

“Disfluencies in 3 to 5 Years Old Telugu Speaking Normal Preschool Children”

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Abstract

Speech disfluencies are widespread in spontaneous verbal communication. According to Adams, 1977 from a clinical perspective, “data on speech characteristics of young children, just beginning to stutter are needed to develop meaningful norms that can be used in refining and validating differential diagnostic schemes of early childhood stuttering”; Hence, a normative disfluency reference across age will assist differential diagnosis of normal disfluency and beginning childhood stuttering, therefore, facilitating in planning the appropriate management program.

Purpose: The objectives of the present study are to investigate 1) the frequency of disfluencies, and types of disfluencies exhibited by 3 – 5 year old typically developing Telugu speaking children, 2) whether age, gender or speech elicitation tasks have any impact on disfluencies.

Method: 24 typically developing Telugu speaking preschool children between 3 - 5 years were selected for the study. Three different speech elicitation tasks used are a general conversation, nursery rhyme recitation, and picture description. Speech samples were audio reordered and transcribed verbatim for the further analysis of 10 types of disfluencies.

Result: Results indicated that 1) there is an insignificant difference in total disfluencies between age and gender. 2) There is a considerable difference among the percentage of disfluency across task. 3) There is a significant difference between the distributions of individual disfluencies.

Conclusion: The study suggests that disfluencies are greater as age increases (from 3 to 5 years old). Males showed the highest values of total disfluencies than females. Picture description task is more disfluent than other two speech elicitation tasks. Among the disfluencies, the pause has the highest frequency of occurrence regardless of age or gender.

Educational objectives: The reader will learn about: 1) the impact of age and gender on the total frequencies of disfluencies in normal Telugu-speaking preschool children; 2) the total disfluencies as well as the type of disfluencies seen in these young children's

speech, and 3) the impact of speech elicitation tasks in different types of disfluencies in Telugu speaking normal preschool children.

Keywords: *Disfluencies, pre-schooler, Telugu Speaking, Stuttering.*

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Chapter I

Introduction

Kent (1976), defined Speech as a complex, highly skilled motor act, of which the complexity and stabilization will continue to adolescent years. It comprises three components that are voice, articulation and fluency. In recent years, researchers have interestingly turned into young children's speech disfluencies as a root of information about the development of language. It is exciting to study the speech disfluencies and language acquisition process as speech disfluencies may possibly reflect underlying linguistic processes. The steady flow of linguistic production may be disrupted by Speech disfluencies. These disruptions occur when the speaker encounters difficulty to recoup a particular word or syntactically construct a sentence. In addition, changes in fluency may signify changes in language development or attempt to use new strategies in language acquisition (Goldman-Eisler, 1968; cited in Guo, Tomblin, & Samelson, 2008).

I.(A). Fluency and Disfluency:

The term *fluency*, derived from the Latin word “fluere” meaning to flow (Guillot, 1999). The speech is the smooth and continuous forward flow of sounds that contains meaningful linguistic information. Starkweather (1987), described fluency as “effortless flow of speech”. Fluency means the non-stuttered and forward flow of verbal utterances in terms of both content and production (Starkweather, 1987). American Speech-Language and Hearing Association (ASHA) Special Interest Division (SID) 4 defined *Disfluency* as speech that exhibits deviations in continuity, smoothness, and ease of rate and effort. Term ‘disfluency’ or ‘nonfluency’ imply disruptions in both timing and continuous course of speech those are commonly considered as normal. The Latin

prefix “dis” denotes separation, negation or opposition (Farlex Partner Medical Dictionary, 2012). The prefix “dys” denotes means “abnormal or faulty” (American Heritage Dictionary of the English Language, 2011). According to Wingate (1984), the term “disfluency” is the referent of “all kinds of speech features that contrast with fluency” however, dysfluency, signifies abnormality of fluency; but is not limited to stuttering. The researcher concluded that fluency is thus the central referent from which distinct words are constructed by adding to “fluency”, the qualifying prefixes: “dis” (or “non”) and “dys” (Wingate, 1984). Starkweather (1987), viewed ‘Disfluency’ as normal, non-stuttered interruptions of speech and ‘dysfluency’ as stuttered interruptions of speech.

Speech disfluencies are widespread in spontaneous verbal output. Most of the children usually exhibit normal disfluencies when their language skills become more proficient, especially at 2-6 years of age. These disfluencies are usually insignificant and produced effortlessly. Some children may learn to speak with comparatively lesser disfluency; while others repeat sounds, syllables, or phrases, interject and/ or revise during this period. Recently researchers in the field of stuttering are more interested in gathering normative reference on the disfluencies of normal young children to assist in making a differential diagnosis of normal disfluency from incipient stuttering characteristics. According to Adams (1977), from a clinical viewpoint, “data on speech characteristics of young children, just beginning to stutter are needed to develop meaningful norms, that can be used in refining and validating differential diagnostic schemes of early childhood stuttering”. It is also known that speech and language acquisition and incipient stuttering occurs at the same period of rapid speech and language development between the 2.5 and 5 years of age (Bloodstein & Ratner, 2008). The current study reviews the occurrence of disfluencies observed at the discrete ages from 3-5 years. In addition, this also focuses on the effect of age, gender and speech generation task on disfluencies.

I.(B). Dimensions of Fluency:

Starkweather (1987) defined speech fluency as “a normal level of skill in the production of speech” (p. 12). He proposed four primary dimensions of fluency: continuity, rate, duration, coarticulation, and effort.

- **Continuity** - i.e., the relatedness of sounds, syllables, and words within the verbal output.
- **Rate** -i.e., the pace at which a spoken message is verbalized.
- **Rhythm** -i.e., prosodic patterns within a verbal output.
- **Effort** - i.e., the amount of energy a speaker use up while speaking.

I.(C). Normal developmental disfluencies:

Children may be more disfluent at certain period than others as they surpass through the phases of language development. This developmental period of disfluency is a normal occurrence. Children become more fluent as they become more proficient in mastering a spoken language. According to Starkweather (1987), children's speech becomes increasingly fluent and their fluency increases as the children mature and they also learn to deal with lapses of fluency, in a more refined way. While developing language skills, between the ages of 2-6 years, nearly 80% of the children go through a period of normal non-fluency. According to Yairi (1982), in developing speakers-young children, mostly -hesitations or disfluencies occur frequently, particularly in children who are more or less on the verge of attaining full linguistic competence, around age 3, disfluency often shows a peak. Children who are delayed in their speech and language development will continue to experience disfluency as they tend to acquire a sense of failure as speakers and learn to struggle with their speech attempts (Silverman, 1996).

The development of fluency and disfluency in young children has received high interest lately. Children aged between three and five are commonly observed to experience disfluency (Bloodstein, 1983). During this period, children follow an orderly progression of language acquisition and increase their repertoire of linguistic complexity. Achieving this increase in linguistic complexity often presents a greater linguistic load for the children when they are communicating. The co-occurrence of disfluency in preschool children with their continuing language acquisition indicates potential relationships between disfluency and the increasing sentence complexity they are mastering.

I.(D). Literature review:

In literature, by the middle of 19th century, researchers interestingly turned into developing a normative reference of disfluencies in children across language and culture. Johnson et al. (1959) conducted one of the first known study in children who do and do not stutter to provide a normative reference about the speech disfluencies. These researchers obtained their data by assessing the speech disfluencies from the audio recorded speech samples of selected children's speech. The study focused on analysing the disfluencies of 89 children who do and do not stutter in the age group of 2.5 to 8 years. Their findings indicated an insignificant difference between both groups with respect to gender. Since then, many investigators conducted similar studies based on investigating speech disfluencies from audio samples of native English speakers (e.g., Ambrose, & Yairi, 1999); Pellowski, & Conture, 2002; Yaruss, LaSalle, Conture, 1998) as well as other languages (e.g., Boey, Wuyts, Heyning, Bodt, & Heylen, 2007; Carlo, & Watson, 2003; Martins, & Andrade, 2008; Natke, Sandrieser, Pietrowsky, & Kalveram, 2006). All of these researches contributed to the groundwork established by Johnson and colleagues in the 1950s.

I.(D) (1). Studies in the English Language

The exemplary studies conducted in native English speaking children to establish a normative reference of disfluencies included those done by Johnson et.al (1959); Yairi, & Clifton (1972); Yairi (1981); Wexler (1982); Wexler, & Mysak (1982); Yairi (1983); and Dejoy & Gregory (1985). Johnson et. al (1959) focused on the onset of stuttering in children upto 8 years, whereas Yairi, & Clifton (1972), and Yairi (1981) were focused on to investigate disfluent speech behaviour in young children, school going children, and geriatric people. Wexler (1982) investigated the development of disfluency in 2 to 6-year old boys in both neutral and stressful situations to analyse situational variability on disfluency. Wexler & Mysak (1982) also studied disfluencies in of 2 to 6- year-old male children. Yairi (1983) studied the onset of stuttering in young children of 2-3 years old. Dejoy & Gregory (1985) studied disfluency characters in preschool children to find out a relationship between age and frequency (cited in Ram B Anjana, 2013). All these studies on disfluencies in normal children have contributed to establish normative data

on expected speech behaviours of young children. The outcome of some of these studies was given immediately after this.

Yairi (1981) studied the spontaneous speech of 18 girls and 15 boys of 24 and 33 months old to identify different disfluencies based on the classification given by Johnson, (1961) and Williams, Silverman, & Kools (1968). This study also tried to differentiate word repetitions as single syllable word repetitions and multi-syllable word repetitions. The study also tried to provide individual and group data by counting the frequencies of occurrence of each disfluency type and the total number of disfluencies. The study concluded that the total number of disfluencies was wide-ranging from 0 to 25.6 disfluencies on a percent of word metric and four types of disfluencies recorded were part-word repetitions, single-syllable word repetition, interjection and revision. The author also observed that boys were more disfluent than the girls with the largest discrepancies observed in part - word repetitions and interjections and younger children especially 2- year-olds showed extremely diverse disfluency counts. However, the study could not find statistically significant gender differences in specific disfluency types or in the total number of disfluencies, based on two tailed t- tests ($p = .05$; $df = 31$).

Wexler & Mysak (1982) studied the disfluency characteristics in 36 non-stuttering males aged 2 to 6 yrs old to investigate types of disfluency and relationships among the different disfluency types. The authors identified and classified a total of 7 disfluency types based on the revision of Johnson's (1961) classification system and the total frequency of various disfluency types was investigated. In addition, the study also evaluated two kinds of compound disfluencies- clustering, (a term introduced by Silverman, 1969) to describe the occurrence of more than one disfluency on the same word or consecutive words or both, and oscillation, (a term introduced by Mysak, 1978) to describe the number of repetitions per instance of disfluency. The authors reported that the two most commonly occurring disfluency types observed were a revision, incomplete phrases and interjections which were followed by phrase repetitions and word repetitions. The least observed type was part-word repetitions for 2 -year- olds and disrhythmic phonations, part-word repetitions, phrase repetitions, and word repetitions for 4 and 6- year- olds. Though the study reported a developmental decrease with

respect to clustering and oscillation, statistically significant differences could not be found across age groups which were supported by studies of Wexler 1978, 1982.

Dejoy & Gregory (1985) identified and studied nine types of disfluency, in 60 non-stuttering males aged 3.5 and 5 years of age. They observed seven types of disfluency that are part-word repetitions, word repetitions, phrase repetitions, revision, interjections, incomplete phrases and disrhythmic phonations (Williams et.al, 1968). The frequencies of disfluencies were computed on a percent word metric. The results indicated that some of the disfluencies that were commonly observed in young children's speech i.e., repetitions, incomplete phrases and disrhythmic phonations declined significantly. The two types of disfluency that discriminated between the older and younger children were part-word repetitions and disrhythmic phonations, significantly correlated on the older group and vary in younger children. This together may reflect a less mature speech motor system in the later preschool years which reflect "motor factor" (supported by Wexler, & Mysak, 1982). They also found that interjections and ungrammatical pauses did not decline significantly across the ages, suggesting that these are disfluencies that may characterize more of adult-like speech.

Ambrose, & Yairi (1999) studied recorded speech samples of 90 children with stuttering in the age range of two to five years within six months of stuttering onset and 54 age-matched normally fluent children. Their aim was to provide a normative reference for early stuttering which would provide a basis for the differential diagnosis of stuttering from normal disfluency and to discuss the possible differences in gender and age with respect to disfluencies in the preschool children. Their study was based on six-category classification system that included part-word repetitions, single syllable word repetitions, disrhythmic phonation comprising of prolongations, blocks and broken words, interjections revision or abandoned utterances and multi-syllable or phrase repetitions. They classified first three types as Stuttering like Disfluencies (SLD) and the rest as Other Disfluencies (OD). They concluded that Part word repetitions are the most frequent disfluency observed in the stuttering group, whereas, interjections and revisions are the highest frequent disfluencies in the control group. They could not find any statistically significant differences in gender or age within and between the experimental and control groups. However, authors noted that part word repetitions and

repetition units were decreased significantly with age. Other disfluencies tended to increase with age however, statistical significance could not be obtained. They also introduced a weighted measure of Stuttering Like Disfluencies (SLD). This is the percent of the weighted sum of part-word repetitions, single syllable word repetitions and disrhythmic phonation on a syllable metric.

Pellowski & Conture (2002) investigated disfluencies in 36 children with stuttering and the equal number of normal children whose age and gender was matched. They measured SLD, OD, total disfluencies (TD) and the number of repetition units (RU). They also calculated the weighted SLD measure as described by Ambrose & Yairi (1999). Results showed a statistically significant difference between the groups for stuttering-like disfluencies and total disfluencies.

I.(D) (2). Studies in other languages:

According to researchers, stuttering is a fluency disorder observed across languages and cultures (Bloodstein, 1995; Cooper & Cooper, 1998; Shapiro, 1999; Van Borsel, Maes, & Foulon 2001; and Van Riper, 1971). Hence lots of similar studies were carried out in different linguistic and cultural groups to generalize of findings of English speaking children to other linguistic and cultural group.

Carlo & Watson, 2003 studied disfluencies of 32 normally fluent monolingual Spanish-speaking children of age between 3 to 5-year old. The study also examined the influence of gender and age on the speech disfluencies. They adapted the classification system described by Dejoy & Gregory (1985), Yairi (1981) and Campbell, & Hill (1987) to analyse disfluencies. Results showed a statistically insignificant difference in the total speech disfluencies exhibited by boys and girls or by the younger and older age groups. This differed from the earlier findings of English studies that there is a decrease in the total disfluencies with an increase in chronological age (Dejoy, and Gregory, 1985; Wexler, 1982; Wexler, & Mysak, 1982; Yairi, 1997). However the absence of gender effect was in congruence with earlier studies of English speaking children done by Ambrose & Yairi, 1999; Haynes, & Hood, 1977; Kools, & Berryman, 1971; Yairi, 1981, 1982 and Yairi, & Lewis, 1984. The authors thus concluded the possibility that

the relationship between age and disfluency may be different for Spanish and English speaking children.

Natke, et.al, 2006 conducted a study in German-speaking preschool children who stutter and children who do not stutter whose age and gender was matched. Their aim is to compare stuttering like as well as normal disfluencies of German-speaking preschool children who stutter with that of children do not stutter. Their goal was to find out how powerful are the classification measures for the diagnosis of stuttering in German-speaking pre-school children and to see how disfluency patterns of native English and German- speaking children close to the onset of stuttering differ. Their results were consistent with reports of Yairi, & Ambrose, 1999; Pellowski, & Conture, 2002 conducted in English speaking children. All of them reported that specific types of disfluencies for CWS and CWNS differ significantly at a very early age and all disfluency types classified as SLD are produced significantly more often by children who stutter than by children who do not stutter. Their findings were consistent with that of Ambrose, & Yairi, (1999) who stated that “very early stuttering is distinct from normal disfluency” and “therefore it cannot be said that all children go through at least a brief period of “stuttering” (cited in Natke, et.al, 2006).

Boey, et.al (2007) conducted a study to compare the characteristics of stuttering-like disfluencies in 693 Dutch-speaking children who stutter with that of 79 normally speaking children. Their findings of the characteristics of stuttering-like disfluencies in Dutch-speaking children are similar to the studies in English-speaking children. They found out a statistically significant difference in the frequency of SLD between the stuttering group ($M = 15.71$) and control group ($M = 0.42$).

Characteristics of stuttering-like disfluencies in 8 monolingual Portuguese school-age children whose mean age was 10 years, were studied by Valente, Ana Rita, & Jesus, Luis, (2011). They also compared it with an equal number of normally fluent children. The authors also developed an assessment tool (Jesus & Valente, 2010), to evaluate the factors that characterize SLD i.e. frequency and types of SLD, duration and physical tension of concomitant symptoms which was described earlier by Guitar, 2006 and Riley, 2009. The authors found that the mean number of repetition units for the group with stuttering was higher than that of the normal group, which was in congruence with

studies by Yairi & Ambrose, 1999 and Boey et al., 2007. All these studies find out some amount of physical tension associated with SLD in the stuttering group and no tension was seen in the normally fluent group.

Several studies in late 19th and early 20th century have provided much information about disfluencies of young children with and without stuttering. The studies done by Yairi, & Lewis, 1984; Meyers, 1986; Conture, 1990; Schwartz, Zebrowski, & Conture, 1990; Zebrowski, 1991; Yairi, & Ambrose, 1992; Ryan, 1992; Yairi et al. 1993; Yaruss, 1997; and Boey, et.al, 2007 compared disfluencies of children who stutter with their normally disfluent counterparts. These studies have contributed to an additional understanding of childhood stuttering. While Meyers (1986) studied quantitative and qualitative variability of disfluency in children, Zebrowski (1991) attempted to provide data on duration of disfluencies.

Studies in Indian context:

In India, many researchers have studied different aspects of speech fluency in most of south Indian languages except Telugu that included but not limited to Nagapoornima, 1990; Indu, 1990 & Yamini, 1990; Rajendraswamy, 1991, Rathika, Kanaka, Sunila, & Rajashekhar, 2012 and Ram B Anjana ,2013 in Kannada language; Joby, 1998; Umarajan, 2000; James ,2011; and Abraham, Anuja Sara; Kumaraswami, Satish; George, Janet & Arya, 2015 in Malayalam; Paulene & Boominathan, 2008 in Tamil. Sharma, 1991 studied disfluencies in Hindi speaking children. Although many studies tried to describe early speech disfluencies in the various Indian context, the data provided by them are diversified.

Nagapoornima, 1990; Indu, 1990 & Yamini, 1990 and Rajendraswamy, 1991 developed a fluency test in Kannada based on their study in different age groups. While Nagapoornima (1990), studied disfluency data of 12 children in the age groups of 3-4 years, Indu(1990); Yamini (1990); and Rajendraswamy (1991) studied disfluencies of children aged, 4-5, 5-6 and 6-7 years accordingly. They used simple pictures, cartoons and pictures depicting Pancatantra stories to record speech sample for further disfluency analysis. They considered a total disfluency of greater than 25 – 30 % as abnormal. The percentage of disfluency reported in these studies are high as they considered each

iteration of sound /syllable are one repetition which is in contrast to that of studies in English, wherein most of the researchers considered several iterations of sound /syllable as one instance of repetition.

Ram B Anjana & Savithri (2007) analysed the speech samples of 20 Kannada speaking children (10 boys & 10 girls) in the age range of 5.1 to 6 years, to identify the disfluencies. The materials used included are same as that of previous studies in Kannada Language (Nagapoornima, 1990; Indu, 1990 & Yamini, 1990 and Rajendraswamy,1991). The study investigated types of disfluencies and their frequency of occurrence along the impact of gender on disfluencies. The study observed all most all disfluencies in most of the participants and among them, sound repetition are the most prominent disfluency observed. The least noted disfluency was broken words followed by prolongations. The study also concluded that boys had a greater percentage of disfluencies than that of girls.

Ram B Anjana (2013) studied disfluencies in 30 typically developing Kannada speaking children of 2 – 6 years old. Findings of the study revealed that, percent disfluency of 2.21, 3.47, 2.94, and 3.38 in children in the age range of $2.1 \leq 3$, $3 \leq 4$, $4 \leq 5$, $5 \leq 6$ years, respectively which can be considered as normal. No significant gender difference was obtained for percent disfluencies across age groups. The significant difference across ages was obtained only for DP and TD. According to the author, increased likelihood of disfluencies in older children is because they use more syntactically complex utterances than young children. The study also observed the increasing tendency of interjections and revisions with an advance in age. The study concluded that children between 2 to 4 years showed a high frequency of all most all types of the disfluencies, which indicates a close proximity to the period of onset of stuttering.

Umarajan, (2000) conducted a research study on 60 Malayalam speaking children between 3- 8 years of age to investigate the relationship between age and the total percentage of disfluencies. The study could not find any linear relationship between age and the total percentage of disfluencies though the percentage of disfluencies decreased with age upto 6 years. In contradictory to this, there was an increase in the percentage of disfluencies by the age of 6-7 years and again decrease from 7-8 years. 3-4 years group

showed the highest percentage of disfluencies. Unfilled pauses were greatest in frequency; in the age range of 3-4 years and 4-5 years. Phrase repetitions or prolongations were not observed in age children between 4-5 years old. Children between 5-6 years showed the highest frequency of parenthetical remarks, and those between 6-7 years had the highest frequency of audible inspirations. Filled pauses were observed at maximum in children between 7-8 years.

James (2011) conducted a study in Malayalam speaking normal children in the age range of 3- 6 years to find out nature of disfluencies. The author observed all most all disfluencies in the speech sample of children in the selected group. The study reveals that interjection, repetition and silent pauses were the most frequently occurring disfluencies especially silent pauses were evident in earlier age whereas interjection and repetition were almost consistent throughout the child's repertoire. Disfluency index are found to be decreased with the increase in age. The disfluencies like part-word repetition, silent pauses and sound/syllable interjections were evident in the earlier ages and as the child progress through the age disfluencies like whole word repetition, word interjection and incomplete phrases are frequently occurring. Such pattern shows the child's progressive control over his language.

Abraham, Anuja Sara et.al (2015) studied Pause Duration in Typically Developing Malayalam Speaking Children. The study revealed that there is not much variation in the filled pause duration, whereas the unfilled pause showed a consistent general progression across the age group for conversation task. The study concluded that the reason for the increase in the pauses may be attributed to them being used during the planning time, required for the production of the content words (Silverman, 1973).

Shekinah & Boominathan (2008) studied disfluencies in 3 to 4-year-old Tamil speaking children. At the end of the study, researchers got an average disfluency score of 8% and 7.4 % for 3to 3.6 years and 3.6 to 4 years accordingly. Rathika et.al, (2012) analysed the disfluencies in 48 Tamil Speaking normal Children between 4 - 8 Years (with 12 children in each age group). A total of seven types of disfluencies were identified. They included filled pauses, unfilled pauses having a duration greater than 300 ms; repetition (that include syllable repetition, part word repetition, whole word repetition, phrase repetition), parenthetical remark, false starts, audible inspiration, and

prolongation. The results indicated pauses to have the highest percentage of disfluencies in all the age groups; among the repetitions, whole word repetitions occurred most frequently, followed by part-word repetition; syllable and phrase repetition showed an increasing trend till 7 years with age and reduced by 8 years; prolongation was the only disfluency that was not seen in any of the children between 4-8 years (only one child exhibited between 5-6 years) and the total percentage of 38 disfluencies ranged from 17.1 (7-8 years) to 30 (5-6 years). However, the findings of the study were not in congruence with the Western studies.

I.(D) (3). Frequency of speech disfluencies:

According to Yairi, (1997), ‘disfluency counts are the best ever metric of stuttering for both clinical and research purposes’ hence, used as the dependent measure in numerous studies of fluency (cited in Ram B Anjana & Savitri, 2007). Van Riper in 1971 considered the number of disfluencies as a clinical measure to evaluate disfluency and an index of stuttering severity. Analyses of disfluency received the greatest value in the evaluation and diagnosis of early childhood stuttering, as it also provides information about the differential diagnosis of normal disfluency and incipient stuttering.

Zebrowski (1995) defined ‘Frequency of disfluency’ as the number of disfluent speech units (can be either syllables or words) a child often produces within a sample of predetermined size or duration of the speech sample. Yairi (1981) analyzed the frequencies of occurrence of disfluencies in the verbal output of 33 2-year old normally speaking children. Yairi (1981) found less than 6 disfluencies per 100 words in about half of the subjects he studied, while others had disfluencies between 6 and 13 per 100 words. Also, there was the maximum concentration of subjects close to the lower end i.e., less than two disfluencies per 100 words.

In Wexler, & Mysak (1982)’s study, the frequency of disfluency was calculated per 100 words spoken for non-stuttering male children in the age group of 2, 4 and 6 years. They found that the mean frequency of total disfluency was greater for 2-year-olds when compared to 4 and 6-year-olds. Also, 2-year-olds showed the highest frequencies

of disfluencies than that of the other two groups. The study also concluded that the highest variability of frequency counts in the 2-year-olds than that of other two.

Dejoy & Gregory (1985) found that 3.5 years olds were more disfluent than 5-year-olds in the frequency count of total disfluencies. Carlo, & Watson (2003), studied disfluencies of 8 girls and 7 boys aged 3.5 to 4 years and 8 girls and 9 boys aged 5.0 to 5.5 years and found that means of total disfluencies ranged from 5.21 to 8.26 with the younger boys showed lowest and older girls showed the highest mean values, though the difference was no statistically significant across age or gender. When they combined both age groups, total frequency of speech disfluencies was between 3.0 and 5.99.

Ram B Anjana (2013) observed in most of the Indian studies, a total disfluency of greater than 25 – 30 % was considered as abnormal. The percent disfluency is high in Indian studies compared to that of English studies. According to researcher, this is because most of the Indian researchers calculated each iteration as one repetition which was incongruous with English studies, in which several iterations of sound /syllable counted as one instance of repetition (Ram B Anjana, 2013).

The results of all these studies provide interesting findings. First, reports of the studies that examined normally fluent children, found frequencies to be different for different age groups. With younger children (around 2-3 years) showing higher frequencies compared to the older group (4 to 6-year-olds). However, some reported no effect of age or gender on disfluencies. Second, there is lots of variability with respect to the frequency, suggested by the high Standard Deviation obtained in the scores. SDs is noted to be approximating the mean.

I.(D) (4). Disfluency measurement:

A brief review of the literature of disfluency calculation revealed that some researchers prefer to count the number of syllables in the given speech sample (e.g., Boberg & Kully, 1985; Campbell, & Hill, 1987; Costello, & Ingham, 1984; Riley, 1994) whereas others count the number of words (e.g., Conture, 1990a; Conture, & Caruso). In general the difference between these two units of measurement appear to be relatively minor because it is possible to convert from one unit to the other by simply

multiplying by a constant representing the ratio of the number of syllables per word (Andrews & Ingham, 1971; Conture, 1990b, Conture & Caruso, 1987; Culatta & Goldberg 1995; Ham, 1986; cited in Yaruss, 1997).

I.(D) (5). Counting Total disfluencies:

This simply means counting all the disfluencies present in a speech sample with no distinction being made as stuttering or normal. Yairi (1997) stated that “disfluency counts have been the classic metric of the disorder (stuttering) as well as the dependent variable of interest in both clinical and experimental studies” (cited in Ram B Anjana & Savithri, 2007). This metric is archetypal as it has not changed substantially since it was first introduced by Johnson in the late 1950s (Johnson, 1961; Johnson et al., 1959). Here, the clinician/researcher transcribes a speech sample and then classifies each transcribed disfluency to a particular type. Thus, in this method, no differentiation is made between normal disfluencies and stuttering.

I.(D) (6). Types of disfluencies:

The frequency of speech disfluency is highly variable both amongst and between the different ages in preschool children. Hence, by its own, it cannot unfailingly differentiate between stuttering and normal disfluency in preschool children. Therefore it is necessary to take into account the types of disfluencies that children produce, as well as the proportions of these different types in order to categorize a child as stuttering or normally disfluent. There have been several studies reporting several types of disfluencies produced by young stuttering and non-stuttering children, and their distribution. One of the first classification schemes was proposed by Johnson 1961; (Johnson, Darley & Spriestersbach, 1963) who categorised disfluencies as either interjection, part word repetitions, word repetitions, phrase repetitions, revisions, incomplete phrases, broken words or prolonged sounds. Kools, & Berryman (1971) in their study of 92 first grade children, found that non-stutterers showed more interjections than any other type of disfluency.

Several studies considered variations on Johnson’s method of classification of disfluencies, as very effective for differentiating between normal disfluency and

incipient stuttering (Ambrose & Yairi, 1999; Pellowski & Conture, 2002). Johnson's system was modified by later investigators, thus restricting comparisons among studies that used its many variants. For example, Gregory & Hill (1993) and Zebrowski, (1991) used 10 disfluency characteristics whereas Carlo & Watson (2003) used 15 disfluency types. While Yairi & Ambrose (1992) used 8 disfluency types, Yairi, Ambrose & Niermann (1993) used 7, and Yairi & Ambrose, (1999) used only 6 disfluency types. The Stuttering like Disfluencies (SLD) measure was introduced by Yairi, E., & Ambrose (1992). According to Yairi (1995), Stuttering like Disfluency reduces the semantic confusion of labelling disfluencies of non stuttering children as "stuttering", and recognizes that not all disfluencies of persons who stutter are necessarily "stuttering".

Yairi & Lewis (1984) used a modified classification scheme of Johnson's (1959) classification of disfluency to identify disfluencies in ten 2-3-year-old normal children and their age-matched control groups. They found that both groups produced "all recognized types of disfluency", but in varying amounts. The most frequently occurring disfluencies in the speech of stutterers, in ranked order, were part-word repetitions, disrhythmic phonations and single syllable word repetitions. For the normally speaking counterparts, most frequently occurring disfluencies in ranked order were interjections, part-word repetitions and revision-incomplete phrase. Further, the controlled group produced significantly high part-word-repetitions and sound prolongations than the non-stuttering group. Word repetitions, revisions and incomplete phrases were also the prevalent types. Yairi (1981) reported, in his 33, 2-year-old normal subjects, two clusters of common disfluency types - repetitions one syllable words or parts of words and interjections and revisions. In a follow-up of his earlier study, Yairi (1982) found that children between 2 to 3.6 years showed revisions and phrase repetitions that are high in frequency, whereas part-word repetitions and interjections are less.

Zebrowski (1991), in his study of young children within 12 months of incipient stuttering and age and gender-matched normally disfluent children, concluded that "there was no particular type of speech disfluency that was exhibited by either the stuttering or non-stuttering children". However, the findings were concordant with earlier studies, which concluded that the stuttering children produced more within word

disfluencies than their non-stuttering counterparts. Yairi & Ambrose (1999) found that the main difference between the stuttering and control groups was determined by the proportion of SLD (types of fluency disruptions that are most typical in persons with stuttering). For the group with stuttering, SLD constituted 66% of the total disfluency whereas in the normal group it was 34%. Other disfluencies constituted 34% of the total disfluency for the stuttering group and 76% for the control group. Part word repetitions occurred with maximum frequency in the stuttering group while in the control group, interjections and revisions provided the major contribution to the disfluency count. Weighted SLD scores were found to be continuous across age groups and score below 4.00 for used to assign subjects in the control group and above 4.00 for the experimental group.

Pellowski & Conture (2002), in their study on 36 stuttering and 36 non-stuttering children, also calculated the weighted SLD measure as described by Ambrose & Yairi (1999). Results showed a statistically significant difference between the groups for stuttering-like disfluencies and total disfluencies. 81% and 42% of the total disfluencies comprised of SLDs in the experimental and control groups respectively while OD occupied 58% of the total disfluencies in the controls and 19 % in the group with stuttering. According to them, the weighted SLD value of 4% and the unweighted SLD of 3% could almost correctly classify 97% of the children as stuttering or normal.

I.(D) (7). Categorization of disfluencies- Literature summary:

Literature review on disfluencies concluded with 4 different modes of categorization. They are as follows (cited in Yaruss, 1997):

1. Within word vs between words disfluencies (Conture, 1990a; 1990b): Within word, disfluencies are judged to be more characteristic of individuals who do stutter those includes monosyllabic whole word repetition, sound /syllable repetition, audible prolongation, and inaudible prolongation. Between words disfluencies are judged to be more characteristic of individuals who do stutter, those include phrase repetition, polysyllabic whole word repetition, interjection and revision.

2. Stuttering like disfluencies (Yari. 1996; Yairi & Ambrose, 1992; Yari, et.al, 1993; Yairi , Ambrose, Paden, & Throneburg, 1996): Stuttering like disfluencies (SLD) are those characteristic of individuals who stutter and include, part word repetition, monosyllabic word repetition, and dysrhythmic phonation. Other disfluencies (OD) - Interjection, phrase repetition, revision and incomplete phrase are characteristic of individuals who do not stutter.
3. Stutter type disfluencies (Meyers, 1986): Stutter type disfluencies are characteristic of individuals who stutter those include part-word repetition, prolongation, broken word and tense pause. Normal disfluencies include whole word repetition, phrase repetition, revision, incomplete phrase and interjection.
4. Less typical vs more typical disfluencies (Campbell, & Hill, 1987): less typical disfluencies are the disfluencies more characteristic of individual with stuttering those include monosyllabic word repetition (3 or more repetitions), part word syllable repetition(3 or more repetition), sound repetition, prolongation and blocks. More typical disfluencies include hesitation, interjection, revision, phrase repetition, monosyllabic word repetition (2 or fewer repetitions with no tension) and part word syllable repetition (2 or fewer repetition with no tension).

I.(E). Variable effect on disfluency:

Variables that affect the disfluency or stuttering were one of the interesting topics for many investigators. The rate of speech, syntactical complexity, and length of utterance are major parameters that were interestingly investigated by many researchers. Some studies indicated that disfluencies showed General tendency to increase with syntactical complexity or length if utterance (Bernstein Ratner & Catherine Costa Sih, 1987; Gaines, Runyan, & Meyers, 1991; Logan, & Conture, 1995; Yaruss, 1999). The relationship between rate of speech and disfluencies are uncertain though some studies indicated a possible relationship between disfluencies and fast rate of speech (Kelly, & Conture, 1992; Logan, & Conture, 1995; Meyers, & Freeman, 1985; Vanryckeghem, Martine & Glessing, Jeffrey & Brutton, Gene & McAlindon, Peter, 1999; Yaruss 1997).

Earlier studies support the psycholinguistic theory of stuttering which states that disfluencies origins from phonological and syntactical difficulties or suprasegmental encoding (Ratner, 1997; Perkins, Kent & Curlee,1991; Postma, & Kolk (1993) Bosshardt & Hans-Georg (2006), observed an increase in utterance length and syntactical complexity increases processing demands, and hence children who stutter are more susceptible to these increases. According to Howell, Au-Yeung, & Pilgrim, (1999), observed the fast rate of speech as another reason for increased disfluency as this also increases processing demands.

Speech elicitation tasks can be assorted. For example, Reilly & Fisher (2012) considered using a standard 132-word paragraph – “The Grandfather Passage” to read for speech analysis. While Mundt, Snyder, Cannizzaro, Chappie, & Geralts (2007), used counting from 1 to 20 as standard speech elicitation task, other investigators like Vogel, Adam & Fletcher, Janet & Snyder, Peter & Fredrickson, Amy & Maruff, Paul (2011) considered repeating the days of the week, Titze (1995) used recording of singing “Happy Birthday” etc. According to Vogel et al. (2011), the advantage of using these standard tasks to analyse temporal characteristics of speech are their stability and reliability. As these tasks only focus on very specific aspects of speech, they are not sufficient to provide information on conversational speech. This is the reason why the investigators also used free speech tasks for speech analysis. Such free speech tasks can be maintaining a monologue or a short conversation for a definite duration, descriptive speech about an object, answering questions, etc. According to Vogel et al. (2011), observed the instability and unreliability of free speech elicitation task especially with respect to temporal aspects and this can be the reason why investigators in the literature did not give much attention to the spontaneous speech. Though investigators like Ingham & Riley(1998) & Yaruss (1997) considered using multiple speech samples across contexts, speakers, and situations, further research of spontaneous speech analysis is needed.

I.(E) (1). Influence of Age on disfluency:

Review of several studies on disfluency has shown that disfluency of normal speaking children tends to decrease with age. Colburn & Mysak (1982), and Yairi (1982) observed variations in disfluency at 2 years of age while conducting longitudinal

studies. Evidently, some children become more disfluent as language emerges. Several investigators (Haynes & Hood, 1977; Wexler, 1982; Dejoy & Gregory, 1985) reported the decreasing tendency of the frequency of disfluency with age from 4 to 8 years. Haynes & Hood (1977) also observed interjection significantly increases from ages 4 and 8 years. Word repetitions however, exhibited a noticeable downward shift. This downward shifting was also observed for revisions and incomplete phrases. According to Haynes & Hood (1977), the connotation of this shifting is that researchers ought to know about conceivable changes in the specific types of disfluency, as a component of expanding age when attempting to frame or to interpret normative reference on disfluency". Dejoy, & Gregory (1985) observed a decrease in some disfluencies with an increase in age from 3.5 to 5.5 years and these disfluencies include the word, part-word and phrase repetitions, incomplete phrases and disrhythmic phonations. Ambrose & Yairi (1999) did not find any significant difference in disfluencies with age, in children from 2 to 5 years of age. However, they found that among the Stuttering Like Disfluencies, part-word repetitions and single syllable word repetitions were highest in the 3-year-old range which decreased later. They observed this influence of age in repetition units too. Thus the literature is equivocal on the effect of age on disfluencies.

I.(E) (2). Influence of Gender on disfluency:

Glasner & Rosenthal (1957) found sex ratio was only 1.4 to 1 among 153 children who were reported by their parents to have stuttered at some time before entering the first grade. Andrews & Harris (1964) found that the sex ratios based on incidence figures tend to be lower than ratios based on the prevalence of stuttering at a given time, which may be due to shorter episodes of stuttering in girls than in boys. They reported that the sex ratio averaged from 2.6 to 1. Johnson et.al (1959), Kools & Berryman (1971), Haynes & Hood (1977), Ratusnik, Kiruluk, & Ratusnik, (1979), or Ambrose, & Yairi (1999) did not find any sex differences. Kools & Berryman (1971) analyzed speech samples from 46 male and 46 female first-grade children. They found no significant difference between genders. Only incomplete phrases were significantly different, with more males than females exhibiting it. Ratusnik et al. (1979) studied the rate of disfluency in 4 groups of 36 preschoolers (mean age- 4 years 10 months) each, equally divided by sex. Subjects included lower status black, lower status white, middle

social status black and middle social status of white children. They identified 6 disfluency types – interjections, word repetitions, part word repetitions, phrase repetitions, revisions and incomplete phrases - in a 300-word sample. They found disfluency on 7% of the words. They reported that “sex was not associated with rate of disfluency, and there were no interactions between sex and social status background or sex and racial background”.

I.(E) (3). Influence of speech elicitation task on disfluency.

The literature review indicated that the narration is more structured than conversation as it offers a discourse elicitation context. According to Johnston, 1982; this is because, while narrating a story, the speaker must knit the information about the characters in the story, the circumstances that the characters are facing, consequences that are related to the story either in causal and temporal way, problems solving and the final outcomes together. In addition to this, according to Stadler, Marie & Gay (2005), to narrate a story or event the speaker often uses more intricate language than that of conversation. Because speakers often use more and more elaborated verb and noun modifiers to knit each character and actions together within and across utterances (Westby, 1984). Notwithstanding this, while portraying a story or occasion, the speaker assumes sole responsibility for arranging and passing on the data to the audience wherein conversation at least two speakers co-develop the stream of topics and remarks over time without endeavouring to adjust to a recommended global structure. Accordingly, it could be contended that portraying a story or event puts more linguistic, cognitive, and communicative demands on speakers than does in conversation.

Davies (2013), suggested the idea that dialogue is more fluent than monologue, in so far as speech rates in dialogue are faster. The study also suggested that in the field of research into oral proficiency, fluency and task-based language learning, picture stories are widely used as an elicitation tool in such research, and monologue is generally preferred to dialogue because it is more convenient to measure and analyse for fluency. Dialogue tasks seem to elicit more fluent speech, and findings based on dialogue may reflect everyday speaking ability better than those based on the monologue.

Chapter II

Method

II.(A). Need for the study:

The literature review reached the following conclusions:

1. Most of the study indicated that the frequency of disfluency decreases with increasing age. (Colburn & Mysak 1982; Yairi 1982; Dejoy & Gregory, 1985; Wexler, 1982; Wexler & Mysak 1982; Yairi 1997; Haynes & Hood, 1977; James, 2011). Whereas some studies could not find any statistically significant difference in the age factor (Ambrose & Yairi, 1999; Carlo & Watson, 2003).
2. Most of the studies indicated that there were no gender differences (Ambrose & Yairi (1999), Haynes & Hood 1977; Kools & Berryman, 1971; Yairi, 1981, 1982; Yairi & Lewis 1984, Carlo & Watson, 2003; Ram B Anjana , 2013). Andrews & Harris (1964) found that the sex ratios based on incidence figures tend to be lower than ratios based on the prevalence of stuttering at a given time, which may be due to shorter episodes of stuttering in girls than in boys.
3. Researchers have observed a decrease in certain types of disfluencies (whole and part-word repetitions, phrase repetitions, incomplete phrases, revisions and disrhythmic phonations) with age. Some disfluency types like interjections have been reported to increase with age.

Most of the investigators studied either English speaking children or bilingual English speaking children. Though there were studies to investigate disfluencies in Spanish, Dutch, Portuguese, and French-speaking monolingual as well as bilingual normal children, the data are still limited. In the Indian context, few studies were

conducted on disfluency analysis that includes Hindi, Kannada, Malayalam, and Tamil. Because stuttering is a fluency disorder which can be seen regardless of culture and dialects (reviews by Van Riper, 1971; Bloodstein, 1995; Cooper & Cooper, 1998; Shapiro, 1999; Van Borsel, Maes, & Foulon, 2001) studying the disfluencies and developing a normative reference of the young children's speech across different culture and dialect is crucial. According to Bloodstein, & Ratner, 2008, a formal assessment of stuttering typically involves analysis of conversational speech. However, conversational speech alone may be insufficient to analyse different types of disfluencies in young children. The current study takes into account all the more firmly controlled correlation of the impacts of discourse modality and conceivably leads to a better understanding of the estimation of each kind of speech elicitation tasks in the analysis of youngsters' fluency.

In this context, the present study investigated disfluencies in typically developing Telugu speaking preschool children from 3-5 years old. The specific objectives of the study are:

- A. Investigate frequency and type of disfluency.
- B. Influence of age, gender and speech elicitation task on disfluency.

II.(B). Participants:

24 typically developing normal Telugu speaking preschool children of the age range from 3.0 year to 5.0 year were participated for the present study. They were divided into two equal groups based on their chronological age. Group I represent the children between 3.00 to 3.11 years old and Group II represent those between 4.00-4.11 years old. Both the group contained an equal number of male children and female children i.e., 6 males and females in both the groups. The selection criteria follow immediately after this.

II.(C). Inclusion/ exclusion criteria:

Subjects were recruited based on the school records as well as class teacher's report. Whoever selected does not possess any history of speech-language delay, hearing

impairment, intellectual disability, physical challenges or oral motor dysfunction. None of them was attending any kind of rehabilitative intervention programs. They all passed in hearing screening, speech and language screening, intellectual screening, oral mechanism screening examination. The screening procedure was carried out by a qualified speech therapist. All the children were native speakers of Telugu who are from middle-class family background and studying in either kinder garden or primary classes of Lyceum Public school, Zaheerabad, Telangana. Informed consent detailing the nature of the study and the purpose was taken from the school principal to recruit participant from their school. Another 2 native speakers were recruited to conduct the predefined tasks in the native language. Details of the participants in the present study are given in table 1(a) and (b).

Table 2.(a). *Details of participants in group I indicating age and gender.*

Participant	Age (in years)	Gender	Participant	Age (in years)	Gender
1	3.11	Male	7	3.9	Female
2	3.7	Male	8	3.7	Female
3	3.8	Male	9	3.6	Female
4	3.7	Male	10	3.9	Female
5	3.11	Male	11	3.9	Female
6	3.9	Male	12	3.9	Female

Table 1.(b). *Details of participants in group I indicating age and gender.*

Participant	Age	Gender	Participant	Age	Gender
	(in years)			(in years)	
1	4	Male	7	4.4	Female
2	4.5	Male	8	4.1	Female
3	4.1.	Male	9	4.5	Female
4	4.1	Male	10	4	Female
5	4	Male	11	4.3	Female
6	4.3	Male	12	4	Female

II.(D). Data Collection:

Pilot study: The pilot study conducted on selected 10 students (5 from each age group) of same age group. The aim of the pilot study was to investigate (1) what materials can be more adaptable for the study (2) what is the effective length of speech sample in various tasks, and (3) environmental variability on performance. Three types of speech elicitation tasks have opted – narrative task (monologue), general conversation (dialogue) and nursery rhyme recitation (imitation). For this, the investigator used 2 different stories and 5 sets of picture description cards in sequence for the narrative task. Preselected 20-30 open-ended general questions regarding family, school, friends, and favourites were used for general conversation task. Familiar 5 Telugu nursery rhymes were selected for nursery rhyme recitation task. Two environments were selected for the pilot study- a sound-treated room wherein only researchers and participants were allowed and a quiet classroom wherein all other

participants are allowed along with investigators. Zoom H1n Handy Recorder and standard laptop were used to record the speech sample.

Based on the pilot study (1) investigator opted sequencing cards for the narrative task as most of the children (especially younger children) could not be able to narrate the short story by their own words. (2) Investigator chooses 10-15 general questions for the conversation to avoid fatigue and distraction which was occurred after few questions (especially observed in the younger group). (3) Two very familiar short nursery rhymes have opted for imitation. (4) A quite standard classroom in the same building wherein other participants were allowed have opted for the further study as most of the children were hesitant to talk in a sound-treated room due to unfamiliarity with that situation.

To build the rapport with children, the researcher and recruited native regional speakers were interacted with the children for an entire day and conducted trial recordings through play. This helped the children to build familiarity with the procedure before formal voice recording. Each participant's voice was recorded separately for general conversation task for the preselected 10 open ended questions, sequencing picture cards of different activities, and nursery rhyme. To build and to maintain a dyadic conversation, occasional verbal prompts were provided when needed.

II.(E). Analysis:

The speech samples were listened and transcribed verbatim to analyse the disfluencies because a verbatim transcript has the benefit of providing a considerable amount of data beyond frequency count. Initial and final portions of the recording sample were excluded from voice analysis to reduce the variable effect. Commonly, the occurrence of disfluencies is likely to be higher at the beginning of speech task as well as towards the end due to the unfamiliarity fatigue and distraction. Disfluencies were identified by carefully and repeatedly listening to the speech samples. The presence of the following disfluencies were analyzed, using the adaptations of classification systems described by Johnson et al. ,1959; Williams et.al., 1968; DeJoy, 1975; Yairi , 1981; Dejoy, & Gregory, 1985; Campbell & Hill, 1987; Ambrose & Yairi, 1999 and Carlo, & Watson, 2003. The disfluencies and their description are shown in table. 2.

Table 2 .*Types of disfluencies and description.*

Disfluencies	Description
Filled Pauses (FP)	Pauses filled with sounds like “mm”... “um” etc.
Unfilled Paused (UFP)	Silent pauses having a duration greater than 300 msec.
Part Word Repetition (PWR)	Repetitions of parts of words which might comprise of one or more syllables. E.g. “bana-banana”.
Word Repetition (WWR)	Repetition of words of more than one syllable. E.g. “Computer-computer”.
Syllable Repetition (SR)	Repetition of a syllable that does not stand alone as an intended word. It includes repetitions of sound in a word.eg. “ppp- paper”.
Phrase repetition	Repetition of two or more words, with no revision or modification of content. E.g., “I have a car-I have a car”.
Revision (REV)	Modification in the content or grammatical form of an utterance.
Prolongation (PRO)	Extended phonation of words/utterances wherein the phonation disturbs the normal rhythm/flow of speech.
Interjections (INJ)	Interjections are the insertion of sounds, syllables, words or phrases within an utterance. E.g., “I went to school -um – by bus”.
False Starters (FS).	Disfluencies which represent changes in pronunciation, word, grammatical structure (or) content of what is said.

II.(F). Measurement of disfluencies:

The total number of disfluencies were counted using fluency charting grid, both age and gender wise and percentage of disfluencies were calculated on a word-based metric adapted from Conture, 1990a; Conture & Caruso, 1987; Riley, 1980. Present study used a word based metric over a syllable-based metric because difference between these two units of measurement appear to be relatively minor and hence it is possible to convert from one unit to the other by simply multiplying by a constant representing the ratio of the number of syllables per word (Andrews & Ingham , 1971; Conture, 1990b, Conture & Caruso, 1987; Culatta & Goldberg, 1995; and Ham, 1986, cited in Yaruss, 1997). After each disfluency types were identified and tabulated, the mean and standard deviation (SD) of the percentage of disfluency were calculated for each disfluency type as well as total disfluencies per 100 words.

II.(G). Statistical analyses:

A commercially available Statistical package for Social Sciences (SPSS 24) was used for statistical analyses. Mean, standard deviation, median, minimum, maximum of each type of disfluency were calculated. Mann Whitney U test is used to find out the significant difference in disfluencies across age group and gender. This nonparametric test was chosen to find out any statistically significant differences in disfluencies across age and gender because this study employed two independent and randomly selected samples and contained a small sample size. Kruskal Wallis test was used to find out significant difference across task.

Chapter III

Results

Results were discussed in the following headlines.

Frequency and type of disfluencies:

A. Percentage of Total disfluencies

A.(i). Across age and gender.

A.(ii). Across task.

B. Percentage of Individual disfluencies.

B.(i). Task 1- Conversation

B.(ii). Task 2-Nursery rhyme recitation.

B.(iii). Task 3- Picture description.

III.(A). FREQUENCY AND TYPE OF DISFLUENCIES:

Percentage of total disfluencies for each group and subgroups were calculated on a word-based metric and subjected to descriptive statistical analysis to find out average mean values, median, standard deviation (S.D), minimum (Min.) and maximum (Max.) values.

III.(A) (1). Total disfluencies Across age group:

Descriptive Statistical analysis result (Table 3.) indicated that there is a slight difference in average mean values of percentage of total disfluency in both groups. The average mean values of percentage of total disfluency are 23.76 (SD -10.75) and 24.82 (SD - 10.67) for group I and II respectively. Children between the age group 4.00-4.11 scored slightly higher mean values than those of children between 3.00-3.11 years old.

Table 3.

Descriptive statistics of the percentage of total disfluencies scored across age group.

	No	Mean	Med.	SD	Min.	Max.	Ran.	Kurtosis	Skewness
Group I	12	23.76	22.48	10.75	10.10	48.84	38.74	1.53	1.07
Group II	12	24.82	20.81	10.68	13.11	47.83	34.72	0.18	0.90

Note: Group I and II represent children between 3.00-3.11 years old and 4.00-4.11 years old respectively.

Mann-Whitney U test result, $U = 67.5$ ($Z = -0.26$), $p > 0.01$ indicated that there is no statistically significant difference between the scores of Group I and II. Table 4 represent Mann Whitney U test statistics.

Table 4.

Mann Whitney U tests statistics on percentage of total disfluencies across age group.

	No	Mean Rank	Sum Of Rank	Mann Whitney U	Wilcoxon W	Z	Asym.Sig (2 Tailed)
Group I	12	12.13	145.5				
Group II	12	12.88	154.5	67.5	145.5	-0.26	0.795

III.(A) (2). Total disfluencies Across gender:

Table 5 represent descriptive statistical analysis of total disfluencies across gender in each group. The average mean values of percentage of total disfluencies are 27.38 (SD. – 12.34) and 21.15 (SD – 7.59) for males and females respectively. Results indicated that males demonstrated with higher mean values of percentage of total disfluencies than that of females. Even within the groups, males demonstrated with higher mean

values of percentage of total disfluencies. The average mean values in group I are 28.18 (SD- 12.05) and 19.83 (SD- 7.86) for males and females respectively. That of Group II are 26.59 (SD- 13.72) and 23.05 (SD 7.43) for males and females respectively (Fig. 1).

Table. 5.

Descriptive statistics of the total percentage of disfluencies across gender.

	No.	Mean	Med.	SD	Min.	Max.	Ran.	Kurtosis	Skewness
Male	12	27.38	24.83	12.34	13.11	48.84	35.73	-0.67	0.67
Female	12	21.15	20.81	7.59	10.10	35.19	25.09	-0.71	0.34

(Med - Median, SD - standard deviation, Min - minimum, Max - Maximum, and Ran – Range.)

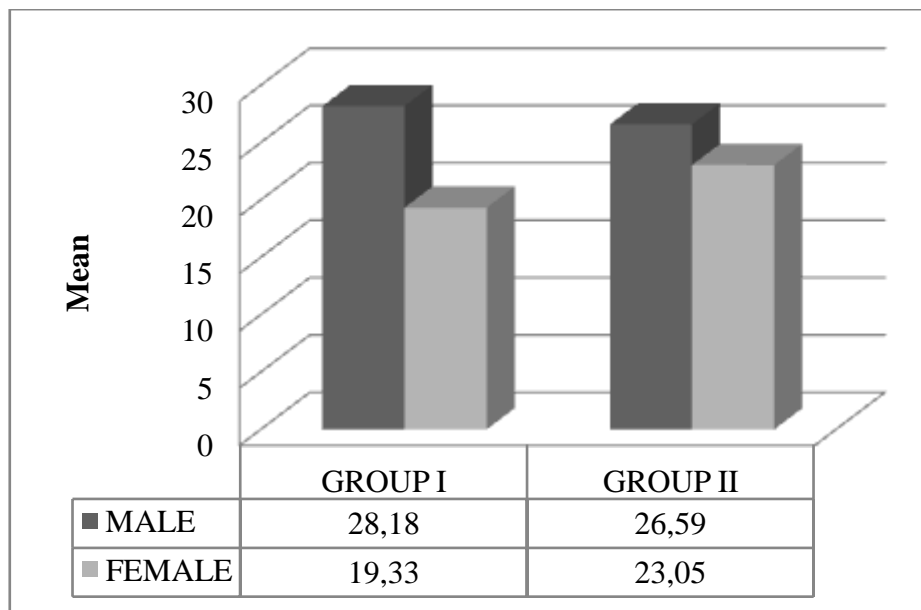


Figure 2. Histogram showing the Average means values of percentage of disfluency across gender within Groups. (Group I represents 3-4 years old, and Group II represents 4-5 years old.)

Mann-Whitney U test result, $U = 53.5$ ($Z = -1.068$), $p > 0.01$ indicated that there is no statistically significant difference between the scores of Males and Females. Table 6

represent Mann Whitney U test statistics across gender. The test could not be employed within groups due to limited sample size less.

Table 6.

Mann Whitney U tests statistics on the percentage of total disfluencies across gender.

	No	Mean Rank	Sum Of Rank	Mann Whitney U	Wilcoxon W	Z	Asym.Sig (2 Tailed)
Group I	12	14.04	16.5	53.5	131.5	-1.068	0.285
Group II	12	10.96	131.5				

(* Significance level - 0.05. Group I and II represent age groups between 3-4 years and 4-5 years respectively.)

III.(A) (3). Total disfluencies across task:

Percentage of total disfluencies for each task across age group were calculated and subjected to descriptive statistical analysis. Three selected tasks are a general conversation, nursery rhyme recitation and picture description that are represented by Task 1, Task 2, and Task 3 respectively. Percentage of total disfluency across age groups is presented in table 7. Both groups I and II scored an average mean value of 23.07 (SD- 20.39) and 31.42 (SD- 14.50) respectively for task 1. For task 2, both groups I and II scored the lowest values that are 15.44 (SD – 9.33) and 10.62 (SD – 9.5) respectively. For task 3, both the group scored the highest values, that is 35.93 (SD- 20.94) and 33.24 (SD -23.95). Figure 2.depicts the average means values of percentage of disfluency across Task.

Table 7.

Descriptive statistics of the percentage of total disfluencies across task.

	TASK	Mean	Med.	SD	Min.	Max	Ran.	Kurtosis	Skewness
GROUP I	Task 1	23.07	17.91	20.39	10.00	85.71	20.40	10.07	3.08
	Task 2	15.44	14.93	9.33	0.00	28.57	28.57	-1.38	-0.04
	Task 3	35.93	36.67	20.94	6.25	75.00	68.75	-0.72	0.27
GROUP II	Task 1	31.42	32.29	14.50	8.33	57.14	48.81	-0.76	0.12
	Task 2	10.62	9.72	9.95	0.00	25.00	25.00	-1.51	0.31
	Task 3	33.24	27.50	23.95	7.69	83.33	75.64	-0.10	0.87

(Note: Task 1-general conversation, Task 2- Nursery rhyme recitation, Task 3- Picture description task. Med - Median, SD- standard deviation, Min - minimum, Max - Maximum, and Ran - Range. Group I- 3 to 4 years old, Group II -4 to 5 years old).

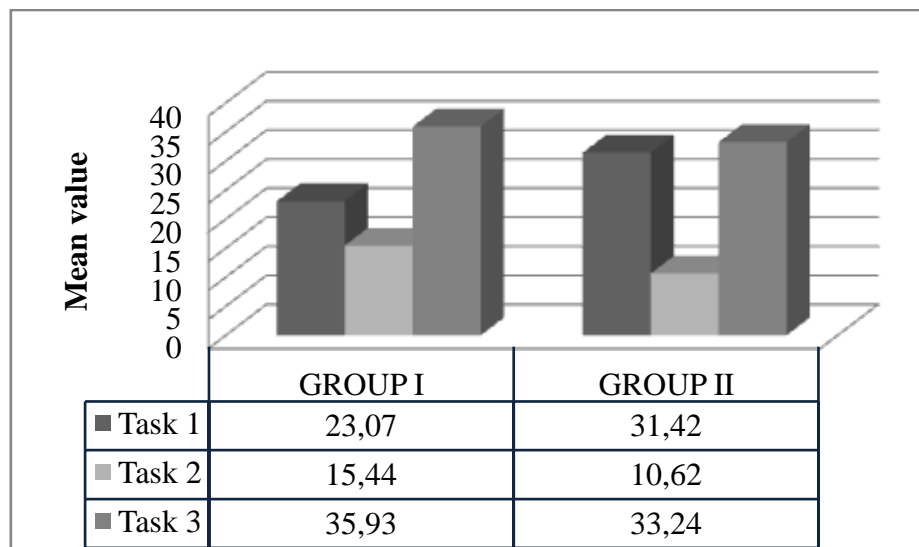


Figure 2. Histogram showing the Average means values of percentage of disfluency across Task. (Group I represents 3-4 years old, and Group II represents 4-5 years old. Task 1-general conversation, Task 2- Nursery rhyme recitation, Task 3- Picture description task).

Kruskal Wallis H test result indicated that there is a statistically significant difference in the median values of percentage of total disfluency across task 1, 2 and 3 ($\chi^2(2) = 6.45$, $df = 2$, $p < 0.05$) in group I. Results are same for Group II ($\chi^2(2) = 11.65$, $df = 2$, $p < 0.05$). Table 8 shows the chi-square values, degrees of freedom and p values in group I and II.

Table 8. *Kruskal Wallis H tests statistics on percentage of total disfluencies across task.*

	Task	No.	Mean Rank	<i>Kruskal Wallis H</i>	df	Asymp. Sig.
Group I	Task 1	12	17.29	6.452	2.000	0.040
	Task 2	12	13.75			
	Task 3	12	24.46			
Group II	Task 1	12	23.46	11.654	2.000	0.003
	Task 2	12	10.08			
	Task 3	12	21.96			

(Note: *Significance level – 0.05. Group I represents 3-4 years old, and Group II represents 4-5 years old. Task 1-general conversation, Task 2- Nursery rhyme recitation, Task 3- Picture description task).

III.(B). INDIVIDUAL DISFLUENCIES:

Percentages of individual disfluencies were calculated for task 1, task 2 and task 3 and were subjected to statistical analysis. Disfluencies that included are filled pause (FP), unfilled pause (UFP), whole word repetition (WWR), part word repetition (PWR), phrase repetition (PR), syllable repetition (SR), Revision (REV), Prolongation (PRO), interjections & audible inspirations (I &A), and False starters(FP).

I.(B).(i). Task 1-General Conversation.

The most frequent disfluencies demonstrated by group I are FP (Mean - 13.50, SD- 19.30) UFP (Mean- 6.50, SD- 6.14), and FS (Mean- 2.33, SD- 4.36). 10 out of 12 participants in Group I had FP, 8 out of 12 had UFP and 4 out of 12 had false starters. 3 out of 12 participants demonstrated with syllable repetition (Mean - 0.92, SD- 1.78) and 1 participant out of 12 demonstrated with prolongation (Mean - 0.25, SD- 0.58). Disfluencies like WWR, PWR, PR, REV, and INJ are not observed in group I.

The most frequent disfluencies demonstrated by group II are FP (Mean- 20.08, SD- 12.92), UFP (Mean- 3.50, SD- 3.45), and PRO (Mean - 1.92, SD - 3.48). All participants in group II demonstrated with FP, 7 out of 12 participants had UFP and 3 out of 12 had PRO, 3 out of 12 participants showed PR (Mean- 1.25, SD- 2.30) and WWR (Mean- 1.25, SD- 3.11) and INJ (Mean - 1.33, SD - 3.23). 2 out of 12 participants demonstrated with PWR (Mean-0.83, SD- 2.13). REV and FS did not observe in group II. Figure 3. depicts the average mean values of individual disfluencies observed in General conversation task. Appendix (E) and (F) in annexe show the descriptive statistics of the percentage of individual disfluencies in General conversation task for the group I and II respectively.

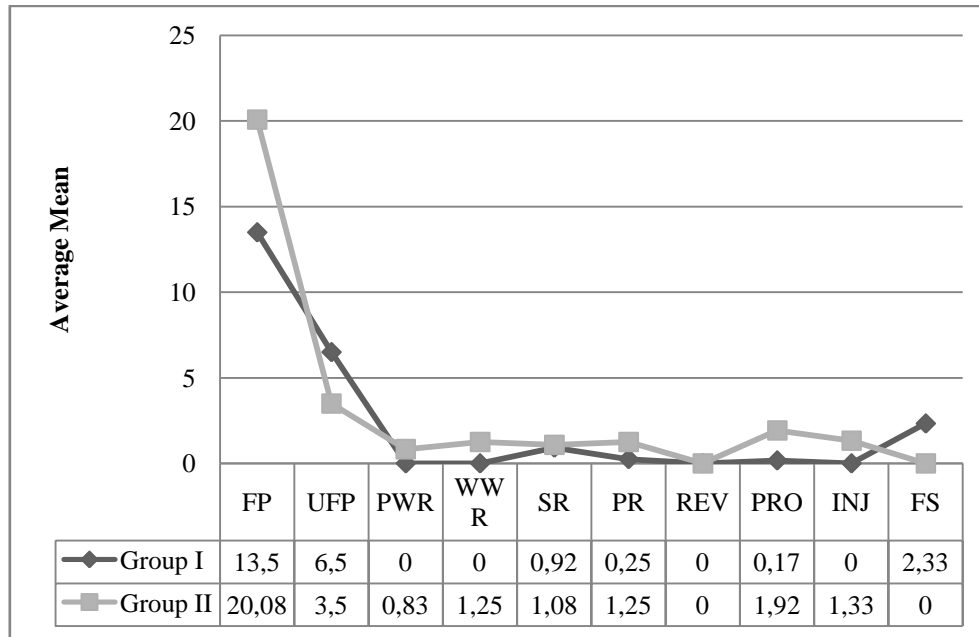


Figure 3. Graph showing the Average means values of percentage of individual disfluencies in Task 1. (Group I- 3to 4 years old, Group II - 4to5, FP-filled pause, UFP-unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters).

I.(B).(ii). Task 2- Nursery Rhyme Recitation.

The most frequent disfluencies demonstrated by group I in Task 2 are PR, FS and FP. 4 out of 12 participants in group I demonstrated with PR (Mean- 2.83, SD- 4.28), and one participant out of 12 demonstrated with FS (Mean-1.08, SD- 3.75), FP (Mean- 0.67, SD- 2.31) and UFP (Mean - 0.58, SD- 2.02). PWR, WWR, SR, REV, PRO, and INJ were not observed in this group.

The most frequent disfluencies demonstrated by group II are PR, UFP and FS. 2 out of 12 participants demonstrated with PR (Mean -1.83, SD-6.35), I participant out of 12 demonstrated with UFP (Mean -1.08, SD- 2.61) and FS (Mean - 0.67, SD - 2.31). FP, PWR, WWR, SR, REV, PRO and INJ were not observed in group II. Figure 4.depicts the average mean values of individual disfluencies observed in General conversation task. Appendix (G) and (H) in annexe show the average mean value of the percentage

of individual disfluencies observed in nursery rhyme recitation task for the group I and II respectively.

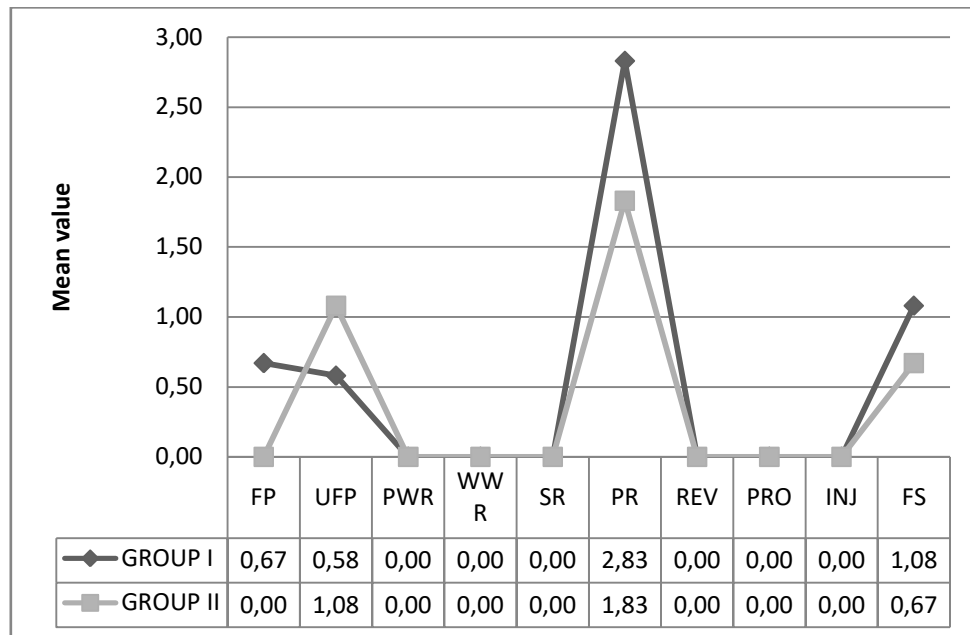


Figure 4. Graph showing the Average means values of percentage of individual disfluencies in Task 2. (Group I- 3to 4 years old, Group II - 4to5, FP-filled pause, UFP-unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters).

I.(B).(iii). Task 3- Picture Description.

The most frequent disfluencies demonstrated by group I in Picture description task are UFP, FP and FS. 9 out of 12 participants demonstrated with UFP (Mean- 17.00, SD- 19.07), 8 out of 12 participants demonstrated with FP (Mean - 11.83, SD- 13.89), and FS (Mean - 5.08, SD- 4.52). 3 participants were demonstrated with SR (Mean - 1.42, SD – 2.64) and 1 participant out of 12 demonstrated with PRO (Mean - 0.67, SD - 2.31). Disfluencies like WWR, PWR, PR, REV and INJ are not observed in group I.

The most frequent disfluencies demonstrated by group II are UFP, FP and SR. 10 out of 12 participants demonstrated with FP (Mean - 16.75, SD- 14.45), 6 out of 12 participants demonstrated with UFP (Mean - 11.42, SD – 16.33), and 3 out of 12 participants were demonstrated with SR (Mean - 2.67, SD – 5.37). 1 out of 12

participants demonstrated with INJ (Mean - 0.67, SD- 2.31), PWR (Mean - 0.50, SD – 1.73), and FS (Mean - 0.58, SD – 2.02). Disfluencies like WWR, PR, REV, and PRO are not observed in group II. Figure 5. depicts the average mean values of individual disfluencies observed in General conversation task. Appendix (G) and (H) in annexe show the average mean value of the percentage of individual disfluencies observed in nursery rhyme recitation task for group I and II respectively shows the average mean value of the percentage of individual disfluencies across age group.

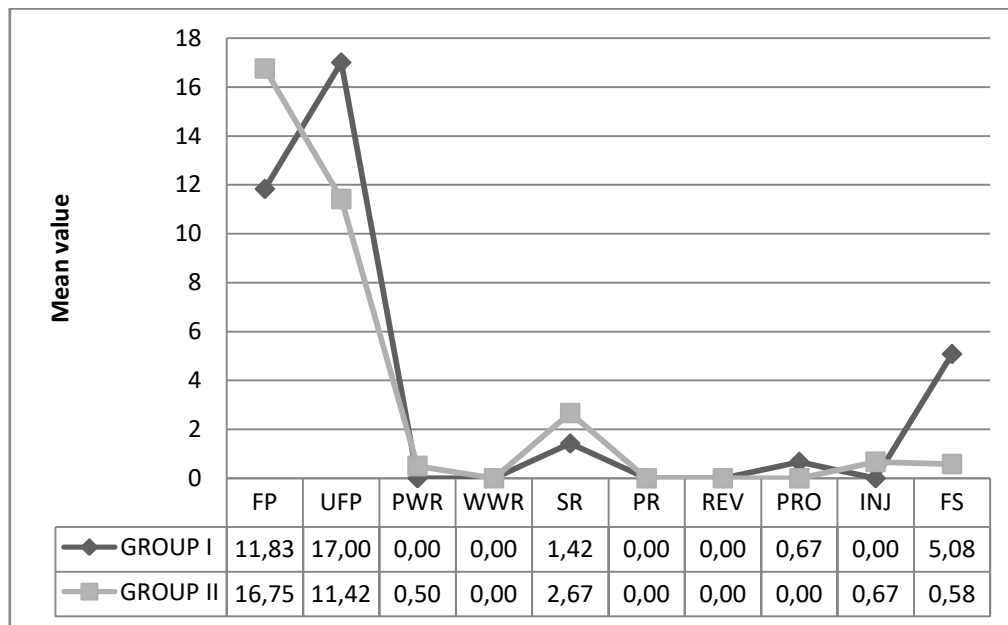


Figure 5. Graph showing the Average means values of percentage of individual disfluencies in Task 3. (Group I- 3to 4 years old, Group II - 4to5, FP-filled pause, UFP-unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters)

Chapter IV

Discussion

According to Bloodstein & Ratner (2008), through the formal assessment of stuttering typically includes a conversational analysis, this may be insufficient to assess disfluencies in preschool children. Hence the present study focused on to overcome this concern and allows for a more tightly controlled comparison of the effects of age, gender and speech elicitation task the assessment of children's fluency. The purpose of the present study was to compare preschool children's speech fluency during 3 different tasks, i.e., a structured conversational task, narrative task and rhyme recitation task. Hence the result of the present study will be used to answer the following research questions. (a) Does the total disfluency decrease with increase in age from 3 to 5 years? (b).does the total disfluency varies with gender? (c).do the discourse affects total disfluency? The scope of the study not only limited to answer these questions but also to find out most frequently occurring disfluency type in different age group. The study revealed the following interesting points.

First, in the present study, descriptive statistical analysis results indicated that there is a slight increase in percentage of total disfluencies with an increase in age. Children between 4 - 5 years (mean average -24.82) demonstrated with slightly higher scores in the percentage of total disfluencies than that of children between 3-4 years old (mean average – 23.76). But statistically, significant differences could not be found in Mann Whitney U test results. This is concordance with the following studies. Ambrose, & Yairi (1999) found out that though part-word repetitions and repetition units tended to significantly decrease with age in preschool children, other disfluencies tended to increase with age, but statistical significance could not be obtained. Carlo & Watson (2003) studied on 32 normal monolingual Spanish children from 3-5 years old to investigate age difference on total disfluency. They also could not find any statistically significant difference across age which also supported the present study. This differed

from the earlier findings of English studies that there is a decrease in the total disfluencies with an increase in chronological age (Dejoy & Gregory, 1985; Wexler, 1982; Wexler & Mysak, 1982; Yairi, 1997). Wexler, & Mysak, (1982) also reported a developmental decrease with respect to clustering and oscillation, but the differences between the age groups were statistically insignificant (supporting studies by Wexler, 1978, 1982).

Second, the study results indicating that males scored higher average mean values for percentage of total disfluency within the group as well as in total. Descriptive statistics show that males scored average mean values of 28.18 and 25.14 in Group I and II respectively. The average mean values for females are 19.33 and 23.05 in group I and group II respectively. The combined average mean percentages of total disfluencies were 27.38 and 21.15 for males and females respectively. However, these differences in average mean percentages of total disfluencies were not statistically significant. Yairi (1981) also concluded similar findings in which 2-year-olds children are extremely diverse regarding disfluency and boys were more disfluent than the girls and the study also could not find any statistically significant gender differences using two tailed t-tests ($p = .05$; $df = 31$). The absence of gender effect was also in congruence with earlier reports of English speaking children (Ambrose & Yairi, 1999; Haynes, & Hood, 1977; Kools & Berryman, 1971; Yairi 1981, 1982; Yairi & Lewis, 1984). This was supported by Carlo & Watson (2003) who reported that no statistically significant difference in the total speech disfluencies exhibited by boys and girls in the Spanish population. In the Indian context, Ram B Anjana (2013) also reported that there were no statistically significant gender differences obtained in her study on Kannada speaking children.

Third, the study indicating that the speech task has an effect on the percentage of total disfluencies. In order to make clarity to this the investigator chooses 3 different speech tasks- General conversation, nursery rhyme recitation and picture narration. Total and individual disfluencies for each task were calculated separately. From the result, both group I and II scored highest values in the picture description task with a mean value of 35.38 and 33.24 respectively. This is followed by general conversation task, which has second highest scores in both group I and II with the mean value of 23.07 and 31.42 respectively. Nursery rhyme recitation task was found to be

comparatively fluent in both age groups (Group I -15.44, Group II -10.62). In summary, a picture description task was more disfluent than other two tasks regardless of the age group which is followed by general conversation task. Kruskal Wallis H test scores also indicated that the difference in percentage of total disfluency among tasks are statistically significant in Group I ($\chi^2(2) = 6.452, df = 2, p < 0.05$) as well as in Group II ($\chi^2(2) = 11.654, df = 2, p < 0.05$). This might be because the frequency of disfluencies will be higher with the task which requires more thought process to answer unexpected questions even though they are known. Whereas less effort needed to recite rhyme which is already known made it more fluent.

Fourth, in the case of individual disfluencies, pauses are the most frequent disfluencies in general conversation task as well as in picture description task. Filled pauses observed more frequently than unfilled pauses. This is true in both groups regardless of age. The other disfluencies observed in Group I for general conversation task are false starters, syllable repetition and prolongation. In group II, phrase repetition, whole word repetition, prolongation and interjection are also observed apart from pauses. In the picture description task, as mentioned above, most frequently observed disfluencies are pauses. For the same task, unfilled pauses are more frequent in Group I than filled pauses; whereas filled pauses are more frequent than unfilled pauses in Group II. Other disfluencies observed in group I and II, for picture description task are false starters and syllable repetition. Prolongation is also observed in Group I whereas part-word repetition and interjection were seen in Group II. In nursery rhyme recitation task, phrase repetition is the most frequent disfluencies, though numbers of children demonstrated are comparatively very less. This is true both in group I and II. False starters and pauses are the other disfluencies observed in nursery rhyme recitation task. Participants in both Groups I and II demonstrated with these 3 disfluencies. The frequency of individual disfluencies for each task is detailing immediately after this.

In **general conversation task**, filled pauses (mean – 13.50) occurred more frequently than unfilled pauses (mean value -6.50). 10 out of 12 participants in group I showed unfilled pause whereas 8 out of 12 had filled pauses. This is also true with Group II, i.e., filled pauses (mean – 20.08) are the most frequently observed disfluency

which is followed by unfilled pauses (mean 3.50). 12 out of 12 participants in group II showed filled pauses and 7 out of 12 participants demonstrated with unfilled pauses. 4 participants out of 12 had false starters (mean - 2.33) in group I, but false starters did not observe in group II. 3 out of 12 participants demonstrated with syllable repetition (Mean - 0.92) and 1 participant demonstrated with prolongation (Mean – 0.25). In group II, 3 out of 12 participants demonstrated with prolongation (1.92) and phrase repetition (1.25), whole word repetition (2.25) and interjections (1.33). Only 2 participants demonstrated with part-word repetition (0.83). Part word repetition, whole word repetition, phrase repetition and interjections are not observed in Group I. Revision observed neither in group I nor group II.

In **nursery rhyme recitation**, most frequently occurred disfluency is phrase repetition, both in Group I and II. In group I, 4 out of 12 participants demonstrated with phrase repetition (2.83), whereas this is reduced by half, i.e., only 2 participants demonstrated Phrase repetition (1.83). Another common disfluency observed both in Group I and II is false starters. One participant from both groups demonstrated with false starters, with a mean value of 1.08 and 0.67 for Group I and II respectively. One participant in group I had filled pause (0.67) and unfilled pause (mean - 0.58). One participant from group II had an unfilled pause (mean -1.08) whereas no filled pause observed in group II. Part word repetition, whole word repetition, syllable repetition, revision, prolongation and interjections were not observed in both groups.

In **picture description task**, most frequently seen disfluencies are pauses. In group I, 9 out of 12 participants demonstrated with unfilled pauses (mean -17.00) and 8 out of 12 participants demonstrated with filled pauses (mean – 11.83). The occurrence of unfilled pauses is comparatively less than that of filled pause in Group II. In group II, 10 out of 12 participants demonstrated with filled pause (mean -16.75) and 6 out of 12 participants demonstrated with unfilled pause (mean -11.42). In Group I, 8 participants out of 12, demonstrated with false starters (mean - 5.08) whereas in Group II, only one participant demonstrated with false starters (mean - 0.58). 3 out of 12 participants from both group demonstrated with syllable repetition with the mean value of 1.42 and 2.67 for group I and II respectively. Only one participant in group I had prolongation (mean – 0.67) and one participant from group II had interjection (mean – 0.67) and part-word

repetition (mean = .05). Neither part-word repetition nor interjection observed in group I. other disfluencies that did not observe in both groups are whole word repetition, phrase repetition and revision.

Among the disfluencies, *pauses* had the maximum percentage in all age groups. Among the pauses, filled pauses inclined with age whereas unfilled pauses decline with age. This is true in general conversation as well as picture description task. High proportions of pauses in children were also noticed by James (2011). Among *repetition*, only syllable repetition and phrase repetition were present in both age groups, and there was an increasing tendency noted with the increase in age. Part word repetition and whole word repetition were not observed in group I. wherein Group II, 3 participants had whole word repetition and one participant had part-word repetition. Among *other disfluencies*, prolongation and false starters were observed in both the age groups. Prolongation was inclined with the increase in the age whereas false starters declined with age. Interjection was noticed only in Group II. Revision did not observe either in Group I or in Group II. Nursery rhyme recitation task was not included in this comparison as this task does not require dyad participation.

In nursery rhyme recitation, among repetition, most frequently occurred disfluency in both groups is phrase repetition which is declined with increase in age. No other repetitions were observed either in group I or in group II. Among pauses, unfilled pause observed in group I as well as in group II and inclination tendency with an increase in age was also noted. Filled pause only observed in group I. Among other disfluencies, false starters are the only one disfluency observed in both groups, which also showed a declining tendency with increasing age.

Chapter V

Summary and Conclusion

Starkweather (1987) observed that children's speech turned out to be more and more fluent when they are maturing. The term *fluent* refers to meaningful verbal output that is produced with swiftly and effortlessly. The speaker's *capacity* to plan and coordinate what s/he wants to say occasionally faces interferences from, the *demands* of language formulation along with social demands of language. According to Starkweather, Gottwald & Halfond, (1990), whenever an individual, does not have this capacity to meet the demands, speech output will be ended up with more disfluencies.

Preschool age is considered as a period at which the overall growth and development will occur at its level best. During this time, children will begin to extend their social interactions for the communicative purposes further to others than family members. DeChristopher (2013), considered this kind of forced communicative interactions to expand their linguistic comfort zone help them to learn how to build new peer bonds. According to Shonkoff & Phillips (2000), children's early social experience contributes to the development of their capacity to build relationships with family or peers, and it is also an important foundation for learning (Shonkoff & Phillips, 2000; Yow, & Markman, 2001). Investigators considered this is the time, the development of disfluencies of speech will also occur in young children's speech which is as normal as any other milestones. It is also known that speech and language abilities develop with age and thus disfluencies or stuttering in many children's speech output begins during this time of rapid language growth between the 2.5 and 5 years of age (e.g., Bloodstein, & Ratner, 2008).

According to Adams (1977) from a clinical viewpoint, "data on speech characteristics of young children, just beginning to stutter are needed to develop meaningful norms, that can be used in refining and validating differential diagnostic

schemes of early childhood stuttering". It is very necessary to standardize a normative reference scheme for disfluencies across age or culture as it helps to see the general patterns of disfluencies in the preschool period. This would also facilitate the differential diagnosis of normal disfluency and incipient stuttering as well as aid in planning appropriate intervention modalities. In lieu of these, the present study was undertaken. The objectives of the study were in two-fold (a) to investigate, the frequency of disfluencies and types of disfluencies exhibited by 3.00-5.00 year old typically developing Telugu speaking children, (b) to investigate the impact of age, gender and task used for speech elicitation on disfluencies. Three different speech elicitation tasks were used in the present study i.e., general conversation, nursery rhyme recitation, and picture description. Henceforth, the present investigation additionally permits an all the more firmly controlled comparison of the impacts of speech elicitation tasks and conceivably leads to a better understanding of the free estimation of each kind of speech elicitation task undertaking in the appraisal of youngsters' speech fluency.

Total of 24 children were included in the present study who were divided into 2 groups according to their age i.e., Group I contains children between 3.00-3.11 years old and Group II contains those of 4.00 - 4.11 years old. Children were engaged in 3 different speech elicitation tasks. The first task involved a dyadic general conversation, second was familiar nursery rhyme recitation and final was picture description of three sets of selected sequencing picture cards. Ten types disfluencies of disfluencies were selected for comparison that includes, Filled pause (FP), Unfilled pause (UFP), part word repetition (PWR), whole word repetition (WWR), syllable repetition(SR), phrase repetition (PR), revision(REV), prolongation(PRO), interjection (INJ) and false starts (FS).

All disfluencies were counted for each task and percentage of total disfluency was calculated out of a total number of word utterances. Percentage of individual disfluencies was also computed out of a total number of word utterances. SPSS 24 was used for statistical analyses. Mean, standard deviation, median, minimum, and maximum of each type of disfluency was calculated. Mann Whitney U test is used to find a significant difference in the percentage of disfluencies between and within groups

and gender. Kruskal Wallis H test was used to find significant difference across three different tasks.

Results indicated that there is a slight increase in the percentage of total disfluencies with the increase in age. Children between 4 - 5 years (mean average -24.82) demonstrated with slightly higher scores in the percentage of total disfluencies than that of children between 3-4 years old (mean average – 23.76). But, the study could not find any statistically significant differences in Mann Whitney U test results. Tumanova, Conture, Lambert & Walden (2014) also found that there were an association between age and the frequency of normal disfluencies, such a way that older preschool children had more disfluencies than younger children. This study was also congruence with Ambrose & Yairi (1999)'s finding of an insignificant tendency for increase of disfluencies with age in their study of preschool children with stuttering and age and gender-matched normal children.

Results also indicated that males scored higher average mean values for percentage of total disfluency within the group as well as in total. Descriptive statistics shows that males scored average mean values of 28.18 and 25.14 in younger and older group respectively. That of females is 19.33 and 23.05 in younger and older group respectively. The combined average mean percentages of total disfluencies were 27.38 and 21.15 for males and females respectively. This is consistent with the previous studies done by Davis, 1939; Johnson et al.,1959; and Tumanova et.al 2014. These studies concluded that boys had more disfluencies than that of girls regardless of talker group. Tumanova et al., 2014 observed the main reason behind this can be the slower development of speech and skills in boys that are less robust than that of girls of same age, incline them to more incessant breakdowns in fluency. However, statistically significant differences could not be found between genders in the present study.

From the result, picture description task was more disfluent than other two tasks regardless of age group which is followed by general conversation task. Nursery rhyme recitation task was found to be comparatively fluent in both age groups. Both younger and older children scored highest values in picture description task with a mean value of 35.38 and 33.24 respectively. This is followed by general conversation task, which has second highest scores in both younger and older group, with mean value of 23.07 and

31.42 respectively. Kruskal Wallis H test scores also indicated that the difference in percentage of total disfluency among tasks is statistically significant in younger and older group. This might be because frequency of disfluencies will be higher with task which requires more thought process to answer unexpected questions even though they are known. Whereas less effort needed to recite rhyme which is already known made it more fluent. According to Starkweather, 1987 the vulnerability of each lexical item that will drop at each place to frame a sentence increases with expanding vocabulary thus result in troublesomely to plan an utterance within the limited time of sentence production.

Among the disfluencies, *pauses* had the maximum percentage in all age groups. Among the pauses, filled pauses inclined with age where as unfilled pauses declines with age. This is true in general conversation as well as picture description task. Among *repetition*, only syllable repetition and phrase repetition were present in both age groups, and there was an increasing tendency noted with increase in age. Part word repetition and whole word repetition were not observed in younger children. Where in older group, 3 participants had whole word repetition and one participant had part-word repetition. Among *other disfluencies*, prolongation and false starters were observed in both the age groups. Prolongation was inclined with increase in the age whereas false starters declined with age. Interjection was noticed only in younger children. Hence all selected disfluencies except revision were observed in 3.00-5.00 years old preschoolers.

The results of the present study provided additional information on the type of disfluencies and their frequency distribution, as well as the impact of age, gender and speech elicitation task on the percentage of disfluencies in typically developing Telugu speaking normal preschool children. The results of the study have provided a normative reference for the percentage of in children between 3-5 years old as well as the general trend in the patterns of disfluencies across different ages and tasks in typically developing Telugu speaking children.

Research : Future research can focus on to determine the situational variability of disfluencies and their frequency of occurrence in more diverse situations, like, structured interview verse free play, or family versus peer group or home verse school environment. Also, the inclusion of children from a wider range of Socio-economic

families would allow a broader understanding of preschooler's speech fluency development. Due to Small sample size, the results were more difficult to interpret and to generalise to a greater population. Therefore, future research involving a larger sample size at discrete age levels is essential to further develop information on the development of fluency. However, this study has taken the first step toward that end. Furthermore, research can focus on a comparative study between children with stuttering and normal children of same age group. It would be an added advantage for those future studies to involve video recording format to get a better understanding of physical concomitance associated with children who begin to stutter.

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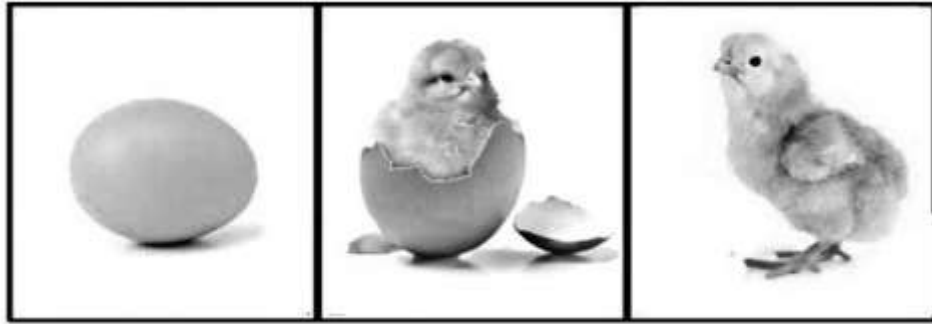
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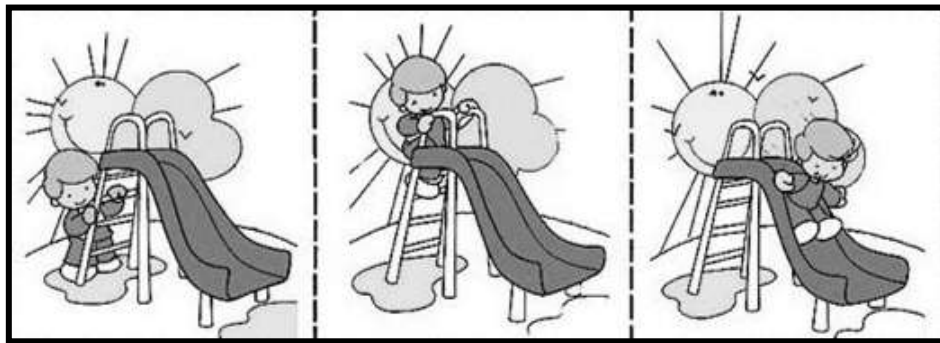
APPENDICES

Appendix (A) –Materials used for the study – picture description

1. Sequence (a)



2. Sequence (b).



3. Sequence (c).



Appendix (B) –sample of transcribed verbatim

Transcribed verbatim

Name: ### ParticipantNo: 19
 Age/Gender: 17-2-2015 / Female Language: Telugu.
 Date of Evaluation: 30-7-2018.

(**Q** Represent investigator questions and **A** represent participant's reply.)

Q	n	i:	p	e	r	e	n	d	i	?										
A	s	a:	i	k	i:	n	t	n	a	.										
Q	?																			
A	s	a:	i	k	i:	n	t	n	a											
Q	n	i:	d	a:	d	i:	p	e	r	e	n	d	i:	?						
A	r	a	v	i	n	d	e	n	.											
Q	e	n	?																	
A	r	a	v	i	n	d	e	n	.											
Q	n	i:	m	a	m	i:	p	e	r	e	n	d	i:	?						
A	d	z	a	i	n	u	.													
Q	e	n	?																	
A	d	z	a	i	n	u	.													
Q	e	n	d	a	m	a	n	d	i	u	n	d	a	n	i	m	k			
A	k	o	n	t	a	m	a	n	b	i:	t	e	l	a	l	e				
	n	t	i	k	a	t	a	d	k	a	u	n	t	i	p	a	?			
	u	u	n	a	m	a	m	a	m	i:	u	n	a	m	a	t	e			
	l	a	l	u	n	a	m	a	d	k	a	u	n	a	.					
Q	n	i	i	s	t	a	m	e	l	a	b	o	m	a	l	e	n			
A	p	e	d	a	p	e	d	a	b	o	m	a	l	u	u	n	a			
	t	i	n	a	p	i	n	a	t	i	n	d	b	o	m	a	l			
	u	u	n	a	p	e	d	l	u	u	n	a	t	i	n	a	t			
	u	n	a	l	i	n	k	a	t	i	n	a	t	i	n	a	.			
Q	n	i	s	k	u	l	e	n	a	f	r	e	n	d	u	p	e			
A	n	e	n	d	i	?														
Q	s	a	t	w	i	k	a													
A	n	g	?																	
A	s	a	t	w	i	k	a													
A	i	s	t	a	m	a	n	a	t	i	n	*								
Q	n	i	n	k	u	i	s	t	a	m	a	n	a	t	i	n	d			
A	a	n	k	e	l	i	s	t	a	m	a	n	a	?						
A	t	s	i	p	s	i	o	b	i	s	k	u	t	l	u	a	n	a		
	m	l	u	e	n	i	n	t	i	n	a	k	u	n	a	t	i	n		
	a	k	u	.																

* false start.

1

Appendix (C) – Recruitment letter to school

To,

Principal,
Lyceum School,
Vasanth Vihar, Beside Adarsh Nagar,
Zaheerabad, Sangareddy, Dist. Telangana

RE: Permission to Conduct Research Study

Dear Madam,

I am writing to request permission to conduct a research study at your institution. I am student of MS in Paediatric speech language therapy program at, School of Advanced Education, Research and Accreditation, University of Isabel I de Castilla, Espanol, and in the process of writing my Master's Thesis. The study is entitled Analysis of disfluencies in Monolingual Telugu speaking children of 3.00- 5.00 years old. I hope that the school administration will allow me to recruit 24 students- 12 boys and 12 girls of 3.00-5.00 years old, from the school to anonymously complete the research study.

If approval is granted, student participants will complete the study in a classroom or other quiet setting on the school site during the school time. The research process should take no longer than one week time. The study will include voice recording of conversation, picture narration, and nursery rhyme recitation of each student individually. The study results will be pooled for the thesis project and individual results of this study will remain absolutely confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by either your school or the individual participants.

Your approval to conduct this study will be greatly appreciated. If you agree, kindly sign below letter of permission / the informed consent, acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,


Soumya Joseph (Investigator)

MS in Paediatric speech language therapy program,
SAERA, University of Isabel I de Castilla, Espanol

Appendix (D) – Informed consent from school principal.

INFORMED CONSENT

I have been informed about the aim, objectives and procedure of the study. I understand that confidentiality of each student will be maintained and data will be used for research purpose only. I, the undersigned, give my consent to let the researcher to conduct study on students of our school.



PRINCIPAL
LYCEUM SCHOOL
GREEN COLONY, ZAHEERABAD
MEDAK-502220, TELANGANA
PRINCIPAL
Lyceum School





Soumya Joseph
Investigator

Appendix (E) –

Mean percentage of individual disfluencies in group I for general conversation task.

	No.	Mean	Median	Minimum	Maximum	SD
FP	12	13.50	8.00	0.00	71.00	19.30
UPF	12	6.50	6.00	0.00	19.00	6.14
PWR	12	0.00	0.00	0.00	0.00	0.00
WWR	12	0.00	0.00	0.00	0.00	0.00
SR	12	0.92	0.00	0.00	5.00	1.78
PR	12	0.25	0.00	0.00	3.00	0.87
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	0.17	0.00	0.00	2.00	0.58
A&I	12	0.00	0.00	0.00	0.00	0.00
FS	12	2.33	0.00	0.00	14.00	4.36

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.

Appendix (F) –

Mean percentage of individual disfluencies in group II for general conversation task.

	No.	Mean	Median	Minimum	Maximum	SD
FP	12	20.08	21.00	4.00	43.00	12.92
UPF	12	3.50	3.50	0.00	8.00	3.45
PWR	12	0.83	0.00	0.00	7.00	2.13
WWR	12	1.25	0.00	0.00	10.00	3.11
SR	12	1.08	0.00	0.00	7.00	2.54
PR	12	1.25	0.00	0.00	6.00	2.30
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	1.92	0.00	0.00	8.00	3.48
A&I	12	1.33	0.00	0.00	10.00	3.23
FS	12	0.00	0.00	0.00	0.00	0.00

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.

Appendix (G) –

Mean percentage of individual disfluencies in group I for nursery rhyme recitation task.

	No.	Mean	Median	Minimum	Maximum	SD
FP	12	0.67	0.00	0.00	8.00	2.31
UPF	12	0.58	0.00	0.00	7.00	2.02
PWR	12	0.00	0.00	0.00	0.00	0.00
WWR	12	0.00	0.00	0.00	0.00	0.00
SR	12	0.00	0.00	0.00	0.00	0.00
PR	12	2.83	0.00	0.00	11.00	4.28
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	0.00	0.00	0.00	0.00	0.00
A&I	12	0.00	0.00	0.00	0.00	0.00
FS	12	1.08	0.00	0.00	13.00	3.75

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.

Appendix (H) –

Mean percentage of individual disfluencies in group II for nursery rhyme recitation task.

	No.	Mean	Median	Minimum	Maximum	SD
FP	12	0.00	0.00	0.00	0.00	0.00
UPF	12	1.08	0.00	0.00	8.00	2.61
PWR	12	0.00	0.00	0.00	0.00	0.00
WWR	12	0.00	0.00	0.00	0.00	0.00
SR	12	0.00	0.00	0.00	0.00	0.00
PR	12	1.83	0.00	0.00	22.00	6.35
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	0.00	0.00	0.00	0.00	0.00
A&I	12	0.00	0.00	0.00	0.00	0.00
FS	12	0.67	0.00	0.00	8.00	2.31

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.

Appendix (I) –

Mean percentage of individual disfluencies in group I for picture description task.

	N	Mean	Median	Minimum	Maximum	SD
FP	12	11.83	7.50	0.00	35.00	13.89
UPF	12	17.00	11.50	0.00	58.00	19.07
PWR	12	0.00	0.00	0.00	0.00	0.00
WWR	12	0.00	0.00	0.00	0.00	0.00
SR	12	1.42	0.00	0.00	7.00	2.64
PR	12	0.00	0.00	0.00	0.00	0.00
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	0.67	0.00	0.00	8.00	2.31
A&I	12	0.00	0.00	0.00	0.00	0.00
FS	12	5.08	5.50	0.00	13.00	4.52

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.

Appendix (J) –

Mean percentage of individual disfluencies in group II for picture description task.

	N	Mean	Median	Minimum	Maximum	SD
FP	12	16.75	12.00	0.00	39.00	14.45
UPF	12	11.42	4.00	0.00	44.00	16.33
PWR	12	0.50	0.00	0.00	6.00	1.73
WWR	12	0.00	0.00	0.00	0.00	0.00
SR	12	2.67	0.00	0.00	17.00	5.37
PR	12	0.00	0.00	0.00	0.00	0.00
REV	12	0.00	0.00	0.00	0.00	0.00
PRO	12	0.00	0.00	0.00	0.00	0.00
A&I	12	0.67	0.00	0.00	8.00	2.31
FS	12	0.58	0.00	0.00	7.00	2.02

Note: FP-filled pause, UPF- unfilled pause, PWR-part word repetition, WWR-whole word repetition, SR – syllable repetition, PR- phrase repetition, REV- revision, PRO- prolongation, INJ- interjection, FS- false starters.