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## Disfluencies in Typically Developing Tamil Speaking Children between 4 - 8 Years

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### Introduction

“Fluency” means flow of speech smoothly and continuously (Starkweather, 1987). Disfluencies refer to some form of break in that smooth flow of speech. Normal disfluency occurs throughout childhood and it may begin earlier than 18 months of age, with its peak between 2 to 3 ½ years. Children also swing back and forth in their degree of disfluency. The development of language (DeJoy & Gregory, 1985; Gordon, Luper & Peterson, 1986; Pearl & Bernthal, 1980; Meyers & Freeman, 1985a), speech motor control (Starkweather, 1987) and episodic stresses in the child’s environment may temporarily increase normal disfluency.

Knowledge of type and frequency of disfluency is paramount in understanding disfluencies especially in young children, as the age periods between 2 – 5 years, it is

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difficult to know whether the child is developing stuttering (or) simply going through this normal period of developing fluency (Starkweather, 1987; Ambrose & Yairi, 1995). On an average, a normally disfluent preschool child has about 10 disfluencies per 100 words (Yairi, 1982). As the complexity of language increases, so does the disfluencies.

Some attempts have been made in the past to study the development of fluency in various languages. Western studies (Yairi & Clifton, 1972; Kowal, O'Connell & Sabin, 1975; Yairi, 1981; Pellowski & Contoure, 2002; Carlo & Watson, 2003) have documented the percentage & types of disfluencies emitted by children in their respective age groups. These studies have revealed that, the types of disfluencies emitted were similar, with the percentage of disfluencies varying across languages, implicating the need for language and culture specific norms for fluency development (Cooper, 1972; Yairi & Ambrose, 1992b).

In India, studies have been done in Kannada (Nagapoornima, Indu & Yamini, 1990; Rajendraswamy, 1991); Hindi (Sharma, 1991); Malayalam (Joby, 1998 & Umarajan, 2000) and Tamil (Paulene & Boominathan, 2008). Although there are studies describing early speech disfluencies across the Indian subcontinent (Nagapoornima, Indu & Yamini, 1990; Rajendraswamy, 1991; Sharma, 1991; Joby, 1998; Umarajan, 2000; Paulene & Boominathan, 2008), the data provided by them are diversified. Since stuttering and related fluency disorders are observed universally across culture and languages, there is a need to study the developmental trends in fluency in children belonging to culturally and linguistically diverse backgrounds (Brutten & Miller, 1988; Carlo & Watson, 2003).

According to Steever (1987), 48 million speakers use Tamil as their first language. It is also estimated that one in every hundred children stutter at some point of time during the school age (Boominathan, Dheepa & Smitha, 2003). For early identification and intervention of stuttering, acquisition of data on aspects of disfluencies

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in Tamil is crucial. In this regard, an attempt was made to study the disfluencies in children between 3 – 4 years kindergarten children (Paulene & Boominathan, 2008).

This paper is a report of the study of the disfluencies in terms of their type, individual and total percentage of disfluencies for Tamil speaking children between 4-8 years.

## **Method**

### **Participants**

Employing a Cross sectional study design, this study comprised of 48 participants in the age range of 4 to 8 years, with 12 in each age group. The participants were divided into four groups i.e. Group I (4 to 4.11 years); Group II (5 to 5.11 years); Group III (6 to 6.11 years) and Group IV (7 to 7.11 years). They were matched for gender at every two months interval within the same group.

### **Source of data collection**

Children from two schools affiliated to Tamilnadu State board of education formed the study group. Only native speakers of Tamil language, with no family history of speech, language or hearing disorders or abnormal performance in academics and conduct (as reported by the class teacher) were considered for the study.

### **Material**

For the age group of 4 – 6 years, a picture description task was used, and for higher age groups, i.e. 6 – 8 years, it was storytelling. Pictures were taken from “With a little bit of help” - The Early Language Training Manual (Karanth, Manjula, Geetha & Prema, 1999). The story included a choice of eight wordless moral stories depicted in six picture sequences. For e.g. the thirsty crow, the greedy dog, the fox and the grapes, the hare and the tortoise, and the clever cap seller.

### **Procedure**

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In general, the experimenter first described few pictures or gave a description of any one story in order to familiarize the child with the task. The child was then encouraged to describe / narrate stories in a complete sentence form. Speech samples of children performing the tasks were audio recorded using a Philips digital recorder in a relatively quiet room at the school premises itself. The total recording time varied depending on the age groups, with younger ones requiring more than 20 minutes to record as compared to the older ones.

### **Analysis**

All the recorded samples were transcribed orthographically (verbatim). The initial 10 second data from the transcribed speech was not considered for analysis to avoid inclusion of probable irregular speech behaviors elicited due to initial test anxiety of recording. Care was taken to ensure that the analyzed samples were representative of the child's speech only. Any other observations regarding any atypical manifestation of disfluencies other than those mentioned above were noted during recording and documented separately.

### **Calculation**

The total percentage of disfluencies, individual percentage of disfluencies and rate of speech were calculated for the all tasks separately. The formulas used were

- a. Types of disfluencies:** In all seven types of disfluencies were noted. They were *Filled pauses* (Pauses filled with sounds like “mm”...”um” etc); *Unfilled pauses* (Silent pauses having duration greater than 300 msec); *Repetition* (Repetition of sounds). This category involves Syllable Repetition (Repetition of syllable); Part-word repetition (Repetition of part of the word); Whole word repetition (repetition of whole word); Phrase repetition (repetitions of phrases). *Parenthetical Remark* (adding explanatory or seemingly unrelated words or phrases), *False Starts* (disfluencies which represent changes in pronunciation, word, grammatical structure (or) content of what is said); *Audible Inspiration* (Audible inspiration during speech. It exists between words, part-words and

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utterances); and *Prolongation* (extended phonation of words/utterances wherein the phonation disturbs the normal rhythm / flow of speech).

b. Total percentage of disfluencies =  $\frac{\text{Total no. of disfluencies}}{\text{Total number of words spoken}} \times 100$

c. Percentage of individual disfluencies =  $\frac{\text{Total no. of individual disfluency}}{\text{Total number of disfluencies}} \times 100$

## Results

The data was subjected to descriptive statistical analysis, to describe the type of disfluencies, the number of children exhibiting disfluencies, mean individual percentage, and total percentage of disfluencies across various age groups.

### Type and individual percentage of disfluencies

The type of disfluencies and mean individual percentage of disfluencies across age groups are depicted in Table 1.

Table 1: Individual percentage of disfluencies across age groups

Types of disfluencies (%)	Age group (Years)			
	4 – 5	5 – 6	6 – 7	7 – 8
<b>SR</b>	1.5	2.1	2.5	2.4
<b>PWR</b>	2	3.45	1.83	2
<b>WWR</b>	2.66	3.75	2	1.8
<b>PHR</b>	1	1.5	1.66	1.3
<b>Prol</b>	-	1	-	-
<b>FP</b>	3.87	8.6	3.58	2.5
<b>UFP</b>	8.33	5.58	3	2.2
<b>FS</b>	2.4	1.4	1.3	1
<b>AI</b>	-	2.5	2.5	2.6
<b>PR</b>	-	-	3	1.3
<b>Average %</b>	<b>3.10</b>	<b>3.32</b>	<b>2.37</b>	<b>1.9</b>

*Syllable repetition – SR; Part-word repetition - PWR; Whole word repetition - WWR; Phrase repetition - PHR; Prolongation- Prol; Filled pauses – FP; Unfilled pauses – UFP; False Starts – FS; Audible Inspiration – AI; Parenthetical Remark – PR.*

#### **4-5 years**

The type of disfluencies seen in 4 - 5 years age group were, Unfilled pauses – (12/12 children); Whole word repetitions – (9/12 children); Filled pauses – (8/12 children); Part word repetitions – (6/12 children); Syllable repetitions – (6/12 children); False start – (5/12 children); and Phrase repetitions- (1/12 children).

The mean individual percentages for various types of disfluencies for the group were: 8.33% (Unfilled pauses), 3.87% (Filled pauses), 2.66% (Whole word repetitions), 2.4% (False start), 2% (Part word repetitions), 1.5% (Syllable repetitions) and 1% (Phrase repetitions).

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It is to be noted that, Audible inspirations, Parenthetical remarks, and Prolongation were not seen in this age group.

### **5-6 years**

The type of disfluencies seen in 5 - 6 years age group were, Unfilled pauses – (12/12 children); Filled pauses – (10/12 children); Syllable repetition – (10/12 children); Part-word repetitions – (11/12 children); False start – (9/12 children); Whole word repetitions – (8/12 children); Audible inspiration – (4/12 children); Phrase repetitions – (6/12 children); and Prolongation – (1/12 children).

The mean individual percentage for various types of disfluencies for 5 - 6 years age are: Filled pauses – 8.6%, Unfilled pauses – 5.58%, Whole word repetitions – 3.75%, Part-word repetitions – 3.45%, Audible inspiration – 2.5%, Syllable repetitions – 2.5%, Phrase repetitions – 1.5%, False start – 1.44%, and Prolongation – 1%.

In this group, disfluencies like Parenthetical remarks were not observed.

### **6-7 years**

The type of disfluencies seen in this age groups were, Filled pauses – (12/12 children); Unfilled pauses – (10/12 children); Whole word repetitions – (9/12 children); Part-word repetitions - (6/12 children); False starts – (6/12 children); Parenthetical remarks, Syllable repetitions and Audible inspiration – (4/12 children); and Phrase repetitions – (3/12 children).

The mean individual percentage for various the types of disfluencies for the group were: Filled pause – 3.58%; Unfilled pauses – 3%; Parenthetical remarks – 3%; Syllable

repetitions and Audible inspirations – 2.5%; Whole word repetition – 2%; Part-word repetitions - 1.83%; Phrase repetitions – 1.66%; and False start – 1.3%.

However, disfluencies like Prolongation were not observed in this age group.

### **7- 8 years**

The type of disfluencies seen in the 7-8 years age group were, Filled pauses, Unfilled pauses & Whole word repetition – (11/12 children); Part-word repetitions – (10/11 children); Phrase repetitions – (6/12 children); Audible inspirations & Syllable repetitions – (5/12 children); Parenthetical remarks – (3/12 children); and False starts – (1/12 children).

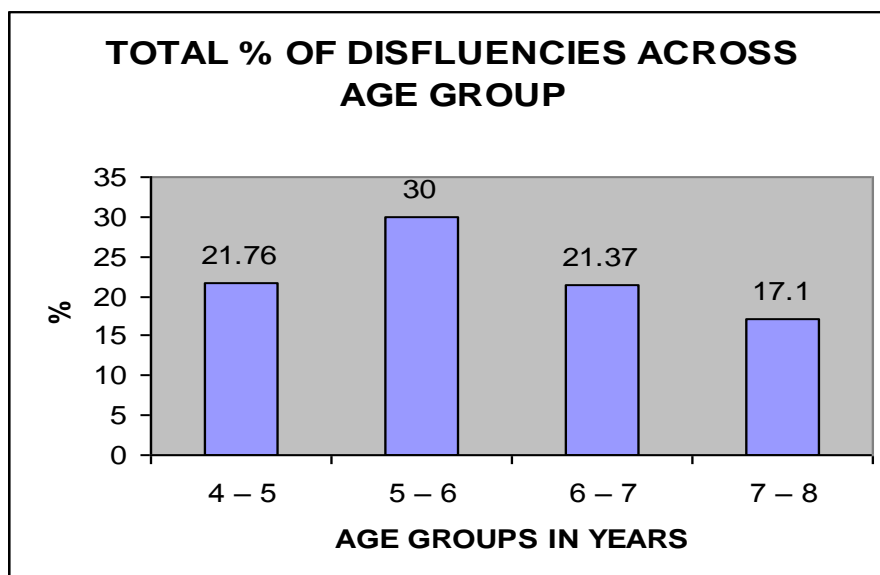
The mean individual percentage for various types of disfluencies for 7 - 8 years age are: Audible inspirations – 2.6%, Filled pauses – 2.5%, Syllable repetitions – 2.4%, Unfilled pauses – 2.2%, Part-word repetitions – 2%, Whole word repetitions – 1.8%, Phrase repetitions – 1.3%, Parenthetical remarks – 1.3%, and False start – 1%.

Disfluencies like Prolongations were not observed in this age group.

### **Total Percentage of disfluencies across age groups**

The mean total percentage of disfluencies across age groups of 4-8 years is depicted in Graph 1.



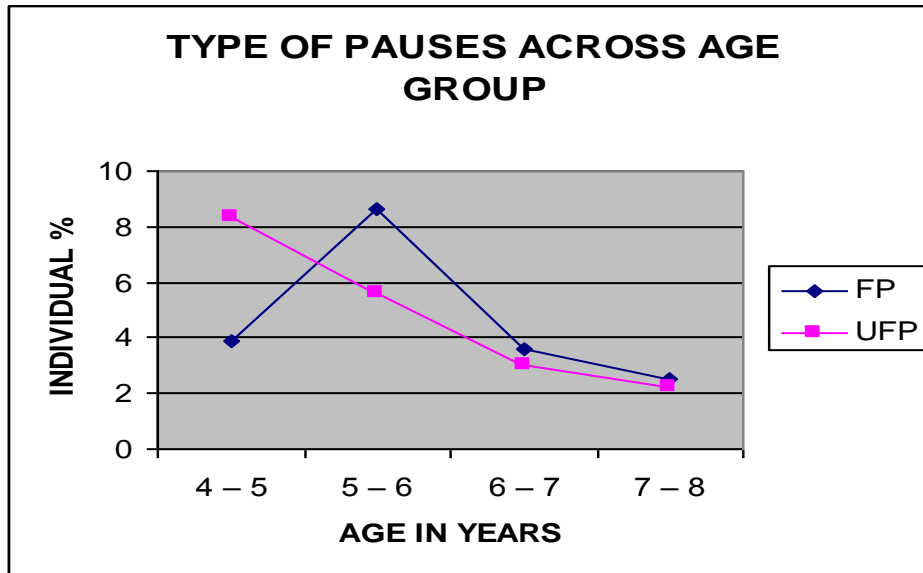


*Graph 1: Mean total percentage of disfluencies across age groups*

From the Graph 1, it is evident that the mean total percentage of disfluencies were 21.76% (4 – 5 years), 30% (5 – 6 years), 21.37% (6-7years) and 17.1% (7 – 8 years).

## **Discussion**

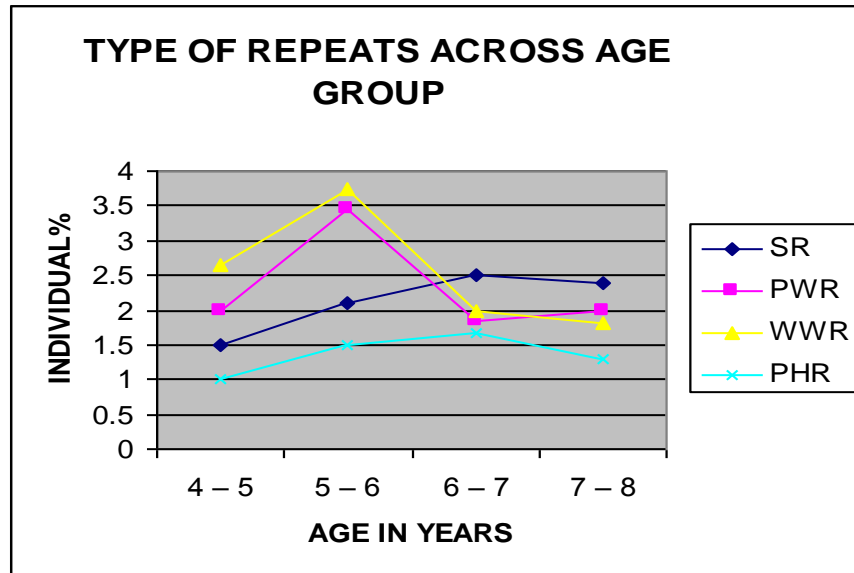
Among the disfluencies, *pauses* had the maximum percentage across all the age groups (Graph 2). Within pauses, the UFP were around 8% followed by FP (4%) in the 4-5 years age groups. However, by 5 years, FP was greater (9%) than UFP (6%). From 6 years to 8 years, both UFP and FP declined from around 3.5% to 2%.



Graph 2: Trend in Pauses (Filled & Unfilled pauses) across age group

Although a decreasing trend was observed among pauses, this decline was not very much evident in the age group of 5 to 8 years. This is in agreement with the study conducted by DeJoy and Gregory (1985), who reported that 5 year old age group did not exhibit a very drastic decline in the occurrence of unfilled pauses. Similar findings were reported by others too (Kowal et al, 1975; DeJoy et al 1985; Nagapoornima, Indu & Yamini, 1990; Rajendraswamy, 1991; Sharma, 1991; Joby, 1998; Umarajan, 2000). These researchers considered pauses as sophisticated disfluencies which persisted even in the speech of older aged children. 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 word (Silverman, 1973).

The second most frequent form of disfluency in this study after pauses were *whole word repetitions*. This was around 3% between 4-5 years, and increased to 4% by 6 years and then, declined to 2% by 8 years. This trend is reflected with the studies in literature.



Graph 3: Trend in Repetition across age group

Among the other type of repetitions (Graph 3), *phrase repetitions* were the least form of disfluencies. Phrase Repetition gradually increased from 1% to 1.6% by 7 years and then reduced to 1.3% by 8 years. *Syllable repetition* also showed a similar pattern like Phrase Repetition (increased from 1.5 to 2.5 % by 7 years and then decreased to 2.4 % by 8 years); however, its percentage of disfluency was slightly greater than phrase repetition. The *part word repetition* increased from 2% to 3.5 % by 6 years and then gradually decreased to 2% by 8 years.

Wexler and Mysak (1982) stated that, among the repeats category, whole word repetition followed by syllable repetition were the most frequently occurring in all the age groups. However, part-word types followed by phrase word repetition were the least observed repeat types in all the age groups. Similar findings were reported by Kowal, O'Connel and Sabin (1975); and Haynes and Hood (1977).

It needs to be stated that many western studies are not in agreement with the findings of the present study with respect to the developmental trends in part-word and phrase repetitions. This could be attributed to the fact that the present study considered Language in India [www.languageinindia.com](http://www.languageinindia.com)

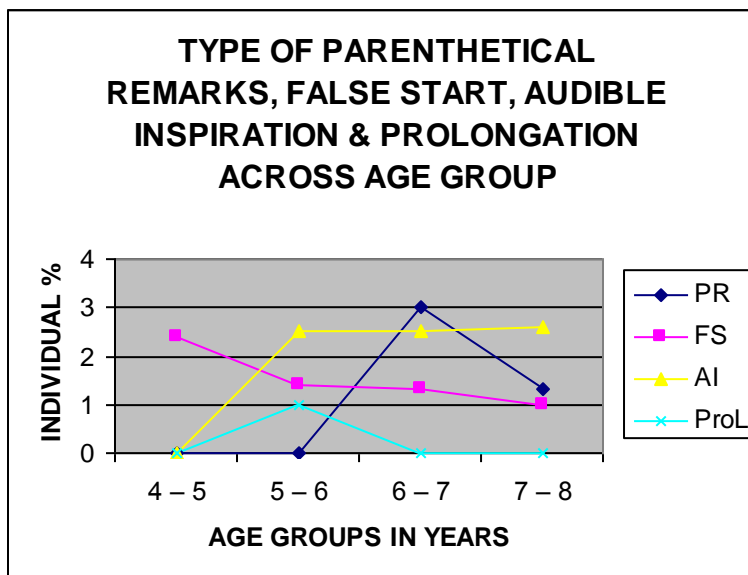
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each iteration as one unit of disfluency and each iteration of a SR or PWR made a meaningful word in most of the Indian languages, including Tamil, thus, resulting in more number of WWR and SR. Studies (Bjerkas, 1980; Wexler & Mysak, 1982) have reported that the motor factor could be responsible for disfluencies like part word repetitions and that the frequency of word repetition decreasing with age coincided with the increase of mean length of utterance.

**Prolongation** is the only form of disfluency which was not observed in any age group (from 4-8 years). However, one child (1%) exhibited this feature in the 5-6 years age group. Though prolongation is considered as a sophisticated form of disfluency in literature (Kowal, O Connell & Sabin, 1975), it was not exhibited by Tamil speaking children. This is in contrast to the findings of Paulene and Boominathan (2008), who reported that Tamil speaking children in the age group of 3 – 4 years exhibited more prolongations (average percentage of 11.30) as compared to other forms of disfluencies. The duration of prolongation in their study was reported to be 1.5 – 2 sec.

**False Start** was found to decrease with age from 2.4 % to 1% by 8 years. **Parenthetical remark** was first observed in the age of 6 years with the percentage of disfluency being 3%; however, by 8 years of age the PR decreased to 1.3%. This decrease in the use of PR and False start can be explained by the use of increased matured language.



Graph 4: Trend in Parenthetical remarks, False start, Audible inspiration & Prolongation across age group

**Audible Inspiration (AI)** was first noticed at 5 years of age and was persistent till 8 years of age. The percentage of the AI remained at 3% across the age range. Haynes and Hood (1977) have reported of similar findings. However, most of the studies indicated a usually decreasing trend with age in disrhythmic phonations. Study by Wexler and Mysak (1982) suggested that disrhythmic phonation may be the motor factors affecting frequency of audible inspiration that resulted in its decrease with increase in age.

The maximum percentage of disfluency was seen between 5-6 years (30%) and then there was a decreasing trend in the percentage of disfluency by 8 years (17%). This finding was in agreement with the English studies who also observed a similar decline from ages 3 to 7 years (Yairi & Clifton, 1972; Haynes & Hood, 1977; Wexler & Mysak, 1982; Yairi, 1981; DeJoy & Gregory, 1985). In terms of comparison of the present study with other Indian studies in reporting total % disfluency, this study correlates with the trends observed in Kannada language (Nagapoornima, Indu, Yamini, 1990; Rajendraswamy, 1991). In Tamil, the percentage of disfluencies in the 3 -4 year age Language in India [www.languageinindia.com](http://www.languageinindia.com)

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group ranged between 7 – 8% (Paulene & Boominathan, 2008). No co-existing physical concomitants were observed in the current study. It is felt that the secondary behaviors could have been missed out due to non- video recording.

## **Conclusion**

This study provided the “normal expectation of disfluencies” in Tamil speaking children between 4 to 8 years. It is obvious that the findings of the present study did not conform to its western counterparts. However, it is certain that there is a general trend of fluency development seen which is specific for each language. Hence, the findings of the present study are meant to give some insight into the normal disfluencies in Tamil Language, presumed to help in the early identification and appropriate management decisions in this group.

The results of the present study are summarized as follows:

- Pauses exhibited greatest percentage of disfluencies
- Among the repetitions, whole word repetitions were the greatest, followed by part word repetition. Syllable and phrase repetition were showing an increased trend till 7 years with age and then reduced by 8 years.
- Prolongation is the only disfluency that was not seen in any of the children between 4-8 years (only one child exhibited between 5-6 years)
- The total percentage of disfluencies ranged from 17.1 (7-8 years) to 30 (5-6 years)

The effect of various tasks and gender differences was not addressed in this study and warrants future studies.

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