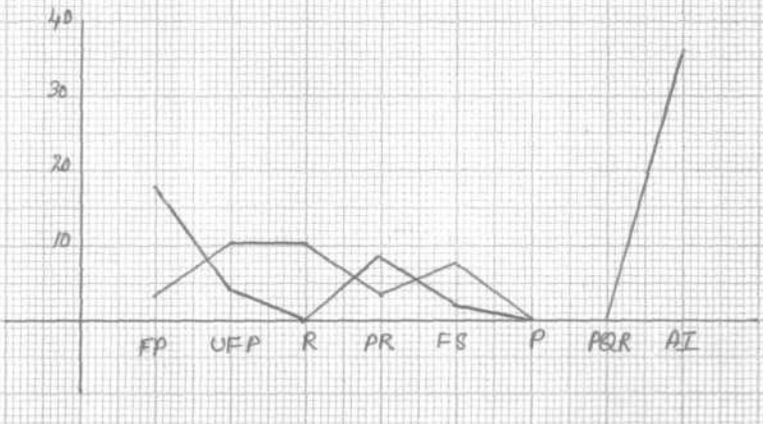
KEY
Conversation
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
S1
S2

AGE: 5·8 - 5·10 years



KEY
Picture Description
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
S1
S2

AGE : 5·8 - 5·10 years



KEY
Story Narration
X AXIS - Type of disfluencies
Y AXIS - Percent of disfluencies
S1
S2

FIGURE 6 : Percent of types of disfluencies in 5·8 - 5·10 years

Tasks—>	C			PD			1	SN	
Subjects / types of repeats.	S1	S2	Ave-rage	S1	S2	Ave-rage		S2	Ave-rage
Sy.R	.39	-	.15	.92	.72	.82	-	-	—
P.W.R.	1.18	.96	1.07	.92	1.81	1.37	3.5	-	1.8
W.R.	.98	.72	.85	2.3	1.81	2.06	3.5	-	1.8
P.U.R.	1.38	.72	1.05	-	-	-	-	-	-
U.R.	-	-	-	-	-	-	-	-	-
Ph.R	-	.48	.24	.46	.36	.41	3.5	-	1.8

Table-22: Different types of repeats in percent in 5.8-5.10 years. (- indicates absence of disfluenc&es).

Both the subjects showed FS in C and PD tasks. However, S2 also had FS in SN task. Overall, S2 had more FS than S1. In C, S2 showed more FS than S1. S1 and S2 exhibited incomplete utterances/phrases and precisions maximally repectively. Minimum of precision and content modifications were exhibited by S1 and S2 respectively. The order of occurrence of FS was incomplete utterances/phrases.precision for S1 and precision - incomplete utterances/phrases - content modifications for S2 1 In PD task, S1 had more FS than S2. Content modifications were the most in S1 and S2. However, precision also occurred in S1 alone maximally. Negation exclamations were the least in

both the subjects. However, incomplete utterances were also least in S1. The order of occurrence of FS for S1 was content modifications, precisions - grammatical corrections - incomplete utterances/phrases,negation exclamations and for S2 it was content modifications, precisions - incomplete utterances/phrases - negation exclamation. In SN task FS were noticed only in S2. Incomplete utterances/phrases were the most and precisions were the least (Table-23).

Tasks	C			PD			SN		
Subjects / Types of FS	s1	S2	Ave-rage		S2	Ave-rage	S1	S2	Ave-rage.
*	-	.4	.2	3.7	3.6	3.65	-	-	-
b	-	-	-	1.1	-	.55	-	-	-
c	-	-	-	-	-	-	-	-	-
d	1.8	.7	1.75	.7	1.4	1.05	-	33.3	16.65
e	1.1	2.2	1.65	3.7	2.1	2.9	-	20	10
f	-	-	-	-	-	-	-	-	-
g	-	-	-	.7	.7	.7	-	-	

Table-23: Percent of the type of Fs in 5.8-5.10 years (- indicates absence of FS).

With respect to the grammatical categories on/before while the disfluencies occurred, in general, on/before nouns the disfluencies were maximum and minimum on/before conjunctions

for Si, locatives and negatives for S2. The disfluencies were maximum on/before nouns in all the three tasks for both the subjects. No disfluencies occurred on/before interjections (Table-24):

		Percent of disfluencies			Net percent of disfluencies.
Tasks --> 3raml cate.	Subjects	C	PD	SN	
Nouns	S1	52.78	56.52	60	54.55
	S2	53.41	69.66	29.03	55.74
Verbs	S1	5.56	17.39	30	11.23
	S2	7.39	21.35	16.13	12.50
Adjectives	s1	1.85		10	1.6
	S2	6.82		3.23	4.39
Adverbs	S1	12.96	13.04		12.3
	S2	9.66		29.03	8.78
Pronouns e	S1	12.04	1.45		7.49
	S2	10.8		12.9	7.77
Locatives	S1	3.7	7.25	-	4.81
	S2	1.14	2.25		1.35
Negatives	S1	3.7	-	-	2.14
	S2	2.27			1.35
Conjunction	S1	.93			.53
	S2	5.11	11.12	3.23	3.72
Interjections	s1			—	
	S2	-	-		-
Determiners	S1	5.56	4.35		4.81
	S2	2.84	5.62	6.45	4.05

Table-24: Percent of disfluencies on/before grammatical categories (Graml.cate) 5.8-5.10 years.

(- indicates absence of disfluencies).

Regarding the positions of occurrence of disfluencies both the subjects had maximum percent of disfluencies in the initial position followed by medial position. The percent of disfluencies in the final position was negligible(Table-25).

	Number of disfluencies		Percent of disfluencies	
Subjects--> positions	S1	S2	S1	S2
Initial	183	279	97.86	94.26
Medial	3	16	1.6	5.41
Final	1	1	.53	.34

Table-25: Number and percent of disfluencies in the three positions in 5.8-5.10 years.

Clusters occurred maximally in C followed by PD and SN in both the subjects. In conversation, S2 had greater number of clusters than S1. S1 had FP and R combination occurring most frequently, but S2 did not show any such pattern. S1 had FP occurring frequently in the initial part in the clusters, However, S2 did not exhibit any such pattern. In picture description, S1 exhibited more clusters than S2. FS-UFP and UFP-R combination were most frequently occurring in S1 and S2 repectively. In Sl,FS, UFP or PR occurred most frequently in the initial part than any other type of disfluency and in S2 UFP or AI ccurred most frequently in the initial part.

In story narration, S2 had greater clusters than S1. S1 and S2 exhibited R or FP and PR or AI occurring in the initial part respectively. While S1 had UFP all the time following the initial part, no such pattern was observed in S2.

Age: 5.10-5.12 years:

Both the subjects had maximum utterances in conversation followed by picture description and story narration. S2 had more utterances in C and SN than S1 and S1 had more utterances in PD than S2. Overall, S1 had more number of utterances than S2. S1 and S2 had maximum percent of disfluencies in PD and C respectively. Minimum percent of disfluencies occurred in SN for both the subjects. Overall, S2 exhibited a higher percent of disfluencies than S1 (Table-26).

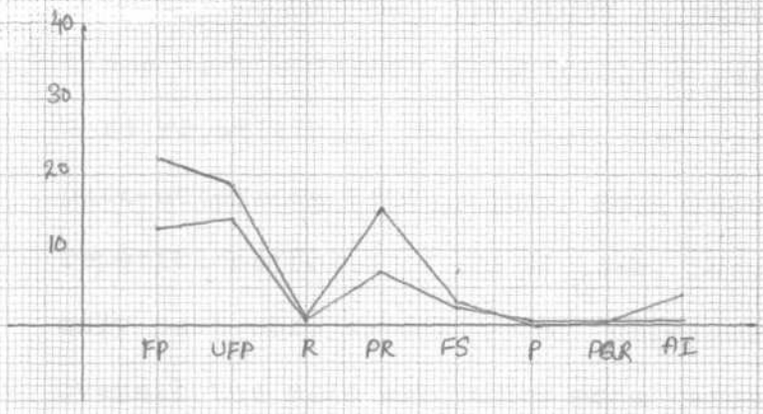
	No.of utterances.		Percent of disfluencies	
Subjects->	S1	S2	S1	S2
tasks t	(Female)	(Male)		
C	545	553	29.17	66.91
PD	269	140	39.78	54.29
SN	27	30	25.0	53.33
Total	841	723	32.34	63.90

Table-26: The number of utterances and percent of disfluencies in S1 and S2 between 5.10 - 5.12 years.

UFP and FP were the maximally occurring types of dis-fluency in S1 and S2 respectively. PQR was the least occurring type of disfluency in both the subjects. In general, the order of occurrence of the disfluencies was UFP-PR-FP-FS-R-AI-P-PQR and FP-UFP-PR-AI-FS-R-PQR respectively for SI and S2. Si exhibited UFP, PR and PR maximally in C, PD and SN tasks respectively. PQR and AI/ AI FP, R and AI were minimally exhibited in C, PD and SN tasks. S2 exhibited UFP, FP, and AI maximally in C, PD and SN tasks respectively and showed least percent of PQR,UFP and R respectively in the three tasks (Fig.7).

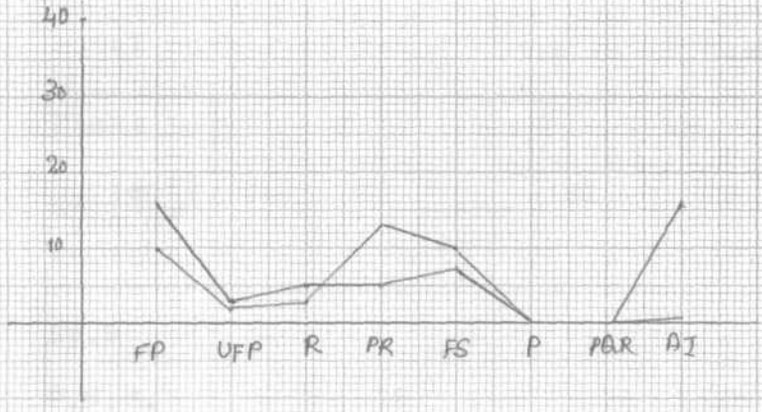
In all the three tasks, both the subjects showed repeats. S1 and S2 showed more repeats in PD and C respec-tively. Both of them showed minimal repeats in SN task. Overall, S2 showed more repeats than S1. Word repetitions were maximum and part utterance repetitions were minimum in both the subjects. However, in S2 phrase repetitions were also less. The order of occurrence of the repeats were word repetitions - part-utterances repetitions for S1 and word repetitions - part-word repetitions - part-utterance repetitions, phrase repetitions for S2. In PD, s1 had more number of repeats than S2. Syllabic repetitions and part-utterance repetitions were more Sl and S2 respectively Least

AGE : 5·10 – 5·12 years



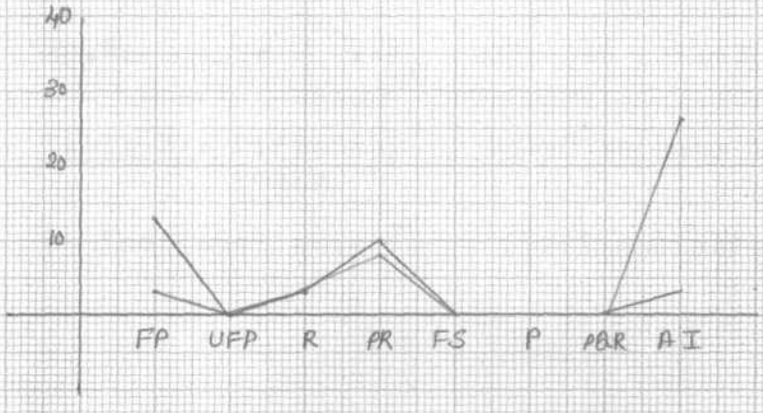
KEY
Conversation
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
S1
S2

AGE : 5·10 – 5·12 years



KEY
Picture description
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
S1
S2

AGE : 5·10 – 5·12 years



KEY
Story Narration
X AXIS – Type of disfluencies
Y AXIS – Percent of disfluencies
S1
S2

FIGURE·7 Percent of types of disfluencies in 5·10 – 5·12 years

In all the three tasks, both the subjects had FS. Overall, S2 had greater FS than S1. Incomplete utterances/phrases were maximum in both the subjects. However, S2 had maximum precisions also. Grammatical corrections and change in meaning were least in both the subjects. But, S1 also showed change in pronunciations and precisions occurring least and S2 had least number of negation exclamations. The order of occurrence of he FS were incomplete utterances/phrases - grammatical correction, change in pronunciations, precisions change in meaning for SI and incomplete utterances/phrases, precisions - content modifications - grammatical corr sections, change in meaning, negation exclamations for S2. In PD task, S2 had more FS than S1. Content modifications and precisions occured more in S1 and S2 respectively. Grammatical corrections were the least for both the subjects. S1 also had least number of incomplete utterances. The order of occurence of the FS for S1 was content modifications - precisions - grammatical corrections, incomplete utterances/phrases and precisions - contentinodifications, incomplete utterances/phrases grammatical corrections for S2. In SN task, S1 had more FS than S2. Content modifications and precisions were noticed in S1 and incomplete utterances/phrases were seen in S2 (Table-28)

Tasks ->	C			PD			SN		
Subjects / Types of FS	S1	S2	Ave-rage	S1	S2	Ave-rage	S1	S2	Ave-rage
a	-	.5	.25	2.3	1.4	1.85	3.5	-	1.75
b	.2	.2	.2	.5	.4	.45	-	-	-
c	.2	-	.1	-	-	-	-	-	-
d	.6	1.4	1	.5	1.4	.95	-	2,3	1.14
e	.2	1.4	.8	.9	2.2	1.55	3.5	-	1.75
f	.2	.2	.2	-	-	-	-	-	-
g	-	.2	.1	-	-	-	-	-	-

Table-28: percent of the types of FS in 5.10-5.12 years

(- indicates absence of FS)

With respect to the grammatical categories on/before which the disfluencies occurred, in general on/before nouns the disfluencies were maximum and minimum on/before locatives of,Sl and on/before interjections for S2. In conversation, both the subjects had maximum disfluencies on/before nouns. In picture description, S1 and S2 had maximum disfluencies on/before nouns and determiners respectively. However, in SN, SI and S2 showed maximum disfluencies on/before determiners and nouns respectively. Disfluencies were negligible on/interjections (Table-29).

Tasks → / Graml. Cate. ↓	Subjects ↓	Percent of disfluencies C	PD	SN	Net percent of disfluencies
Nouns	S1	33.96	30.84	-	31.99
	S2	66.22	13.16	37.50	56.49
Verbs	S1	1.89	12.15	50	6.99
	S2	3.24	11.84	12.5	4.98
Adjectives	S1	11.95	3.74	-	8.46
	S2	6.76	-	6.25	5.63
Adverbs	S1	7.55	12.15	-	9.19
	S2	9.73	10.53	18.75	10.17
Pronouns	S1	13.21	8.41	33.33	11.76
	S2	6.49	1.32	12.50	5.84
Locatives	S1	-	.93	-	.37
	S2	.54	2.63	-	.87
Negatives	S1	12.21	2.8	8-	8.82
	S2	.81	1.32	-	.87
Conjunctions	S1	11.95	-	-	6.99
	S2	4.32	-	-	3.46
Interjections	S1	-	-	-	-
	S2	-	1.32	-	.22
Determiners	S1	6.29	28.97	16.67	15.54
	S2	1.89	57.89	12.5	11.47

Table-29: Percent of disfluencies on/before grammatical categories (Graml.cate) 5.10-5.12 years.

(- indicates absence of disfluencies).

Both the subjects showed maximum percent of disfluencies in initial position followed by medial position. The percent of disfluencies were very minimal in the final position (Table-30).

	Number of disfluencies		Percent of disfluencies	
Subjects—> Positions^	S1	S2	S1	S2
Initial	265	458	97.43	99.13
Medial	5	3	1.84	.65
Final	2	1	.74	.22

Table-30: Number and percent of disfluencies in the three positions in 5.10-5.12 years.

In general, the type of clusters varied. Both the subjects showed more clusters in conversation followed by picture description and story narration. In conversation, in both the subjects UFP and PR combinations occurred maximally. However, the order of the cluster was UFP and PR for S1; PR and UFP for S2. UFP, FP or PR occurred maximally in the initial partly the cluster and the occurrence of R and AI was minimum. In picture description, the combination of FP and FS in initial and second positions respectively, was maximum in both the subjects. Combinations of FP and FS, WR and PR; PR, UFP and PR; FP, FS and FP occurred equally in S1. However, S1 and S2 had PR and AI respectively occuring maximally in the initial part. In story narration, while S1 did not show clusters, S2 exhibited AI and FP combinations maximally followed by AI and PR combinations. AI occupied the initial part of the cluster all the time in S2.

In summary, eleven subjects exhibited maximum utterances in C, followed in order by PD and SN. Only one subject (in the age interval 5.2 - 5.4 years) had more number of utterances in PD task followed by C and SN tasks. In the age groups, 5.0-5.2 years and 5.10-5.12 years, where one male and one female were considered, females exhibited more utterances than males.

At least one subject exhibited maximum percent of dis-fluencies in PD and minimum percent of disfluencies in C or SN task in all the age intervals except in 5.8-5.10 years, where maximum percent of disfluencies were seen in SN and minimum percent of disfluencies were seen in C and PD tasks. In the age intervals 5.0-5.2 years and 5.10-5.12 years, males exhibited greater percent of disfluencies than females.

UFP, FP, PR, AI were the most frequently occurring types of disfluency and P, PQR, R, FS were the least occuring types of disfluency. PR increased from 5-5.4 years and declined from 5.8 years onwords and FS increased between the age of 5.4 - 5.6 years. Among these, UFP occurred more in C and PD tasks while AI occurred more in SN task.

This result partly confirms that of Yairi and Clifton (1972), who found interjections (filled pauses and

parenthetical remarks) to be one of the most frequently occurring type of disfluency in the preschool children, high-school seniors and geriatric persons.

Martin and Strange (1968a), putforth a composite view of function of pauses in speech encoding and asserted that syntactic-semantic structure selection preceded choice of words during encoding and that pauses within major grammatical constituents represented the word selection process; pauses occurring between major constituents indicated a process of selecting structures larger than words. Starkweather (1980) putforth that pauses and hesitations certainly serve the speaker by providing time for planning or decision making when uncertainlty is high and may also serve the listener by informing him that a new clause, some other relatively improbable and hence informationally loaded, material is coming up. Starkweather (1987) opines that parenthetical remarks also serve to fill up time at a point when the speaker has nothing meaningful ready to reproduce. Further, the parenthetical remark is a coordinated and studied use of language. Hence it does not represent an error, but rather ia more like a correction, or atleast provide the time for corrections of thought or of language to occur before utterance (Starkweather, 1987). Thus Starkweather (1987) considers that filled pauses and parenthetical remarks as speech behaviours, are clearly more than stumbles.

In general, among the false starts, precisions, incomplete utterances/phrases, content modifications and grammatical corrections seemed to occur maximally. The other false atarts were exhibited minimally. Change in pronunciation was the least and was seen in conversation task alone. It was also observed that though a subject showed more FS than the other this was not so for all the three tasks.

The finding that FS occurred, but not frequently in the speech of 5-6 years contradicts the results of the study by Yairi and Clifton (1972) who, for 5-year-olds, high school seniors and geriatric persons found. revision-incomplete phrase as one of the most frequently occuring type of disfluency. False starts, revisions and incomplete phrases can be considered to be corrections,essentially the same kind of corrections as parenthetical remark, except that the eiror is not quite detected until after the utterance has begun (Starkweather, 1987). "A speaker begins to say something in a certain way, gets part way into the utterance and realises that the beginning of the sentence would lead to an ungrammatical ending, express an incongruous thought or an illogical conclusion, or state a position that could^be defended, would be socially inappropriate, might lead to a word of uncertain meaning or make any of a number of other 'mistakes' (starkweather, 1987). However, it is probable that FS occurs whenever the child wants to emphasize an aspect

by repeating an utterance or a phrase in a differing word order or wants to be more precise by adding other details like an adjective, adverb, etc. or wants to negate an earlier view point.

In this study, part-word repetitions, word repetitions and part-utterance repetitions occurred frequently and syllabic repetitions occurred relatively less, in children between 5-6 years. Utterance repetitions and phrase repetitions were minimal. Considering the sex differences in the age intervals where a male and a female subject was present, results revealed that males had more number of repetitions than females. Overall, repetitions, tended to increase with increasing chronological age. These results are in consonance with those of Branscom et al (1955) who indicated that every subject showed repetitions either on part-words, whole words or words repeated in phrases. It also supports the results of the study by Haynes and Hood (1977) who found word repetitions in the children under 6 years age; and Yairi and Clifton (1972), who reported that word repetitions were one of the types of disfluency present most frequently in the preschool children and Kowal, O'Connell and Sabin (1975), who commented that part-word repetitions made up a sizable proposition of the total number of repetitions in

kindergarteners and second graders. The finding that syllabus repetitions occurred less in children than word repetitions, followed by phrase repetitions contradict that of Egland (1955) who found sound or syllable repetitions to be the most common disfluency type for non-stutterers.

Repetitions, the form of discontinuity,found in youngest children could be errors. However, word or phrase repetitions could also imply that the young children may be stalling for time just as the older children stall for time by saying "uh" or "Ya Knowwaddimean" (Starkweather, 1987).

In this study, sound prolongations were found to be minimal. This confirms the results of the study on non-stuttering children by Egland (1955), who found limited prolongations. Also, sound prolongations were found to occur in the medial position of an utterance/word, in this study.

Of the 12 subjects, 11 subjects showed maximum disfluencies on/before nouns, and one subject exhibited maximum disfluencies on/before determiners. Disfluencies were minimum on/before locatives, negatives, conjunctions and interjections. This confirms the results of Maclay and Osgood (1959), who putforth that pauses are distributed in a predictable way throughout utterance wherein they are more likely to occur

before content words, such as nouns, verbs, adverbs, and adjectives than before function words such as prepositions, articles and conjunctions.

The results of this study indicated that majority of the disfluencies occurred in the initial position. Few disfluencies occurred in the medial position and negligible disfluencies were exhibited in the final position. Overall, clusters were present maximally in C followed by PD and SN tasks. However, variations were also observed. Both the subjects in the age interval 5.2-5.4 years showed clusters maximally in PD task. Clusters were minimum in SN task. In conversation, no sex differences were noticed. UFP occurred maximally in the initial part of the cluster in C and PD tasks while AI was maximum in the initial part of the cluster in the SN task. Other disfluencies which occurred in the initial part included FP, R, PR and FS.

No studies dealing with clusters (5-6 years) were confounded with. However, the conclusion arrived at, after studying clusters in children ,by Silverman (1973), Colbum (1985) was that clustering of disfluency within the speech of nonstuttering preschool children is a normal phenomenon and does not increase substantially overtime.

Other studies on normal Kannada speaking children (Nagapoornima,(1990) - 3 to 4 years; Indu (1990) - 4 to 5 years) are also compared with this study for the picture description task (Table-31).

Age in years-> Disfluency types (%)|	3-4 years	4-5 years	5-6 years	Ave-rage	Kinder-garteners Kowal et al
FP'	9.6	12	7.66	9.7	1.8
UFP	8.6	1.52	9.2	6.44	-
R	4.0	.69	3.21	2.63	2.5
PR	2.5	5.27	7.49	5.09	.2
FS	.16	.39	6.51	2.35	3.1
P	-	.13	1.11	.41	-
PQR	-	-	.04	.01	-
AI	-	.18	5.38	1.85	-
Total	24.83	20.18	35.60		-

Table:31: Percent of disfluencies across the ages in PD task

It was found that in all the three age groups (4-4 years; 4-5 years, and 5-6 years) disfluencies were exhibited by children. This confirms with Adams (1982) who indicated that disfluencies of one form or the other may be noted, and has attributed these to the developing or immature nervous system.

Developmental effects (a decline in the number of disfluencies) have been shown by UFP and R between 3-5 years, however these tend to increase between 5-6 years. In general, UFP occurred predominantly in 3-4 years, FP in 4-5 years, and PR increased in 5-6 years.

3-6 years has been considered as the preschool years or kindergarteners in the West. A comparison of the scores of these Indian studies with Kowal et al (1975) indicates that the average percent of R and FS of kindergarteners seem to correlate. The average percent of R in the Indian study was 2.63% while that in Kowal et al (1975) was 2.5%. The Indian studies showed that FS occurred 2.35%, while Kowal et al (1975) showed that kindergarteners children had 3.1% FS. A higher average percent of FP and lower average perewt of PR was indicated by the results of studies on Indian children when compared with Kowal et al (1975). The differences could be attributable to the type of language used - Kannada being synthetic and English being analytical, or the material used.

Repetitions show an initial decline followed by an increase in its percent of disfluencies between 3-6 years. This is not in consonance with the study of Branscom et al.

(1955) who putforth that repetitions tend to decrease with increasing chronological age.

FS and R (particularly part-word repetitions) are considered immature types of disfluencies (Starkweather, 1987). With development, these immature types of disfluencies are replaced with more sophisticated types of which the parenthetical remark is typical (Starkweather, 1987).

In this comparitive study, PR and FS show an increase across the ages. The increased occurrence of PR could be attributable to the more sophisticated types of disfluency adopted by children with development, as indicated by Starkweather (1987). FS, though an immature type of disfluency tends to increase with an increase in the linguistic knowledge. As the linguistic knowledge increases, the children's sentences become longer and structurally more complex which require the development of ability to plan and execute longer sequence of speech movements.

Sound prolongations may be exhibited by children especially when they have action accompanying speech (especially in picture description and story narration)and part-question repetitions may occur when the child is not sure of the question or needs time to think for the answer. As the child grows, the sentence length also increases. However,

to cope with the long sentence the child has to inspire in between as the lung volume is not sufficient which may result in audible inspirations.

A proposed fluency test (age range 5 to 6 years):

From the results of this study, a test for fluency has been proposed. This fluency test is for a picture Description task. The rationale for choosing the picture Description task has been arrived at after viewing the pros and cons of the Conversation task, Picture Description task and Story Narration task used in this study. The advantages of the Picture Description task are as follows:

1. Stimulus: The stimulus used here are 11 picture series to to have the child's attention.
2. Rapport: Rapport between the investigator and the child can be easily built up if the former has pictures for the child to see.
3. Prompt: Very little prompt is required by the investigator to ask the child to describe the pictures.
4. Speech sample: The child's speech sample will be more, though the recording is for a stipulated time period. In other words, a sizable number of utterances/words can be recorded without much interruption from the investigator.

Procedure: It is suggested that the investigator has an informal conversation with the child, to be tested, and visually

presents the first picture series and describes it. If the child indicates that he/she does not know how to describe the picture series, then the investigator can give a model using the first picture series. 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 formulas (as mentioned in this study earlier) should be applied to delineate the percent of disfluency.

The cut off scores for the different subgroups in the age range 5-6 years are presented in table-32.

It seems that UFP, FP, PR, FS, P, AI and R are the major types of disfluencies exhibited in children 5-6 years. Tense pauses, word fragmentations and articulatory fixations may prove to differentiate normal children from stutterers. Also, the percent disfluency occuring in children may be considered for diagnosis. Children exhibiting higher percent disfluency (in each type) may be considered as dysfluent rather than disfluent.

Age in years-> / Types of disfle-encies (in percent)		5.0-5.2	5.2-5.4	5.4-5.6	5.6-5.8	5.8-5.10	5.10-5.12
FP	COS Range	.47 0 - 0.94	6.7 5.5 - 7.9	24.9 13.6 - 36.2	6.2 1.9 - 10.5	4.5 2.5 - 6.5	13.42 10.41 - 16.43
UFP	COS Range	8.6 5.7 - 11.6	12.6 11.8 - 13.4	12.26 8.4 - 16.1	12 5 - 19	10.9 5.3 -16.3	2.9 2.23 - 3.57
R	COS Range	.89 .83- .94	2.7 3.69- 3.78	3.5 1.7 - 5.4	2.3 1.1 - 3.8	4.65 4.6 - 4.7	4.2 3.4 -5
PR	COS Range	11.9 9.1 - 14.6	6.8 .7 - 12.9	4.1 1 - 7.2	10.9 2.7 - 19.1	5.3 0 - 10.6	9.2 5 - 13.4
FS	COS Range	3.9 3.3 - 4.6	4.5 2.8 - 6.3	5.9 5.4 - 6.5	10.97 3.8 - 18.1	4.8 4.1 - 5.4	9 7.9 - 10
P	COS Range	2.99 1.4 - 4.6	1.3 .7 - 1.9	.34 0 - 0.67	1.9 0 - 3.8	.13 0 - .46	-
PQR	COS Range	-	-	-	-	.23 0 - .5	-
AI	COS Range	10.14 0 - 20.3	-	-	12.3 12.26-12.38	l.4 0 - 2.9	8.4 0.4 - 16.4
Total	COS	38.89	34.6	51.00	44.27	31.91	47-12

Table-32: Cut off scores (COS) and the range for the different sub-groups for the different disfluency types in the age range 5-6 years for Picture Description task.

However, as these cut off scores are derived from 12 normal children, they could be tdministered for the clinical population to use the test effectively in diagnosis and rehabilitation. In this regard, it is suggested that the test involving Picture description task be utilized clinically for normal non-fluency (NNF) and stuttering children to validate it and further use it efficiently.

SUMMARY AND CONCLUSION

Fluency is "a barometer for the entire speech system ... (with its limits ... apparently set by adequacy of performance of the other dimensions of speech" (Perkins, 1977). It is a multidimentional behaviour, the dimensions of which encompass continuity, rate, effort and rhythm. An understanding of the multidimentionality of normal fluency will help the clinician in diagnosis and rehabilitation of cases with fluency disorders. Several attempts (Branscom, et al 1955; Haynes and Hood, 1977;? Kowal, et al 1975) have been made in the past to describe the development of speech fluency in normal children. However, 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, the present study was planned to explore the speech fluency of Kannada speaking normal children.

Disfluencies in 12 normal, Kannada speaking children in the age range of 5-6 years (the age group of 5-6 years was divide) to six two-month intervals with two subjects in each age interval) belonging to middle socio-economic status were assessed in three different tasks:-conversation, picture description and story narration. The speech samples were audio recorded and were transcribed and analysed for the number of utterances, percent of disfluencies

and percent of different types of disfluencies for position, task, age and grammatical categories. An utterance referred to a minimum linguistic meaningful unit. Nine categories of disfluencies;- filled pauses, unfilled pauses, repeats, parenthetical remarks, false starts, sound prolongations, part-question repetitions, audible inspirations and clusters;- three positions- initial, medial and final?- were considered. The grammatical categories included nouns, determiners, pronouns, verbs, adjectives, adverbs, locatives, negatives, conjunctions and interjections.

The results revealed that overall, more number of utterances were elicited in conversation, followed by picture description and story narration tasks. The disfluencies occurred in the initial position atleast 90% of the time, followed by medial and final position. The disfluencies in the final position were minimal.

Unfilled pauses, filled pauses, parenthetical remarks and audible inspirations occurred most frequently and prolongations, part-question repetitions, repeats and false starts occurred least. In repetitions, part-word repetitions and word repetitions were the most frequently occurring sub-types of disfluencies. Among the false starts, precisions occurred most frequently in all the three tasks. The occurrence of false starts has been attributed to corrections.

emphasis and negation which a child makes.

Parenthetical remarks increased from 5-5.4 years and declined from 5.8 years onwards and false starts increased between the age of 5.4-5.6 years. The grammatical categories on/before which the disfluencies occurred most were on nouns, in all the three tasks. In general, nouns, determiners, pronouns, verbs, adjectives and adverbs had more disfluencies than locatives, negatives, conjunctions and interjections. Also, unfilled pauses or filled pauses occurred maximally. Relating these two aspects, this study supports that pauses (unfilled and filled) occur more on content words than on function words. The clusters observed in this study had audible inspirations occurring more in the initial part of the cluster.

A comparison of the results of this study has been made with two other studies for the picture description task in Kannada speaking normal children (Nagapoornima,(1990) in the age range 3-4 years and Indu (1990) in the age range 4-5 years). The comparison revealed that the filled pauses showed an increase from 3-5 years and then declined. The unfilled pauses declined from 3-5 years and increased beyond this. The repetitions also showed a similar pattern. Both parenthetical remarks and false starts. Increased from 3-6 years. While prolongations and audible inspirations were absent in 3-4 years, they were present in 4-5 years and 5-6

years and exhibited an increment. Part-question repetitions were exhibited only in the age range 5-6 years.

On the basis of the results of this study a fluency test, using the picture description task has been proposed for the age range 5-6 years, and the cut-off scores and the range for each type of disfluency and the overall disfluencies has been provided. The purpose of this test is to help identifying dysfluent children and apply required management techniques. It is suggested that this test be used with clinical population to make it an effective tool in diagnosis and rehabilitation of fluency disorders.

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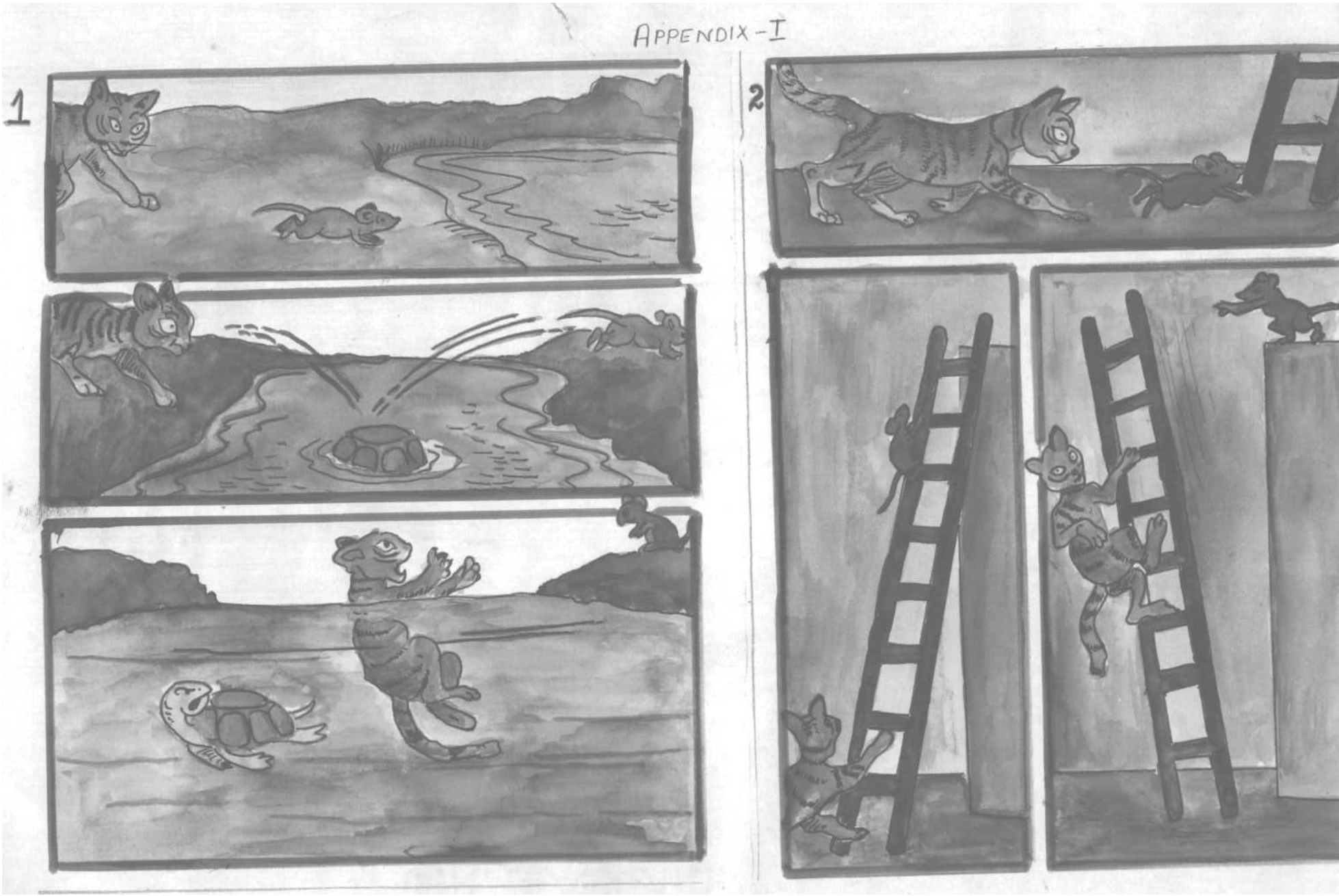
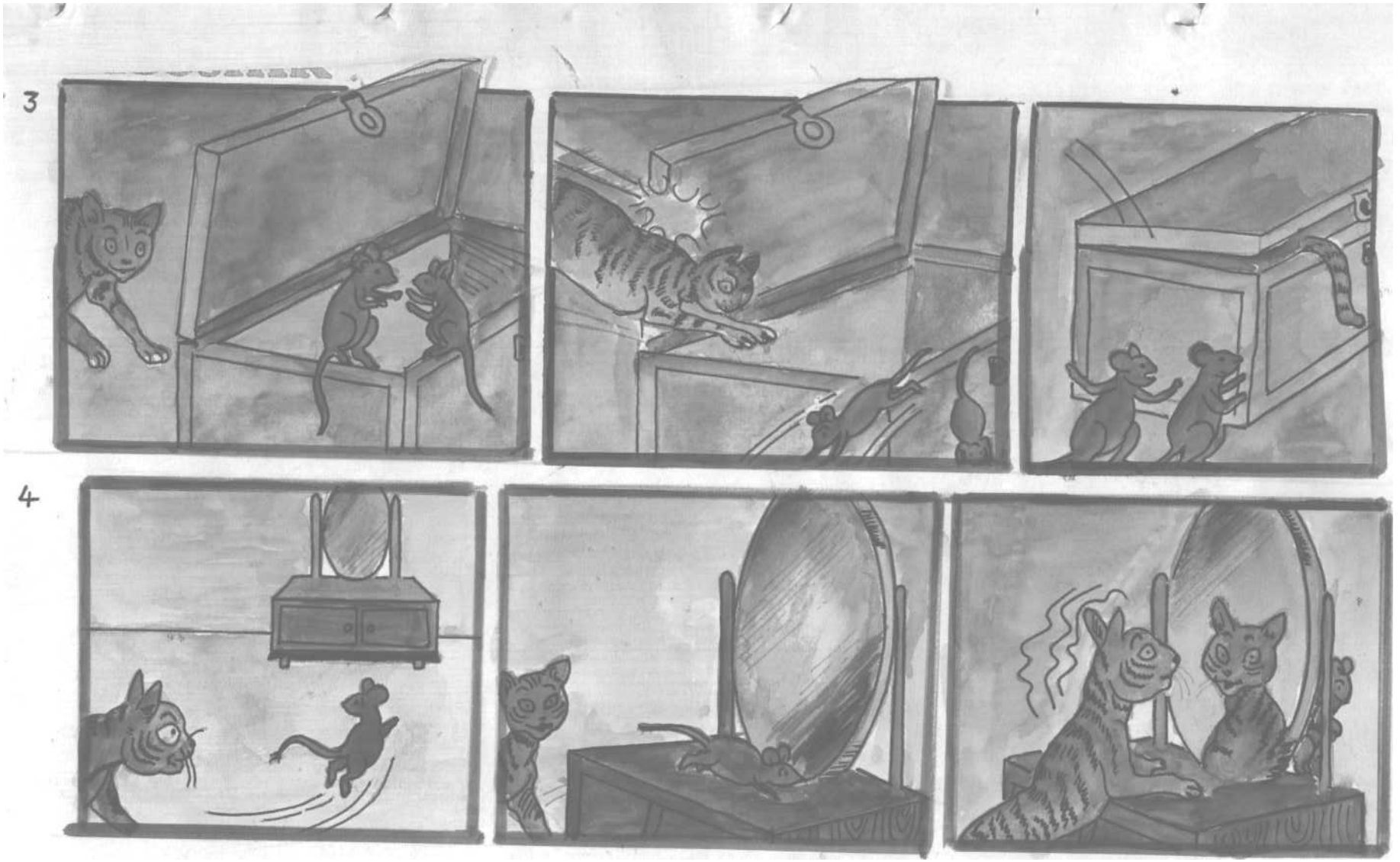
APPENDIX - I

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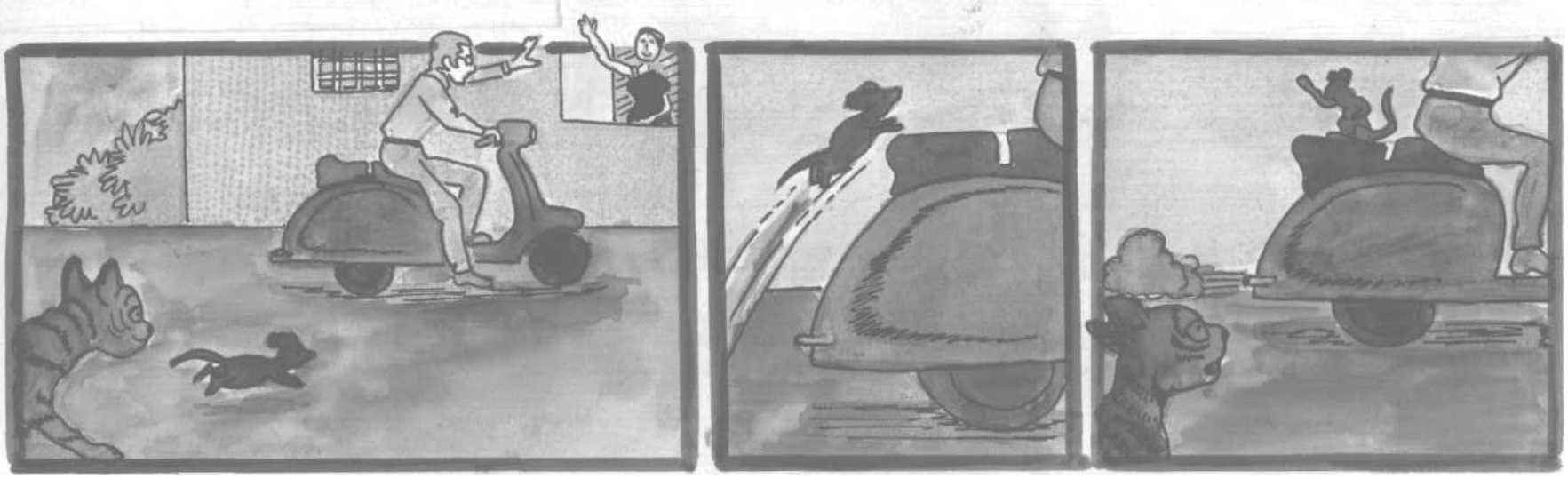
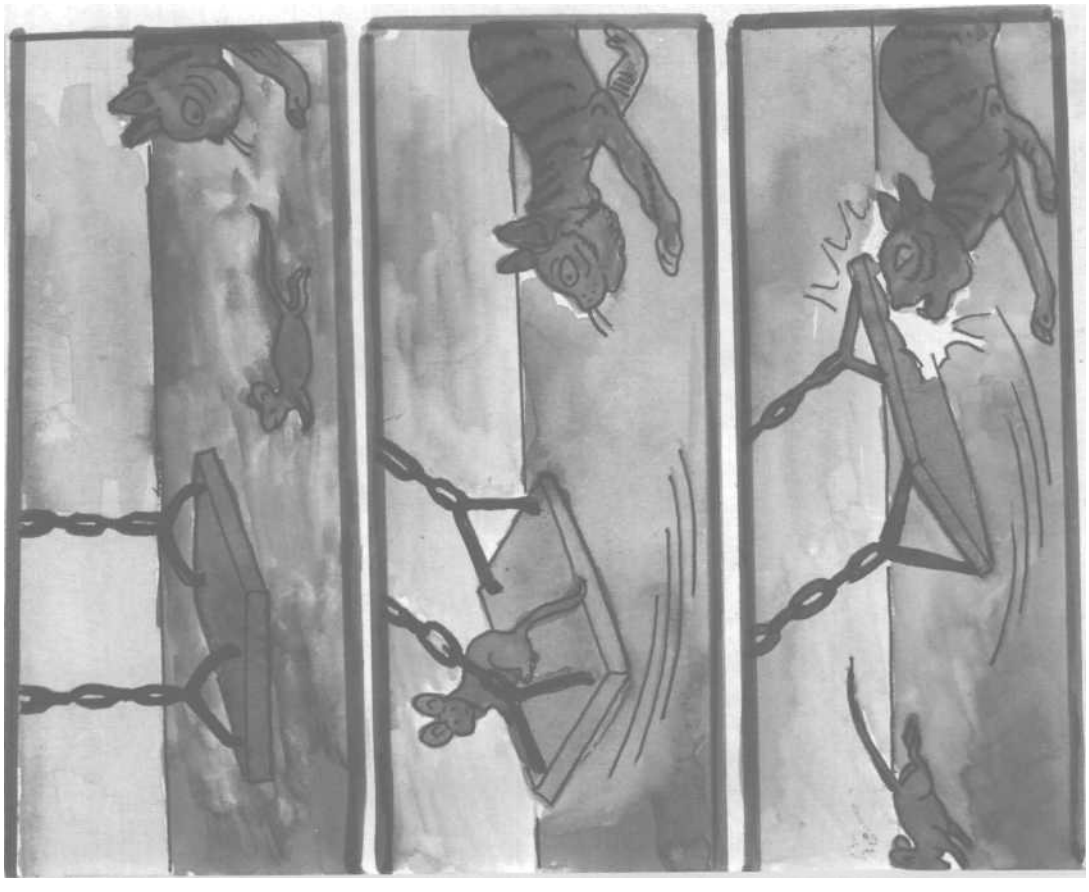
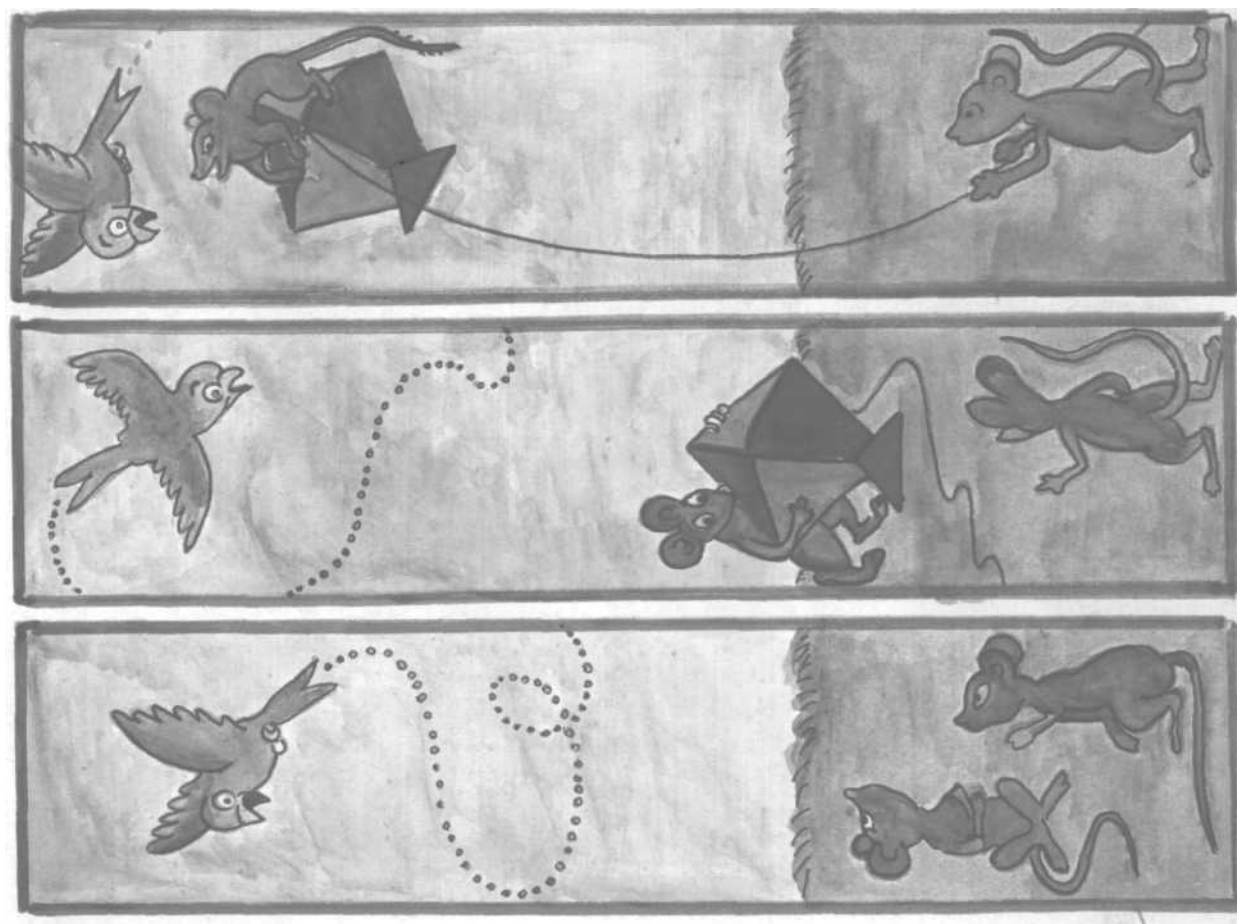
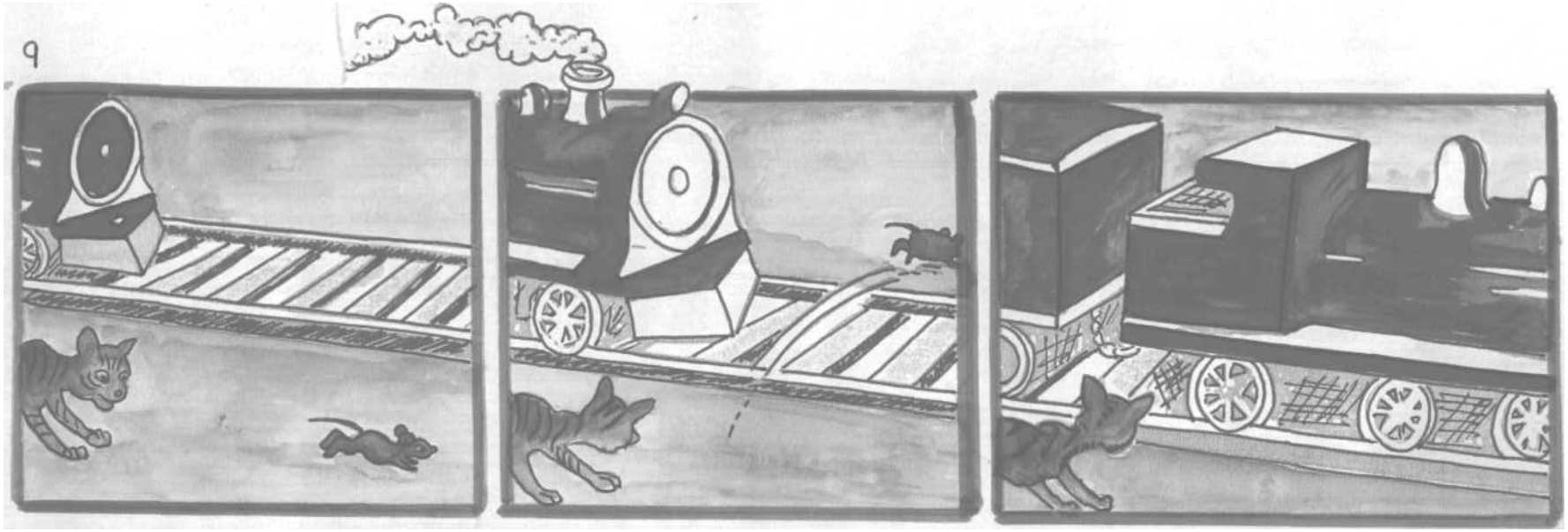


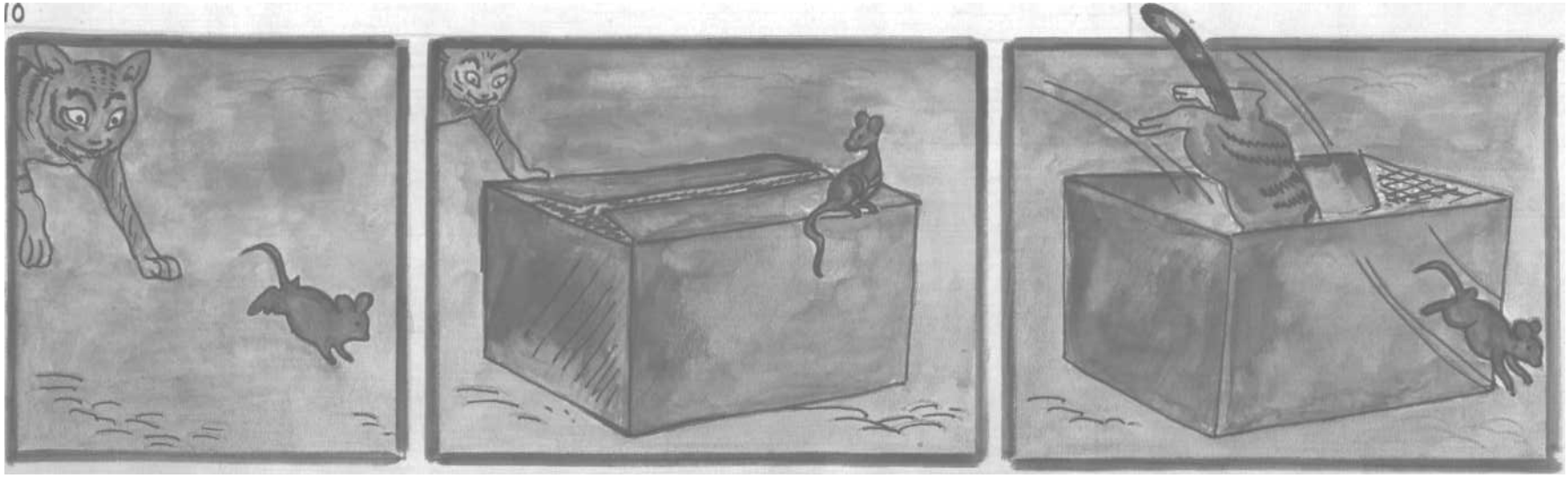


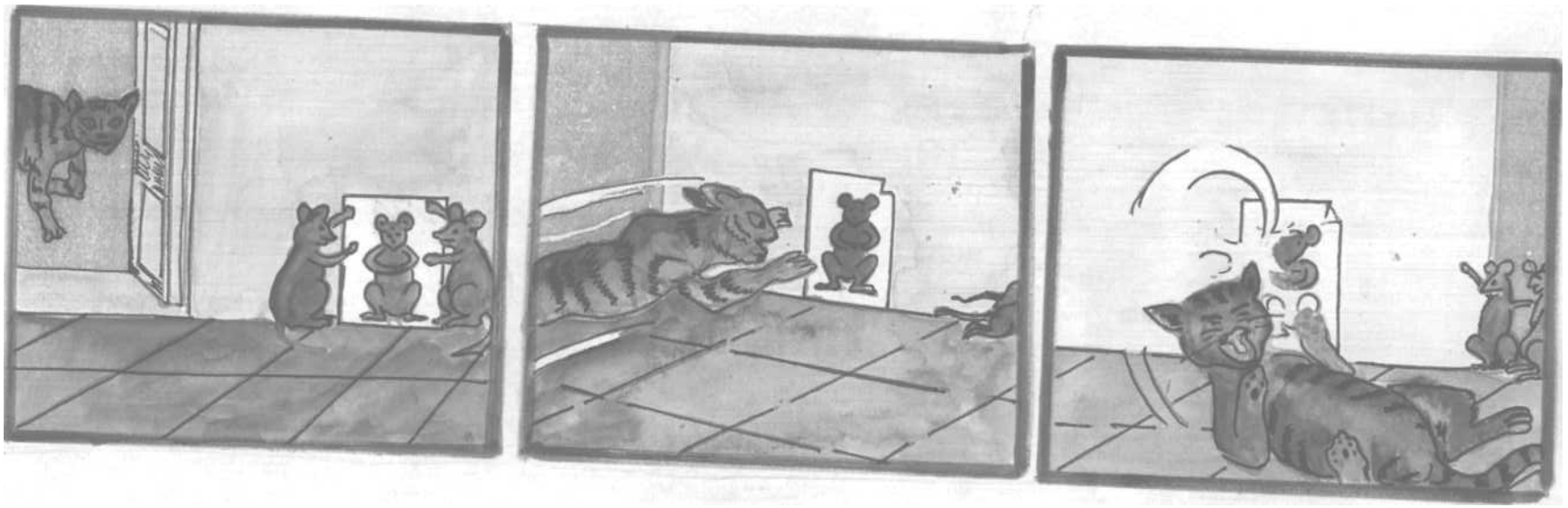


9



10





Age: 5y Months

1

Transcription of the Conversation, Story Narration and Picture description

Clusters in Conversation

CONVERSATION

I:
1 A: [illegible]
IIII UFP+FP+UFP

I:
1 A: FP. [illegible]
II PR+UFP+FP+UFP

I:
1 A: I Std.
III UFP+PR

I:
1 A: FP. [illegible]
I FP+UFP+FP+UFP+FP+UFP

I:
1 A: [illegible]
II FP+UFP+FS

I:
A: [illegible] FP. [illegible]
I UFP+FP+UFP+FP

I: FP.
1 A: [illegible] Cement Factory
I UFP+FP

I:
5 A: [illegible] (precise) [illegible]
I FP+FS+UFP+FP+FS+FP+FP

I:
1 A: [illegible]
I FP+PR+UFP
III PR+FP

I: FP.
6 A: [illegible] — Tora Tora [illegible] Giant Wheeler [illegible] aeroplane
I FP+PWR
I PR+FP+UFP

I:
1 A: [illegible]
FS. (precise) I PR+FP+PR
I FP+UFP+PR
III FP+UFP

I:
A: FP. — Balls [illegible] — FP. — Bat Ball, Tennis [illegible] — Football [illegible].
I FP+R+PR+UFP
I FP+P

I: FP. FP.
A: [illegible] [illegible] Hockey [illegible] Bat Ball [illegible] Football
I PR+FP+UFP

I: FP
1 A: [illegible] Drill Master
II FP+UFP+FP
II PR+UFP+FP+UFP
I PR+UFP+UFP+FP+UFP+FP

I:
A: FP. FS. (precise) [illegible]
1 [illegible] FP. point (precise) [illegible] hole [illegible] one point [illegible].

I: FP.
A: [illegible]

18 UFP
14 FP
(precise) 2 F.S.

I:
A: orange

Utterances 9 11

I:
A: [illegible] Bat ball

5 [illegible], catch [illegible]
[illegible]

I:
1 A: — [illegible]

I:
1 A: [illegible]

I:
1 A: Field

I:
1 A: [illegible] TV ([illegible]) VCR

I: FP
A: [illegible] — [illegible] Tom and Jerry ([illegible]) Postman Pat — [illegible] [illegible]

I:
A: [illegible] Jerry - [illegible] rat ([illegible]) Tom [illegible] cat

I:
1 A: Tom [illegible] [illegible]↑ [illegible]↑ FP [illegible] [illegible]

I:
1 A: — Postman Pat

I:
A: FP [illegible] — FP Postman Pat FS (incomplete phrase) [illegible] FP postman [illegible] [illegible] (precue)

I:
A: [illegible]

I:
A: FP [illegible], [illegible], [illegible]

I:
A: [illegible] ([illegible]) [illegible] — [illegible].

I:
1 A: [illegible] Jayalakshmipuram

I:
1 A: — [illegible] turn [illegible] FP [illegible]
[illegible] red [illegible], [illegible].

I: FP
A: [illegible]. [illegible] 7 [illegible]
4 FP [illegible] homework 9 [illegible]
[illegible].

I:
A: FP Chapati - ([illegible]) [illegible]. . .

I: FP
A: — [illegible] ([illegible]) [illegible].

I: FP
A: [illegible] — Bread ([illegible]) jam

I:
A: [illegible]

I: FP
1 A: Feb. 14 [illegible]

(2 [illegible]) 1 [illegible]
21 FP (1 [illegible])
14 UFP
1 precue → 10 PR
1 incomplete phrase [illegible]
[illegible]

2) A: [illegible] — Ballon [illegible] ..., [illegible]. [illegible] cake cut [illegible] candle ....
I:
5 A: [illegible] letter
I:
2 A: [illegible] friend [illegible]
I: CF
3 A: [illegible] Krishna
I:
1 A: [illegible]
I:
1 A: [illegible]
I:
4 A: [illegible] school. [illegible] St-Joseph
I:
3 A: [illegible] Pushkarni, [illegible] school
I:
1 A: [illegible] Shyamala Miss
I:
1 A: Bhanumati Miss
I:
1 A: Indumati Miss
I:
1 A: Chepa
I: FP PWR
5 A: [illegible]
I: FP FP
3 A: [illegible]
I: FS (content modifn)
13 A: [illegible]
I:
1 A: [illegible]
I: Then he described the pictures + told a story.
2 A: evo — ChocoBar, Chocholate
I:
1 A: [illegible] ...
I:
1 A: [illegible]
I:
1 A: Maruthi van
I:
1 A: Light Brown
I:
4 A: [illegible] — 60 days [illegible]
I: FS (content modifn)
5 A: [illegible]
I: FP
1 A: [illegible]
I:
A: [illegible]
I:
A: [illegible]

12 - UFP
14 - FP
10 - PR
1 - PWR
(content modfn) 2 - F.S.
2 A.T.
81 utterances

a
I:
3 A: ಇದು Krishna ಮತ್ತೆ - ಅಲ್ಲಿ [illegible]
I:
3 A: ಇದು Bat Ball (ಮತ್ತೆ) Football
I:
3 A: Bat Ball ↑ ಆಡ್ತೀನಿ Football ಆಡ್ತೀನಿ.
I:
4 A: W.R. Bread Bread (ಮತ್ತೆ) sauce
I:
3 A: ಇದು Bread (ಮತ್ತೆ) jam
I:
1 A: ಇದು — Fruits
I:
5 A: ಇದು Banana (ಮತ್ತೆ) ಇದು - Banana ಮತ್ತೆ grapes
I: phonol[illegible]
4 A: ಇದು ಇದ್, ಇದು ಇದ್.
I:
5 A: ಇದು — ಇದು Blue - Dark Blue (ಮತ್ತೆ) - DarkBlue, Yellow (F.S. (precise) W.R.)
I:
11 A: ಇದು elephant ನೋಡಿದ್ದೆ, lion ನೋಡಿದ್ದೆ / tiger ನೋಡಿದ್ದೆ, crocodile ನೋಡಿದ್ದೆ ಮತ್ತೆ snake ನೋಡಿದ್ದೆ, python ನೋಡಿದ್ದೆ ಅಷ್ಟೆ.
I:
2 A: ಇದು tiger ಮಲಗಿಕೊಂಡಿದೆ.
I:
6 A: ಇದು lion ಅಷ್ಟೆ crocodile, crocodile, ಆದು. ಇದು [illegible] swim ಮಾಡ್ತಾ ಇದೆ. (precise) → expanding F.S.
I:
1 A: ಇಲ್ಲ
I:
2 A: Giraffe ನೋಡಿದ್ದೆ
I:
2 A: ಇದರ [illegible] [illegible]
I:
1 A: ಇಷ್ಟೆ ಇದ್.
I:
2 A: [illegible] [illegible] [illegible].
I:
2 A: [illegible] ಮತ್ತೆ [illegible] [illegible].
I:
1 A: icecream
I:
1 A: Mango ಮತ್ತೆ [illegible]
I:
2 A: [illegible] chocholate
I:
1 A: ಇಲ್ಲ
I:
2 A: ಇದು [illegible] dress ಹಾಕೊಂಡೆ
I:
3 A: pant ಮತ್ತೆ shirt
I:
4 A: ಇದು red ಮತ್ತೆ - pink

7. UFP
(precise) 2. FS.
1. phonol[illegible]
2. W.R.
13. FP
12. PR
2. [illegible].
77 utterances

3 A: ಅಂ — ಅಂ — Deepavalige ನಾನು ಅಂ ಪಟಾಕಿ ಹಚ್ಚಿದೆ.
T:
2 A: ಅಂ Hydrogen (ಮತ್ತೆ) Bomb
T:
1 A: ಹಚ್ಚಿದೆ
T:
A: ಆಮೇಲೆ ದೊಡ್ಡ ಪಟಾಕಿ ಹಚ್ಚಿದೆ.
T:
A: [illegible] ಮತ್ತೆ Mysore Pak ಮತ್ತೆ — ಅಂ — (noun)
T:
A: Biscuit ತಿಂದೆ, Chocolate ತಿಂದೆ
T:
1 A: [illegible]
T:
4 A: ಅಂ [illegible] [illegible] [illegible], [illegible] dance [illegible].
T:
1 A: ಇಲ್ಲ
T:
2 A: ನಮ್ಮಪ್ಪ ಬರ್ತಾರೆ.
T:
1 A: ನಮ್ಮಪ್ಪ
T:
1 A: Rajesh ಅಪ್ಪ
T:
1 A: ಇಲ್ಲ
T:
2 A: ಅವರ Factoryಗೆ ಹೋಗ್ತಾರೆ.
T:
1 A: ದೊಡ್ಡವರು
T:
A: ಇಲ್ಲ. ಅವರು first [illegible] ಅಂ ಅವರು [illegible] [illegible]
factoryಲಿ ....
T:
1 A: [illegible]
T:
3 A: Machine (ಮತ್ತೆ) — Borewell
T:
A: ಇಲ್ಲ [illegible]
T:
A: ಅಂ cement Factory, "Rajkamal ....."
T:
2 A: [illegible] ಮತ್ತೆ — Hyd.
T:
A: ಇಲ್ಲ, [illegible], [illegible] [illegible].
T:
A: ಆಮೇಲೆ [illegible] [illegible] ಆಮೇಲೆ [illegible].
T:
2 A: [illegible] [illegible] [illegible] [illegible].
T:
A: [illegible] — [illegible] ಅಂ — ಅಂ [illegible] [illegible] ಆಮೇಲೆ ಅಂ —
ಆಮೇಲೆ [illegible], [illegible] [illegible]
T:
1 A: ಅಂ ನಮ್ಮ Uncle
T:
1 A: ಅಂ ನಮ್ಮ friend ಮನೆ.
T:
1 A: ಅಂ [illegible]

10 PR
11 UP
15 IP
1 - WR.
7 Utterances

W R.

2 A: ರಜೆಗಳಲ್ಲಿ Holiday
I: (pronoun)
2 A: — ಎಲ್ಲಾರು ಬಂದ್ರು
I:
1 A: ಮೊದ್ಲನೆದು
I:
2 A: ಅಂ social study ಮತ್ತೆ Science, Kannada ಮತ್ತೆ ಅಂ — Eng. ಮತ್ತೆ k ಅಂ—Sanskrit.
I:
2 A: Scienceಲ್ಲಿ parts of the body
I:
7 A: ಅಂ neck ಮತ್ತೆ ಲೆಗ್ಸ್ ಮತ್ತೆ hand ಮತ್ತೆ ಅಂ- [illegible].
I:
2 A: Multeಲ್ಲಿ, tables
I:
2 A: ಅಂ- ಅಂ 10 once, 11 once — 6 - FP.
I: (W.P)
3 A: Englishನಲ್ಲಿ ಅಂ—Singಲ್ಲಿ poem. — 7 - UFP
I: — 2 FP
1 A: ಅಂ - [illegible] ಮತ್ತೆ (incomplete utterance) — 1 - FS.
1 - W.P.
1 - P. I.
30 utterance.

[illegible] less [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
P.W.R

3.0 utterances

Clustering
2 AI + FP
1 AI + PR

1 PWR
4 FP
8 A.I.
3 P.R.

PICTURE DESCRIPTION

1. [illegible] tortoise [illegible] tortoise [illegible] part utterance 2 AT. 1-P.utt. rept^n 15 utterances

2. [illegible] cat [illegible] (content modific^n) [illegible] 4-A.T, 1-rept^n, 3-FP., 1 F.S., 2-P.R. 11 utterances

3. [illegible] (content modific^n) (content modific^n) bag [illegible] glass [illegible] 1-FS. 3-FP, 1-PR 5 AT

4. [illegible] cat [illegible] cat [illegible] P.W.R. 2 AT. 4 utterances

5. [illegible] (verb) Bye Bye [illegible] FS (praise) FS (precise) rat [illegible] Tata [illegible] FS (incomplete) 3-FP; 3-AT; 3-FS; 1-PWR. 2-precise 1-incomplete utterance 10 utterances

6. [illegible] rat [illegible] F.S. 1-FS; 3 FP. (precise) 14 utterances

8. [illegible] p.utterance rept^n [illegible] boat [illegible] fast [illegible] 1-UFP 2-1 P^n part utterance rept^n 11 utterances

9. [illegible] cat [illegible] cat [illegible] rat [illegible] (content modific^n) (negation excl^n) rat [illegible] jump [illegible] engine [illegible] 4 FP; 3-UFP 1-phrase rept^n 2-F.S. 15 utterances

10. [illegible] cat [illegible]
1-P.R. 1-1 P. 2-A.T. 15 utterances
(content modific^n) 1-F.S.

ಒಂ ಇದು ಅಡಿಯಕ್ಕೆ ಹೋಗುತ್ತೆ ಇದ್ ಆಕಡೆ ಕೈಹಾಕ್ತಾಇತ್ತೆ. ಇದು
ಬಂದಂತ ಬರ್ಡ್ಡಲ್ಲಿತ್ತೆ.

3 FP. ; 2 FS. < content modif" / incomplete | 2 utterances
1 - P.R., 1 - AT

(?ill) (?dialing)

| P + AI + FP + FS
| FP + F + FP
||| FP + FS
|| . AI + FP
| AI + PP + FS
| F + UFP + FP
| . AI + FS
| R + UFP
| AI + PR

[illegible]

[illegible]

[illegible]

3 FP. ; 2 - FS. < content modif / incomplete — 12 utterances

1 - P.R. , 1 - PT

[illegible]

| P + PI + FP + FS

| FP + I + PP

||| FP + FS

|| · PI + FP

| PI + PP + FS

| F + UFP + FP

| · PI + FS

| R + UFP

| PI + PP