PHONETIC INFLUENCES IN BILINGUAL CHILDREN WITH STUTTERING

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MANASAGANGOTHRI

MYSORE-570 006

June 2011.

Certificate

This is to certify that this dissertation entitled **“Phonetic influences in bilingual children with stuttering”** is a bonafide work in part fulfillment for the degree of Master of Science (Speech-Language Pathology) of the student (Registration No. 09SLP032). This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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Declaration

This dissertation entitled **"Phonetic influences in bilingual children with stuttering"** is the result of my own study under the guidance of Mrs. Sangeetha Mahesh. Clinical Lecturer, Department of clinical services, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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CHAPTER I

INTRODUCTION

The term "Stuttering" is defined as, a deficit in the language production system, a defect that extends beyond the level of motor execution and that the defect is not simply one of motor control or coordination but involves more central functions of the language production system (Wingate, 1988). Stuttering is a disorder of high inter and intra individual variability depending on the speaking situations and the language related factors.

Cheverkeva (1977) proposed that stuttering is basically a disorder of language development, an idea recently emphasized by Bloodstein (2002). Although it is widely known that both are closely associated, nature of such associations is not very well understood. The possible stuttering-language link has become a focus of scientific interest, reflected in several stuttering models with psycholinguistic viewpoints. Among these are the Demands-Capacity Model (Starkweather, 1987), the Covert-Repair Hypothesis (Postma & Kolk, 1993), the Trade-Off Hypothesis (Bernstein Ratner, 1997) and the Cognitive Interference Model (Bosshardt, 2002). Investigators have focused their studies on five distinct linguistic variables: (a) phonological aspects, (b) loci of stuttering, (c) language complexity, (d) pragmatics (child's use of language) and (e) language skills.

Previous work has shown that phonetic difficulty affects older, but not younger speakers who stutter and that older speakers experience more difficulty on content words than function words. As the effects of phonetic difficulty are evident in teenage and adulthood, at least some of the factors may have an acquired influence on stuttering (rather than an innate universal basis). This may be established in future work by doing cross-linguistic comparisons to see which factors operate universally. The acquisition of the basic components of a native communication system evolves relatively quickly for most children. In fact, by the time they are of school age, children control most, if not all, of the major features (e.g., phonology, fluency, semantics, and pragmatics) of speech and language (Gleason, 1985; Smith, 1981; Stoel Gammon & Dunn, 1985). These communication abilities develop and mature rapidly so that most children produce adult-like communication by 5–6 years of age (Brown, 1973; Kent & Forner, 1979; Smith, 1978).

Bloomfield (1933) said that bilingualism resulted from the addition of a perfectly learned foreign language to one's own, undiminished native language and added that the definition of perfect was relative. Weinreich (1953) on the other hand defined bilingualism as the alternate use of two languages. The term bilingualism in its broadest sense refers to a condition that ranges from "the total simultaneous and alternating mastery of two language" to "some degree of knowledge of a second language in addition to spontaneous skills which any individual possess in his/her first language"(Siguan & Mackay, 1987).

Stuttering in bilinguals is an area that has not received much attention. But, the belief that stuttering is more prevalent in bilinguals than in monolinguals seems to be widespread (Eisenson, 1984; Shames, 1989; Karniol, 1992). Many of the "facts" about stuttering and its development are derived from studies of monolingual speakers, virtually all of whom are English speakers. It is, however, important to note that it is estimated that over 50% of world's population stutters (De Houwer, 1998) and about 1% of the world's population stutters (Bloodstein, 1995).

Although stuttering in bilinguals is an area of interest, data on bilingualism and stuttering in children are scanty and inconclusive. According to Cabrera and Bernstein Ratner (2000) bilingual children allow the study of whether presumed linguistically governed regularities in stuttering loci and incidence remain constant regardless of language spoken. For example, inconsistency of phonological loci across languages spoken by the speaker would seem to weaken purely motoric accounts of stuttering. Many speech-language pathologists have a fair chance of being confronted with bilingual children who stutter. In providing services to these children, clinicians may be faced with unique problems and questions that go beyond their ordinary competency with fluency disorders. Apart from its clinical significance, the study of stuttering and bilingualism is also interesting from a theoretical viewpoint.

India being a multilingual country where majority of the population speak more than one language and most school going children are exposed to at least two languages at the primary school and beyond, it is important to study about stuttering in children in relation to bilingualism. Stuttering is constrained by linguistic variables and most data available is on English speakers. The cross linguistic studies across different population are required to validate the results. The phonetic loci of dysfluencies in bilingual children with stuttering may throw more light on the nature of this intriguing disorder of speech. Researchers have reported comparisons between monolingual and bilingual adults with stuttering in the Indian context and such comparisons have not been made in children and not focused on phonetic aspects of stuttering between the languages. Hence, the present study was planned.

Need for the Study

India being a multilingual country where majority of the population speak more than one language and most school going children are exposed to at least two languages at the primary school and beyond, it is important to study about stuttering in children in relation to bilingualism.

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The present study is therefore planned with the following objectives:

Aim of the study

The main aim of the present study was to investigate the phonetic influences in bilingual children with stuttering.

Objectives of the Study

1. To compare the phonetic influences in bilingual children with stuttering across two languages (Kannada and English).

2. To compare the phonetic influences in bilingual children with stuttering across tasks (spontaneous speech, monologue, reading, naming) in both English and Kannada.

3. To analyze the loci of dysfluencies occurring at phoneme level and the phonetic context (succeeding phoneme) in two languages (Kannada and English).

CHAPTER II

REVIEW OF LITERATURE

The term "stuttering" is defined as, primarily a puzzle, the pieces of which lie scattered on the tables of speech pathology, psychiatry neurophysiology, genetics and many other discipline" (Van Riper, 1971) . Stuttering occurs when the forward flow of speech is interrupted abnormally by repetitions of a sound, syllable, or articulatory posture or by avoidance and struggle behaviors. (Van Riper, 1978). A deficit in the language production system, a defect that extends beyond the level of motor execution and that the defect is not simply one of motor control or coordination but involves more central functions of the language production system (Wingate, 1988). Stuttering is disorder of high inter and intra individual variability depending on the speaking situations and the language related factors.

Model of stuttering - Covert repair hypothesis (Postma & Kolk, 1993)

It is a pre articulatory repair processes seen in person with stuttering. Self-repairing of speech errors demonstrates that speakers possess a monitoring device with which they verify the correctness of the speech flow. There is substantial evidence that this speech monitor not only comprises an auditory component (i.e., hearing one's own speech), but also an internal part: inspection of the speech program prior to its motoric execution. Errors thus may be detected before they are actually articulated. In the covert repair hypothesis of disfluency, this internal error detection possibility has been extended with an internal correction counterpart. Basically, the covert repair hypothesis contends that disfluencies reflect the interfering side-effects of covert, prearticulatory repairing of speech programming errors on the ongoing speech. Internally detecting and correcting an error obstructs the concurrent articulation in such manner that a disfluent speech event will result. Further, it is shown how, by combining a small number of typical overt self-repair features such as interrupting after error detection, retracing in an utterance, and marking the correction with editing terms, one can parsimoniously account for the specific forms disfluencies are known to take. This reasoning is argued to apply to both normal and stuttered disfluency. With respect to the crucial question concerning what makes stuttering speakers so greatly disfluent, it is hypothesized that their abilities to generate error-free speech programs are disordered. Hence, abundant stuttering derives from the need to repeatedly repair one's speech programs before their speech motor execution.

Loci of stuttering

What is a locus of stuttering?

The loci of stuttering can be described as linguistically conditioned: for example, consonant sounds are more likely to be stuttered on than vowels, and plosive sounds carry a greater risk of stuttering than any other class of sound production. This is likely due to the fact that the articulators must move with greater precision and within a smaller lime frame than for other sounds if the phoneme is not to be misperceived. As such, they carry a greater degree of articulator difficulty.

Geetha (1979) studied some linguistic aspects of stuttering in Kannada. The results revealed in general consonants were stuttered more than vowels. However, stuttering was found on vowel also and in minority of cases vowel were stuttered more than the consonants. Vowel /a/ got the highest frequency of stuttering in initial position.

Wall, Starkweather and Harris (1981) studied the influence of voicing adjustments *in the* location of stuttering in the spontaneous speech of young child with stuttering. The spontaneous speech of nine young 4–6 ½ years children with stuttering was recorded in 45-min play sessions. All subjects had stuttered for 6 min or more and had been diagnosed as stutterers by experienced clinicians. Transcriptions of the tapes were marked to show where stuttering occurred relative to phonemic events. Stuttering occurred significantly more often on words for which voice was initiated after a pause, whether at the beginning or the middle of a sentence & than during running speech. In running speech, frequency of stuttering was influenced by the voicing feature of the sounds surrounding the stuttered phone.

The phonetic factor

Johnson and Brown (1935) *s*tudied stuttering in relation to various speech sounds. In oral reading of 32 adults with stuttering (AWS) and it was found that more stuttering occurred on initial sounds of words. The influence of linguistic and language variables on stuttering have been studied from the time of Brown (1938, 1945) and by many authors subsequently. In a further study by Brown (1938), 32 PWS read a list of 1000 words. For the group as a whole and in the great majority they had more difficulty in consonants than vowels. More stuttering on the first few words of an utterance. Brown (1945) reported that stuttering tended to occur on consonants other than /t/, /h/, /w/ and /ð/. Johnson and Knott (1937) found consistent patterns of words stuttered on during successive readings in adults.

In contrary to earlier study a marked difference between consonant and vowels were found by Hahn (1942) and only 2.9 % of the stuttering occurred on words beginning with a vowel. He had taken 50 AWS who were made to read 550 words selected in four socially related varied situations. The conclusions drawn by him were:

1. It is possible to arrange the sounds in the ranking of difficulty according to median and mean percentage, of stuttering experienced in relation to each sound . The five sounds associated with greatest amount of stuttering are; /g/, /d/, / t̪ / (unvoiced), /l/ and /tʃ/.

2. The ranking can be compared with that the Johnson and Brown (1935) with fair correlation. The /g/, /d/, / t̪ / (unvoiced) /m/ and /tʃ/ in the large percentages and /f/, /s/, /ʃ/, /w/, /d̪/ (voiced) and /h/ in the smaller percentages.

3. Though a general ranking can be set up for a group, individual stutterers vary widely on sounds associated with stuttering and amount of stuttering on a specific sound.

4. Ranking of difficulty of sounds can't be said to show the influence of physical factors in sound formation. Voiced and voiceless plosive consonants classification, or the location, direction and duration of movement in the sound formation seem to have little bearing on the formulation of the general ranking of difficulty of sounds in stuttering.

5. Stuttering occurs predominantly on consonants than vowels.

6. The preponderance of stuttering occurs on initial sounds. The majority of the medial consonants associated with stuttering are at the beginning of accented syllables.

Since the phonetic factor in stuttering of this group is not a strong influence, it is suggested that the physical element in the production of sounds has little relation to stuttering and the other factors, mostly the psychological must be operated.

Connett (1955) concluded more stuttering on words beginning with /e/. Mann (1955) found that in general, consonants /s/, /v/, /m/, /l/ were stuttered more than vowels in word lists and essays, in 29 children with stuttering with the mean age of 10 years although there were exceptions. Williams, Silverman, and Kools (1969) applied Brown's (1945) four factors (grammatical class, position of phoneme/word, type of phoneme, word length) to the speech of 76 kindergartens through sixth-grade children. Bloodstein (1958) noted that the trouble with consonant than vowel may be a degree of stoppage or impedance of airstream, involving greater articulatory tension.

Soderberg (1962) studied phonetic influences upon stuttering. The author investigated the frequency and duration of stuttering instances that are associated with vowels, voiced consonant and voiceless consonant. 3 lists of 5 syllable phrases were recorded by 15 five syllable phrases totaling 50 words. In list one, all initial sounds of words were vowels, in the list two, they were voiced consonants and list three, voiceless consonants. Semivowels and consonants blends were omitted. The lists were equated for word frequency, readability, word length, position of the words, its accent and the grammatical function of words. The results showed no evidence of differences among vowels, voiced consonants and voiceless consonants with respect to mean frequency of stuttering instances.

Quarrington and Conway (1963) concluded that initial words were susceptible to stuttering than medial or final words. Soderberg's designs was criticized by Taylor (1966) according to her stuttering tend to occur on consonants other than /t/, /h/, /w/ & /d/. More on consonants, than on vowels, on sound in the initial position. More on plosives than on continuants. But the particular consonantal contexts were not those found by Brown and Hahn. This was attributed to individual variability.

Williams, Silverman, and Kools (1969) analyzed the verbal imitations or oral reading performance of 76 elementary school aged children with stuttering. Kindergarteners and first graders imitated sentences and the remaining subjects read orally. Long words occasioned more stuttering than short words. Fifty nine percent of the stutterers had more dysfluency on words beginning with vowels and /t/, /w/, /h/, /Ø/. In spite of the trend favoring Brown's consonant-vowel factor, this difference was not statistically significant. Soderberg (1967) concluded that stuttering was mostly clause initial.

Mackay and Soderberg (1970) studied 30 persons with stuttering (PWS) and 48 person with persons with no stuttering (PWNS). Result indicated more stuttering on syllables beginning with consonants. Contradictory study by Van Riper, (1971) concluded vowels is stuttered more than consonants. No significant difference among adults and children were also noted.

Griggs and Still (1979) an analyzed individual differences in words stuttered. Six PWS (two adults and four children between 12 and 14 years old) read 33 or more passages of prose of approximately 200 words, in sessions of 16 or 17 passages. Words were classified by initial phoneme, grammatical class, length, and position in sentence, and proportions of stutters were examined as a function of these variables. The extensive data allowed a detailed analysis of individual differences, with the following results. Five subjects showed the usual higher rate of stuttering on consonants, though there were differences in which consonants were stuttered most, and one subject showed more stuttering on vowels. A markedly higher rate was found on initial words of sentences in two subjects, and these two subjects were also exceptional in stuttering more on content than function words, and in showing a type of stutter characterized by blocks rather than repetitions. Stuttering tends to occur at or near the beginning of a sentence. Contrary to Taylor (1966) there were significant correlations between stuttering and grammatical class even when initial phoneme and word in sentence were held constant. There were no significant changes within sessions. Two subjects showed a significant decrease between sessions, one showed an increase; these changes were due to familiarity with the experimental situation, rather than with passages per se.

Huinck, Van Lieshout, Peters and Hulstijn (2003) studied gestural overlap in consonant clusters effects on the fluent speech of stuttering and non-stuttering subjects. The study was designed to investigate if persons who stutter differ from persons who do not stutter in the coproduction of different types of consonant clusters, as measured in the number of dysfluencies and incorrect speech productions, in speech reaction times and in word durations. Based on the Gestural Phonology Model of Browman and Goldstein (1987), two types of consonant clusters were formed: homorganic and heterorganic clusters, both intra-syllabic (CVCC) and inter-syllabic (CVC#CVC). Overall, the results indicated that homorganic clusters elicited more incorrect speech productions and longer reaction times than the heterorganic clusters, but there was no difference between the homorganic and the heterorganic clusters in the word duration data. Persons with stuttering showed a higher percentage dysfluencies and higher percentage incorrect speech productions than person without stuttering but there were no main group effects in reaction times and word durations. However, there was a significant three way interaction effect between group, cluster type and cluster place homorganic clusters elicited longer reaction times than heterorganic clusters, but only in the inter-syllabic condition and only for persons who stutter. This result suggested that the production of two consonants with the same place of articulation across a syllable boundary puts higher demands on motor planning and/or initiation than producing the same cluster at the end of a syllable, in particular for person with stuttering.

Position of instances of Stuttering

Many studies in the literature have revealed the relationship between the word position in a sentence and stuttering. More stuttering was observed on the first word of a sentence, less on the second word and even less on the third (Brown, 1938, 1945). And instances of stuttering tend to occur on words at the beginning of sentences (Brown, 1938) and on content words such as nouns and verbs (Brown, 1937).

Hejna (1955) found a partial support for the position gradient effect in the spontaneous speech of stutterers. Greater than expected levels of stuttering were observed on the 2^{nd}, 3^{rd}, 4^{tb}, 6^{th} and 7^{th} word positions. 1^{st} and the 5^{th} word positions were not found to differ significantly from expected frequencies. The failure to find the most stuttering on the 1° word was explained to be due to the fact that in the spontaneous speech, the initial word was often a starter word as 'well', ‘And’ which convey little meaning.

Studying the role of initial phonemes in the stuttering of spontaneous speech, Hejna (1955) concluded that the consonants tended to be associated with more stuttering. However, no significant trend among the various consonants was noted.

Quarrington, Conway and Siegel (1962) contrasted the amount of stuttering on 1^{st} and final words of sentences, finding a significance difference in frequency, with more stuttering on the initial words. Conway and Quarrington (1963) tried to control for other variables as initial phonetic sound, grammatical class and number of syllables by designing the sentences read by the stutterers, also found the initial word had more susceptible to stuttering than medial and medial more than final position of words in the sentences. Quarington, Conway and Siegel (1962) selected four consonants associated with high stuttering frequency (/g/, /l/, /d/, /p/) and four low frequency sounds in words (/w/, /s/, /h/, /f/) using words equated for syllable stress length and frequency of occurrence . They showed that high stuttering frequency consonants and low frequency has no difference. A correlation of 0.49 between position of the word within the sentences and decreasing frequency of stuttering was found and more unpredictable words are more likely to be stuttered.

Blankenship (1964) concluded from his study that Quarrington's speculation that initial position may be associated with a high frequency of stuttering may not only hold true for person with stuttering but for person with non stuttering as well. Taylore (1966) showed that word position was a more important determiner of the loci of stuttering than either the length of the word or the phonetic characteristic of the syllables. It was also found that more stuttering occurred on initial word clauses than on subsequent words even though initial words were more typically the function words and pronouns while final words were more often the lexical class (Soderberg, 1967). Bloodstein and Gantwerk (1967) also found that very young stutterers had more trouble on the first words of their utterances.

Silverman and Williams (1967) found little difference between the loci of disfluencies in stutterers as compared to normal speakers except that the stutterers had more difficulties in the initial position, in getting started.

Wingate (1979) concluded more stuttering occurred on the first three words in a sentence and also found that a word frequency effect was only seen with lists of short rather than longer words. Griggs and Still (1979) reported stuttering tends to occur at, or near the beginning of a sentence. The above studies confirmed that occurrence of stuttering is related to the position of the word in sentence.

Bernstein (1981) concluded children's stuttering occurs more frequently at sentence initial position.The finding that the occurrence of instances of stuttering is predictable (i.e., beginning of a sentence) was consistent with psycholinguistic studies showing that other, more typical, disfluencies such as whole-word repetitions and pauses are also more likely to occur at the beginning of an utterance (e.g., Boomer, 1965; Holmes, 1988; Maclay & Osgood, 1959) for example, due to uncertainty associated with planning the sentence. Similarly, studies examining stuttering in childhood have suggested that instances of stuttering at the beginning of a sentence are related to aspects of sentence planning, such as integrating syntactic constituents (Bernstein, 1981; Wall, Starkweather & Cairns, 1981) or motor initiation/execution (Bloodstein & Gantwerk, 1981; Logan & LaSalle, 1999).

A number of studies have reported that utterances that are longer and/or more syntactically complex are more likely to be stuttered (Logan & Conture, 1997; Yaruss, 1999; Zackheim & Conture, 2003).

A recent study by Natke, Sandrieser, Petrowsky and Kalveram (2004) suggest that most of stuttering occurs on first syllables and more on first sound of syllables. Findings from studies examining word- and sentence-level measures of disfluency therefore seem to demonstrate that both stuttered and other disfluencies. 1) tend to be located at the beginning of an utterance, and 2) tend to occur in longer and syntactically complex utterances. These findings suggest that the occurrence of both stuttering and other types of disfluencies may be triggered by aspects of sentence planning, and that their manifestation in speech tends to occur at the beginning of a planning unit (i.e., a clause). Thus, stuttering and other types of disfluency may both be triggered by similar factors, and word- and sentence-level measures may each may tap into those factors.

Phonetic context

Like Bluemel (1930), even Wingate (1945) considers the repetitions or blocks on the consonants is only due to the actual difficulty encountered in saying the following sound which is almost invariably a vowel (or dipthong). Thus, he considers stuttering to be the attempted production of a stressed vowel. He feels that the shaping movements that distinguish one vowel from another perhaps contribute to the occurrence of stuttering event.

Fletcher (1928) reffered to an inability to effect articulate speech by connecting the sound being given with the succeeding one. Kenyon (1944) felt that stutterers do not have any difficulty on consonants but they are stuttered because of the succeeding vowels. Forrester (1947) spoke of stuttering as an ability to join one syllable to other sufficiently and quickly.

Hunt (1967) regarded the stuttering to occur not on consonants alone but that it may extend to all sounds including vowels. He classified the stuttering as vowel stuttering and consonantal stuttering. The vowels u (as in 'rude') and 'O' seemed to offer greater difficulty than ‘e' (as in 'ebb') or I (as in 'it'). In the consonantal stuttering, disfluencies were chiefly found to occur on the utterance of mute and explosive consonants and their medial’s as /p/, /t/, / k/, / b/, /d/ and /m/. The aspirated and continuant sounds as /f/, /w/ and /s / offered much less difficulty, as the oral canal was not so completely closed as in the explosives. This does not mean that it is on account of difficulty of articulating explosives because, he often repeated these sounds in a rapid succession. It is the enunciation of the following sound, be it vowel or a consonant which is his difficulty; he cannot join them. It is, therefore, during the transition from one mechanism to another that the impediment chiefly takes place. It is the disturbed relation and the antagonism between the vocal and the articulating mechanism which given rise to stuttering; the spasmodic condition of the glottis which takes place in the explosive sounds is the 'effect' and not the cause of the distributed relation.

MacKay (1970) analyzed stuttering in the natural speech of Germans and the result revealed the following facts:

1. Stuttered phonemes are frequently preceded or followed in the context by an identical phoneme defined as the inducing phoneme.

2. The inducing phoneme usually followed rather than preceded the stuttered phoneme.

3. The inducing phoneme occurred closer to the stuttered phoneme than would be expected by chance.

4. The stuttered and inducing phonemes were usually situated in identical syllabic positions.

5. Stuttered phonemes usually occurred in stressed syllables.

Three main assumptions seemed necessary to explain these findings:

1. Both syllables and phonemes are units in a hierarchy of speech motor determinants

2. Contradictory aspects of similar motor programs (at both the syllabic and phonemic levels) interact in reciprocal inhibitory fashion. This assumption also provided a possible explanation of

blocking and prolongation of speech sounds phenomena which occur in contexts similar to stuttering.

3. The sub threshold excitability for stressed units is greater than for unstressed ones.

Jayaram (1979) studied the phonetic environment in AWS in terms of sound categories instead of individual sounds. The Succeeding phoneme was studied in terms of individual sounds classified according to place and manner of articulation. AWS in the Kannada language groups show a significant difference in the phonetic environment in which they stutter while their respective normal groups show no such difference. There is the same trend in both the spontaneous speech and in the oral reading task. For Kannada speakers short and long vowels are more affected when the succeeding sounds are voiceless stops. All other sounds are more affected when they are followed by short or long vowels, mostly long vowels. The same trend is found in the data for reading task. However, there are a few exceptions in the reading task results when the succeeding sounds have been voiced stops or nasals. The important thing is that while vowels are more often stuttered when the succeeding sounds are voiceless sounds, consonants are stuttered more when they are followed by vowels, more often long vowels. Similar are the findings for stuttering in English language, in both reading task and spontaneous speech. The trend is more pronounced in the case of stuttering in English language in the sense that stuttered consonants are always followed by voiced sounds, without any exceptions. There are two possible explanations for these findings.

(1) There might be disturbance in the initiation of voice

(2) The system of anticipatory coarticulation is faulty

And concluded that more often consonants are stuttered when the succeeding sounds are voiced sounds. Geetha (1979) studied 15 person with stuttering to see whether different vowel consonant combination) has any effect on the stuttering, the stuttering blocks were analyzed with regard to the type of VC combination in each of the syllable and part word repetitions. The Syllable stuttering was classified into five syllabic structures - Vowel (v), consonant-vowel (CV) vowel-consonant (VC), consonant-vowel-consonant (CVC) and consonant-consonant-vowel (CCV). The investigation was carried out on the sound and syllable repetitions and block. The syllables in a word were classified into initial, medial and final positions and when a word contained only two syllables, it was classified as only initial and final positions. The result clearly shows that it is the first syllable of the word which is stuttered often. The frequencies in the medial and final positions are in most instances zero. There are only two instances (in only two individual) of occurrence of median and final syllable blocks, and even there the frequency is very less. Result appears that CV and V syllables carry more stuttering than the rest of them. The frequency of stuttering on VC, CVC and CCV syllables is comparatively less. The greater number of blocks on CV syllables than on the V syllables also confirms the earlier conclusion that the consonants are more than the vowels though vowels also the stuttered upon. The transitional hypothesis that stuttering is due to the problem in transition from vowel to consonant or visa versa was not be justified fully as stuttering on CVC syllable is comparatively very low.

The role of phonetic factors as determinants of stuttering has also been investigated. Throneburg , Yairi & Paden (1994) investigated the relation between the phonologic difficulty of words and the point at which stuttering like disfluencies occurred in the speech of preschool children identified as having a stuttering problem. 24 children were taken and were divided into subgroups according to stuttering severity and phonologic ability. A spontaneous speech sample of approximately 1,000 words was tape-recorded from each child, and perceived disfluencies were identified. The phonologic difficulty of each word on which there was a stuttering-like disfluency and of each fluent word immediately following such disfluency was categorized. Using a scheme for the characterization of the phonetic difficulty of speech material. They classified words spoken by pre-school children who stutter into different categories according to whether they contained (1) developmentally Late Emerging Consonants (LEC; Sander, 1972) which are /r/,/l/,/s/,/z/,/ʤ/,/v/,/tʃ/,/h/,/θ/,/ð/,/ʃ/,/ʒ/ (2) Consonant strings (CS) and (3) whether the word contained Multiple-syllables (MS). Factors (1) and (2) could occupy any position within the word. The data showed that the proportion of disfluent and immediately following words in each type of phonologic difficulty closely resembled the proportion of words in the speech sample of the same type of difficulty. There were no significant differences between the subgroups of stutterers and concluded, therefore, that the phonologic difficulty of the disfluent word, and the fluent word following it, did not contribute to fluency breakdown regardless of the children's stuttering severity or phonologic ability. None of the three factors occurred significantly more often in stuttered words than non-stuttered words.

Howell and Au-Yeung (1995) confirmed this finding in a wider age range of children with stuttering (2 to 12 year old). Logan and Conture (1997) investigated temporal, grammatical and phonological characteristics of conversational utterances in 14 children with stuttering. Results indicated that the stuttered utterances of children with stuttering contained more syllables than fluent utterances. Howell, Au-Yeung and Sackin (2000) studied the influence of phonological difficulty of a word on the stuttering and its variation across age. The phonological aspect examined was late emerging consonants and consonant clusters. The results indicated that the children (3-11 yrs) stuttered more on words starting with late emerging consonants than on those starting with early emerging consonants.

Location of stuttering

De Nil (1995) studied the influence of phonetic context on temporal sequencing of upper lip, lower lip, and jaw peak velocity and movement onset during bilabial consonants in person with stuttering and person with non stuttering adults. Study was designed to investigate further previous reports of abnormal articulatory temporal coordination among AWS. Five AWS and four AWNS were instructed to produce repeatedly three target utterances embedded in different phonetic contexts. Closing gestures of the upper lip (UL), lower lip (LL), and jaw (JA) were analyzed in terms of the temporal sequencing of movement onset and peak velocity. The results failed to support previous reports of an invariant articulatory sequencing pattern among normal speakers. The frequency of the UL-LL-JA sequence pattern depended not only on the nature of the bilabial consonant (/p/ or /m/) but also on the phonetic context surrounding the consonant. Significant differences in peak velocity sequencing were found between the AWS and the AWNS for /sapapple/. The UL-LL-JA sequence pattern was more typical for the normal speech movements than for those of the stuttering. No differences between the two subject groups were found for any of the other two target utterances (/emma papa/ and /emma maffia/).

Robb, Sargent and O'Beirne (2009) examined characteristics of disfluency clusters in person with stuttering and compared these characteristics to those previously reported for children with stuttering. The spontaneous speech of ten adults with stuttering was sampled and organized according to utterance length in syllables. The overall number and type of disfluency clusters occurring in each sample were determined. Findings indicated that utterances containing disfluency clusters were significantly longer than fluent utterances, and the occurrence of disfluency clusters was correlated with overall percentage of disfluency.

Bilingualism

What is Bilingulism?

Bilingualism is an integral product of globalization and social mobility. The phenomenon is so widely prevalent and multifaceted that it is, indeed, very difficult to define bilingualism in a manner covering all aspects. One could however, characterized the phenomenon in a more or less comprehensive manner.

According to Grosjean (1994), the term bilingual refers to an individual who uses two or more languages or dialects in his or her everyday life, regardless of the context of use. People who speak and understand two languages, or two dialects and who are able to avoid mixing the two linguistic systems when writing and reading can be referred to as “bilinguals” (Aglioti, Beltramello, Girardi & Fabbro, 1996).

The term “bilingualism” in its broadest sense refers to a condition that ranges from “the total simultaneous and alternating mastery of two languages” to “some degree of knowledge of a second language” in addition to spontaneous skills which any individual posses. A child who has acquired two or more languages at the same time (simultaneous bilingualism) and that of an individual who has acquired one language and then subsequently acquires another (sequential bilingualism or second language acquisition).

Types of bilingualism:

***Successive Vs Simultaneous* :**(Mc Laughlin, 1984).

Successive: Learning one language after already knowing another. This is situation for all those who become bilingual as adults, as well as for many who become bilingual early in life.

Simultaneous: Learning two languages as "first languages". That is person who is a simultaneous bilingual goes from speaking no language at all directly to speaking two languages. Infants who are exposed to two languages from birth will become simultaneous bilinguals.

Mc Laughlin (1978) set up an age criterion which was adopted by many scholars, that acquisition of two languages before the age of 3 is referred as simultaneous acquisition whereas introduction of second language after the age of 3 is termed as successive acquisition.

If age of acquisition of either language is considered, two separate groups of bilinguals emerge: simultaneous or early bilinguals, and successive or late bilinguals (Kotik-Friedgut, 2001; Paradis, 2001, 2004). Another typology, proposed by Weinreich (1953) defines bilingualism according to the way words in the different languages relate to underlying concepts. He distinguishes three different groups of bilinguals: compound, coordinate and subordinate bilinguals. Coordinate bilinguals learn L1 (mother tongue) and L2 (second language) in two different contexts (home, school), and therefore supposedly have two semantic systems and two codes. Conversely, compound bilinguals learn both L1 and L2 in the same context and supposedly have only one semantic system but two codes. Subordinate bilinguals learn the second language by reference to the L1 or the dominant language.

Stuttering and Bilingualism:

Prevalence of Stuttering in Bilingual

A child who is bilingual is more likely to stutter than one who is monolingual, but the reason for this is not clear. It was hypothesized that bilingual children who stutter may experience linguistic interference, resulting in motor instability and increased disfluency. Bilinguals may stutter on different phonetic loci in their two languages but there is a consistency on stuttering loci across syntactic class (Bernstein Ratner, 1985).

Same difference hypothesis

Stuttering in bilinguals is an area that has not received much attention. But the belief that stuttering is more prevalent in bilinguals than in monolinguals seems to be widespread (Rachel Karniol, 1992). Nwokah (1988) suggested bilingual persons with stuttering who are dysfluent in both languages more often show different patterns in one language than the other.

Rachel Karniol (1992) reported stuttering in a Hebrew- English speaking child assumed a direct link between the occurrence of stuttering and bilingualism. She suggested that stuttering in this case was a function of syntactic overload and referred to the neuroscience model of stuttering proposed by Nudelman, Herbrich, Hoyt and Rosenfield (1989). In the model, the disfluencies reflect moments of instability in a multiloop system. Speech motor control involves two major control loops, an outer loop for linguistic programming and an inner loop for motor programming of the vocal apparatus. Bilingualism, then leads to instability as a result of the additional processing time required for either the outer loop, inner loop or both. Differences in prevalence of stuttering between mono and bilinguals cannot be attributed to bilingualism alone.

Economic insecurity and emotional instability during acquisition of second language can be other factors. Stuttering onset never reported in adults learning new language. Early bilinguals are more vulnerable because the same brain structures are utilized for learning both languages while different structures are recruited for second language learning in late bilinguals.

Although stuttering in bilinguals is an area of interest, data on bilingualism and stuttering in children are scanty and inconclusive. According to Cabrera and Bernstein Ratner (2000), bilingual children allow the study of whether presumed linguistically governed regularities in stuttering loci and incidence remain constant regardless of language spoken. For example, inconsistency of phonological loci across languages spoken by the speaker would seem to weaken purely motoric accounts of stuttering.

Howell et al., (2009) studied the effects of bilingualism on stuttering during late childhood. They examine stuttering by children speaking an alternative language exclusively (LE) or with English (BIL) and studied onset of stuttering, school performance and recovery rate relative to monolingual speakers who stutter. Result revelled that bilingual children had an increased risk of stuttering and a lower chance of recovery from stuttering than language exclusively and monolingual speakers.

Lattermann and Shenker (2005) reported that 50% of the world's population is bilingual. Considering the fact that 1% of the world's population stutters (Bloodstein, 1995) the need for specific research in the field of stuttering and bilingualism is apparent. Shenker (2004 a) suggested that, due to the difficulty in untangling the many variables contributing to language use and stuttering, bilingualism and stuttering is possibly a neglected field of research. This is not only because stuttering shows a heterogeneous pattern in each individual but even more so because bilingualism is a heterogeneous phenomenon (Van Borsel, Maes, & Foulon, 2001).The amount and types of environmental and psycho-social factors on these phenomena, and how they manifest themselves in a person, differ individually. What is known is about stuttering has been recorded in a number of diverse cultural settings around the world, and thus, possibly is a universal phenomenon *(*Au-Yeung, Howell, *&* Pilgrim, 1998; Bernstein Ratner & Benitez, 1985; Bloodstein, 1995; Jayaram, 1983; Nwokah, 1988; Van Borsel et al., 2001). Moreover, the primary symptoms of stuttering, which in general are blocks, sound and syllable repetitions, and sound prolongations, appear to be the same cross-linguistically (Bernstein Ratner, 2004). An issue confronting researchers is that a wide range of conflicting results concerning the nature of stuttering in bilinguals has been reported (Bernstein Ratner & Benitez, 1985; Dale, 1977; Howell et al., 2004; Jankelowitz & Bortz, 1996; Jayaram, 1983; Meline, Stoehr, Cranfield & Elliot, 2006; Nwokah, 1988; Roberts, 2002). A contributing factor might be that, due to the heterogeneous nature of stuttering and bilingualism, the overall picture of stuttering in each individual differs (Bernstein Ratner, 2004). As a result, little is known about the precise relationship between bilingualism and stuttering (Shenker, 2004a). One example demonstrating this issue is research on the prevalence of stuttering in bilinguals. The review of Van Borsel et al., (2001) recalls a number of researchers that have found positive data to support the assumption that bilingualism could cause stuttering or that there is a higher prevalence of stuttering in bilingual speakers compared to monolingual speakers (Bloodstein, 1995). Howell, Davis and Au-Yeung (2003) reported in their literature review that stuttering has been suggested to be more prevalent in children who learn English as L2. Furthermore, Au-Yeung, Howell, Davis, Charles, and Saekin (2001) found evidence that children (i.e., girls) are more prone to stuttering if they are exposed to L2 either between 0-6 year of age, with an especially high prevalence within age 3 (43,75%), or after age 12. The age range of 0-6 being a critical time for stuttering to occur in bilinguals has previously been reported by Stern (1948). In other words, there might be a 21 positive cause-and-effect relationship between stuttering and bilingualism for some person with stuttering that is possibly due to age and gender. If so, bilingualism would only be one factor of a variety of factors that contribute to the occurrence of stuttering. However there is a lack of credible research to support the suggestion that bilingual speakers are more prone to developing stuttering than monolingual speakers (Van Borsel, Maes, & Foulon, 2001. Roberts and Shenker (2007) point out that if bilingualism was at the origin of stuttering, there would need to be a higher prevalence of stuttering in countries with more bilingual or multilingual speakers compared to countries with more monolingual speakers. However, no research to support this hypothesis has been reported thus far. Other features evaluated in bilingual person with stuttering include remission and stuttering severity. There are reports that bilingual children who stutter show a slightly higher chance of remission than monolingual children who stutter (Ambrose, 2006; Bernstein Ratner, 2005a).

Stuttering occurs in both languages: the same-hypothesis

The suggestion has been made that language competency supports remission (Bernstein Ratner, 2005a). Stuttering characteristics and severity are also reported to differ according to the particular language spoken by the bilingual person with stuttering (e.g., Jankelowitz & Bortz, 1996; Jayaram, 1983; Nwokah, 1988). This suggestion is supported by a recent investigation in the cortical representation of language in bilinguals whereby different parts of the brain are activated for each individual speaker as well as for each language spoken by the same individual speaker (Halsband, 2006). Stuttering can be displayed in three different ways in a bilingual person with stuttering. The three possibilities are (1) Stuttering is only demonstrated in one language but not the other, (2) Stuttering occurs in both languages but dissimilarly and, (3) Stuttering occurs similarly in both languages. Limited data exists to support the occurrence of stuttering in one language only (Possibility 1). Dale (1977) examined four Spanish-English speaking adults who lived in the USA since their birth but spoke Spanish at home. All participants exclusively exhibited stuttering in Spanish (L1). Dale attributed the fact that none of the individuals were found to 22 stutter in English (L2) to environmental pressure to speak Spanish fluently. Despite this report, it does not seem to be the norm that stuttering occurs in one language only (Van Borsel, Maes & Foulon, 2001). Furthermore, if disfluencies only occur in L2 and no signs of tension are observed, it is suggested that low proficiency might be at the origin of these disfluencies. Thus, the disfluencies should not be mistaken as stuttering (Bernstein Ratner, 2004; Gonzalez et al., 2004; Van Borsel et al., 2001). Conversely, most research examining stuttering in bilingual speakers has reported stuttering to occur in both languages (Possibilities 2 & 3).

More recently Sneha, Shruthi and Geetha (2008) studied variation of dysfluency in bilingual speakers with mild and moderate degree of stuttering in 10 adult bilingual person with stuttering. Compared the variations in dysfluencies in bilingual speakers who stutter in both the languages. And compared the percentage of Stuttering like dysfluencies with that of Non stuttering like dysfluencies within each language and between the two languages. Result revelled that there was no significant difference in the severity of stuttering in L1 and L2. Comparison of percentage of SLDs and NDs within L1 and L2 also showed no significant difference.

Stuttering occurs in both languages: the different-hypothesis

In particular, research tends to support the Difference-Hypothesis (Possibility 2), which refers to differing characteristics of stuttering in L1 and L2 (e.g., Bernstein Ratner & Benitez, 1985; Jankelowitz & Bortz, 1996; Jayaram, 1983; Nwokah, 1988). Bilingual PWS who are dysfluent in both languages more often show different patterns in one language than in the other.

A number of authors have reported cases that are consistent with Nwokah's (1988) difference-hypothesis, including Nwokah herself. Jarayam (1983) studied 10 bilingual male AWS, ages 19-32 years (mean 25; 6 years) who knew both English and Kannada, a language spoken in South India, but Kannada was their primary language. There appeared to be no difference in the two languages in either the pattern or distribution of stuttering on different sound groups, however, subjects were reported to stutter more in Kannada than in English, particularly in spontaneous speech, though this difference may not have been statistically significant. Suggests that some bilingual stutterers may differ in the severity of their stuttering in both languages, but not in the pattern or distribution of stuttering. There are also reports of stuttering occurring equally in both languages (Possibility 3), which is referred to as the Same-Hypothesis (Van Riper, 1971; Lebrun et al., 1990). However, the numbers of studies supporting the Same-Hypothesis are fewer compared to those supporting the Difference- Hypothesis. In regard to the Difference-Hypothesis, a language proficiency level (Jankelowit & Bortz, 1996) as well as syntactical and grammatical differences (Bernstein Ratner & Benitez, 1985), has been reported to account for the distinction of stuttering patterns in the two languages. A summary of the past studies examined differing stuttering characteristics in bilingual speakers is in the sequence of language acquisition (L1 and L2), the severity of stuttering across languages and information on language proficiency in case of simultaneous L1/ L2 acquisition. In all of the listed studies, L1 was considered the more proficient language.

Leah Philip (2008) investigated stuttering variability in bi/multilingual persons with stuttering. Result indicated higher frequency of blocks in Kannada than English but not statistically significant. No significant difference in severity between L1 and L2. No interaction between language and task but within a language difference across tasks was seen.

Lim (2008) studied the influence of language dominance on stuttering severity in English–Mandarin bilingual speakers. English and Mandarin are the 2 most spoken languages in the world, yet it is not known how stuttering manifests in English–Mandarin bilinguals. In their research, the authors investigated whether the severity and type of stuttering is different in English and Mandarin in English–Mandarin bilinguals, and whether this difference was influenced by language dominance. They had taken thirty English–Mandarin bilinguals who stutter, ages 12–44 years, were categorized into 3 groups (15 English-dominant, 4 Mandarin-dominant, and 11 balanced bilinguals) using a self-report classification tool. Three 10-min conversations in English and Mandarin were assessed by 2 English–Mandarin bilingual clinicians for percent syllables stuttered (%SS), perceived stuttering severity (SEV), and types of stuttering behaviors using the Lidcombe Behavioral Data Language (LBDL); (Packman & Onslow, 1998; Teesson, Packman & Onslow, 2003). Results indicated that English-dominant and Mandarin-dominant bilingual who stutters exhibited higher %SS and SEV scores in their less dominant language, whereas the scores for the balanced bilinguals were similar for both languages. The difference in the percentage of stutters per LBDL category between English and Mandarin was not markedly different for any bilingual group. They concluded that language dominance appeared to influence the severity but not the types of stuttering behaviors in bilingual with stuttering. And they said clinicians working with BWS need to assess language dominance when diagnosing stuttering severity in bilingual clients.

Schaefer and Robb (2008) in their study they stated that to date, limited research has been reported on stuttering and bilingualism. Existing data reports conflicting results on stuttering characteristics across languages of bilingual person with stuttering. Investigations to date include language acquisition, language proficiency, cultural influence, and linguistic as well as phonetic aspects in bilingual's person with stuttering. Thus, assumptions on causal factors of stuttering are plenty, but research is missing to either support or refute those assumptions. Small sample sizes have been an additional obstacle. The purpose of their study was to analyze stuttering characteristics in German - English bilingual person with stuttering. 15 German - English bilingual person with stuttering, ranging in age between 10 and 59 years (mean = 25) were investigated. For all of the participants, German was acquired first (L1) and English second (L2). L2 exposure ranged from 5 to 20+ years (mean = 10). 15 minute conversational speech samples were collected in each language. In addition, an English proficiency test (Cloze Test) and a post-conversational questionnaire were administered. Analysis focused on differences in stuttering severity across languages, the distribution of stuttered content and function words across languages, and possible relationships between L2 proficiency and stuttering. Results indicated significantly more stuttering in L1 compared to L2. In L1, stuttering occurred significantly more often on content words. In L2, no significant difference between stuttering on function and content words was observed. For percentage of syllables stuttered, across language analysis detected significantly more stuttering on content words in German (L1) and more stuttering on function words in English (L2). No direct correlations between stuttering and language proficiency have been found.

Loci of stuttering seen in bilingual adults with stuttering in Indian context

In the Indian context Jayaram (1983) studied phonetic influences on stuttering in 19-32 years (mean age 25.6 years) monolingual and bilingual adults they knew both Kannada and English but Kannada was their primary language. Analysis was done with respect to two modes of speaking (oral reading versus spontaneous speech). Results indicated that the initial nasals, voiceless fricatives and voiceless stops were stuttered more than other sounds. Although the majority of the stuttering occurred on the initial sound of words the study suggested that considering only the word-initial stuttering may not give a total picture of the phonetic influences on stuttering.

Researches have reported comparison between monolingual and bilingual AWS in the Indian context and such comparison have not been made in children and not focused on phonetic aspects of stuttering between languages. Hence, the present study is planned.

CHAPTER III

METHOD

Participants

The participants for this study consisted of bilingual children with stuttering. 10 of bilingual children with stuttering in the age range of 8-12 yrs were considered who spoke Kannada as L1 and English as L2. The subject details are as provided in the following table 1.

Table 1: Details of the participants of the study

Type of population	**Age (in years)**	**Gender**	**Severity of stuttering**	**History of therapy**
Bilingual children with stuttering	8years	Male	Moderate	-
	9years	Male	Sever	-
	10yeras	Male	Moderate	-
	11years	Male	Moderate	-
	12years	Female	Moderate	-
	12years	Female	Severe	-
	12years	Male	Severe	+
	12years	Male	Severe	+
	12years	Male	Sever	-
	12years	Male	Moderate	-

+ Indicates treatment taken - indicates no treatment.

Ethical Standards used in the study for the selection of participants

Ethical considerations were maintained and adhered to while selecting the participants for the study. The participants (or family members of children with stuttering) were explained the purpose and procedure of the study and an informal verbal/written consent was taken from the parents of all the participants. They were randomly selected based on the inclusionary criteria's.

Inclusionary criteria were

The following criterions were set down:

1. Diagnosed as having developmental stuttering
2. All the participants under consideration were native Kannada speakers.
3. Studying in a English medium school.
4. Having normal or corrected vision.
5. Mid and higher socioeconomic status.
6. A rating of "minimal social proficiency" (Score -2) in English language on all the macro skills of the International Second Language Proficiency Rating Scale (ISLPR) (Ingram, 1985).
7. Not having any history of hearing, neurological, visual, language and /or psychological deficits.

Materials used were

1. Stuttering Severity Instrument-3 (Riley, 1994)
2. International Second Language Proficiency Rating Scale (ISLPR) (Ingram, 1985).
3. Socio economic scale (Venketasan, 2004).
4. The Rainbow Passage (Fairbanks, 1960).

5. Kannada Passage taken from Kannada Picture Articulation Test (Babu, Ratna & Bettageri, 1972).
6. English articulation test (Edinburgh articulation test by Antony, Bogle & Ingram, 1971).
7. Restandardization of Kannada Articulation Test **(**Deepa & Savithri, 2010).
8. Audio video recording equipment.
9. Checklist for assessment of dysfluencies in bilingual children with stuttering.

Procedure followed in Test administration

Test environment:

Subjects were made to sit comfortably and the testing was carried out on a quiet environment without any distraction.

Seating

The participants were comfortably seated in a quiet room. Each participant was seated in front of the laptop at a comfortable distance from where it was easy for him/her to see the stimulus. The clinician sat to the left of the participant and slightly behind clearly out of his/her working area and field of vision to avoid distractions that he/she might receive.

Test Instructions and Parameters

The participants were instructed to name and to answer each questions asked by clinician prior to the actual tests the participants were given pre-test instructions. This was done to make sure that they are comfortable with test. If any part of the test trial was not performed correctly, the instructions were repeated. The commands were delivered at appropriate tempo and the rate of speech was maintained across all tests and commands. All the repeats and cues were repeated at the same rate as that of the presentation. The intensity level was monitored across the presentation for all the commands, at a comfortable listening level. The prosodic features such as rate, fluency, stress, intonation, and juncture was held constant between commands and within commands.

Pretest Instructions

Pretest instructions were given to the participant to make sure that he/she has got the concept and does the activity smoothly.

> "I am going to administer a test on you. You will be asked to name them as I display them on laptop screen. The commands differ for different task. Whenever you feel that you have not understood what I have told then please stop me and ask me to repeat. I will repeat the instructions again."

Steps followed while testing

1. They were interviewed to elicit details about the dysfluencies using the checklist. The checklist which included information such as, age of onset of stuttering, age of acquisition of second language, experience of stuttering in both the languages and tasks and sound specificity in stuttering in both the languages (Appendix-I).

2. Stuttering Severity Instrument (Riley, 1994) was used to rate the severity of dysfluencies Where it provides frequency, duration and physical concomitant score, its percentile and severity based on the score gives whether they have mild, moderate, moderately severe or severe stuttering. Moderate, moderately severe and severe Children with stuttering where considered for testing.

3. The adapted version of International Second Language Proficiency Rating Scale (ISLPR) (Ingram, 1985), previously referred to as ASLPR (Ingram 1985) which is a widely accepted rating scale to assess second language proficiency. This was used to check the proficiency in English language. A rating of "minimal social proficiency" (Score -2) in English

language on all the macro skills (speaking, listening, reading and writing) was considered as bilingual. This scale has 8 rating which includes 0,0+,-1,+1,2,3,4,5 as rated from a continuum zero proficiency to native-like proficiency.

4. Socio economic status was checked using the socio economic scale (Appendix IV) given by Venketasan (2004).

5. Spontaneous speech was elicited using some common questions pertaining to the individual's background and hobbies (Appendix III). Speech was also elicited using monologue using a set of few topics pertaining to house, school, and favorite show.

6. Spontaneous naming tasks were carried out using articulation tests in English (English articulation test i.e. Edinburgh articulation test by Antony, Bogle & Ingram, 1971) and in Kannada (Restandardization of Kannada Articulation Test **(**Deepa & Savithri, 2010) using pictures. The pictures where presented one after the other through laptop and the responses were recorded in laptop when the child was not able to name few pictures additional cues were given to elicit response even then if the child was not able to say they were asked to repeat after the clinician. The same procedure was carried out for English as well.

7. Reading sample was obtained using the standard passage in English (Rainbow passage) and Kannada passage (Babu, Ratna & Bettageri, 1972) given in (Appendix II).

Description of the test

Description of the English Passage

The Rainbow passage is one of the most common standard reading passage was used to test an individual's ability to produce connected speech and it contains almost all the English phonemes.

Description of the Kannada Passage

Three standard reading passages in Kannada were taken which consisted of 130 words and which incorporate all the phonemes in Kannada with respective frequency of occurrence as given by Jayaram (1985). The familiarity of reading passage was tested on five child Kannada speaker. They were instructed to rate the passage as (1-familiar, 2-very familiar, 3-not so familiar, 4-not familiar. Familiarity was based on content and frequency of occurrence of word used three of five rated the passage as very familiar were as two of them rated it as familiar.All the tasks were carried out in Kannada (L1) and English (L2) language. Video audio recording of the speech sample was performed for further analysis.

Time constraints

The time taken to complete the test was approximately 120 minutes for individual bilingual children with stuttering.

Analysis of speech samples

The data recorded from all the 10 participants was transcribed verbatim using the narrow and broad IPA transcription. All the responses of child were analyzed sound by sound for the Phonetic influence in bilingual children across stuttering severity and languages. The loci of dysfluencies occurring at phoneme level and also the succeeding phoneme (phonetic context) were analyzed across the two languages (L1 & L2). The succeeding phoneme was also considered based on the explanation of Covert repair hypothesis (Kolk & Postma, 1997). It suggests that the dysfluencies are the result of correcting or repairing the phonological errors detected in the phonetic plan before they are spoken.

The type of dysfluencies: The types of dysfluencies were identified as per Bloodstein (1987) criteria as follow:

A) Repetitions

Syllable Repetitions: Dysfluenies characterized by repetitions of syllables. (For e.g.ba ba ba: ll).

Part word repetitions: Dysfluencies characterized by repetition of part of the word. (For e.g. Sne:ha Sne:ha Sne;hitha).

Whole word repetitions: Dysfluenies characterized by repetition of whole word. (For e.g. ball-ball).

B) Unfilled pauses: Silent longer than 300 ms.

C) Filled pauses: Pauses with extraneous sounds like /a/, /m/ etc.

D) Prolongation: Dysfluencies characterized by prolongation of sound.(For e.g. ShShShoe)

E) Interjections: Dysfluencies characterized by addition of functional word. (For e.g. well, the etc).

F) Phrase repetitions: Dysfluencies characterized by repetition of two or more words.

Analysis of dysfluencies made with respect to phonemes such as Consonants and Vowels as:

Classification of vowels was done as

- Short vowels.
- Long vowels.

- Semivowels.
- Front vowel.
- medial vowel and
- Back vowel.

Classification of consonants was also done based on

- **Place of articulation**
  - Bilabial.
  - Labiodentals.
  - Palatal.
  - Dental.
  - Retroflex.
  - Alveolar.
  - Velar.
  - Uvular and
  - Glottal.
- **Manner of articulation based on voiceless/ voiced**
  - Stops.
  - Fricatives.
  - Affricates.
  - Nasals.
  - Trill and
  - Approximants.

Data Analysis

The relative difficulty of individual phonemes across tasks and languages (L1 & L2) was calculated using the following formulas.

1. % of dysfluency for each individual phoneme across entire task

$$\text{\% of dysfluency for each phoneme across entire task} = \frac{\text{Total no. of dysfluencies}}{\text{Total no.of frequency of occurrence of respective phoneme}} \times 100$$

2. % of dysfluency for each phoneme during conversation:

$$\text{\% of dysfluency for each phoneme across entire task} = \frac{\text{Total no. of dysfluencies during conversation}}{\text{Total no.of frequency of occurrence of respective phoneme during conversation}} \times 100$$

3. % of dysfluency for each phoneme during monologue:

$$\text{\% of dysfluency for each phoneme across entire task} = \frac{\text{Total no. of dysfluencies during monologue}}{\text{Total no.of frequency of occurrence of respective phoneme during monologue}} \times 100$$

4. % of dysfluency for each phoneme during reading:

$$\text{\% of dysfluency for each phoneme across entire task} = \frac{\text{Total no. of dysfluencies during reading}}{\text{Total no.of frequency of occurrence of respective phoneme during reading}} \times 100$$

5. % of dysfluency for each phoneme during spontaneous naming tasks:

$$\text{\% of dysfluency for each phoneme across entire task} = \frac{\text{Total no. of dysfluencies during naming}}{\text{Total no.of frequency of occurrence of respective phoneme during naming}} \times 100$$

Test of equality of proportion were used to determine the significant difference between the languages across subjects. The following formula was used to calculate the significant difference.

Z=P1-P2/SE (Z =<1.96, p<0.05 level) indicates significant difference.

P1=Mean % of dysfluency for each phoneme in English Language.

P2= Mean % of dysfluency for each phoneme in Kannada Language.

N1=Total number of occurrence of individual phoneme in English language.

N2=Total number of occurrence of individual phoneme in Kannada language.

$$SE=\sqrt{\left(\frac{P1*q1}{N1}\right)+\left(\frac{P2*q2}{N2}\right)}$$

CHAPTER IV

RESULTS AND DISCUSSION

The current study aimed to investigate the phonetic influences in bilingual children with stuttering. The analysis included 10 Bilingual CWS ranged 8-12 years who visited AIISH with the complaint of stuttering. Repetitions, prolongations, hesitations of sound or syllables and blocks etc were considered for analysis.

A total of 44 phonemes in which dysfluency occurred were considered for which distinction was made as vowels and consonants. The analysis was carried out according to place and manner of articulation of phoneme. Vowels were classified as short, long vowel, mid, front and as back vowel. Consonants were classified according to place as bilabial, alveolar, velar, labio-dentals, palatal, glottal, liquids, and so on. Manner of articulation of consonants as fricative, stops, liquid, trill, tap, affricate, and nasal. They were further classified as voiced and unvoiced.

The total percentage of occurrence of dysfluency was calculated by dividing the number of occurrence of each dysfluent phoneme by total number of individual phoneme across task and across subjects and over all phonemes. The result obtained have been discussed as follows,

1. Phonetic influences in bilingual children with stuttering across two languages (Kannada and English) among each phoneme in entire task.
2. Phonetic influences in bilingual children with stuttering across subjects for two languages (Kannada and English) among each phoneme in entire task.
3. Phonetic influences in bilingual children with stuttering across tasks (spontaneous speech, monologue, reading, naming) in both English and Kannada.

4. Loci of dysfluencies occurring at phoneme level and the phonetic context (succeeding phoneme) in two languages (Kannada and English).

1. Phonetic influences in bilingual children with stuttering across two languages (Kannada and English) among consonants

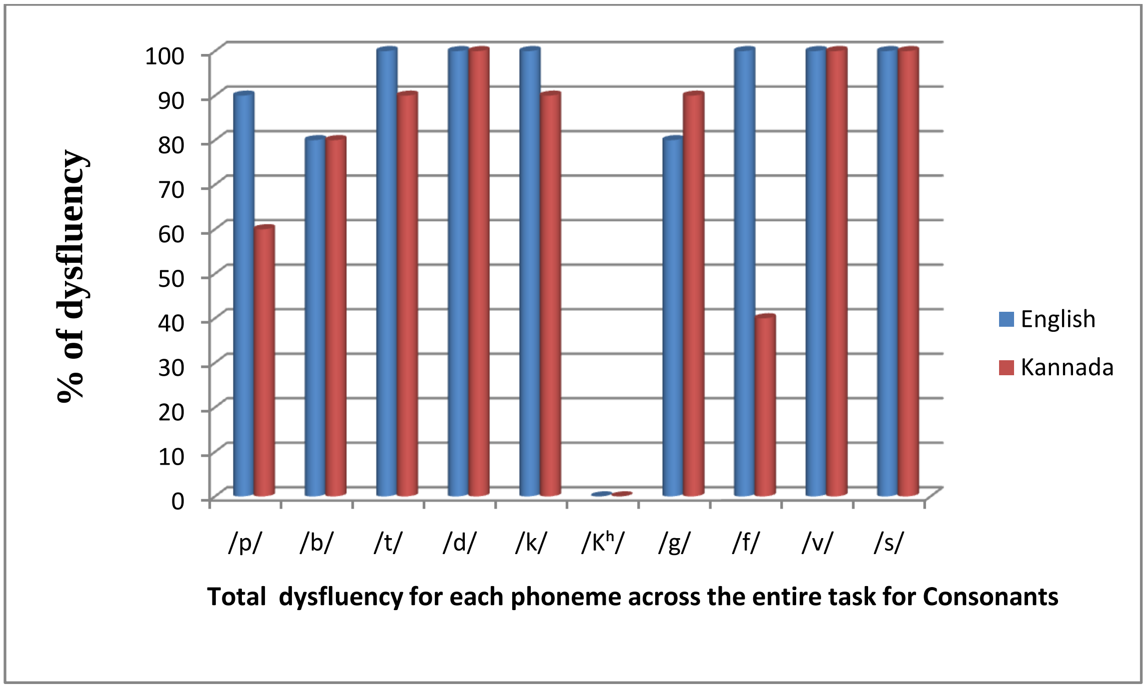
a) Mean % of subject with dysfluenct consonants

Loci of dysfluency among phonemes in a total of 10 subjects for Kannada and English languages were analyzed and are depicted in table 2 and graph (1a & 1b).

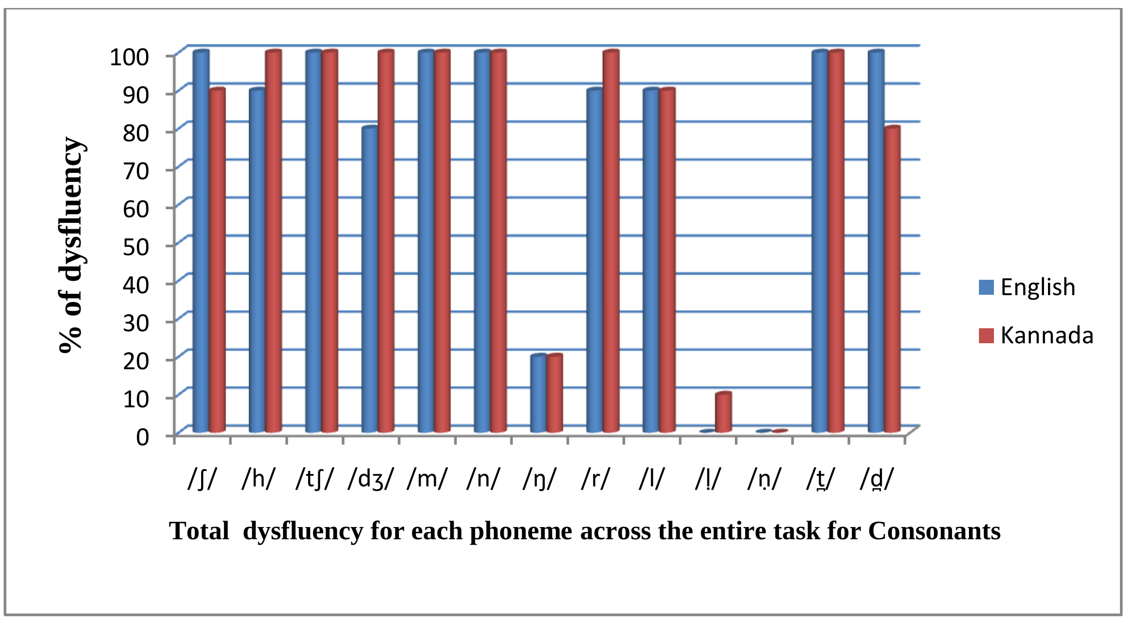
If a score of frequency of occurrence of dysfluency in total subjects is 100, it means that all the subjects had difficulty with respective consonants, where as a score of 80 means 8 had difficulty, 70 means 7 had difficulty with respect to that phoneme so on.

Table 2: Mean % of subjects with dysfluent consonants

Manner of articulation	Place of articulation	Phonemes	Frequency of occurrence of dysfluency		
			English	Kannada	Z value
Stop	Bilabial	/p/	100	100	0.00
		/b/	100	100	0.00
	Alveolar	/t/	100	100	0.00
		/d/	100	90	1.05
	Velar	/k/	100	100	0.00
		/g/	10	0	0.00
Fricative	Labio-dental	/f/	100	90	1.05
		/v/	100	90	1.05
	Alveolar	/s/	100	90	1.05
	Palatalo Alveolar	/ʃ/	100	100	0.00
	Glottal	/h/	100	90	1.05
Affricate	Palatal	/tʃ/	90	100	1.05
		/dʒ/	100	100	0.00
Nasal	Bilabial	/m/	80	100	1.58
	Alveolar	/n/	100	100	0.00
	Velar	/ŋ/	100	100	0.00
Retroflex, Trill, Tap.	Palatal	/r/	20	20	0.00
Retroflex	Palatal	/ḷ/	0	0	1.05
Lateral	Alveolodental	/l/	90	90	0.00
Retroflex	Palatal	/ṇ/	0	10	1.05
Stop(K),Fricative(E)	Alveolar dental	/t̪/	90	90	0.00
		/d̪/	100	100	0.00



Graph 1a: Frequency of occurrence of dysfluency for Consonants



Graph 1b: Frequency of occurrence of dysfluency for Consonants

As depicted in table 2 and graph (1a, 1b) the loci of dysfluency across the total subjects indicate that the variability is present according to place and manner of articulation

Place / Manner of articulation for Consonants

The data suggests that all the 10 CWS had dysfluencies among phonemes such as bilabial stop /p/, /b/, alveolar stop /t/, /d/, velar stop /k/, palate alveolar fricative /ʃ/, alveolar dental fricative /d̪/, palatal affricate /dʒ/ and alveolar nasal /ŋ/ in both Kannada and English languages. However, dysfluency was seen for alveolar dental lateral /l/ in 9 CWS both in Kannada and English. Palatal affricate /tʃ/, palatal retroflex /ḷ / was affected only in English among 9 CWS, whereas glottal fricative /h/, alveolar fricative /s/, labiodentals fricative /v/, /f/, alveolar stop /d/ was affected in 9 CWS only in Kannada. Other phonemes like velar stop /g/ in 1 CWS, palatal retroflex /r/ in 2 CWS in English and palatal retroflex /ḷ/ in 1 CWS .Other sounds didn't have any dysfluency among entire task.

This data suggests that in Kannada /h/, /s/, /v/, /f/, /d/ and English //ḷ/, /tʃ/ in /p/, /b/, /t/, /d/, /k/, /tʃ/, /d̪/, /dʒ/ and /n/ was dysfluent in all children. Frequency of occurrence of dysfluency among 10 subjects was compared using the test of equality of proportion. There was significant difference seen across Kannada and English at ($z<1.96$, $p<0.05$ level) for /p/, /b/, /t/, /k/, /g/, /ʃ/, /dʒ/, /n/, /ŋ/, /r/, /l/, /t̪/ and /d̪/ ($z=0$, $p<0.05$ level) among all the 22 consonants.

b. Mean % of loci of dysfluent consonants in total subjects

The frequency of occurrence of dysfluency for all the 10 subjects was considered and the mean was taken for the same as depicted in the following table 3.

Table 3: Mean % of loci of dysfluenct consonants in total subjects

Manner of articulation	Place of articulation	Phonemes	English	Kannada
Stop	Bilabial	/p/	15.15	15.15
		/b/	12.80	30.697
	Alveolar	/t/	11.72	12.47
		/d/	0	15.14
	Velar	/k/	0	28.42
		/g/	17.289	20.17
Fricative	Labio-dental	/f/	16.466	9.68
		/v/	11.20	10.87
		/s/	18.28	25.38
	Alveolar	/ʃ/	123.8	19.04
	PalataloAlveolar	/h/	18.26	14.80
	Glottal	/tʃ/	22.05	34.04
Affricate	Palatal	/dʒ/	16.14	18.60
Nasal	Bilabial	/m/	17.79	18.92
	Alveolar	/n/	10.66	17.025
	Velar	/ŋ/	1.232	0.322
Retroflex, Trill, Tap.	Palatal	/r/	17.20	18.96
Retroflex	Palatal	/ḷ/	1.666	0.45
Lateral	Alveolodental	/l/	14.75	9.022
Retroflex	Palatal	/n./	2.352	0
Stop(K),Fricative(E)	Alveolar dental	/t̪/	17.99	15.50
		/d̪/	14.21	10.01

Place/ Manner of articulation:

The total % for loci of dysfluency was calculated by dividing the number of occurrence of each dysfluent phoneme by the total number of occurrence of phonemes across task and languages The mean % for loci of dysfluency is depicted in table 3 when calculated for both language

For English bilabial stop /p/ (15.15%), bilabail stop /b/ (12.8%), alveolar stop /t/ (11.72%), alveolar stop /d/ (0%), velar stop/ k/ (0%), velar stop/ g/ (17%), labiodentals fricative /f/ (16.4%), labiodenatl fricative /v/ (11.2 %), alveolar fricative /s/ (18.28%), palato alveolar fricative /ʃ/ (12.5 %), glottal fricative /h/ (18.26 %), palatal affricate /tʃ/ (22.05%), palatal affricate /dʒ/ (16.14%), bilabial nasal /m/ (17.79 %), alveolar nasal /n/ (10.66%), velar nasal /ŋ/ (1.23 %), palatal retroflex /r/ (17.20%), palatal retroflex /ḷ/ (1.66%), alveolodental lateral /l/(14.75%), palatal retroflex /ṇ/ (2.35%), alveolar stop /t̪/ (17.99%), dental fricative /d̪/ (14.21%) were dysfluent .

For Kannada bilabial stop /p/ (15.15%), bilabial stop /b/ (30.6%), alveolar stop /t/ (12.47%), alveolar stop /d/ (15.14%), velar stop /k/ (28.42%), velar stop /g/ (20.17 %), labiodentals fricative /f/ (9.6%), labiodentals fricative /v/ (10.8%), alveolar fricative /s/ (25.38%), palate alveolar fricative /ʃ/ (19.04%), glottal fricative /h/ (14.80%), palatal affricate /tʃ/ (34.04%), palatal affricate /dʒ/ (18.60%), bilabial nasal /m/ (18.92%), alveolar nasal /n/ (17.02%) , velar nasal /ŋ/ (0.32%), palatal retroflex /r/ (18.96%), palatal retroflex /ḷ/ (0.45%), alveodental lateral /l/ (9.02 %), palatal retroflex /ṇ/ (0 %), alveolar dental stop /t̪ / (15.50 %), alveolar dental fricative /d̪/ (10.01 %) were dysfluent.

Our data suggests that in english /tʃ/, /ʃ/, /h/, /t̪/ ,/m/, /r/, /g/ all this have got higher rank of dysfluency than other. In Kannada /tʃ/, /b/, /k/, /ʃ/, /g/, /r/ and /m/ had high rank of dysfluency when compared to other sounds. The rank order of the phonetic dysfluency with respect to place of articulation of consonants included palatal, alveolar, glottal, bilabial and velar for English language whereas the rank order for Kannada language were palatal, bilabial , velar, alveolar and palatoalveolar . The rank order of the phonetic dysfluency with respect to manner of articulation of consonants included affricate, fricative, stop, nasal and retroflex for English language were as in Kannada the order were affricate, stops, fricative, retroflex and nasal.

The result indicated that bilingual CWS had greater difficulty in /tʃ/, /b/, /k/, /ʃ/, /g/, /r/ and /m/ in Kannada /tʃ/, /ʃ/, /h/, /t̪/ , /m/, /r/, /g/ in English language and no difficulty in /d/,/k/ in Kannada and /ṇ/ in English. /tʃ/, /p/, /m/ were dysfluent both in Kannada and English.

This data is in agreement with Hahn (1942) who reported more stuttering on G, D, L, TH (unvoiced) CH and M and in smaller percentages on F, S, SH, WH (voiced) and also in agreement with Brown (1938,1945) study.

c . Mean % of loci of dysfluenct consonant across individual subjects

Mean % of dysfluency for consonants across subjects are depicted in table 4a and 4 b .where all the subjects mean value across task were considered and the significant difference were also calculated

Subject 1: Alveolar dental stop/d̪/ had 31.2% dysfluency in English and 13.33% in Kannada. Alveolar dental stop /t̪/ got 90.90% in Kannada and 4.92 in English. There was a no significant difference for /d̪/ (z=11.43, p>0.05), /t̪/ (z=2.50, p>0.05) between Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 9 sounds and remaining 13 consonants had no significant difference.

Table 4a: Mean % loci of dysfluenct consonants across individual subjects

Manner of articulation	Place of articulation	Phonemes	Subject 1			Subject 2			Subject 3			Subject 4			Subject 5		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z	E	K	Z
Stop	Bilabial	/p/	1.39	17	1.0	25	17	0	0.5	3.7	0.85	23	38	1.23	47.4	10	2.82
		/b/	3.57	33	3.9	18.1	100	10.1	0.8	1.81	0.431	16.6	42.85	2.63	27.27	42.8	1.17
	Alveolar	/t/	7.95	81	12	5.55	0	0	0.7	1.31	0.215	8.88	11.11	0.32	10.41	5.88	0.62
		/d/	15.3	0	2.0	0	0	0	0	0	0	28.5	23.81	0.39	4.65	57.1	2.76
	Velar	/k/	9.89	38	1.9	7	53	0	1.1	5.7	1.33	33	32	0.11	39.4	13	2.64
		/g/	9.09	66	8.1	9.09	0	1.04	0.8	1.38	0.151	15.2	7.69	1.01	45.45	18.1	2.03
Fricative	Labio-dental	/f/	4.76	0	2.0	25	7.1	0	0.7	3.22	0.72	27.9	21.73	0.56	23.68	33.3	0.63
		/v/	1.37	0	0.5	7.14	7.1	0	1.5	1.13	0.17	10.8	38.09	2.44	9.75	20	0.90
	Alveolar	/s/	11.5	47	1.5	25	86.11	0	2.0	1.29	0.36	17.9	32.55	1.81	22.91	23.0	0.01
	PalataloAlveolar	/ʃ/	21.7	30	0.5	11.0	10.0	0	5.3	7.5	0.20	20	21.05	0.07	0	10	1.05
	Glottal	/h/	0	21	3.3	17.2	10.2	0	4.8	4.5	0.09	26.7	25	0.19	28	25	0.23
Affricate	Palatal	/tʃ/	10	34	3.2	8.33	78.7	0	8.3	4.54	0.22	30.7	58.06	1.75	31.81	55.5	1.54
		/dʒ/	0	40	5.3	0	0	0	0	2.5	0.50	16.6	25	0.47	25	50	1.13
Nasal	Bilabial	/m/	4.12	16	2.4	29.1	18.91	0.9	1.90	2.5	0.25	16.2	42	3.14	23.52	37.5	1.21
	Alveolar	/n/	22.2	21	0.0	8.10	1.72	1.3	0	2.34	1.23	9.30	32.69	2.97	4.44	48.2	4.59
	Velar	/ŋ/	0	3.2	0.8	0	0	0	0	0	0	0	0	0	0	0	0
Retroflex, Trill, Tap.	Palatal	/r/	0	35	2.7	40	0	1.8	2.67	12.5	0.41	10.71	28.57	1.55	19.23	25	0.25
Retroflex	Palatal	/ḷ/	0.00	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lateral	Alveolodental	/l/	0	41.	4.1	40	0	1.8	6.52	8.333	0.17	10.53	4.76	0.68	22.22	0	2.26
Retroflex	Palatal	/ṇ/	0.00	0.0	0.0	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stop(K),Fricative(E)	Alveolar dental	/t̪/	31.2	13	2.5	12.5	5	0	0	3.12	0.88	0	17.5	2.91	57.14	16.6	1.87
		/d̪/	4.92	90	11.	25	0	1.15	1.8	0	1.12	2.97	0	1.75	10.20	0	2.36

Table 4b: Mean % loci of dysfluency consonants across individual subjects

Manner of articulation	Place of articulation	Phonemes	Subject 6			Subject 7			Subject 8			Subject 9			Subject 10		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z	E	K	Z
Stop	Bilabial	/p/	13	4.8	1.25	14.3	4.76	0.96	7.14	17.7	1.60	7.14	21.62	1.91	12.5	17.6	0.69
		/b/	26.	31.25	0.513	18.91	18.55	0.048	7.27	9.27	0.52	7.27	6.89	0.10	1.49	19.6	3.14
	Alveolar	/t/	28.	1.40	4.26	15	2.29	2.16	10.87	9.30	0.34	10.87	2.89	2.08	18.1	8.69	1.58
		/d/	6.6	44.44	3.006	26.66	2.63	2.052	2.381	2.70	0.10	2.381	5.494	1.07	9.30	15.2	0.85
	Velar	/k/	28	53	2.35	16.1	16.1	0.00	20.51	18.1	0.25	20.51	28.26	0.84	24.4	27.2	0.36
		/g/	23	27.77	0.34	35.29	5.55	2.437	1.78	27.2	2.66	1.785	22.22	2.52	16.6	25	0.83
Fricative	Labio-dental	/f/	20	2.63	2.67	30	0	3.58	5.35	6.25	0.20	5.35	2.564	0.71	2.89	20	2.96
	Alveolar	/v/	12	9.67	0.57	40.62	5.691	3.91	4.46	5.04	0.20	4.46	1.23	1.40	4.25	20.6	2.10
		/s/	14	18.51	0.639	25.64	11.26	1.81	8.98	4.47	1.14	8.98	10.81	0.39	18.8	17.8	0.16
	Palatalo Alveolar	/ʃ/	38	8.82	2.128	0	0	0	11.53	0	1.84	11.53	0	1.84	2.63	13.0	1.85
	Glottal	/h/	14	4.70	1.40	12.32	28.57	2.26	16.66	5.40	2.05	16.66	14.28	0.35	10	9.09	0.15
Affricate	Palatal	/tʃ/	53	27.77	1.659	29.41	22.72	0.47	6.25	5.55	0.10	6.25	20.83	1.42	5.55	32.1	2.88
		/dʒ/	50	7.40	1.20	16.66	27.77	0.6	0	5.26	1.45	0	15.78	1.89	12.5	12.2	0.03
Nasal	Bilabial	/m/	37	27.08	1.43	17.85	6.49	1.94	1.86	17.6	3.63	1.86	6.66	1.38	17.8	13.7	0.67
	Alveolar	/n/	28	33.82	0.393	23.52	2.22	2.02	4.25	0	1.44	4.25	13.88	2.17	2	13.3	2.08
	Velar	/ŋ/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retroflex, Trill,Tap.	Palatal	/r/	29	50	1.322	16.66	13.33	0.33	11.11	19.2	1.07	11.11	4.25	1.14	1.37	1.05	0.18
Retroflex	Palatal	/ḷ/	0.0	0.00	0.00	0.00	0.00	0.00	0.00	4.55	1.02	0.00	0.00	0.00	0.00	0.00	0.00
Lateral	Alveolodental	/l/	5.8	20	1.331	25	3.22	1.93	8.57	5.76	0.48	8.57	4.54	0.62	2.38	1.92	0.15
Retroflex	Palatal	/n./	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stop(K),Fricative(E)	Alveolar dental	/t̪/	25	17.14	0.56	45.454	21.42	1.29	3.29	8.33	1.01	3.29	40	2.35	1.96	12.5	0.88
		/d̪/	20	2.12	3.70	19.047	1.01	2.93	17.39	6.06	1.83	17.39	0	3.81	6.66	0	2.53

Subject 2: Bilabial nasal /m/ had got 29.17% in English and 18.91% in Kannada. Bilabial stop /b/ had got 100% in Kannada and 18.18% in English. There was significant difference for /l/ (z=1.82, p<0.05) no significant difference for /b/ (z=10.1, p>0.05) in both languages. Among 22 consonants, significant difference at 0.05 level was present for 21 sounds and remaining 1consonants had no significant difference.

Subject 3: Palatal affricate /tʃ /had got 8.33% in English and 4.54% in Kannada. Alveodental lateral / l / had 8.33% in Kannada and 6.52% in English. There was a significant difference seen for /tʃ/ (z=0.22, p<0.05), /l/ (z=0.17, p<0.05) for Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for all 22 sounds and remaining 0 consonants had no significant difference.

Subject 4: Palatal affricate /tʃ/ 30.77% and 58.06% both in English and Kannada. There was a significant difference seen for /tʃ/ (z =1.75, p<0.05) for both Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 16 sounds and remaining 6 consonants had no significant difference.

Subject 5: Alveolar dental stop / /t̪/ had got 57.14% in English and 16.66% in Kannada. Alveolar stop /d/ had got 57.15% in Kannada and 4.65% in English. There was a significant difference seen for /t̪/ (z=1.87, p<0.05) there was no significant difference seen for /d/ (z=2.76, p>0.05 level) both in Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 15 sounds and remaining 7 consonants had no significant difference.

Subject 6: Palatal affricate /tʃ/ had got 53.84% in English and 27.77% in Kannada. Alveolar stop /r/ had 50% in Kannada and 29.73 in English. There was significant difference seen for /tʃ/ (z=1.65, p<0.05 level), /r/ (z=1.32, p<0.05 level) between both languages. Among 22 consonants, significant difference at 0.05 level was present for 16 sounds and remaining 6 consonants had no significant difference.

Subject 7: Alveolardental stop /t̪/ 45.45% in English and 21.42% in Kannada. Glottal fricative /h/ had got 28.57% in Kannada and12.32 in English. There was a significant difference seen for /t̪/ (z=1.29, p<0.05 level), there was no significant difference for /t̪/ (z=2.26, p>0.05 level) both languages. Among 22 consonants, significant difference at 0.05 level was present for 10 sounds and remaining 12 consonants had no significant difference.

Subject 8: Velar stop /k/ had 20.51% in English and 18.18% in Kannada. Velar stop /g/ had 27.27% in Kannada and 1.78% in English. There was a significant difference seen for /k/ (z=0.25, p<0.05 level), there was no significant difference for /g/ (z=2.66, p>0.05 level) between Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 17 sounds and remaining 5 consonants had no significant difference.

Subject 9: Velar stop /k/ had got 20.51% in English and 28.26 %in Kannada. Velar stop /t̪/ had got 40% in Kannada and 3.29 in English. There was a significant difference seen for /k/ (z=0.84, p<0.05 level), there was no significant difference for /t̪/ (z=2.35, p>0.05 level) between Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 14 sounds and remaining 8 consonants had no significant difference.

Subject 10: Velar stop /k/ had got 24.49% in English and 27.27 % in Kannada. Palatal affricate /tʃ/ had got 32.14% in Kannada and 5.55% in English. There was a significant difference seen for /k/ (z=0.36, p<0.05 level), there was no significant difference for /tʃ/ (z=2.88, p>0.05 level) between Kannada and English. Among 22 consonants, significant difference at 0.05 level was present for 13 sounds and remaining 9 consonants had no significant difference.

The results indicate that velar stop /k/, alveolardental stop /t̪/, bilabial nasal /m/, palatal affricate /tʃ/ had higher dysfluency in English in majority of children and alveolar stop /r/, palatal affricate /tʃ/, Alveolar dental stop /t̪/, bilabial stop /b/, alveodental lateral / l/, alveolar stop /d/, glottal fricative /h/, alveolardental stop /t̪/ had higher dysfluency in Kannada in the majority of children . Palatal affricate /tʃ/ had got higher dysfluency both in Kannada and English. On comparing the dysfluent consonants between languages significant difference at 0.05 level was found for majority of the sounds in individual children.

d) Mean % of dysfluent consonants across individual task.

The occurrence of dysfluent consonants across four tasks were averaged and the table 5 depicts the mean % across tasks.

Place and manner of articulation of consonants

Conversation

Velar stop /k/ had 23.18% higher dysfluency in English and 59.32% in Kannada. Whereas other phonemes had got less dysfluency both in Kannada and English.

Reading

Velar stop /g/ had 30.43 % of dysfluency in English and 22.22 % of dysfluency in Kannada, Alveolar stop /d/ had 55.55% of dysfluency in Kannada and 18.18% in English.

Naming

Alveolar stop /d/ had 19.04 % of disfluency in English and 33.33% of dysfluency in Kannada, bilabial stop /b/ had 31.31 % of dysfluency in Kannada and 5% in English.

Narration

Glottal fricative /h/ had 23.96 % of disfluency in English and 17.16 % of dysfluency in Kannada; Velar stop /k/ had 27.51 % of dysfluency in Kannada and 19.19 % in English. Our data suggests that velar stop /k/, velar stop /g/, alveolar stop /d/, bilabial stop /b/, glottal fricative /h/ had higher dysfluency both in Kannada and English.

Table 5: Mean % of loci of dysfluent Consonants across individual task

Manner of articulation	Place of articulation	Phonemes	Conversation			Reading			Naming			Narration		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z
Stop	Bilabial	/p/	9.83	9.23	0.12	9.09	16.66	2.39	10.44	28.88	0.61	11.25	13.39	0.70
		/b/	10.22	12.5	0.46	17.07	34	3.91	5	31.37	1.90	14.33	12.82	0.55
	Alveolar	/t/	16.66	12.06	0.77	19.14	20	0.99	2.70	8.69	0.08	11.33	3.86	3.82
		/d/	7.27	10	0.50	18.18	55.55	0.71	19.04	33.33	2.26	8.5	6.16	0.92
	Velar	/k/	23.18	59.32	4.93	16.66	14	0.86	13.92	18.4	0.33	19.19	27.51	1.99
		/g/	11.36	9.090	0.35	30.43	22.22	2.13	6.84	25.92	0.72	16.14	16.16	0.00
Fricative	Labio-dental	/f/	15	9.25	1.02	17.24	0	3.45	7.53	0	2.46	19.04	11.76	2.10
		/v/	4.93	5.17	0.06	5.55	41.66	3.40	4.32	50	2.37	10.13	6.485	2.02
	Alveolar	/s/	14.03	5.14	2.72	24.63	21.66	1.87	10.15	20.58	0.40	16.76	16.88	0.04
	Palatalo Alveolar	/ʃ/	20.68	12	0.99	25	22.22	0.00	0	0	0.17	12.37	10.81	0.39
	Glottal	/h/	16.07	7.40	1.52	10.52	6.66	1.02	5.78	9.574	0.46	23.96	17.16	1.88
Affricate	Palatal	/tʃ/	15	10.66	0.74	50	25	5.42	0	72.72	1.16	15.50	30	3.00
		/dʒ/	14.28	9.61	0.54	0	25	2.15	0	13.33	2.58	11.32	10.38	0.19
Nasal	Bilabial	/m/	18.23	18.65	0.10	19.35	34.14	0.50	11.32	14.28	1.44	12.31	15.40	1.32
	Alveolar	/n/	8.98	18.75	2.13	0	20	0.18	10.25	9.210	1.58	10.08	18.39	2.91
	Velar	/ŋ/	0	25	1.15	0	0	0.00	0	0	0.00	0	0	0.00
Retroflex, Trill, Tap.	Palatal	/r/	8.33	14.28	0.88	22.22	60	1.03	13.04	6.25	1.82	14.81	8.25	1.82
Retroflex	Palatal	/ḷ/	0	6.66	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Lateral	Alveolodental	/l/	0	5.26	1.45	0	5	3.02	12.5	0	1.03	16.49	7.058	2.22
Retroflex	Palatal	/ṇ/	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Stop(K),Fricative(E)	Alveolar dental	/t̪/	5	8.69	0.76	18.18	20	1.92	10.52	35	0.12	9.87	14.07	1.10
		/d̪/	5.45	0	1.78	0	0	0.24	1.66	2.22	0.00	21.16	1.818	7.23

Percentage of occurrence of dysfluency was compared using the test of equality of proportions. The results indicated that the frequency of occurrence of dysfluency across the task there was no significant difference seen in Conversation for /n/ (z=2.13, p>0.05), /s/ (z=2.72, p >0.05), /k/ (z=4.93, p>0.05) in naming for /dʒ/ (z =2.58 , p>0.05), /v/ (z=2.37, p>0.05), /f/ (z=2.46, p>0.05), /d/ (z=2.26, p>0.05) in reading for /l/ (z=3.02, p>0.05), /dʒ/ (z=2,15, p>0.05) , /tʃ/(z=5.42, p>0.05), /v/ (z=3.40, p>0.05), /g/ (z=2.13, p>0.05), /p/ (z=2.39, p>0.05), /b/(z=3.91, p>0.05) and in narration for /t/ (z=3.82, p>0.05), /f/ (z=2.10, p> 0.05), /v/ (z =2.02, p>0.05), /tʃ /(z=3.00, p>0.05), /n/ (z=2.91, p>0.05), /l/ (z=2.22, p>0.05), /d̪/ (z=7.23, p>0.05).

There was significant difference seen for conversation for consonants such as /p/(z=0.12, p <0.05), /b/ (z =0.46, p<0.05), /t/ (z=0.77, p<0.05), /d/ (z=0.50, p<0.05), /g/ (z=0.35, p<0.05), /f/ (z=1.02, p<0.05), /v/ (z=0.06,p<0.05), /ʃ/ (z=0.99, p<0.05), /h/ (z=1.52, p<0.05), /tʃ/ (z=0.74, p <0.05), /dʒ/ (z =0.54, p<0.05), /m/ (z=0.10, p<0.05), /ŋ/ (z=1.15, p<0.05), /r/ (z=0.88, p<0.05), /l/ (z=1.45, p<0.05), /t̪/ (z=0.76, p<0.05), /d̪/ (z=1.78, p<0.05), /ḷ/ and /ṇ/ (z=0, p <0.05).

In the reading task significant difference was present for consonants such as, /t/ (z=0.99, p <0.05), /d/ (z=0.71, p<0.05), /k/ (z=0.86, p<0.05), /s/ (z=1.87, p<0.05), /h/ (z=(1.02, p <0.05) ,/m/ (z=0.50, p<0.05), /n/ (z=0.18, p <0.05), /r/ (z=1.03, p<0.05), /t̪/ (z=1.92, p<0.05), /d̪/ (z=0.24, p <0.05), /ʃ/ and /ŋ/, /ḷ/, /ṇ/ (z=0, p<0.05). In naming task significant difference was found for /p/ (z=0.61, p<0.05) , /b/ (z=1.90, p <0.05), /t/ (z=0.08, p <0.05), /ḷ/ (z=0.33, p<0.05), /g/ (z=0.72, p <0.05), /s/ (z=0.40, p <0.05), /ʃ/ (z=0.17, p<0.05), /h/ (z=0.46, p<0.05), /tʃ/ (z=1.16, p<0.05), /m/ (z=1.44, p<0.05), /n/ (z=1.58, p<0.05), /r/ (z=1.82, p<0.05), /l/ (z=1.03, p <0.05), /t̪/ (z=0.12, p <0.05) and /d̪/, /ŋ/, /l./, /n./ (z=0, p <0.05), For narration task significant difference was found for /p/ (z=0.70, p <0.05), /b/ (z=0.55, p <0.05), /d/ (z=0.92, p <0.05), /s/ (z=0.04, p <0.05), /ʃ/ (z=0.39, p <0.05), /h/ (z=1.88, p <0.05), /dʒ/ (z=0.19, p <0.05), /m/ (z=1.32, p <0.05), /r/ (z=1.82, p <0.05), /t̪/ (z=1.10,p <0.05) and /g/, /l./, /n./, /ŋ/ (z =0, p<0.05) both on comparing Kannada and English language .

Result of the present study supports the difference hypothesis .It was found that majority of consonants were dysfluent in both Kannada and English language .However ,the pattern dysfluency for consonants varied between language for majority of consonants .This suggests that the type of difficulty with respect to consonants was not similar for both the languages. Hunt's (1967) studied on the vowel and consonant stuttering. The author concluded that the aspirated and continuant sounds as /f/, /w/ and /s / had got less difficulty, as the oral canal was not so completely closed as in the explosives. There is not much of a difference seen between children. The result supports the view of Brown (1938) and others that "words beginning with consonants produced more stuttering than those beginning with vowels" in a majority of subjects.

Reid (1946) an**d** Van Riper (1971) noted that in most stutterers, the early behaviour is primarily syllabic repetitions or prolongations of a sound or articulatory posture. Syllable (steton) maintained that the breath pulse is the basic integrator of the syllable. According to him, the searching behaviour in achieving the necessary timing of the breath pulse and in the successive articulatory postures is found in the repetitive type of stuttering.

As consonants involve a greater degree of articulator tension (Lehiste & Peterson, 1959) it is more likely that they are more susceptible to stuttering. As the consonants are relatively more important for clarity and distinctness and hence for meaning they lend themselves more readily to the suggestion that they are difficult to articulate (Bloodstein

1978). Perhaps this is a possible reason for increased stuttering on consonants than on vowels. Stop consonants require complete closure of the articulatory pathway on the other hand continuous consonants require a free pathway. Fricatives require some intermediate position between these two extremes. This intermediate position involves certain balance between these two extremes and perhaps more effort is involved in maintaining such a balance. Consequent to the effort required and the difficulty in maintaining such a balance, the production of fricatives become more difficult. This may be the reason for higher stuttering in these sounds. It is seen in the course of this report that the distribution of sounds in the language and the stuttering on them furnishes yet another possible explanation to our observation of more stuttering to be associated with fricative

This data is in agreement with Brown's (1938) study he states that more difficulty in consonants than vowels. Brown (1945) reported that stuttering tended to occur on consonants other than /t/, /h/, /w/ and /ð. This data is in agreement with Johnson and Brown (1935) study their result indicated loci of dysfluency among /g/, /d/, / t̪ / (unvoiced), /m/ and /tʃ/ in the large percentages of dysflueny and /f/, /s/, /ʃ/, /w/, / d̪/ (voiced) and /h/ in the smaller percentages.

Mann (1955) found consonants /s/, /v/, /m/, /l/ with more dysfluency, and Mackay and Soderberg (1970) indicated more stuttering on syllables beginning with consonants. The production of consonants is complex compared to vowels. Bloodstein (1958) reported a degree of stoppage or impedance of airstream, involving greater articulatory tension during production of consonants than a vowel.

Hahn (1942) reported more stuttering on G, D, L, TH (unvoiced) CH and M and in smaller percentages on F, S, SH, WH (voiced).Stuttering represent the oscillatory struggle associated with the disorder .They are most likely produced with a purpose ,namely to release the speech system from block or struggle (Dayalu et al., 2001; Kalinowski et al., 2000).

Jarayam (1983) who concluded that some bilingual stutterers may differ in the severity of their stuttering in both languages, but not in the pattern or distribution of stuttering. The results suggest from our data that the loci of dysfluency can occur in any type of consonant among CWS as mentioned in earlier studies .This suggests that the type of difficulty with respect to consonants was not similar for both the languages.

Position of sound

The analysis of the dysfluency with respect to phoneme was compared with initial, medial and final position. Across the entire task initial position had high frequency of occurrence of dysfluency among medial and final position. Similar are the findings for stuttering in English and Kannada language. More stuttering was seen in initial position of word and sentence in both Kannada and English for entire task. Stuttering occur more frequently in the first few words of a sentence (Brown, 1945; Wingate, 1982). As described in the literature, the results of the current study also found more stuttering in initial position. Problem in initiation probably could be because the brain has yet to receive an appropriate signal to help suppress the neural stuttering block.

2. Phonetic influence in bilingual CWS across languages (Kannada and English) among vowels

a) Mean % of subject with dysfluent vowel

Loci of dysfluency among phonemes in a total of 10 subjects for Kannada and English languages were analyzed and are depicted in table 6 and graph (2a, 2b, 2c).

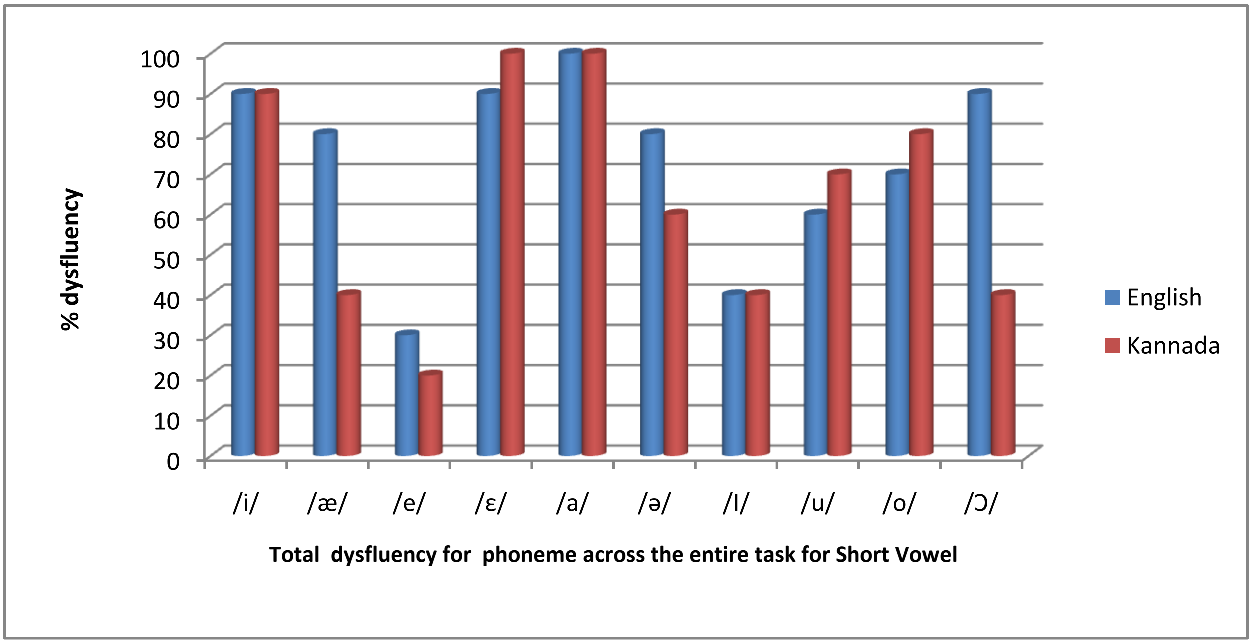
If a score of frequency of occurrence of dysfluency in total subjects is 100, it means that all the subjects had difficulty with respective phoneme, where as a score of 80 means 8 had difficulty, 70 means 7 had difficulty with respect to that phoneme so on.

Place and manner of articulation of vowels

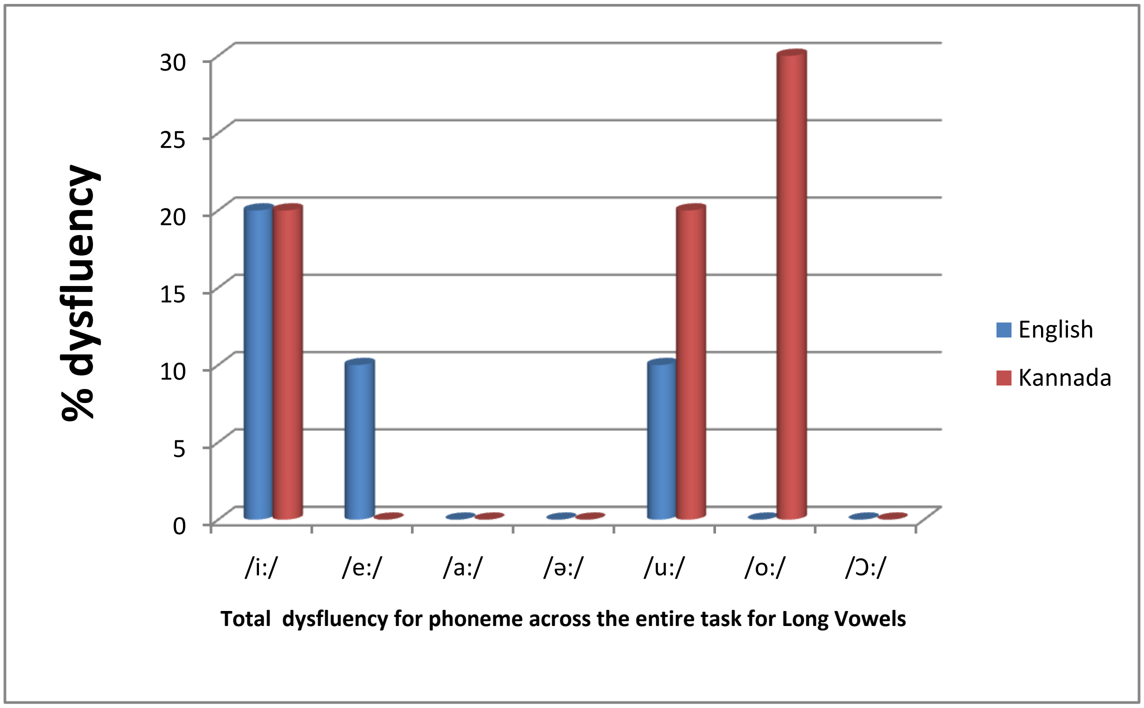
The data suggests that all the 10 CWS had dysfluencies for back short vowels /i/, /a/ in both Kannada and English. However other vowels like front short vowel /i/ were it had dysfluent in 9 CWS in both the languages .Front short vowel /æ/, back short vowel /ə/ were dysfluent in 8 CWS only in English. Semi back vowel /j/and back short vowel /o/ were dysfluenct in 8 CWS only in Kannada. No dysfluency was found for /a: / in both the groups. Frequency of occurrence of dysfluency was compared using the test of equality of proportions. The results indicated that the frequency of occurrence of dysfluency across languages was significantly different for vowels such as /i/, /e/, /a/, /ə/, /I/, /u/, /o/, /Ɔ/, /i:/, /e:/, /a:/, /ə:/, /u:/,/o: /, /Ɔ:/, /ai/, /au/, /j/ ($z=0$, $p< 0.0.5$ level) for majority of vowels .This indicates that CWS exhibited more difficulty in short vowels. However, only /Ɔ/ ($z=2.75$, $p>0.05$ level), /æ/ ($z=2.00$, $p>0.05$ level) and /o: / ($z= 2.07$, $p>0.05$ level) there was no significant difference seen in both languages .On comparing the dysfluent vowels between languages significant difference at 0.05 level was found for majority of vowels in individual children.

Table 6: Mean % of subjects with occurrence of dysfluent vowels

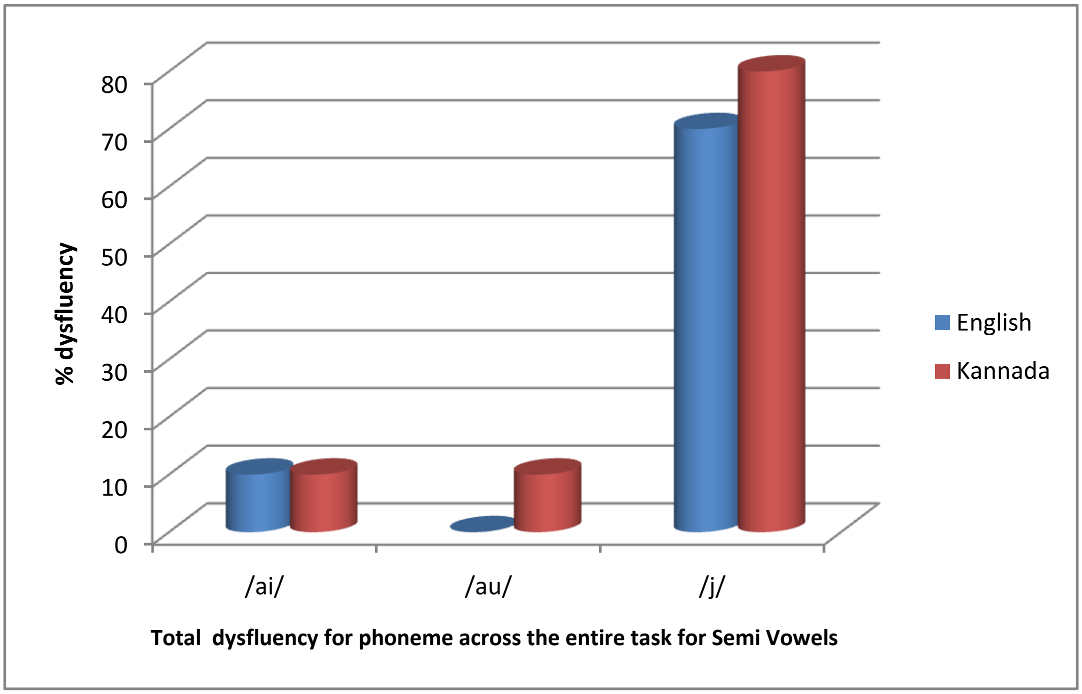
Manner of Articulation	Place of Articulation	Phonemes	English	Kannada	Z value
Short Vowel	Front Vowel	/i/	90	90	0.00
		/æ/	80	40	2.00
		/e/	30	20	0.52
		/ɛ/	90	100	1.05
	Back Vowel	/a/	100	100	0.00
	Central vowel	/ə/	80	60	1.00
	Front vowel	/I/	40	40	0.00
	Back Vowel	/u/	60	70	0.47
		/o/	70	80	0.52
		/Ɔ/	90	40	2.75
Long Vowel	Front Vowel	/iː /	20	20	0.00
		/eː /	10	0	1.05
	Back vowel	/aː /	0	0	0.00
	Central vowel	/əː /	0	0	0.00
	Back Vowel	/uː /	10	20	0.63
		/oː /	0	30	2.07
		/Ɔː/	0	0	0.00
Diphthong	Central Vowel	/ai/	10	10	0.00
		/au/	0	10	1.05
Semi vowel	Back vowel	/j/	70	80	0.52



Graph 2a: Frequency of occurrence of dysfluency for Short vowels



Graph 2 b: Frequency of occurrence of dysfluency for Long vowels



Graph 2 c: Frequency of occurrence of dysfluency for semi vowels

The result indicates that back short vowel /i/, /a/ has got 1st higher dysfluency in both Kannada and English. Front short vowel /i/ gets 2nd rank and front short vowel /æ/, 3rd rank only in English. Semi back vowel /j/ and back short vowel /o/ gets 4th rank of dysfluency in Kannada. No dysfluency was found for /a: / in both the languages.

b) Mean % of loci of dysfluent vowels in total subjects

The frequency of occurrence of dysfluency for all the 10 subjects was considered and the mean was taken for the same as depicted in the table 7.

Table 7: Mean % of dysfluent vowel in total subjects

Manner of Articulation	Place of Articulation	Phonemes	English	Kannada
Short Vowel	Front Vowel	/i/	9.788104	15.59229
		/æ/	7.402478	11.14286
		/e/	3.333333	0
		/ε/	24.90152	50.59813
	Back Vowel	/a/	8.876286	25.27725
	Central vowel	/ə/	9.974686	5.196828
	Front vowel	/I/	5.714286	1.135308
	Back Vowel	/u/	10.625	10.41421
		/o/	7.35528	16.13974
		/Ɔ/	16.01086	1.094276
Long Vowel	Front Vowel	/iː/	4.166667	3.75
		/eː/	3.690476	0
	Back vowel	/aː/	0.322581	12.79192
	Central vowel	/əː/	0	0
	Back Vowel	/uː/	4	0.769231
		/oː/	0	5.624389
		/Ɔː/	0	0
Diphthong	Central Vowel	/ai/	28.3341	9.767279
		/au/	2.5	4.697581
Semi vowel	Back vowel	/j/	3.509615	23.58263

Place and manner of articulation for vowels

Mean value when calculated for all the subjects for English front short vowel /i/ (9.78%), /æ/ (7.40 %), /e/(3.33%), /ɛ/ (24.90%), back short vowel /a/ (8.87%) short vowel central /ə/ (9.97 %), front short vowel /I/ (5.71%), back short vowel /u/ (10.62%), /o/ (7.35%), /Ɔ/ (16.01), for front long vowel. /i:/ (4.16 %), /e:/ (3.69%), back long vowel /a:/ (0.32%), front long vowel /u:/ (4%), /o:/ (0 %), /Ɔ:/ (0%), central diphthong /ai/ (28.33 %), /au /(2.5%), back semi vowel /j/ (3.50 %) were dysfluent .

For Kannada front short vowel /i/ (15.59%), /æ/ (11.14%), /e/(0 %), /ɛ/ (50.59%), back short vowel /a/ (25.27 %), short vowel central /ə/ (5.19 %), front short vowel /I/ (1.13 %), back short vowel /u/ (10.41%), /o/(16.13%), /Ɔ/(1.09%), for front long vowel. /i:/ (3.75 %), /e:/ (0%), back long vowel /a:/ (12.79%), front long vowel /u:/ (0.76%), /o:/ (5.62%), /Ɔ:/ (0%), central dipthong /ai/ (9.76 %), /au/ (4.69 %), back semi vowel /j/ (23.15 %) were dysfluent.

Our data suggests that when the sounds was ranked according to the difficulty /ai/, /ɛ/, /Ɔ/, /u/, /ə/, /i/, /a/, /æ/, /o/ and /I/ are the rank order from 1st to 10. Other sounds had less dysfluency when compared to these phonemes. The result go in agreement with (Hunt (1967; Van Riper, 1971) were they have stated that vowels are also stuttered. The present study is contradicting Jayaram (1979) were his result states that long vowel are more affected than short vowel as in the present study short vowels are more affected than long vowel.

c) Mean % of dysfluent vowels across subjects

The mean was calculated across subjects and the dysfluency was noted for each individual subjects as depicted in tables (8 a & 8b).

Table 8 a: Mean % of loci of dysfluent vowels across individual subjects

Manner of Articulation	Place of Articulation	Phonemes	Subject 1			Subject 2			Subject 3			Subject 4			Subject 5		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z	E	K	Z
Short Vowel	Front Vowel	/i/	2.43	40	3.86	27.77	0	0	1.436	3.7	0.58	13.58	19.04	0.58	0	36.36	2.50
		/æ/	0.91	71.42857	8.86	12.5	0	0	1.136	0	0.50	1.052	0	1.00	8	0	2.08
		/e/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	33.33	0.00	1.22	0.00	0.00	0.00
		/ɛ/	0	100	0	45.45	50.0	0	22.72	6.0	1.24	18.75	25	0.49	18.75	22.22	0.22
	Back Vowel	/a/	5.97	15.15	1.2	33.3	1.34	0	12.5	11.	0.0	5	19.04	1.42	8	70	4.00
	Central Vowel	/ə/	0	35	3.0	42.8	5	0	2.88	1.5	0.3	19.0	2.94	1.7	2.04	0	1.0
	Front Vowel	/I/	0	9.52	1.3	0	0	0	0	1.8	0.87	0	0	0	0	0	0
	Back Vowel	/u/	0	50	6.4	0	2.94	0	6.25	4.1	0.1	0	0	0	0	10.5	1.4
		/o/	28.5	80	2.2	0	44.2	0	0	8.3	0.7	20	8	0.6	0	0	0
		/Ɔ/	0.00	0.00	0.0	33.3	9.09	0.0	1.47	0.0	0.5	7.41	0.00	1.4	6.67	0.00	1.4
Long Vowel	Front Vowel	/i:/	16.66	33.33	0.67	0	0	0	25	4.1	0.4	0	0	0	0	0	0
		/e:/	33.3	0	1.8	0	0	0	3.57	0	0.5	0	0	0	0	0	0
	Back Vowel	/a:/	3.22	55.55	3.30	0	9.09	0	0	0	0	0	0	0	0	20	1.58
	Central Vowel	/ə:/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Back Vowel	/u:/	40	7.69	2.47	0	0	0	0	0	0	0	0	0	0	0	0
		/o:/	0	42.85	3.96	0	2.91	0	0	2.77	0.50	0	0	0	0	0	0
		/Ɔ:/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diphthong	Central Vowel	/ai/	0	25	2.31	30.77	0	0	14.71	10	0.30	2.32	9.09	0.75	62.5	0	5.16
		/au/	0.00	0.00	0.00	0	0	0	25	0	0.82	0	12.5	1.07	0	0	0.00
Semi vowel	Back Vowel	/j/	0	80	6	0	12.5	0	6.25	12.5	0.33	0	0	0	0	28.57	1.67

Table 8 b: Mean % of loci of dysfluent vowels across individual subjects

Manner of Articulation	Place of Articulation	Phonemes	Subject 6			Subject 7			Subject 8			Subject 9			Subject 10		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z	E	K	Z
Short Vowel	Front Vowel	/i/	17.97	19.35	0.16	8.69	8.73	0.00	12.98	4.950	1.82	12.98	12	0.13	0	11.76	1.50
		/æ/	0	0	0	8.82	0	1.81	15.62	40	1.71	15.62	0	0	10.34	0	2.58
		/e/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		/ɛ/	33.33	21.42	0.67	90	54.83	2.69	7.14	11.86	0.58	7.14	0	1.03	5.71	19.35	1.68
	Back Vowel	/a/	14.28	51.35	2.97	0	36	3.75	2.27	0.763	0.63	2.27	22.10	4.11	5.12	25.80	2.39
	Central Vowel	/ə/	9.52	0	1.48	17.14	2.70	2.09	3.125	0	1.75	3.12	4.761	0.43	0	0	0
	Front Vowel	/I/	0	0	0	0	0	0	28.57	0	1.67	28.57	0	1.67	0	0	0
	Back Vowel	/u/	100	22.22	7.93	0	0	0	0	0	0	0	14.28	1.52	0	0	0
		/o/	14.28	12.5	0.12	0	0	0	4.34	0	1.02	4.34	4.166	0.03	2	4.16	0.47
		/Ɔ/	39.13	0.00	3.85	53.85	0.00	3.89	8.33	1.85	1.31	8.33	0.00	1.81	1.59	0.00	1.01
Long Vowel	Front Vowel	/i:/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		/e:/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Back Vowel	/a:/	0	27.27	2.87	0	0	0	0	0	0	0	0	0	0	16	2.18
	Central Vowel	/ə:/	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Back Vowel	/u:/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		/o:/	0	0	0	0	7.69	1.04	0	0	0	0	0	0	0	0	0
		/Ɔ:/	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diphthong	Central Vowel	/ai/	57.14	7.14	3.35	30.77	2.43	3.02	40	44	0.30	40	0	4.47	5.12	0	1.45
		/au/	0	3.22	1.02	0	0	0.00	0	25	2.31	0	6.25	1.03	0	0	0.00
Semi vowel	BackVowel	/j/	0	16.66	1.89	25	75	2.52	0	10.58	3.17	0	0	0	3.84	0	1.019

Place and manner of articulation for vowels

Subject 1: Back vowel long vowel /u: / had 40% in English and 7.69% in Kannada. Back vowel short vowel /o/ had 80% in Kannada and 28.57 % in English. There was no significant difference for /u: / ($z=2.47$, $p>0.05$ level), /o/ ($z=2.28$, $p>0.05$ level).Among 15 vowels , significant difference at 0.05 level was present for 5 sounds and remaining 10 had no significant difference.

Subject 2: Front vowel short vowel /ɛ/ had 45.45% and 50% both in Kannada and English. There was significant difference /ɛ/ ($z=0$, $p<0.05$) in both Kannada and English

Subject 3: Front vowel short vowel /ɛ/ had 22.72% in English and 6.03% in Kannada.

Back vowel semi vowel /j/ had 12.5% in Kannada and 0% in English. There is a significant difference seen /ɛ/ ($a=1.24$, $p<0.05$), /j/ ($z=0.33$, $p<0.05$ level) in both Kannada and English. Among 12 vowels, significant difference at 0.05 level was present for 12 sounds and remaining 0 had no significant difference.

Subject 4: Front vowel short vowel /e/ had 33.33% in English and 0% in Kannada. Front vowel short vowel /i/ had 19.04% in Kannada and 13.58% in English .There is a significant difference seen for /e/ ($z=1.22$, $p<0.05$), /i/ ($z=0.58$, $p<0.05$ level) in both Kannada and English. Among 16 vowels, significant difference at 0.05 level was present for 16 sounds and remaining 0 had no significant difference.

Subject 5: Central vowel diphthong /ai/ had 62.5 % in English and 0% in Kannada. Front vowel short vowel /i/ had 36.36% in Kannada and 0% in English. There is no significant difference seen for /ai/ ($z=5.16$, $p<0.05$), /i/ ($z=2.50$, $p>0.05$ level) in both Kannada and English. Among 10 vowels, significant difference at 0.05 level was present for 7 sounds and remaining 3 had no significant difference.

Subject 6: Central vowel diphthong /ai/ had 58.14% in English and 4.14 in Kannada.

Back vowel short vowel /a/ had 51.35% in Kannada and 14.28% in English. There is a significant difference seen for /ai/ (z=3.34, p>0.05), /a/ (z=2.97, p>0.05 level) in both Kannada and English . Among 11 vowels , significant difference at 0.05 level was present for 6 sounds and remaining 5 had no significant difference.

Subject 7: Back short vowel /ε/ had 90% and 54.83%, back semi vowel /j/ 75% in Kannada, 25% in English .There is a significant difference seen for /ε/ (z=2.69, p>0.05), /i/ (z=2.52, p>0.05 level) in both Kannada and English Among 10 vowels, significant difference at 0.05 level was present for 4 sounds and remaining 6 had no significant difference.

Subject 8: Central vowel diphthong /ai/ had 40 % and 44% in both English and Kannada. There is a significant difference seen for /ai/ (z=0.30, p<0.05 level) in both Kannada and English. Among 11 vowels, significant difference at 0.05 level was present for 9 sounds and remaining 2 had no significant difference

Subject 9: Central vowel diphthong /ai/ had 40% in English and 0% in Kannada. Back vowel short vowel /a/ had 22.10 % in Kannada and 2.27% in English There is no significant difference seen for /ai/ (z=4.47, p>0.05), /a/ (z=4.11, p>0.05 level) in both Kannada and English. Among 12 vowels, significant difference at 0.05 level was present for 10 sounds and remaining 2 had no significant difference

Subject 10: Front vowel short vowel /æ/ had 10.34% in English and 0% in Kannada. Back vowel short vowel /a/ had 25.80% in Kannada and 5.12% in English. There is a no significant difference seen for /æ/ (z=2.58, p>0.05), /a/ (z=2.39, p>0.05 level) in both Kannada and English. Among 9 vowels, significant difference at 0.05 level was present for 6 sounds and remaining 3 had no significant difference

The results suggest that front vowel short vowel /æ/, central vowel diphthong /ai/, back vowel long vowel /u:/, front short vowel /ɛ/, front short vowel /e/ in English and back short vowel /a/, back short vowel /o/, back semi vowel /j/, front short vowel /i/ had higher dysfluency in Kannada.

d) Mean % of loci of dysfluent vowel across individual task

The occurrence of dysfluent consonants across four tasks were averaged and table 9 depicts the mean % across tasks.

Place and manner of articulation of Vowel

Conversation

Front vowel /e/ had got 33.33 % of dysfluency in English, front vowel /ɛ/ had 18.51 % of dysfluency in English and 19.6 7% of dysfluency in Kannada. Front vowel /e:/ had 33.33 % of dysfluency in English. Back vowel /a:/ had 100 % of dysfluency in English and 11.11% of dysfluency in Kannada, Central vowel /ai/ and /au/ had 0% dysfluency in Kannada and 0 % dysfluency in English. Semi vowel /j/ had 14.28% dysfluency in Kannada and 10% dsyfluency in English.

Reading

Back vowel /u/ had 100 % of dysfluency in English and 57.14 % of dysfluency in Kannada. Back vowel /a/ had 9.09 % of dysfluency in English and 57.54% of dysfluency in Kannada. There was significant difference for /i/ (2.94), /ɛ/ (3.39) and /ə/ (2.97) seen between Kannada and English. Front vowel /e: / had 100 % of dysfluency in English and 0 % of dysfluency in Kannada. Back vowel /o: / had 0 % of dysfluency in English and 33.33% of dysfluency in Kannada. There was no significant difference seen between Kannada and

English. Central vowel /ai/ and /au/ had no dysfluency in Kannada and in English. Semi vowel /j/ had 31, 25 % dysfluency in Kannada and 0% dsyfluency in English.

Table 9: Mean % of loci of dysfluent vowels across individual tasks

Manner of Articulation	Place of Articulation	Phonemes	Conversation			Reading			Naming			Narration		
			E	K	Z	E	K	Z	E	K	Z	E	K	Z
Short Vowel	Front Vowel	/i/	6.75	11.26	1.10	0	22.22	2.94	5.23	46.15	1.60	10.93	9.09	0.73
		/æ/	2.91	15.78	1.51	0	0	1.00	0.87	0	0.00	8.71	6.45	0.63
		/e/	33.33	0	1.22	0	0	0.00	0	0	0.00	0	0	0.00
		/ɛ/	18.51	19.67	0.13	25	90	3.39	84.61	35	3.61	21.64	15.38	1.27
	Back Vowel	/a/	4.672	8.60	1.11	9.09	54.54	0.43	50	41.66	3.32	5.40	20.66	3.32
	Central Vowel	/ə/	12	1.33	1.61	16.66	0	0.89	9.30	5.66	0.00	8.73	3.105	4.95
	Front Vowel	/I/	22.22	0	1.60	0	0	0.00	0	0	0.00	0	7.042	2.32
	Back Vowel	/u/	0	8	1.47	100	57.14	0.00	0	22.22	2.29	4.61	2.38	0.72
		/o/	0	6.97	1.80	0	62.5	1.04	8.33	0	3.65	7.81	4.12	0.94
		/Ɔ/	0	0	0.00	0	20	2.97	9.09	0	1.12	21.62	1.470	4.83
Long Vowel	Front Vowel	/i: /	0	0	0.00	0	25	0.00	0	0	0.00	9.09	16.66	0.43
		/e: /	33.33	0	0.00	100	0	0.00	0	0	0.00	0	0	0.00
	Back Vowel	/a: /	100	11.11	12.00	0	0	0.00	0	10.52	0.00	0	66.66	4.24
	Central Vowel	/ə: /	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
	Back Vowel	/u: /	40	0	1.83	0	0	0.00	0	0	0.00	0	0	0.00
		/o: /	0	0	0.00	0	33.33	0.00	0	0	0.00	0	21.42	0.00
		/Ɔ:/	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Diphthong	Central Vowel	/ai/	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
		/au/	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00
Semi vowel	Back Vowel	/j/	10	14.28	0.32	0	31.25	1.92	5.55	42.85	2.70	12.5	12.38	0.02

Naming

Front vowel /ɛ/ had 84.61 % of dysfluency in English and 35 % of dysfluency in Kannada. Front vowel /i/ had 5.23 % of dysfluency in English and 46.15% of dysfluency in Kannada. Back vowel /a:/ had no dysfluency in English and 10.52% of dysfluency in Kannada. Central vowel /ai/ and /au/ had no dysfluency in Kannada and in English. Semi vowel /j/ had 42.85 % dysfluency in Kannada and 5.55% dsyfluency in English.

Narration

Front vowel /ɛ/ had 21.64 % of dysfluency in English and 15.38 % of dysfluency in Kannada. Back vowel /a/ had 5.40 % of dysfluency in English and 20.66% of dysfluency in Kannada. Back vowel /Ɔ:/ had 21.62 % of dysfluency in English and 1.47 % of dysfluency in Kannada. Back vowel /o:/ had 21.42 % of dysfluency in Kannada and no dysfluency in English. Central vowel /ai/ and /au/ has no dysfluency in Kannada and no dysfluency in English. Semi vowel /j/ had 12.38 % dysfluency in Kannada and 12.5 % dsyfluency in English.

0ur data suggests that Front vowel /e/, /i/, /ɛ/ and semi vowel /j/, back vowel /u/, /a:/, /a/ had higher dysfluency when compared to other vowels. The results of the present study also supports Hunt's (1967) view that stuttering not only occurs on consonants but that it may extend to all sounds including vowels. Thus there are a few CWS in the present study in whom the vowel (/a/) stuttering is more than any one particular consonant stuttering. Even the means of different sound categories imply this. Also it supports study done by Geetha (1979) were she states that vowel /a/ had higher dysfluency. According to Zipfs Principle of Least Effort (Zipfs, 1949) long vowels which require longer duration than short vowels occur in low percentage in the language than short vowel . This principle holds good even to our results which revealed more stuttering on short vowels.

The languages (Kannada and English) that we considered include greater frequency of occurrence of short vowels compared to long vowels. Percentage of occurrence of dysfluency was compared using the test of equality of proportions. The results indicated that the frequency of occurrence of dysfluenct vowels across the task there was no significant difference seen in conversation for /a: / ($z=12.00$, $p>0.05$ level), in naming for /o/ ($z=3.65$, $p>0.05$ level), /ɛ/ ($z=3.61$, $p>0.05$ level) and /a/ ($z=3.32$, $p>0.05$ level) /u/ ($z=2.29$, $p>0.05$ level), /j/ ($z=2.70$, $p>0.05$ level) , in narration for /i/ ($z=2.32$, $p>0.05$ level), /ɛ/ ($z=3.32$, $p>0.05$ level) and /a/ ($z=4.95$, $p>0.05$ level) for Kannada and English. However, there was significant difference seen for conversation /i/ ($z=1.10$, $p<0.05$ level), /æ/ ($z=1.51$, $p<0.05$ level) in both languages.

Result of the present study supports the difference hypothesis. It was found that majority of vowels were dysfluent in both Kannada and English language. However, the pattern dysfluency for vowels s varied between language for majority of vowels. This suggests that the type of difficulty with respect to vowels was not similar for both the languages.

Johnson & Brown (1935) and Brown (1938) yielded a rank order of sound difficulty in which consonants clearly filled the higher ranks, and vowels the lowest. Similarly, even in the present study vowels are less affected compared to consonants.

In contrary Wingate (1988) pointed out that this differential between consonant and vowel is misleading that it is an artifact undoubtedly occasioned by the structure of words. In fact, analysis of word structure clearly confutes the belief that consonants arc more difficult than vowels. First, and particularly important, most words begin with consonants. Significantly, initial position is where stutters occur. Once again, the matter of initial position emerges as critical. Further, another feature of word structure is highly pertinent to the matter of a relationship between consonants and stutter occurrence.

Both the length of words and the length of utterance are related to motoric execution. In this study the subjects have used longer words and sentences in narration, reading and in conversation task .They had more problem in these tasks comparing to naming. This study supports that longer words and sentence are of course motorically more difficult to plan, time and execute: but perhaps more importantly they are produced at a more rapid rate (Malecot, Johanson & Kizziar, 1972; Amster, 1984). Long lexical and syntactic items present a more formidable problem of planning, timing and execution (Sternberg, 1978) which may be why there are longer pauses preceding longer utterance (Goldman Eisler, 1958; Grosjean & Collins, 1979; Reich, 1980). Longer sentence are spoken more rapidly by preschool children (Amster, 1984) Longer sentence require more motor programming and motor execution (Peters,Hulstijin & Starkweather, 1989). Hence the present study is in agreement with earlier studies ,as narration task had greater amount of dysfluency compared to other tasks.

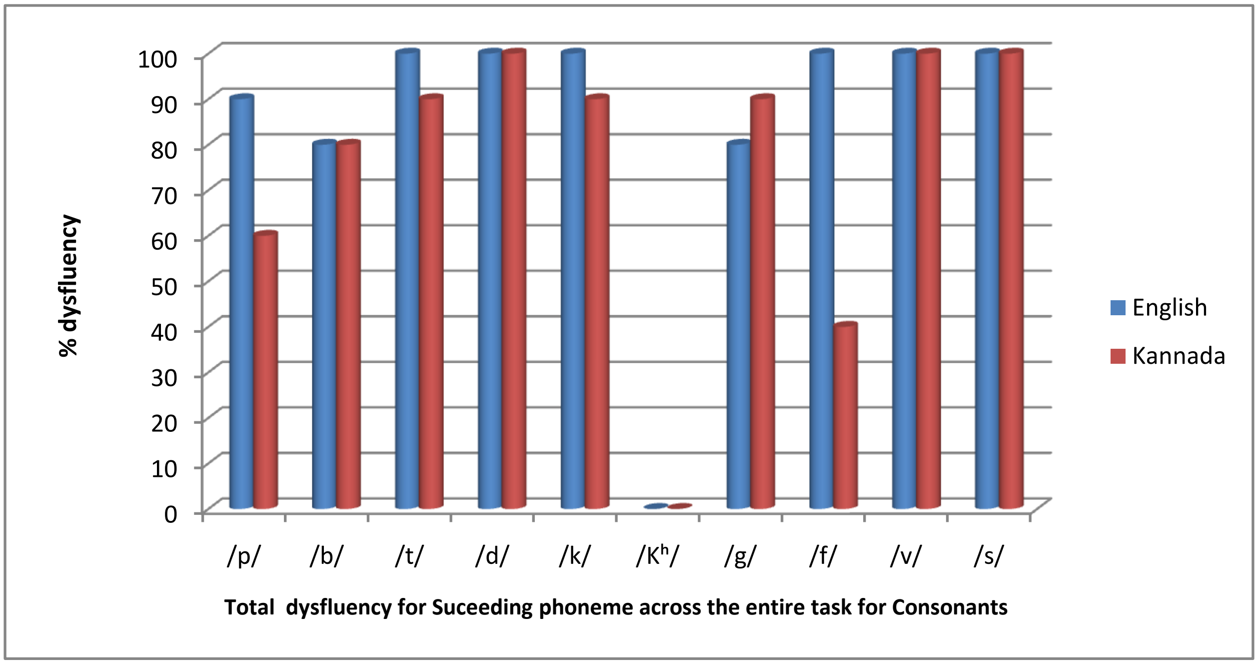
3. Phonetic influences in bilingual CWS with respect to succeeding phoneme for dysfluent phoneme.

a) Mean % of subjects with occurrence of succeeding consonants

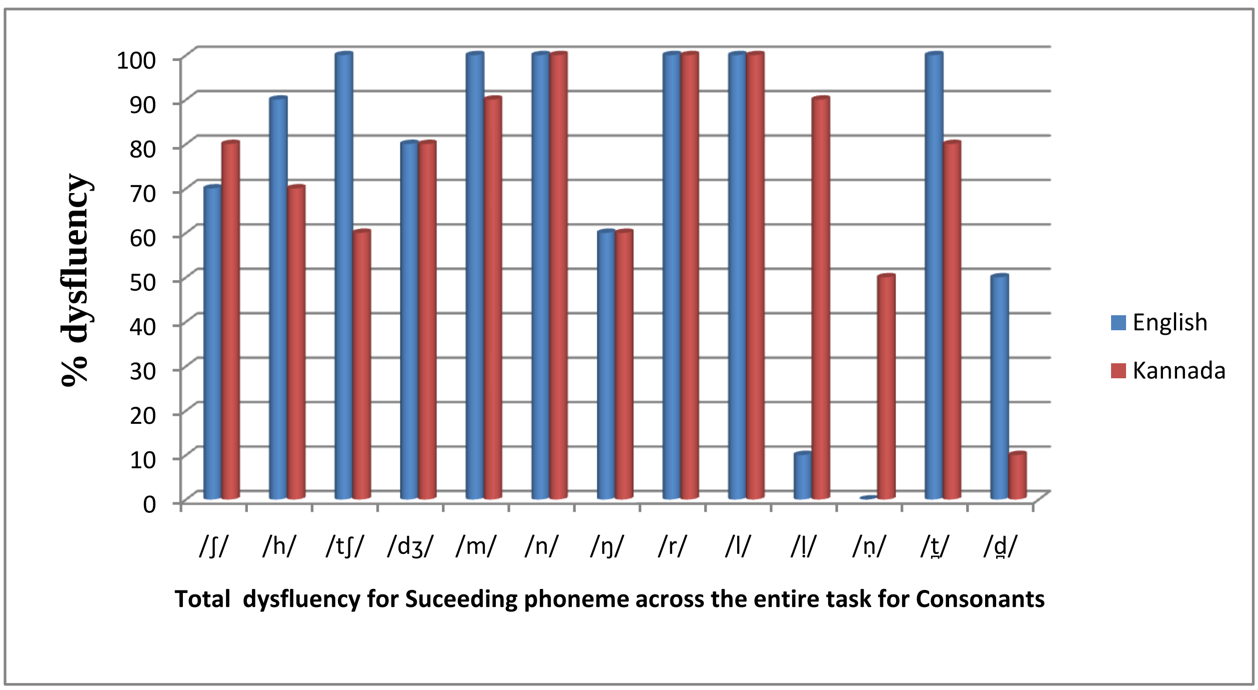
Loci of dysfluency across entire task with respect to succeeding consonants were considered wein a the total of 10 subjects for Kannada and English languages were analyzed and is depicted in table 10 and graphs (3 a & 3b). If a score for the occurrence of succeeding phoneme in total subjects is 100, it means that all the subjects had such phoneme as a succeeding phoneme. A score of 80 means 8 had succeeding phoneme as that sound, 70 means 7 had succeeding phoneme as that sound and so on.

Table 10: Mean % of subjects with occurrence of succeeding consonant for the dysfluent phoneme

Manner of Articulation	Place of Articulation	Phonemes	English	Kannada	Z value
Stop	Bilabial	/p/	90.00	60.00	1.65
		/b/	80.00	80.00	0.00
	Alveolar	/t/	100.00	90.00	1.05
		/d/	100.00	100.00	0.00
	Velar	/k/	100.00	90.00	1.05
		/Kʰ/	0.00	0.00	0.00
		/g/	80.00	90.00	0.63
Fricative	Labiodental	/f/	100.00	40.00	3.87
		/v/	100.00	100.00	0.00
	Alveolar	/s/	100.00	100.00	0.00
	Palato alveolar	/ʃ/	70.00	80.00	0.52
	Glottal	/h/	90.00	70.00	1.15
Affricate	Palatal	/tʃ/	100.00	60.00	2.58
		/dʒ/	80.00	80.00	0.00
Nasal	Bilabial	/m/	100.00	90.00	1.05
	Alveolar	/n/	100.00	100.00	0.00
	Velar	/ŋ/	60.00	60.00	0.00
Retroflex, Trill,Tap.	Palatal	/r/	100.00	100.00	0.00
Retroflex	alevlodental	/l/	100.00	100.00	0.00
Lateral	Palatal	/ḷ/	10.00	90.00	5.96
Retroflex	Palatal	/ṇ/	0.00	50.00	3.16
Stop(K),Fricative(E)	alveolardental	/t̪/	100.00	80.00	1.58
		/d̪/	50.00	10.00	2.17



Graph 3a: Succeeding consonants for dysfluent phonemes



Graph 3b: Succeeding consonants for dysfluent phonemes

Place / Manner of articulation of consonants

The data was analysed with respect to succeeding consonants during instances of stuttering. It was found that alveolar stop /t/ and /d/, labiodental fricative /v/, alveolar fricative /s/ and alveolar nasal /n/, palatal retroflex /r/ and alveodental lateral /l/ succeeded in all 10 CWS for both languages. The results also indicated that the analysis of succeeding consonants across languages were significantly different in both languages. However, only /f/ /tʃ/ , /ḷ/ , and /d̪/ had no significant difference in both languages

The result indicated that there was significant difference for /p/ ($z=1.65$, $p < 0.05$) , /b/ ($z=0.00$, $p < 0.05$), /t/ ($z=1.05$, $p< 0.05$), /d/ ($z=0$, $p<0.05$), /k/ ($z=1.05$, $p<0.05$), /g/ ($z=0.63$, $p < 0.05$), /v/ ($z=0$, $p < 0.05$), /s/ ($z=0$, $p<0.05$), /ʃ/ ($z=0.52$, $p < 0.05$), /h/ ($z=1.15$, $p < 0.05$), /dʒ/ ($z=0$, $p < 0.05$), /m/ ($z=1.05$, $p< 0.05$), /n/ ($z=0$, $p<0.05$), /ŋ/ ($z=0$, $p<0.05$), /r/ ($z= 0$, $p< 0.05$), /l/ ($z=0$, $p< 0.05$), /t̪/ ($z=1.58$, $p<0.05$), in Kannada and English. However , for /f/ ($z=3.87$, $p> 0.05$), /tʃ/ ($z=2.58$, $p > 0.05$) , /l./ ($z=5.96$, $p >0.05$), /ṇ/ ($z=3.16$, $p>0.05$), /d̪/ ($z=2.17$, $p>0.05$) had no significant difference seen in Kannada and English. On comparing the succeeded consonants for dysfluent phoneme between languages significant difference at 0.05 level was found for majority of the sounds in individual children.

b) Mean % of frequency of occurrence of succeeding consonants

Mean was calculated for all the succeeding consonants for dysfluent phoneme among 10 subjects and the same is as depicted in the table 11.

Table 11: Mean% of frequency of occurrence of succeeding consonants for dysfluent phonemes

Manner of Articulation	Place of Articulation	Phonemes	English	Kannada
Stop	Bilabial	/p/	6.544613	12.20031
		/b/	6.095365	12.46639
	Alveolar	/t/	20.42729	20.52702
		/d/	13.24054	26.23553
	Velar	/k/	14.07592	17.78427
		/g/	11.86195	8.662034
Fricative	Labiodental	/f/	20.02933	3.7181
		/v/	20.06679	17.48651
	Alveolar	/s/	13.15404	25.05553
	Palato alveolar	/ʃ/	7.995937	10.63969
	Glottal	/h/	14.88264	14.51273
Affricate	Palatal	/tʃ/	9.519132	17.06107
		/dʒ/	7.591554	13.3724
Nasal	Bilabial	/m/	19.87791	26.54427
	Alveolar	/n/	18.24153	23.67959
	Velar	/ŋ/	5.58584	10.18232
Retroflex, Trill,Tap.	Palatal	/r/	16.68958	23.6441
Retroflex	Alevlodental	/ḷ/	0.425532	16.47421
Lateral	Palatal	/l/	13.53339	10.13999
Retroflex	Palatal	/n./	0.25641	8.577407
Stop(K),Fricative(E)	Alveolardental	/t̪/	19.20014	13.82565
		/d̪/	11.7619	0.363636

Place of articulation/ Manner of articulation

Mean value when calculated for both languages for English bilabial stop /p/ (8.87%), bilabial stop /b/ (8.03%), alveolar stop /t/ (25.65%), and /d/ (18.35%),velar stop /k/ (18.76%), velar stop /g/ (13.06%), labiodentals fricative /f/ (25.52 %) and /v/ (26.47%), alveolar fricative /s/ (17.54%), palato alveolar fricative /ʃ/ (10.71%), glottal fricative /h/ (20.12%), palatal affricate /tʃ/ (13.81%), and /dʒ/ (9.25%),bilabial nasal, /m/ (25.95%), alveolar nasal /n/ (23.98%), velar nasal /ŋ/ (7.59%), palatal retroflex /r/ (19.77%), palatal retroflex /ḷ/ (0.42%), alveolar dental lateral /l/ (17.72%), /ṇ/ (0.25%), /t̪/ (30.45%), /d̪/ (11.76%) succeeded dysfluent phonemes.

For Kannada bilabial stop /p/ (12.20%), bilabial stop /b/ (12.46%), alveolar stop /t/ (20.52 %), /d/ (26.23%), velar stop /k/ (17.78), velar stop /g/ (8.66%), labiodentals fricative /f/ (3.71%) and /v/ (17.48%), alveolar fricative /s/ (25.05%), palato alveolar fricative /ʃ/ (10.63%), glottal fricative /h/ (14.51%), palatal affricate /tʃ/ (17.06%) succeeded dysfluent phonemes.

In both Kannada and English /dʒ/ (13.37%), bilabial nasal, /m/ (26.54%), alveolar nasal /n/ (23.67%), velar nasal /ŋ/ (10.18%), palatal retroflex /r/ (23.64%), palatal retroflex /ḷ/ (16.47%), alveolar dental lateral /l/ (10.13%), /ṇ/ (8.57%), /t̪/(13.82%), /d̪/ (0.36%) were dysfluent. Our data suggests that for English /t̪/, /v/, /m/, /t/, /n/, /h/, /r/ succeeded and in Kannada /m/, /d/, /s/, /n/, /r/, /t/, /k/, /tʃ/ succeeded dysfluent phoneme. There was mixed results with reference to the occurrence of voiced and voiceless succeeding consonants. However, majority the times voiced consonants succeeded the dysfluent phoneme. This does not mean that it is on account of difficulty of articulating explosives because, he often repeated these sounds in a rapid succession. It is the enunciation of the following sound, be it vowel or a consonant which is his difficulty; he cannot join them. It is, therefore, during the transition from one mechanism to another that the impediment chiefly takes place. It is the disturbed relation and the antagonism between the vocal and the articulating mechanism which gives rise to stuttering; the spasmodic condition of the glottis which takes place in the explosive sounds is the 'effect' and not the cause of the distributed relation.

This is also supported by the following studies by Jayaram (1979) who concluded that more often consonants are stuttered when the succeeding sounds are voiced sounds. Jayaram (1979) were he states the trend is more pronounced in the case of stuttering in English language in the sense that stuttered consonants are always followed by voiced sounds, without any exceptions. Also this can be a reason as suggested by Jayaram (1978) the two possibilities like there might be disturbance in the initiation of voice and the system of anticipatory coarticulation is faulty.

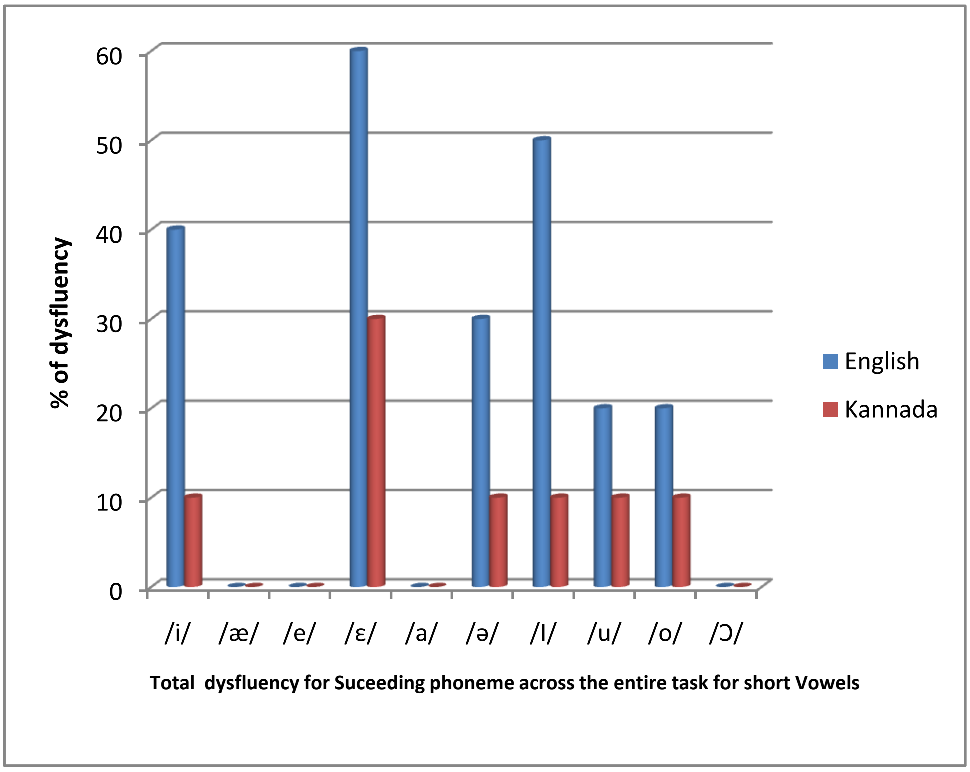
c. Mean % of subjects with occurrence of succeeding vowels for the dysfluent phonemes

Mean was calculated for all the 10 subjects for succeeding vowels for the dysfluent phonemes for Kannada and English languages and the same is as depicted in the table 12 and graphs (4a, 4b, 4c). If a score for succeeding vowels for the dysfluent phoneme in total subjects is 100, it means that all the subjects had that particular phoneme as succeeding vowels for the dysfluent phonemes. If it is 70 that means 7 had that particular succeeding vowel s for the dysfluent phoneme and so on

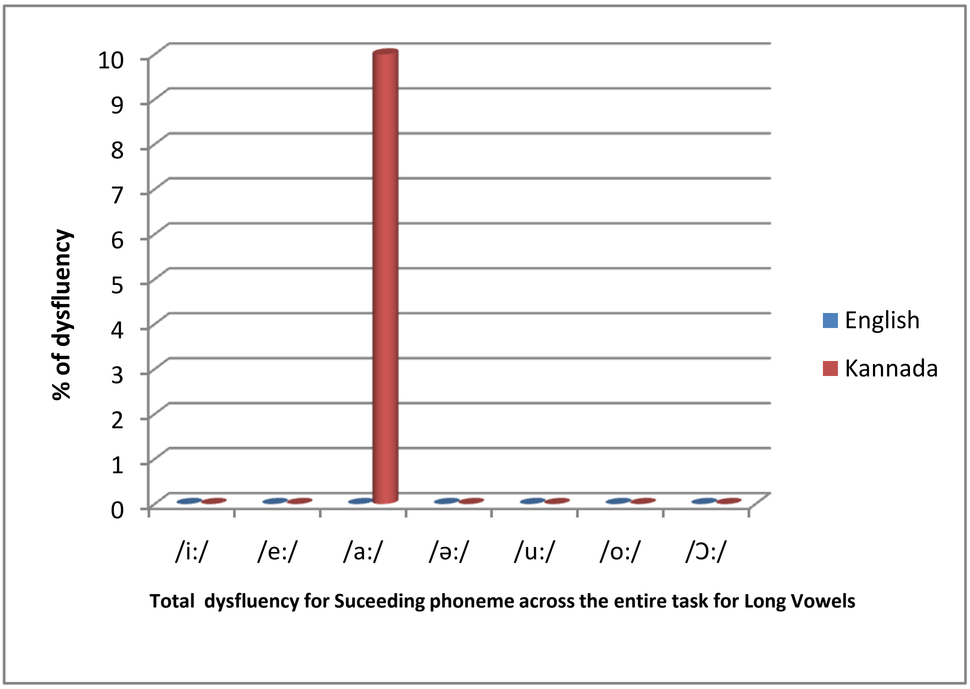
.

Table 12: Mean % of subjects with occurrence of succeeding vowels for dysfluent phonemes

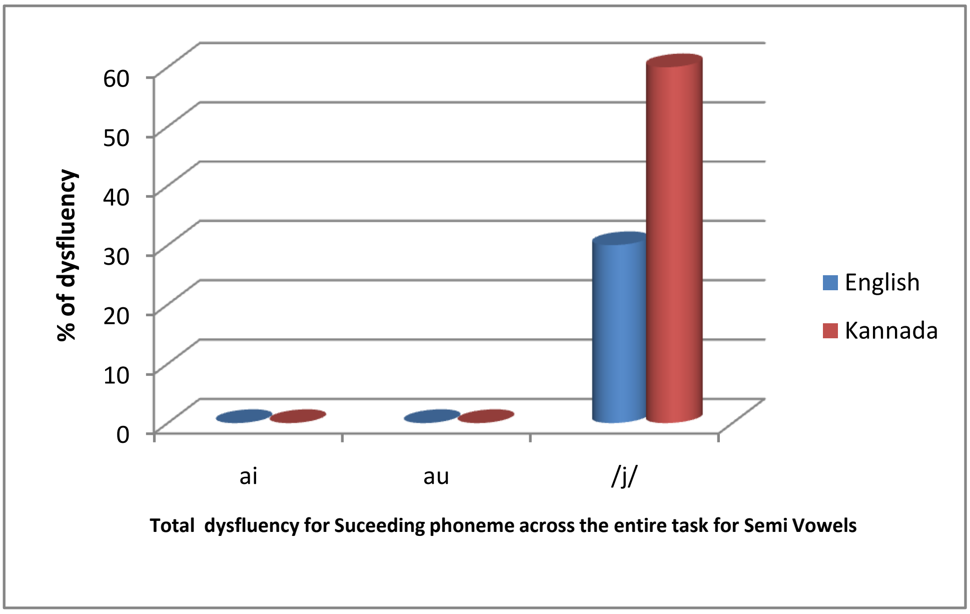
Manner of Articulation	Place of Articulation	Phonemes	English	Kannada	Z Value
Short Vowel	Front Vowel	/i/	40	10	1.65
		/æ/	0	0	0.00
		/e/	0	0	0.00
		/ɛ/	60	30	1.41
	Back Vowel	/a/	0	0	0.00
	Central Vowel	/ə/	30	10	1.15
	Near Front Vowel	/I/	50	10	2.17
	Back Vowel	/u/	20	10	0.63
		/o/	20	10	0.63
		/Ɔ/	0	0	0.00
Long Vowel	Front Vowel	/i: /	0	0	0.00
		/e: /	0	0	0.00
	Back Vowel	/a: /	0	10	1.05
	Central Vowel	/ə: /	0	0	0.00
	Back Vowel	/u: /	0	0	0.00
		/o: /	0	0	0.00
		/Ɔ:/	0	0	0.00
Diphthong	Central Vowel	/ai/	0	0	0.00
		/au/	0	0	0.00
Semi vowel	Back Vowel	/j/	30	60	1.41



Graph 4a: Suceeding vowels for dysfluent phonemes



Graph 4b: Suceeding vowels for dysfluent phonemes



Graph 4c: Suceeding vowels for dysfluent Phoneme

Mean value when calculated for both language /ɛ/ front vowel succeeded 6 CWS in English and in 3 CWS in Kannada, and /I/ front vowel succeeded in 5 CWS in English and only 1 CWS in Kannada . Long back vowel /a: / succeeded in 1 CWS in Kannada. Semi back vowel /j/ succeeded 3 CWS in English and 6 CWS in Kannada, other central vowel /ai/ and /au/ did not succeed both in Kannada and English. Our data states that short vowel /ɛ/, /I/, long vowel /a: /, semi vowel /j/ succeeded when compared with other vowels. The result indicated that there was significant difference for/ i/ ($z=1.63$, $p<0.05$), /æ/($z=0.00$ $p<0.05$), /e/ ($z=0$, $p<0.05$), /ɛ/ ($z=1.41$, $p<0.05$), /a/ ($z=0$, $p<0.05$), /ə/($z=1.15$, $p<0.05$), /u/($z=0.63$, $p<0.05$), /o/ ($z= 0.63$, $p<0.05$) , /Ɔ/($z=0$, $p<0.05$), /i:/ ($z=0$, $p<0.05$), /e: / $z= 0$, $p<0.05$), /a:/ ($z=1.05$, $p<0.05$), /ə :/ ($z=0$, $p<0.05$), /u :/ ($z=0$, $p<0.05$), /Ɔ:/ ($z=0$, $p<0.05$), /ə:/ ($z=0$, $p<0.05$), /ai/ ($z=0$, $p<0.05$), /au/ ($z= 0$, $p<0.05$), /j/ ($z=1.41$, $p<0.05$) in Kannada and English. However front short vowel /I/ ($z=2.17$, $p > 0.05$ level) had no significant difference in Kannada and English. On comparing the succeeded vowels for dysfluent phoneme between languages significant difference at 0.05 level was found for majority of the sounds in individual children.

d) Mean % of frequency of occurrence of succeeding vowels

Mean value for all the subjects were averaged for succeeded vowels and are depicted in table 12. For English central diphthong /ai/(10.79), /au/(10.43), front short vowel/ɛ/(6.14 %),back short /u/(5.33 %), front short /I/(4.60 %), back semi vowel /j/(2.77 %) ,central short /ə/(4.81 %) , back short /a/(0 %) and front vowel / i/ (0 %), /æ/(0 %) ,/e/(0%) were succeeded for dysfluent phoneme.

For Kannada back semi vowel /j/ (6.97 %) central diphthong /ai/ (7.48 %), /au/ (3.5 %), front sort /ɛ/ (0.73 %), central short vowel /ə/ (0.095 %), front short vowel /i/ (0.147 %), front short vowel / I / (0.65 %), back short u/(0.18 %), /o/ (0.2 5%) were succeeded dysfluent phoneme. The result suggests that in English /ai/, /au/, /ɛ/, /ə/, /i/, /a/ succeded dysfluent phoneme. Kannada /ai/, /j/, /au/, /ɛ/ and /u/ succeeded dysfluent phoneme according to the rank order of highest to lowest frequency. Considering place of articulation rank order of occurrence of the succeeding consonants were dental, labiodentals, bilabial, alveolar and glottal for English Language were as in Kannada language the order were bilabial, alveolar velar and palatal sounds. Considering manner of articulation rank order of occurrence of the succeeding consonants were stop, nasal, fricative and retroflex in English language were as the order in Kannada were nasal , stop, fricative and affricate.

Jayaram (1979) stated that vowels are more often stuttered when the succeeding sounds are voiceless sounds; consonants are stuttered more when they are followed by vowels, more often long vowels. There are two possible explanations for these findings.

(1) There might be disturbance in the initiation of voice

(2) The system of anticipatory co-articulation is faulty

Table 13: Mean % of frequency of occurrence of succeeding vowels

Manner of Articulation	Place of Articulation	Phoneme	English	Kannada
Short Vowel	Front Vowel	/i/	0	0.147059
		/æ/	0	0
		/e/	0	0
		/ɛ/	6.14277	0.734447
	Back Vowel	/a/	0	0
	Central Vowel	/ə/	4.817531	0.095238
	Near Front Vowel	/I/	4.607558	0.65957
	Back Vowel	/u/	5.336911	0.188679
		/o/	1.641337	0.2
		/Ɔ/	0	0
Long Vowel	Front Vowel	/i:/	0	0
		/e:/	0	0
	Back Vowel	/a:/	0	0
	Central Vowel	/ə:/	0	0
	Back Vowel	/u:/	0	0
		/o:/	0	0
		/Ɔ:/	0	0
Diphthong	Central Vowel	/ai/	10.79397	7.481203
		/au/	10.43956	3.538462
Semi vowel	Back Vowel	/j/	2.779839	6.974191

It was observed that more often consonants arc stuttered when the succeeding sounds are voiced sounds. There is a strong reason to interpret this as a difficulty in initiating voice. A number of studies have indirectly implicated the phonatory mechanism seen in stuttering.

It has been said that initiation of vocalization is a 'crucial element in the complex of stuttering' by Quarrington, Convey and Siegel (1962) and that it is the constant need for tra-nsition from voiceless to voiced sounds which results in increased disfluency (Wingate, 1969).

Adams and Reis (1971) found that the frequency with which vocalization must be initiated and stopped is related to the frequency of attendant disfluency. Adams and Reis (1965) maintain that fluency is dependent on the correct timing and the prompt smooth initiation and maintenance of air flow and glottal vibration. However, Manning and Coufal (1976) found no significant difference in the amount of stuttering during the various phonatory transitions. Difficulty in the initiation of voice can be either because there is no smooth air flow from the subglottal to the supraglottal region because of the failure of the coordinated activity of the laryngeal muscles or because of lack of tension of the vocal cord muscles. At the level of the glottis, increased muscular tension in the intrinsic laryngeal muscles may cause a complete closure of the glottis where a configuration appropriate for normal voicing is required. This difficulty may be either because there is physical impairment or the system is not triggered at the proper time. Wyke (1974) has hypothesized that stuttering may arise as a result of premature, abnormally slow or involuntary presetting of the laryngeal (and/or respiratory) musculature or disorganized reflex maintenance of this preset pattern of muscle tone.

Evidence to laryngeal involvement in stuttering has emerged from physiological studies. Certain abnormal laryngeal activities like arhythmic vocal fold vibration (Chevrie muller

(1963), asymmetric tight closure of the larynx (Fujita, 1978) wide separation of the posterior vocal folds (Conture, 1974) and simultaneous contraction of antagonistic muscles (Freeman 1978) have been noted to occur in the laryngeal mechanism of PWS at the time of a stuttering block. However, these physiological studies do not indicate whether these abnormal activities of laryngeal musculature lead to stuttering. There is also the possibility that stuttering might be leading to such abnormal activities. There is no experimental evidence to support the contention that disruptions in the PWS speech have their origin in the larynx and in the subglottal region. Till such evidence is forthcoming our conclusions will have to be kept in abeyance. Riley and Riley (1985) state that some children do not master the necessary motor aspects of speech in time for normal fluency to develop, thus requiring intervention. They divide oral motor coordination to include three areas accuracy, smooth flow and rate. Zimmerman et al (1983) concluded that inadequate central processing capacity is the "subsoil" of stuttering. They hypothesized that PWS are limited in their abilities to deal with the relationship between motor speech output and its associated feedback. Starkweather and Ackemian (1997) for younger children, recommend that the coordination, speed and speech control that children need in order to speak fluently are best practiced during those circumstances where fluent speech is more likely to occur. Ratner (1996) cautions that stuttering may coexist with other speech and language problems involving difficulties with verb phrases, words starting with particular sounds, or complex and coordinate constructions acquired later in the developmental sequence. She recommends strategies for dealing with these coexisting conditions.

If we accept that difficulty in intra and inter syllabic transition as we find them in PWS speech as due to problem in voice initiation, then it becomes difficult to explain the following like voiceless consonants are stuttered more in the initial position. Vowels are stuttered more when the succeeding sounds are voiceless sounds. Is it because PWS fail to terminate vocalization that vowels are stuttered more in the company of voiceless sounds remains a question. In Kannada language most of the stuttering is on the whole syllable, which necessarily ends with a vowel. Since the syllables always end with a vowel, the succeeding sound being either a voiceless sound or voiced sound, the transition to the next sound should not be a problem because if the succeeding sound is a voiced sound the problem of difficulty in voice initiation does not arise and if the succeeding sound is a voiceless sound initiation of vocalization does not arise, the voiced consonants are stuttered more even when the succeeding sounds are voiced sounds. If stuttering reflects the difficulty in initiating voice, then at least in the voiced-voiced sound transition environment there should have been less stuttering. These factors will have to be satisfactorily explained before we can accept that difficulty in initiation of voice leads to increased stuttering.

Coarticulation occurs continuously in speech and assists in the smooth transition from sound to sound. It is as if all motor commands for the components of target movements in an entire syllable are issued simultaneously at the onset of that syllable as long as they are non-contradictry (Kozhenvikov & Chistovish, 1965). The motor specifications of target movements will include such factors as which articulatory organs are to be involved; which muscles or groups of muscles are to contract; the degree of force of contraction; the velocity of articulatory movements etc. In normal speakers, the effector system probably ' triggers off as a whole certain sequences of target movements, without waiting for the feedback signal of the completed move-ments. The smooth triggering of successive target movements is an important requirement for normal fluent speech. To facilitate such smooth transition, it is necessary for the motor regulator to 'scan ahead' to at least the next target movement in time and make appropriate modifications to the current neurolinguistic program being processed at any given time. It is only by maintaining such constant surveillance that the motor regulator can ensure that the speech organs move in a parallel fashion and so enable coarticulation to occur freely. Assuming that sequences of movements for an entire syllable are triggered off as a whole at the beginning of that syllable, then failure in such a sequence results in the fixation of target movements of the current neurolinguistic program being processed, which is probably what is happening in speech of PWS. Probably because there is fixation of the target movement of the first sound and somehow the speech organs have not received the motor schema for the succeeding sound or syllable in time, PWS repeat the sound or syllabic many times or prolong them before going on to the next sound.

Henke (1967) in his 'book ahead model' has shown that speech units are organized as 'bundles of independent articulatory features'. Motor commands to speech muscles are encoded in the central nervous system primarily in terms of idealized articulatory 'targets' or 'target movements' which may or may not correspond to linguistic units such as phonemes (MacNeilage, 1970). However, if we accept Henke's (1967) contention, then features of the language also become important. Also the extent to which a given 'target movement' is fulfilled will depend largely on such external factors as overall speed of utterance, those targets which precede or follow it and the prosodic features of the language (Dalton & Hardcastle, 1977).

To conclude, the present study showed greater frequency of occurrence of dysfluency among consonants than vowels. Majority of the phonemes exhibited different pattern of phonetic influences in both Kannada and English language. Such pattern suggest the supporting fact to ‘Difference Hypothesis’. It may be due to abnormally slow or involuntary presetting of language, respiratory or disorganized reflex maintenance of muscle tone during dysfluent phoneme. However, it is possible that in additional to above difficulties other factors may also contribute in aggravating the difficulties in a subgroup of CWS.

CHAPTER V

SUMMARY AND CONCLUSION

The present study is an attempt to examine the phonetic influences of stuttering in Kannada and English speaking bilingual children in an Indian context. The study investigated the spontaneous speech, naming, conversation, and reading samples of 10 CWS (2 female and 8 male) ranging in the age range 9 years to 12 years. The speech samples were recorded, transcribed and analyzed based on manner and place of articulation of vowels and consonants. Some of the important results are;

- Consonants in general were stuttered more often than vowels. However, stuttering was found on vowels also and in minority of cases. For the group as a whole, short vowel got the highest frequency of stuttering when it was the first sound than long vowel. Children varied widely in terms of their difficulty with any particular sound.
- The rank order of the phonetic dysfluency with respect to place of articulation of consonants included palatal, alveolar, glottal, bilabial and velar for English language whereas the rank order for Kannada language were palatal, bilabial, velar, alveolar and palatoalveolar .
- The rank order of the phonetic dysfluency with respect to manner of articulation of consonants included affricate, fricative, stop, nasal and retroflex for English language whereas in Kannada the order were affricate, stops, fricative, retroflex and nasal.
- Considering place of articulation rank order of occurrence of the succeeding consonants were dental, labiodentals, bilabial, alveolar and glottal for English Language where as in Kannada language the order were bilabial, alveolar, velar and palatal sounds.

- Considering manner of articulation rank order of occurrence of the succeeding consonants were stop, nasal, fricative and retroflex in English language whereas the order in Kannada were nasal, stop, fricative and affricate.
- The occurrence of succeeding vowels consequent to dysfluent phoneme were central diphthong, front high and back semi vowel in both Kannada and English language.
- Narration task had greater % of dysfluent phonemes followed by reading, conversation and naming.

Majority of dysfluent consonants, dysfluent vowels, and occurrence of succeeding phoneme showed significant difference between the two languages considered, Kannada and English. The present study suggests intra and inters subject variability in the pattern of phonetic influences. The results support ‘difference hypothesis of stuttering’ with reference to frequency of occurrence of majority of dysfluent phonemes. However, few dysfluent phonemes did not show significant difference between the languages. Earlier study (MacNeilage, 1970) reported that the motor commands to speech muscles are encoded in the central nervous system primarily in terms of idealized articulatory targets during fluent production. The occurrence of dysfluent phonemes may be due to abnormally slow or involuntary presetting of language, respiratory or disorganized reflex maintenance of muscle tone during instances of stuttering. However, it is possible that in additional to above difficulties other factors may also contribute in aggravating the difficulties in a subgroup of CWS.

Future direction

1. Studies on other languages that has varying linguistic structure is recommended.
2. To examine the linguistic aspects with respect to word frequency in the languages considered.
3. Similar study can be carried out by including more number of bilingual children with stuttering in a study.
4. Studies on the impact of a second language on the phonetic influences is recommended

Implication of the study

Data obtained from the present study will be helpful

1) In understanding phonetic influences in bilingual children with stuttering for Kannada and English languages.
2) The findings would contribute to our theoretical understanding of the problem.
3) It would be of clinical importance both in the assessment and management of bilingual children with stuttering.
4) It will also contribute to a program of research that will ultimately reveal the mechanisms underlying executive functioning in bilingual children with stuttering

Limitation of the study

1) Languages considered were only Kannada and English.

2) Loci of Phoneme and Succeeding phoneme were treated as two separate entities. The analysis of succeeding phoneme with respect to its preceded dysfluent phoneme were not analyzed together due to time constraints. Hence a caution remains while concluding about the phonetic context of the loci phoneme.

3) Frequency of occurrence of phonemes and word usage in each language (Kannada and English) was not well controlled.

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APPENDIX I

Checklist for Assessment of disfluencies in Bilingual Children with Stuttering

Case Name: **Age/Sex:** **Case no:**

Provisional Diagnosis: **Education:**

Mother Tongue: **Other Languages Known:**

Parent's education /occupation:

- Age of onset:
- Family History: Yes/No.
- Acquisition of Kannada was at which age: 1-birth-2yrs 2-3-4yrs 3- 4-5yrs 4->6yrs.
- Acquisition of English was at which age: 1- birth-2yrs 2-3-4yrs 3- 4-5yrs 4->6yrs.
- Which language does the child speak at home?
- Which language does the child speak at school?
- Which language does the child like?
- How frequently child uses Kannada: 1-25%; 2-50; 3-75; 4-100%.
- How frequently child uses English: 1-25%; 2-50; 3-75; 4-100%.
- How proficient is child in Kannada: 1-poor 2 – average 3-good 4-v good.
- How proficient is child in English: 1-poor 2 – average 3-good 4-v good.
- Which language do you use the most:
- Which T.V. channel do your child watches the most(specify language):
- Does your child experience more stuttering at any sound specifically: Yes/No.

If yes, specify: In Kannada-

In English-

- Earlier history of therapy :Yes/No If yes specify:
- How do you rate your stuttering in the following situation? Please answer the following statements

On a four point scale as: 1-Nil. 2-Mild. 3-Moderate. 4-Severe.

1. How much stuttering does the child experience while speaking in Kannada?

1 2 3 4

2. How much stuttering does the child experience while speaking in English?

1 2 3 4

3. How much stuttering does the child experience while reading in Kannada?

1 2 3 4

4. How much stuttering does the child experience while reading in English?

1 2 3

APPENDIX II

READING PASSAGES

English **The Rainbow Passage (Fairbanks, 1960)**

When the sunlight strikes raindrop in the air, they act as prism and form a raindow.The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking the pot of gold at the end of the rainbow. Throughout the centuries people have explained the rainbow in various ways. Some have accepted it as a miracle without physical explanation. To the Hebrews it was a token that there would be no more universal floods. The Greek used to imagine that it was a sign from the gods to foretell war or heavy rain. The Norsemen considered the rainbow ach the gods passed from earth to their home in sky. Others have tried to explain the phenomenon physically. Aristotle thought that the rainbow was caused by reflection of the sun’s rays by the rain. Since then physicists have found that it is not reflection, but refraction by the raindrops which causes the rainbows. Many complicated ideas about the rainbow have been formed. The difference in the rainbow depends considerably upon the size of the drops increases. The actual primary rainbow observed is said to be the effect of super-imposition of a number of bows .If the red of the second bow falls upon the green of the first ,the result is to give a bow with an abnormally wide yellow band, since red and green light when mixed form yellow. This is a very common type of bow, one showing mainly red and yellow, with little or no green or blue.

Kannada: (Phonemic Transcription (International Phonetic Alphabet) of Kannada passage.

PASSAGE "A"

ಕೃಷ್ಣಾ ನದಿಯು ಸಹ್ಯಾದ್ರಿ ಪರ್ವತಗಳಲ್ಲಿ, ಮಹಾಬಲೇಶ್ವರದ ಹತ್ತಿರ ಹುಟ್ಟುತ್ತದೆ. ಇದು ಹುಟ್ಟುವ ಪ್ರದೇಶವು ರಮಣೀಯ ಸ್ಥಾನ, ಇದು ಮಹಾರಾಷ್ಟ್ರ, ಕರ್ನಾಟಕ ಮತ್ತು ಆಂಧ್ರಪ್ರದೇಶಗಳಲ್ಲಿ ಹರಿದು ಬಂಗಾಳ ಕೊಲ್ಲಿಯಲ್ಲಿ ಸೇರುತ್ತದೆ. ಇದಕ್ಕೆ ಉಪನದಿಗಳು ಹಲವು. ಕೊಯಿನ, ತುಂಗ, ಭದ್ರ, ಘಟಪ್ರಭಾ, ಭೀಮಾ, ಮಲಪ್ರಭಾ ಅವುಗಳಲ್ಲಿ ಕೆಲವು.

ಕೊಯಿನಾ ನದಿಗೆ ಅಣೆಕಟ್ಟನ್ನು ಕಟ್ಟಿ ವಿದ್ಯುತ್ತನ್ನು ಉತ್ಪಾದನೆ ಮಾಡುತ್ತಾರೆ.

Krʃṇa: nəd̪Iju səhja:d̪ri pərvət̪əgəḷəlli məha:bəle:ʃvərəd̪a hat̪t̪Ira huṭṭut̪t̪ad̪e. Id̪u huṭṭuva prade:ʃəvu rəməṇi:ja st̪ʰa:na. Id̪u məha:ra:ʃṭra , kərna:ṭəka mət̪t̪u a:nd̪ʰraprə:d̪e:ʃagəḷalli hərId̪u baŋga:ḷa kollIjənnu se:rut̪t̪əd̪e .Id̪əkke upənəd̪Igalu hələvu. kojIna, t̪uŋgabʰadra: , gʰəṭapraba , bʰi:ma: məlaprabʰa əvugaḷalli kelavu.

KojIna: nəd̪Ige aṇIkəṭṭannu kəṭṭi vIdjut̪t̪annu ut̪pa:d̪əne ma: ḍut̪ t̪a: ve.

Passage "B"

ತೋಳ ಮತ್ತು ಆಡು

ಒಂದು ಆಡು ಬೆಟ್ಟದ ನೆತ್ತಿಯಲ್ಲಿ ಮೇಯುತ್ತಿತ್ತು. ಒಂದು ತೋಳ ಅದನ್ನು ನೋಡಿತು. ಅಲ್ಲಿಗೆ ಹೋಗಲು ಅದಕ್ಕೆ ಸಾಧ್ಯವಿರಲಿಲ್ಲ. ಅದು ಅದನ್ನು ಕುರಿತು–

'ಕೆಳಗೆ ಬಾರಯ್ಯ ಅಷ್ಟು ಎತ್ತರದಲ್ಲಿದ್ದರೆ ಕಾಲು ಜಾರಿದರೆ ಏನುಗತಿ' ಅಲ್ಲದೆ ಇಲ್ಲಿ ಹುಲ್ಲು ಹುಲುಸಾಗಿ ಬೆಳೆದಿದೆ. ಬಹು ರುಚಿಯಾಗಿದೆ, ಎಂದು ಆಮಂತ್ರಣ ನೀಡಿತು.

ಅದಕ್ಕೆ ಆಡು–ನೀನು ನನ್ನನ್ನು ಕರೆಯುತ್ತಿರುವುದು ನನ್ನ ಊಟಕ್ಕೊ? ನಿನ್ನ ಭೋಜನಕ್ಕೋ ಎಂದು ಕೇಳಿತು.

t̪o:ḷa məṯṯu a:ḍu

Ond̪u a:ḍu beṭṭəd̪a neṯṯejIlli me :juṯṯIṯṯu. Ond̪u t̪o :la əd̪ənnu no :ḍIṯu. əllIge ho:galu ad̪əkke sa :d̪ʰjavIralilla . əd̪u ad̪ənnu kurIṯu . "keḷəge ba:rəIja . əʃṭu eṯṯərəd̪əllId̪d̪ərə ka :lu ʤa:rId̪are e :nu gəṯi ? əlləd̪e IllI hullu hulusa:gI beḷɛd̪Ide. bəhu ruʧIja:gId̪e" end̪u a:mənṯrəṇa ni:ḍIṯu.

əd̪əkke a :du "ninu nənnənnu kərejuṯṯIruvud̪u nənna u :ṭakko nInna bʰo:ʤənakko:?" enu ke:ḷIṯu.

Passage "c"

ಮೈಸೂರಿನಲ್ಲಿ ಖೆಡ್ಡಾ ಜಗತ್ ಪ್ರಸಿದ್ಧವಾಗಿದೆ. ಬಹಳ ಜನರು ಅದನ್ನು ವೀಕ್ಷಿಸಲು ಕಾಕನಕೋಟೆಯಲ್ಲಿ ಭಾರಿ ಉತ್ಸಾಹದಿಂದ ಅಣಿಯಾಗುತ್ತಾರೆ. ಛಲದ ಆನೆಗಳನ್ನು ಹಿಡಿಯುವುದೇ ಅದರ ಉದ್ದೇಶವಲ್ಲ, ಆನೆಗಳನ್ನು ತರಬೇತಾದ ಆನೆಗಳಿಂದ ಪಳಗಿಸುವುದು ಒಂದು ಮಹತ್ಕಾರ್ಯ. ಈ ಘಟನೆಯನ್ನು ವೀಕ್ಷಿಸುವವರು ಚಕಿತರಾಗುತ್ತಾರೆ. ಎದೆ ಝಲ್ ಎನ್ನುವುದರಲ್ಲಿ ಸಂದೇಹವಿಲ್ಲ. ಖೆಡ್ಡಾದ ಕೆಲಸ ಮುಗಿಯುವಂತಹುದಲ್ಲ. ಕಾಡಾನೆಗಳನ್ನು ಹಿಡಿಯುವುದು, ಪಳಗಿಸುವುದು ಸಾಮಾನ್ಯವೇನಲ್ಲ.

ಕಾರ್ಯದ ಫಲ ತದನಂತರ ತಿಳಿಯುವುದು.

maIsu:rInəlli kʰɛḍḍa: ʤəgəṯ prəsId̪d̪ʰəva :gId̪e . bəhəḷa ʤənəru əd̪ənnu vi:kʃIsəlu ka:kənəko:ṭejəlli bʰa :ri uṯsa :hadInda aṇIja:guṯṯa:re . tʃʰələd̪a a:nɛgaḷannu hIḍIjuvud̪e ad̪ara ud̪d̪e :ʃəvəlla , a:nɛgəḷənnu ṯərəbeṯa :d̪a a:negəḷInd̪a pəḷəgIsuvud̪u ond̪u məhə ṯka:rja. i: gʰəṭəɛejənnu vi:kʃIsuvəvəru tʃəkIṯəra:gu ṯ ṯa:re ɛd̪e ʤʰəl ɛnnuvud̪ərəlli sənd̪e:həvIlla.

kʰɛḍa:nɛgəḷənnu hIḍIjuvud̪u pəḷəgIsuvud̪u sa:ma:njəve;nəlla.

Ka:rjəd̪a pʰəla ṯəd̪ənənṯəra ṯIḷIjuvud̪u.

APPENDIX III

COMMON QUESTIONS

Instructions: "I will ask you some questions and you will answer in complete sentence"

1. What is your name?
2. How many of them are there in your family? And who are they?
3. What do your mother and father do?
4. What is your school name? And in which class are you studying?
5. Where is your house?
6. How do you go to school?
7. What did you have for your breakfast?
8. Which sweet do u like the most?
9. What are the games that you like to play at home?
10. What are the games that you like to play at school?

Kannada: (Phonemic Transcription (International Phonetic Alphabet) of Kannada common questions

1. nInna hɛsəre:nu?
2. nInna mənɛjalli ɛʃṭu ʤəna Id̠d̠a:re? ja:rella: Id̠d̠a:re?
3. nInna t̠ənd̠ɛ- t̠a:jI e:nu kɛləsa ma:ḍu t̠ t̠a:re?
4. nInna ʃa:lɛja hɛsarenu?ni:nu ja:va klassnəlli o:d̠ut̠t̠d̠d̠i:ja?
5. ninna məne ɛllid̠e?
6. ni:nu ʃa:lɛge he:ge ho:gut̠t̠i:ja?
7. t̠InḍI e:nu ma:dId̠e?
8. nInage ja:va sIhIt̠Inḍi Iʃṭa?
9. mənɛjəlli ja:va a:ṭəgəḷənnu a:ḍəlu Iʃṭa pəḍut̠t̠i:ja mat̠t̠u ʃa:lɛjəlli ja:va a:ṭəgəḷənnu a:ḍəlu Iʃṭa ?
10. raʤ sIkIdaga ɛ:nu ma:dtI:ja?

APPENDIX IV

NIMH Socio Economic Status Scale

SL No	Grade Occupation	Score	Descriptions/Illustrations
I.	Professional	5	Doctors, Engineers, Chartered or Cost Accountants, IT Professionals, Architects, Audiologists, Group A Jobs, Large Scale business with Turnover above INR 50 lac per annum, etc
II.	Semi-Professional	4	Technicians, Skilled Workers, Business with turnover between INR 10-20 lacs per annum, Group B Jobs, etc
III.	Technical	3	Technicians, Skilled Workers, Business with turnover between INR 5-10 lacs per annum, Group C Jobs, etc
IV	Semi-skilled	2	Assistants to Techies, Farmers, Field Workers, Group D Staff, auto or taxi drivers, small time painters, carpenters, bartenders, etc
V	Unskilled	1	Part time Jobbers, Manual Workers, House Maids, porters, etc

SL no.	Grade Highest Education	Score	Descriptions/Illustrations
I	PG & Above	5	Post Graduate Diplomas, Doctorates, Professional Qualifications, etc
II	Graduates	4	Graduates with Diploma, etc
III	Under-Graduates	3	Pre-University Courses, Intermediate, Plus Two Level Courses, etc
IV	Middle & High School	2	Passed or Failed Tenth Class, SSC, SSLC, etc
V	Illiterate	1	Unread or cannot read or write

SL no.	Annual Family Income	Score	Descriptions/Illustrations
I	Rs. 75 Lac & Above	5	Estimations are based on liquid cash earnings only of all family members calculated for a year. It distinguishes and excludes permanent assets or fixed properties
II	Rs. 25-50 Lac	4	
III	Rs. 10-20 Lac	3	
IV	Rs. 1-5 Lac	2	
V	Below Rs. 1 Lac	1	

SL no.	Property	Score	Descriptions/Illustrations
I	Above Rs 1 Crore	5	Estimates to be made based on present market value of housing land, movable and immovable property, Fixed and fluid assets, household articles, owned or Vehicles, rented housing, two or four wheeler, jewelry etc.Approximations are permitted.
II	Rs. 50-100 Lacs	4	
III	Rs. 10-50 Lacs	3	
IV	Below Rs. 10 Lacs	2	
V	No Property	1	

SL no.	Per Capita Income	Score	Descriptions/Illustrations
I	Above Rs. 75000	5	Indicates how much each individual receives in monetary terms of the yearly income of his/her family; Derived by dividing the yearly family income by the total number of members in the family; The ongoing PCI for India in 2008-09 is Rs. 38084/-
II	Rs. 50000-75000	4	
III	Rs. 30000-50000	3	
IV	Rs. 15000-30000	2	
V	Below Rs. 15000	1	

NIMH SOCIO-ECONOMIC STATUS SCALE

Variable/s	**I**	**II**	**III**	**IV**	**V**
Highest Occupation					
Highest Education					
Annual Family Income					
Property					
Per Capita Income					