

Disfluencies and Rate Characteristics of English Speaking Bilingual Young Indian Adults: Effects of Task and Speech Situations

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ABSTRACT

Purpose: The aim of the study is to document the type and frequency of disfluencies and rate characteristics which occurs in bilingual young non stutters who speak both Tamil and English and to compare the result across various speaking situations and task.

Method: Thirty Bilingual (Tamil and English) young Indian adults, 15 Males and 15 Females within the age range of 18-22 years were considered as the participants. Recording were done for 10-15 minutes using PRAAT software for each of the task i.e. General Conversation and Narration across various speaking situations such as familiar partner, unfamiliar partner, Telephonic communication, Communicating with opposite gender, Class presentation and Group discussion and across task such as general conversation and narration. Statistical analysis was carried out using Man Whitney U test to compare the disfluencies across situation and tasks.

Result: Typical disfluencies had highest mean score than atypical disfluency. Among the various speaking situations unfamiliar communication partner, opposite gender, class presentation and group discussion had highest mean score when compared to familiar communication partner and telephonic conversation. Across task, narration had greatest disfluencies when compared to general conversation task. Male participants had highest

disfluencies and had fast rate of speech when compared with females.

Keywords: Disfluencies, Bilinguals, Situations, Task, Speech rate, Self rating.

INTRODUCTION

The ability to communicate effectively can lead one to the top of the success ladder and for it the speech has to be fluent. The term fluency refers to continuous and smooth speech flow [1] Fluency is the barometer for the entire speech systems, with its limits apparently set by adequacy or performance of other dimensions of speech. [2]

Disfluencies are disruptions or breaks in the smooth flow of speech by unintentionally repeating a word or a phrase, forgetting a word mid utterance or having too many interjections. [3] The process that generates disfluencies is the same for both speakers who stutter and do not stutter. [4] Thus fluency level of speech varies between individuals and it is depended on the day, on the speaker's emotional state, on the domain of topic of conversation and on the everyday speech situations. [5] Hence the speech disruptions can occur to the speech of both fluent and stuttering individuals. [6] Fluent speech can be distinguished from stuttering by the

typology, frequency of speech disruptions and the speech rate [1]

Disfluencies in speech have been categorized as typical and atypical disfluencies [7] The typical disfluencies include Hesitation, Interjection of sounds, Revision of phrases/ sentences, two or less repetition with no tension. Atypical disfluencies include 3 or more disfluencies, Part word repetition, Sound repetition, prolongation and Blocks with increased tension.

Thus disfluency is used as a general referent, pertaining to the usual and normal disruptions in the patterns of speech movements that are perceived as "Fluent speech." [8] Several studies have attempted to analyse the type and frequency of the disfluencies which occurs in normal speakers to ascertain the effect it has on speech. In developing countries like India, understanding bilingualism is important because all adults speak more than one language across different part of the countries. Thus the second language that they utilize can be termed as non-fluent speech or L2 which can give rise to various forms of disfluencies.

Several studies have attempted to analyse the type of disfluencies and frequency of its occurrence in normal speaker to ascertain the effect. A study was carried out on 92 first grade children to document the disfluency behaviour between male and female nonstuttering children and the occurrences of types of disfluencies were identified from tape recordings. The result reveals that no sex differences were found with regard to total number of disfluencies. Comparisons of incidence of specific types of disfluencies revealed that males exhibited a greater number of incomplete phrases than females [9]

Another study was done to document the relationship between age and frequency of disfluency. 60 non-stuttering males undergoing preschool in the age range 3.5-5 years was evaluated. The results of this investigation suggested that nonstuttering children begin to show more

adult-like disfluency patterns towards the later preschool years. The younger children showed higher rates of part-word, word and phrase repetitions, incomplete phrases and dysrhythmic phonation. The older children demonstrated significantly more grammatical pauses. The two groups did not differ in frequency of interjections, ungrammatical pauses and revisions. [10]

The relationship between anxiety and disfluencies were studied in three college students, each individual was video recorded in following speaking situation-classroom presentation, conversation with an unfamiliar speaker, and conversation with familiar speaker. A 150 word sample was collected. Results revealed that the three subjects produced more disfluencies when speaking with an unfamiliar person as compared to classroom presentation. 87% of disfluencies were interjections across all subjects. Other types of disfluencies found were revisions, incomplete phrases and phrase repetitions. The results also revealed that different environments and anxiety levels might have an effect on fluency. [11,12]

The disfluency patterns were compared in normal and stuttered speech by taking four stutters and non-stutters to analyse the prosodic patterns that surfaced from their spontaneous narrations by giving a story telling task. The preliminary results revealed that major disfluencies include prolongation, pause and cut, repetitions in non-stutters, while in stutters disfluencies were accompanied by more prosodic irregularities. [13]

Study on the speech disfluencies in English speaking Indian adult was done to assess the common disfluencies observed in 22-25 year old Indian adults who use English. Speech samples were collected for two minutes, each for three different conditions; reading, monologue and general conversation. The result revealed five types of disfluencies that were observed in them-pauses, repetitions, interjections, revision and prolongations. Disfluencies are present since an increased planning time is required for the rapid flow of speech. Study

concluded that the type of disfluencies present are quite normal and do not affect speech considerably. [14]

An Indian study was done in 4-5 year old normal bilingual children and concluded that the type of disfluencies present in English speaking Indian children are filled pauses, interjections, word repetitions, prolongations and phrase repetitions. [15]

Only few studies had profiled disfluencies in bilingual Indian non-stuttering young adults speaking both in Tamil and English language. Limited studies have been conducted to compare the disfluencies occurring in non-stutters speech across various speaking/ communication situations and tasks. Hence there is a need to profile the disfluencies which occur in bilingual young non stutters adults who are bilinguals (Tamil and English). Disfluencies varies across task and situations thus the present study is needed to compare the results across various speaking situations and also task.

MATERIALS AND METHODS

The study aimed to profile the disfluencies and rate across different speaking situations and task. It is also focused to evaluate the frequency of disfluencies and gender differences across speaking task and various situations.

Participants

30 Normal English speaking bilingual young adults 15 males and 15 females in the age range of 18-22 years (Mean age: 20 years) were considered as the participants. All participant spoke Tamil as their first language and they predominantly used English as their second language and hence it is considered as their second most proficient language. The participants were recruited based on graduate college going student and volunteer bases. They were exposed to English majority of the times, either at college or with their peer group.

Inclusion Criteria

- The following criteria were considered for the selection of participants
- University students / college going students were considered as the participant with the age range of 18- 22 years.
- Leap questionnaire was administered to check the proficiency in each of languages/ criteria to check bilingualism.
- None of the participants reported of psychological/mental/stress situations.

Exclusion Criteria

- Participants who know more than two languages (Tamil & English) were not included in the study.
- Participants with less proficiency in either languages or who fail LEAP test were not considered as the participants.

Procedure

All subjects were screened for Language Experience and Proficiency Questionnaire (LEAP-Q). [16] Data from this questionnaire were used to determine the participant's self-reported levels of L2 proficiency, L2 exposure and L2 experiences. LEAP-Q is a reliable questionnaire that elicits internally consistent self-reported data regarding bilingual's language proficiency, age of acquisition, and history of prior and current language exposure across all languages. The questionnaire was validated in a large sample of bilingual's speaker and shown to be highly predictive bilingual's actual linguistic performance in both L1 & L2. A prior written consent was obtained from all the participants and also need of the study was explained to each participant.

Recording was done in a quiet sound treated room. The participants were seated comfortably at a distance of 1 feet from the laptop placed on the table. Each participant speech was recorded individually using a standard laptop with microphone and with the help of PRAAT voice recording and analysis software 5.1 version. Recording of speech samples were done in English for the duration of 10-15 minutes with minimum of 230 syllables in each sample.

Task

All the participants were given two tasks: General conversation and Narration. General conversation, involved the topics such as name of the subject, his/her daily routines, hobbies and overall general description of their respective personalities. Story narration task was also carried out where the participants were asked to narrate any story of their choice or speak elaborately in a topic given such as memorable moments, favourite sports etc. Situations: The tasks were recorded in following six situations: One to one conversation was carried out with familiar Communication Partner, Unfamiliar Communication Partner, Opposite gender and telephone conversation/ Group conversation involves group presentation and Group discussion. In each of the situations the two tasks were carried out for 5-10 minutes. The table 1 shows the various speaking situations and the tasks.

Table 1: Two tasks and six situations done under each task are tabulated.

Task/ Situations	General conversation	Narration
Familiar partner		
Unfamiliar partner		
Opposite gender		
Telephone		-
Group presentation	-	
Group discussion		

Analysis

The disfluencies obtained in the speech samples are categorized into typical and atypical disfluency. The frequency of each disfluency is calculated separately for male and female participants across 6 speaking situations and 2 tasks. The disfluencies obtained were also compared between male and female participants to determine gender effect. Speech rate was calculated according to Peters and Guitar (1991) criteria of Words per minute (WPM) of 115- 165 words for all 30 participants. The participants were also given a self-rating questionnaire to rate which of the situations / task was perceptually difficulty for them and found to have more disfluencies. The table 2 shows the rating given in the self-rating questionnaire.

Table 2: The rating and the scoring given for each of the speaking situations and tasks are tabulated.

Ratings	Scores
Not at all difficult	0
Not very difficult	1
Somewhat difficult	2
Very difficult	3
Extremely difficult	4

Statistical methods

The disfluencies obtained from each participant was subjected to descriptive statistical analysis using Statistical Package for the Social Science (SPSS) version 22.00. Mean and Standard deviation (SD) values were computed for all speaking situations and task. Non- Parametric test, Mann-Whitney U were carried out to find out the significant differences across all the situations, task and genders effect if any.

RESULT

The aim of the present study is to document the type and frequency of disfluencies and rate characteristics in bilingual young non stutterers and to compare the result across various speaking task and situations. A total of 360 samples recorded from 30 participants in 6 speaking situations such as familiar communication partner, unfamiliar communication partner, opposite gender, telephone, class presentation and group discussion and 2 tasks, general conversation and narration were subjected to descriptive and statistical analysis.

Typical vs Atypical disfluencies

The types of disfluencies were categorized as typical/ atypical. On descriptive analyses, Mean and Standard deviation (SD) values of various type of disfluencies were calculated. The typical disfluencies such as Hesitation, Interjection of sounds, Revision of phrases/ sentences, two or less repetition with no tension were documented and few atypical disfluencies such as Part word repetition, Sound repletion, and prolongation were also obtained. Result reveals that there were greater mean score obtained for typical disfluency when compared to atypical disfluency. Statistical analysis was carried

out and the Mean and Standard deviation are tabulated in the table 3.

Table 3: Mean and Standard deviation for the two task across various speaking situations between Male and Female participants

Situations	Disfluencies	General conversation				Narration			
		Male		Female		Male		Female	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
FCP	Typical	3.01	1.68	2.20	1.63	3.73	1.69	3.2	1.14
	Atypical	0.91	0.54	0.91	0.53	0.93	0.58	0.59	0.53
UCP	Typical	3.39	1.53	3.03	1.54	3.5	1.21	3.41	1.37
	Atypical	0.62	0.52	0.46	0.39	0.64	0.54	0.6	0.5
OG	Typical	3.23	1.60	2.98	1.15	3.45	1.55	3.08	1.11
	Atypical	0.84	0.72	0.62	0.42	1.17	1.11	0.73	0.48
T	Typical	3.31	1.54	2.71	0.95	-	-	-	-
	Atypical	0.58	0.47	0.51	0.42	-	-	-	-
CP	Typical	-	-	-	-	3.73	1.21	3.4	1.43
	Atypical	-	-	-	-	0.82	0.42	0.53	0.34
GD	Typical	3.66	1.57	2.45	1.20	3.62	1.57	1.94	1.20
	Atypical	0.91	0.54	0.71	0.46	0.91	0.54	0.71	0.46

Note: FCP- Familiar communication partner, UCP- Unfamiliar communication partner, OG- Opposite gender, T-Telephone, CP-Class presentation and GD- Group discussion

In general conversation task, male participants obtained higher mean scores than females in Familiar communication partner (3.01), Opposite gender (3,23), Telephone (3.31) and Group discussion (3.66) situations. In unfamiliar communication both males and females participants exhibited similar mean scores which indicate the fact that conversing with unfamiliar partner leads to higher disfluencies.

Lesser amount of atypical disfluencies was seen in Group discussion, familiar communication partner and opposite gender situations when compared to other situations.

During Narration task, male and female participants obtained similar mean scores in all speaking situations except in group discussion which indicate that males have higher number of disfluencies in group situations than one on one situation.

Frequency of disfluencies

The overall occurrence of disfluencies across the situations and task were compared. In general conversation task, greater disfluencies were present in situations such as conversing with unfamiliar partner, opposite gender, telephone and Group discussion. Lesser number of disfluencies was present when conversing with familiar partner. Among typical disfluencies interjection and hesitation was predominantly seen across situations and also few atypical disfluencies such as word repetition and prolongation was seen predominantly when communicating with opposite gender, unfamiliar partner, telephone and group discussion. Mean and standard deviation was calculated for each disfluencies in generation conversation and the results are tabulated in table 4.

Table 4: Mean and Standard deviation for each types of disfluencies for General conversation task

Situation	Gender	Typical Atypical						
		ITD	HES	REV	PR	WR	PWR	PRO
FCP	M	5.53(2.3)	2.93(2.2)	1.07(1.0)	.67(.9)	2.53(1.0)	.40(.6)	1.67(.4)
	F	4.67(3.1)	2.07(1.7)	.40 (.5)	.07(.2)	1.67(1.1)	.33(.6)	1.00(.7)
UCP	M	6.80(2.3)	3.13(1.9)	.93(.8)	.60(.8)	2.73(1.0)	.07(.2)	1.20(.7)
	F	6.67(2.4)	2.80(1.2)	.93(.7)	.20(.5)	1.73(.9)	.00(.0)	1.33(.6)
OG	M	6.13(2.4)	3.00(2.1)	1.20(.9)	.60(.9)	2.60(.9)	.40(.6)	1.53(.6)
	F	5.47(1.5)	2.40(1.2)	.73(.7)	.47(.6)	2.27(1.0)	.00(.0)	1.40(.6)
T	M	5.80(2.3)	3.20(1.4)	1.33(.7)	.40(.7)	2.93(1.6)	.07(.2)	1.27(.4)
	F	5.53(1.4)	2.73(1.1)	1.07(.5)	.20(.5)	1.53(.7)	.00(.0)	1.33(.7)
CP	M	-	-	-	-	-	-	-
	F	-	-	-	-	-	-	-
GD	M	7.00(2.4)	3.47(1.8)	1.07(.9)	1.27(.8)	3.13(.9)	.07(.2)	1.40(.5)
	F	5.20(1.9)	2.47(1.1)	.47(.5)	.80(.7)	1.67(1.1)	.00(.0)	1.33(.6)

Note: FCP- Familiar communication partner, UCP- Unfamiliar communication partner, OG- Opposite gender, T-Telephone, CP-Class presentation and GD- Group discussion. Class presentation cannot be done for the task of general conversation.

In narration task, greater disfluencies was seen in when communication with unfamiliar partner, opposite gender, class presentation and group discussion. Mean scores were higher for typical disfluencies when compared to atypical disfluencies. Among typical disfluency, interjection, hesitation was highly seen in all situations opposite gender and telephone. Among atypical disfluency word repetition and prolongation has higher occurrence. Overall disfluencies were seen higher in narration task when compared to general conversation task. Mean and standard deviation was calculated and tabulated in table 5 for narration task.

Table 5: Mean and Standard deviation for each types of disfluencies for Narration task

Situation	Gender	Typical				Atypical		
		ITD	HES	REV	PR	WR	PWR	PRO
FCP	M	6.20(2.8)	3.20(1.6)	1.60(.9)	1.47(1.0)	2.93(1.3)	.00(.0)	1.33(.7)
	F	5.80(1.6)	2.80(1.4)	1.33(.7)	.53(.7)	2.87(.8)	.07(.2)	1.00(.7)
UCP	M	7.27(1.7)	3.20(1.9)	1.00(.7)	.93(.8)	2.53(1.3)	.00(.0)	1.00(.7)
	F	6.93(2.4)	2.80(1.1)	1.40(.8)	.60(.7)	1.93(1.1)	.00(.0)	1.20(.7)
OG	M	6.80(1.8)	2.80(1.5)	1.93(1.2)	1.47(1.5)	2.27(1.5)	.53(1.2)	1.33(.7)
	F	5.87(1.6)	2.47(.9)	1.33(.4)	.53(.7)	2.67(1.3)	.00(.0)	1.67(.7)
T	M	-	-	-	-	-	-	-
	F	-	-	-	-	-	-	-
CP	M	7.13(1.6)	3.27(1.4)	1.60(.7)	1.20(.6)	2.93(.9)	.00(.0)	1.27(.5)
	F	6.40(1.7)	3.40(1.8)	1.60(.8)	.20(.4)	2.20(1.2)	.00(.0)	1.40(.6)
GD	M	7.00(2.4)	3.47(1.8)	1.07(.9)	1.27(.8)	3.13(.9)	.07(.2)	1.40(.5)
	F	5.20(1.9)	2.47(1.1)	.47(.5)	.80(.7)	1.67(1.1)	.00(.0)	1.33(.6)

Note: FCP- Familiar communication partner, UCP- Unfamiliar communication partner, OG- Opposite gender, T-Telephone, CP-Class presentation and GD- Group discussion.
Telephonic conversation cannot be done for the task of narration.

Comparison of Male and Female

The Male participants have higher number of disfluencies when compared to females in each of the speaking situations and in narration task more amount of disfluencies were present. Across the situations greater mean score was obtained in group discussion (2.58 and 1.76) and class presentation (2.48 and 2.17) indicating that one on one is much easier than one to many situation irrespective of the gender. Similar mean scores was obtained when communicating with unfamiliar partner (2.2 and 1.9) and with opposite gender (2.3 and 1.9).

When compared across task, male participants exhibited higher disfluencies in narration (2.46) than females (2.04) and in general conversation task, males got a mean score of 2.09 which was higher than females (1.62). Male and Female participants' performance was compared across various speaking situations and task and the mean values are shown in the bar diagram 1.

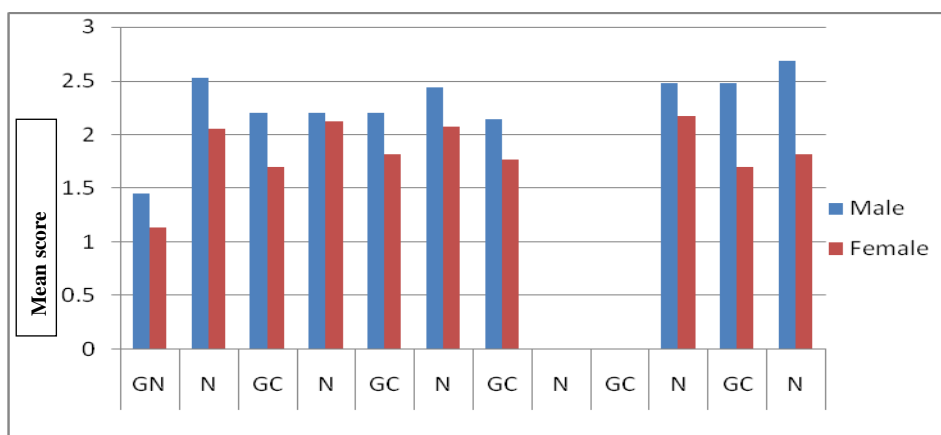


Figure1: Male and female performance for various speaking situations and task

Speech rate

The rate of speech was compared across various speaking situation and task to see for significant difference and the results are tabulated in the table 6. When compared across the task all male participant had increased word per minute (WPM) in the task of general conversation whereas female participants had increased WPM in the task of narration. When compared across situations increased WPM were noted in situation such as familiar communication partner and in group discussion in the task of general conversation, whereas in the task of narration increased WPM were noted in opposite gender and group discussion. Statistical significant difference was seen in

familiar communication partner in general conversation and unfamiliar communication partner in Narration. In the situation of opposite gender male participant had increased WPM in conversing than narrating with the females. Under unfamiliar communication partner both males and female participants have reduced WPM in the task of general conversation. Average WPM was calculated separately for males and females which revealed 119.42 words and 117.37. Significant p value was obtained in unfamiliar communication partner for the task of narration, and in familiar communication partner for the task of general conversation.

Table 6 compares the speech rate obtained for male and female participants across various speaking situations and also task.

Task	Situations	Male		Female		Z value	P value
		Mean	SD	Mean	SD		
GC	FCP	125.67	20.2	106.13	19.5	-2.452	.014
	UCP	87.93	10.1	85.60	9.1	-.686	.493
	OG	124.40	28.1	134.93	19.9	-1.122	.262
	T	125.53	29.0	120.67	26.7	-.335	.737
	GD	125.60	21.3	111.93	12.8	-1.70	.088
N	FCP	118.40	16.7	123.47	27.2	-.166	.868
	UCP	121.13	20.3	141.13	24.2	-2.282	.022
	OG	120.80	16.2	114.53	26.4	-.832	.406
	CP	119.20	16.6	123.47	27.2	-.083	.934
	GP	125.60	21.3	111.93	12.8	-1.70	.088

Self-rating

The participants were asked to rate on a Self-rating questionnaire in a 5 point rating scale for all of the situations and two task. 1 indicated not all difficult and 5 indicated extremely difficult. The ratings of the participants are shown in bar diagram. Figure 2 represent the self-rating for six situations and figure 3 represent the self-rating for two task.

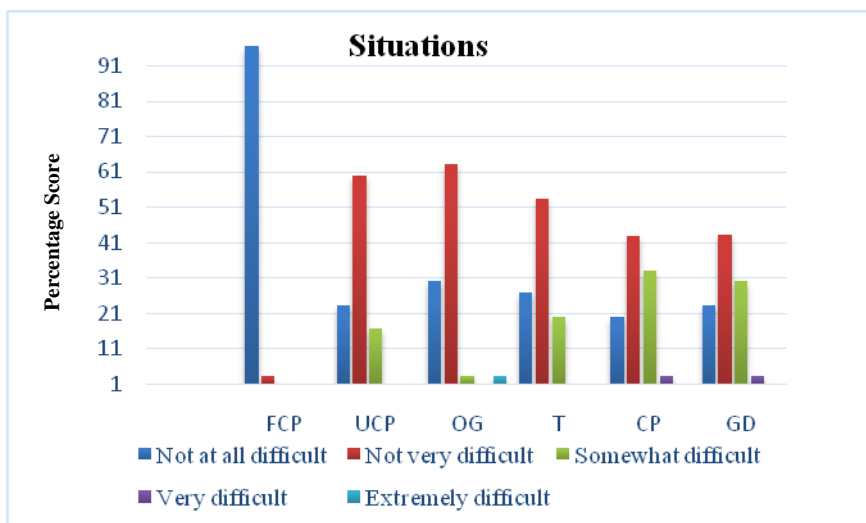


Figure 2: Various speaking situation showing the level of difficulty rated by each of the participants.

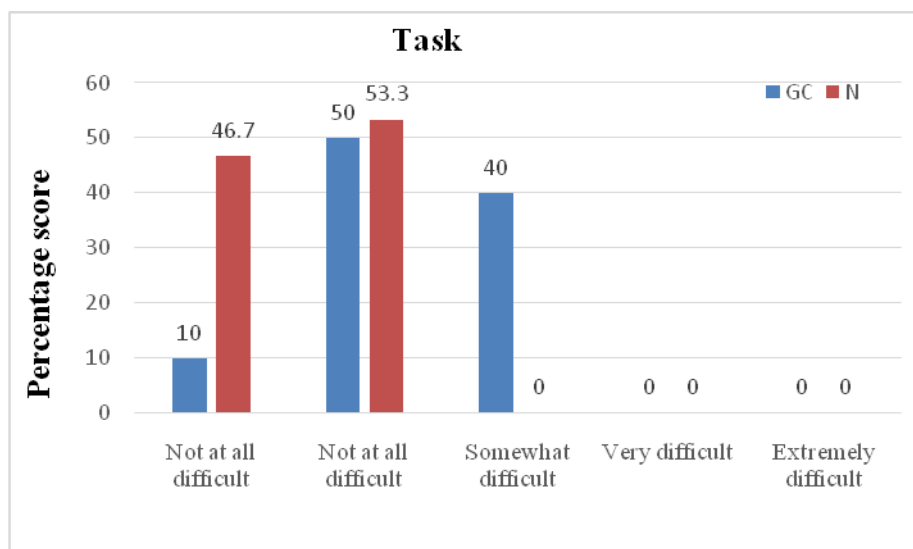


Figure 3: Task showing the level of difficulty rated by each of the participants.

Score of 1 (Not at all difficult) was rated by 97% in FCP whereas score of 4 (Very difficult) and 5 (Extremely difficult) was only reported in the situation CP and GD. The result reveals that conversing with familiar partner were easier and exhibited less disfluencies than other speaking situations. Score of 2 (Not at all difficult) and 3 (Somewhat difficult) were almost similarly rated in UCP and OG, also in CP and GD. Across the task, Narration was rated to be perceptually difficult than General conversation. The perceptual ratings by the participants on the self-rating questionnaire were in accordance with type and frequency of disfluencies.

DISCUSSION

On comparing Mean and SD among typical and atypical disfluencies, greater mean scores were obtained for typical than atypical disfluencies. These findings are supported in previous literature, which emphasized that more typical and less atypical disfluencies are observed in normal speakers and presence of typical disfluencies such as interjection and hesitation are predominantly seen in spontaneous speech in normal fluent adults. [17]

On calculating the frequency of disfluencies across two tasks, lesser number of disfluency noted when speaking with a familiar person. This indicates that speakers

might be less anxious when speaking to a familiar person and might result in lower disfluencies. Also familiarity with other speaker's speech style might also lead to fewer disfluencies.

Greater numbers of disfluencies were noted in unfamiliar partner, opposite gender, telephone and Group discussion under general conversation task and in unfamiliar partner, opposite gender, class presentation and group discussion under narration task. On comparing disfluencies among these two tasks, higher numbers of disfluencies were seen in narration than general conversation task. This could be because spontaneous speech require rapid development there are chances that it could to be susceptible to present disfluencies. [18]

On comparing the disfluencies between male and female participants, male participants scored higher disfluencies which is in accordance with the previous literature that men produce more fillers than women. [19]

On calculating average Word per Minute (WPM), result reveals that male produced 119.42 words/min and female produced 117.37 words/min. Increased rate of speech were noted in situation such as familiar communication partner and in group discussion in the task of general conversation, whereas in the task of narration increased rate of speech were noted in opposite gender and group

discussion. Self-rating questionnaire was administered for six situations and two task. Participants rated that narration was difficult than general conversation task and conversing with familiar partner were rated as easiest as other situation. Group situations such as class presentation and group discussion were much difficult than one to one situation.

CONCLUSION

The present study reveals that normal English speaking bilingual Indian adults exhibited higher number of typical Disfluencies. Atypical disfluencies such as part word repetition, word repetition and prolongation were also present in the situation that is demanding. Future studies are directed to study effect of bilingualism and multilingualism on disfluencies i.e, effect of 1st, 2nd and 3rd language on disfluencies. Sample size can be increased that is more representative of general population and a larger number of anxiety evoking situations as the result of these studies can be applicable to people who stutter.

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