IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 4, Issue 5 Ver. II (Sep. - Oct. 2015), PP 50-56
www.iosrjournals.org

Phonetic Inventory in Malayalam-English Bilingual Children

[1]Sofia V Sunny, Maslp, [2]Satish Kumaraswamy,
Asst. Professor &Ph.D SScholar
1.Speech language pathologist & Audiologist, Ephphatha speech and hearing centre, Trissur, Kerala,India
[2]Assistant Professor, PhD Scholar Dr. M. V. Shetty College of Speech and Hearing Mangalore Karnataka India

Abstract: *The present study was focused on phonetic inventory in Malayalam English bilingual children with the age range of 3-5 years. The Malayalam diagnostic articulation test was administered to 40 typically developing children. Subjects were divided into two groups with an inter age interval of 12 months (3-4 years, 4-5 years) in urban and rural areas.The results revealed that there was a significant difference ($p<0.05$) across the age groups and across regions for some phonetics. The performance varied across age groups. As age increased, the scores also increased indicating the inventory of phonetics with the age and regions due to neuromuscular maturation and stimulation (bilingual). However there was no significant difference observed across gender.This study gives the information regarding the phonetic inventory in 3-5 years old Malayalam English bilingual children.*

Key-words:*Phonetic inventory, Bilingual*

I. Introduction

Communication is animportant element in defining humans as a social being. It is mainly an active and planned two way process of exchanging messages. The exchange of information is not possible without a tool which is common to both speaker and listener. Man invented language for this intention.

Language is a learned code or system of rules (Owens, 2008). It is a rule governed by behavior, described by at least five parameters such as phonologic, morphologic, syntactic, semantic and pragmatic language learning and the uses are determined by interaction of biological, cognitive, psychological and environmental factors (American Speech Language Hearing Association, 1982).

Phonology concerns itself with systems of phonemes, abstract cognitive units of speech sound or sign which differentiate the words of a language. Phonetics is a branch of linguistics and it is the physical description of sounds and which concerns with the production, transmission and reception of the sounds of human speech. Phonetic studies have extendedits importance in recent times because of the large number of people learning to speak second languages.

A phonetic inventory describes the inventory of all speech sounds, regardless of whether or not the sounds are produced correctly relative to the language. It is a system that distinguishes four main places of articulation which includes labial, alveolar, palatal, and velar, a two-way voice contrast and three moods of articulation such as stop, fricative and approximant. A method to consider a child's phonetic inventory might be to array the phonemes on the continuum of phonological knowledge. Whatever way the clinician decides to examine a child's phonological system, a phonetic inventory is a good starting point as it can give significant insights into phonotactic rules and the child's overall knowledge of the sound system.

Speech-language pathologists can use this information to identify sounds in a client's phonological system for languages other than English, determine phonemic influences of a client's native language on English, identify sounds from the client's first language that may not exist in English or identify sounds in English that do not exist in someone's native language, recognize that even if there are similar sounds across two languages, they may not be used the similar way. Audiologists can use this information to correlate the client's audiogram and the sounds of the client's language(s), recognize and respond to amplification requirements, identify the effect of the individual's phonemic system on speech audiometry assessment and modify materials and procedures during speech audiometry assessment.

In Kerala, the individuals speak a wide array of languages. Not only these languages are spoken but are also taught in Kerala. Malayalam and English are the most widely spoken languages in this state. Since people of this place are highly educated and learned, English language is mostly used in schools and colleges for communication. English which is spoken as a second language in India has developed distinct sound patterns in terms of both segmental and prosodic characteristics. There are 35 consonants in Malayalam language besides 16 vowels. There is an alveolar nasal that extends the alphabet count to 52.

SerryandBlamey (1998) studied Phonetic Inventory Development in 9 cochlear implant children with profoundly impaired hearing and revealed the order of phone acquisition similar to those of normally hearing children, although the process of acquisition occurred at a slower rate.

Goldstein and Washington (2001) investigated phonological patterns in 12 typically developing 4 year old bilingual (Spanish-English) children. The results indicated that there were no significant differences between the two languages on percentage of consonants correct; percentage of consonants correct for voicing, place of articulation and manner of articulation; or percentage of occurrence for phonological processes. However, the children exhibited different patterns of production across the two languages and showed different patterns compared to monolingual children of either language.

Smith and Barlow (2008) examined how interaction contributes to phonological acquisition in bilingual children in order to determine what constitutes typical development of bilingual speech sound inventories and the result shows Bilinguals had phonetic inventories that were commensurate in complexity with monolinguals. Bilingual children acquire two inventories in the same amount of time that monolinguals acquire one, and with the same level of complexity. Evidence of transfer occurred from English to Spanish and vice versa.

Smithand Goldstein (2010) examined the accuracy of early-, middle-, and late-developing (EML) sounds in Spanish-English bilingual children and their monolingual peers and they concluded these exploratory findings indicate the need for longitudinal examination of EML categories with a larger cohort of children to observe similarities and differences between monolingual and bilingual development.

The acquisition of Malayalam follows the same pattern as in English but generally it was found that the most of sounds were acquired earlier in the Indian studies compared to the western context.

Wiltshire and Harnsberger (2006) investigated the differences between two groups varying in native language (Gujarati and Tamil) to evaluate to what extent Indian English (IE) accents are based on a single target phonological-phonetic system (i.e., General Indian English), and/or vary due to transfer from the native language. Consonants, vowels and intonation patterns from five Gujarati English (GE) and five Tamil English (TE) speakers of IE were transcribed and, in a subset of cases, acoustically analyzed. The results showed transfer effects in GE back vowels, TE rhotics and the proportion of rising versus falling pitch accents in GE intonation. The effect of the General Indian English model was evident in the front vowels of both GE and TE and in the presence of initial voiced stops in TE. Thus, the data reveal both phonetic and phonological influences of IE speakers' native language on their accent in IE, even in proficient speakers; these influences appear to supersede IE norms and can be found in both the segmental and suprasegmental properties of their speech.

Neethipriya (2007) investigated the aspects of phonotactics in typically developing Telugu speaking children in the age range of 3-6 years and the cluster analysis revealed that the medial clusters occurred pre dominantly with 60-70% of frequency and within medial clusters, geminated clusters occurred more commonly with a percentage of occurrence between 30 and 40%. This frequency was maintained across all age groups.

PrathimaandSreedevi (2009) concluded that the children acquired most of the sounds at a younger age and among boys all the vowels and diphthongs /ai/ were acquired by the age of 3-3.6 years, diphthongs /ou/ at 3.6-4 years and most of the consonants were acquired by 90% of the children by the age of 3.6-4 years, and by the age of 4 years /r/ was acquired by 90% children in medial position and /h/ was not acquired even by 75% of children. By 3-3.6 years of age, among girls, all the vowels, diphthongs and consonant cluster /ski/ were acquired by 90% of the children and most of the consonants were acquired by 4 years except /r/ and /h/ and the consonant cluster /ksts/ and /ble/ were acquired by 75% of the children.

SirsaandRedford(2013) explored whether the sound structure of IE differs with the divergent native languages of its speakers or whether it is similar regardless of speakers' native languages and revealed IE has a target phonology that is distinct from the phonology of native Indian languages. The subtle L1 effects on IE may reflect either the incomplete acquisition of the target phonology or the influence of sociolinguistic factors on the use and evolution of IE.

Many studies show that the children of this generation are acquiring sounds at an earlier age than their earlier counter parts. More recently it has been observed that Malayalam native speakers tend to acquire phonology faster than western population. Immediate need to test much younger children for determining the exact age of phonetic inventory and to update the previously obtained norms which in turn helps in assessment and intervention in clinical population , as well as for research purposes. Hence the present study was taken up to know the acquisition pattern of phonology in typically developing 3 to 5 years Malayalam children.

II. Aim

The aim of the present study was

- To analyze the phonetic inventory in Malayalam-English bilingual children with the age range of 3-5 years.

- To compare the inventory of sounds between the areas (rural and urban).
- To compare the inventory of sounds between age groups (3-4 years and 4-5 years).

III. Methodology

Subject

Forty typically developing childrenin the age range of 3-5 years with no history of speech and hearing problem, neurological problem and who spoke Malayalam as their native language participated in the present study. The subjects were further sub divided into two groups,3-4 years and 4-5 years.

Instrument

Micromax A250 voice recorder

Procedure

The pictures in Malayalam Articulation Test (Maya, 1990) were presented visually one after the other through the use of laptop and the children were instructed to name the photograph. Oral responses were recorded. Each child is to be tested individually in a quiet, noise free environment.

Data analysis:

The recorded samples were transcribed using broad and narrow International Phonetic Alphabet (2005).The proficiency of the native language of the parents was assessed using the Language Proficiency Questionnaire: An adaptation of LEAP-Q in the Indian context by Maitreyee and Goswami (2009).Responses were analyzed sound-by-sound on a response sheet. Any sound that occurred more than once in a speech sample was considered as occurring in the phonetic inventory of that system. Correct responses (CR) were given a score of 1 and incorrect response or the sounds which the child cannot produce were given a score of 0.

IV. Results And Discussion

The aim of the present study was to analyze the phonetic inventory in Malayalam-English bilingual children in the age range of 3-5 years. The diagnostic Malayalam articulation test (Maya,1990) was administered to 40 typically developing childrenin the age range of 3-5 years. Subjects were divided into two groups with an inter age interval of 12 months (3-4 years, 4-5 years). All responses were analyzed sound-by-sound on a response sheet. Any sound that occurred more than once in a speech sample was considered as occurring in the phonetic inventory of that system. The total score for each subject was calculated.

The data obtained was subjected to statistical analysis. T- Test was carried out to find the significant difference in phonetic inventory between the age groups (3-4 years, 4-5 years) as well as across areas (rural and urban).The results indicated that, there was a significant difference in phonetic inventory across age groups and across regions (rural and urban). However, there was no significant difference present across gender. All the vowels tested were found to be produced before the age of 3 years. Most of the consonants were mastered by 100% of the children by 4- 5 years of age. Some of the consonants were found to be produced by children in both the regions at the age of 3 years are, Plosive /k/, /g/, /t/, /d/, /ɵ/, /tha/, /p/, /b/,/-tt/, nasals /ɳ/, /ɳ/, /n/, /m/, central approximation /j/, /v/ lateral approximation /l/,/ɭ/, affricates /tʃ/, fricatives /s/,/f/,/h/, medial clusters /-ndʒ/, /-nd-/,/-nk-/, /-nt-/, /nja/, and trill /r/ sounds. Some consonants like /gʰ/,/bʰ/, /kʃa/, /kʰ/, /h/, /-kr-/, /dʰ/, /-tr-/, /ʃta/, /-kṣ-/ and /-nḍr-/ showed a slight difference across regions as well as age.

Urban area between ages

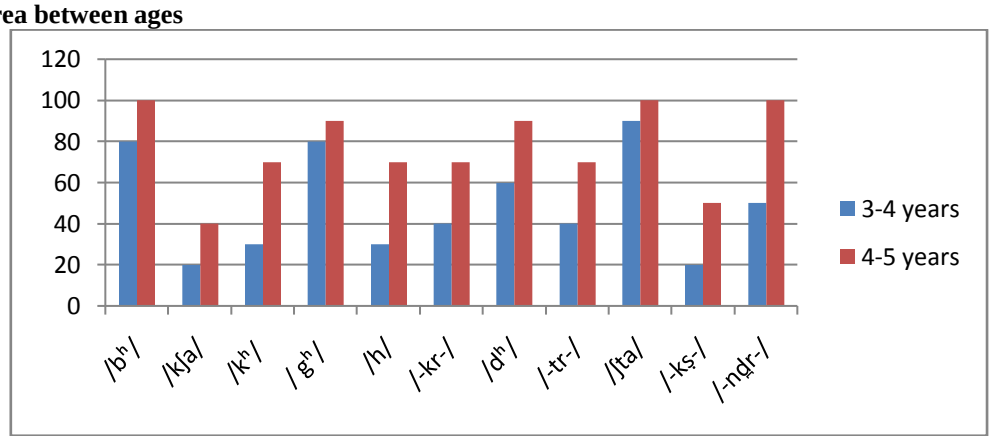

Fig 1: Showing comparison of acquisition of sound across age groups in urban population.

Area		Age	Absent		Present		Total		
			No. of subjects	%	No. of subjects	%	No. of subjects	%	p value
Urban	/bʰ/	3-4 yrs	2	20	8	80	10	100	0.068019
		4-5yrs	0	0	10	100	10	100	NS
	/kʃa/	3-4yrs	8	80	2	20	10	100	0.164557
		4-5 yrs	6	60	4	40	10	100	NS
	/kʰ/	3-4 yrs	7	70	3	30	10	100	0.036819
		4-5 yrs	3	30	7	70	10	100	Sig
	/gʰ/	3-4yrs	2	20	8	80	10	100	0.265584
		4-5 yrs	1	10	9	90	10	100	NS
	/h/	3-4 yrs	7	70	3	30	10	100	0.036819
		4-5 yrs	3	30	7	70	10	100	Sig
	/-kr-/	3-4 yrs	6	60	4	40	10	100	0.088765
		4-5 yrs	3	30	7	70	10	100	NS
	/dʰ/	3-4 yrs	4	40	6	60	10	100	0.060668
		4-5 yrs	1	10	9	90	10	100	NS
	/-tr-/	3-4 yrs	6	60	4	40	10	100	0.088765
		4-5 yrs	3	30	7	70	10	100	
	/ʃta/	3-4 yrs	1	10	9	90	10	100	0.152451
		4-5 yrs	0	0	10	100	10	100	NS
	/-kṣ-/	3-4 yrs	8	80	2	20	10	100	0.079799
		4-5 yrs	5	50	5	50	10	100	NS
	/-nḍr-/	3-4 yrs	5	50	5	50	10	100	0.004912
		4-5 yrs	0	0	10	100	10	100	HS

Table 1: Showing comparison of acquisition of sound across age groups in urbanpopulation.

From Figure 1 and Table 1, it is clearly showing that there was a significant difference across the age groups in urban area. The scores were increased as age increased. When compared with the age, there was a significant difference seen for /kʰ/, /h/and highly significant difference was observed for /-nḍr-/ sound and also there was no significant difference in terms of sounds like / gʰ/,/bʰ/, /kʃa/, /-kr-/, /dʰ/, /-tr-/,/ʃta/ and /-kṣ-/

Rural area between ages

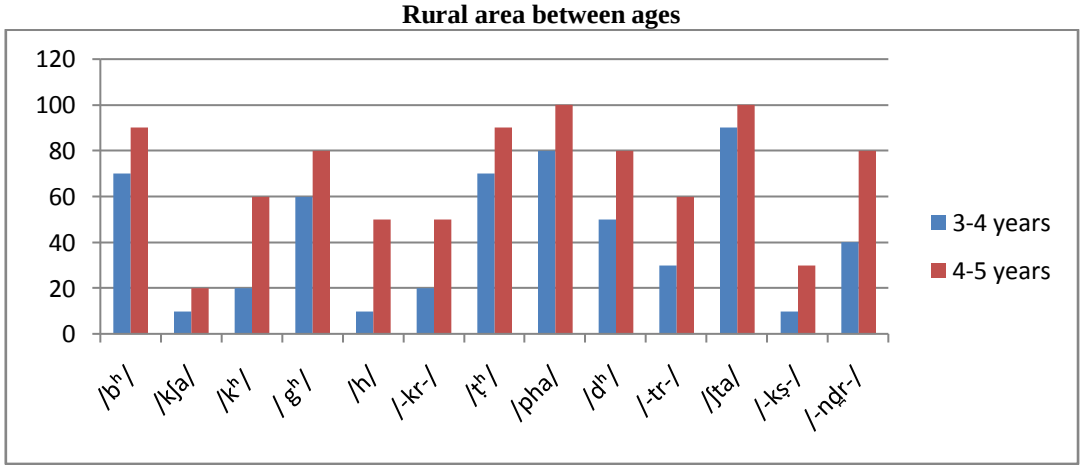

Fig 2:Showingcomparison of acquisition of sound across age groups in rural population

Area		Age	Absent		Present		Total		
			No. of subjects	%	No. of subjects	%	No. of subjects	%	p value
Rural	/bʰ/	3-4 yrs	3	30	7	70	10	100	0.131776
		4-5 yrs	1	10	9	90	10	100	NS
	/kʃa/	3-4 yrs	9	90	1	10	10	100	0.265584
		4-5 yrs	8	80	2	20	10	100	NS
	/kʰ/	3-4 yrs	8	80	2	20	10	100	0.033945
		4-5 yrs	4	40	6	60	10	100	Sig
	/gʰ/	3-4 yrs	4	40	6	60	10	100	0.164557
		4-5 yrs	2	20	8	80	10	100	NS
	/h/	3-4 yrs	9	90	1	10	10	100	0.025481
		4-5 yrs	5	50	5	50	10	100	Sig
	/-kr-/	3-4 yrs	8	80	2	20	10	100	0.079799
		4-5 yrs	5	50	5	50	10	100	NS
	/ʈʰ/	3-4 yrs	3	30	7	70	10	100	0.131776
		4-5 yrs	1	10	9	90	10	100	NS
	/pha/	3-4 yrs	2	20	8	80	10	100	0.068019
		4-5 yrs	0	0	10	100	10	100	NS

	/dʰ/	3-4 yrs	5	50	5	50	1	0	100	0.079799
		4-5 yrs	2	20	8	80	1	0	100	NS
	/-tr-/	3-4 yrs	7	70	3	30	1	0	100	0.088765
		4-5 yrs	4	40	6	60	1	0	100	NS
	/ʃta/	3-4 yrs	2	10	9	90	1	0	100	0.152451
		4-5 yrs	2	0	10	100	1	0	100	NS
	/-kṣ-/	3-4 yrs	2	90	1	10	1	0	100	0.131776
		4-5 yrs	2	70	3	30	1	0	100	NS
	/-ndr-/	3-4 yrs	2	60	4	40	1	0	100	0.033945
		4-5 yrs	2	20	8	80	1	0	100	Sig

Table 2:Showing comparison of acquisition of sound across age groups in rural population

From Figure 2 and Table 2, it is clearly showing that the following speech sounds /kʰ/, /h/and /-ndr-/ have significant difference across the age groups and there was no significant difference in terms of sounds like /gʰ/,/bʰ/, /kʃa/, /-kr-/, /dʰ/, /ṭʰ/, /-tr-/,/ʃta/, /pha/, and /-kṣ-/ sounds.

Comparing rural and urban between ages

Age		Area	Absent		Present		Total		
			No. of subjects	%	No. of subjects	%	No. of subjects	%	p value
3-4 yrs	/bʰ/	Urban	2	20	8	80	10	100	0.302788
		Rural	3	30	7	70	10	100	NS
	/kʃa/	Urban	8	80	2	20	10	100	0.265584
		Rural	9	90	1	10	10	100	NS
	/kʰ/	Urban	7	70	3	30	10	100	0.302788
		Rural	8	80	2	20	10	100	NS
	/gʰ/	Urban	2	20	8	80	10	100	0.164557
		Rural	4	40	6	60	10	100	NS
	/h/	Urban	7	70	3	30	10	100	0.131776
		Rural	9	90	1	10	10	100	NS
	/-kr-/	Urban	6	60	4	40	10	100	0.164557
		Rural	8	80	2	20	10	100	NS
	/ṭʰ/	Urban	0	0	10	100	10	100	0.030145
		Rural	3	30	7	70	10	100	Sig
	/pha/	Urban	0	0	10	100	10	100	0.068019
		Rural	2	20	8	80	10	100	NS
	/dʰ/	Urban	4	40	6	60	10	100	0.326548
		Rural	5	50	5	50	10	100	NS
	/-tr-/	Urban	6	60	4	40	10	100	0.319604
		Rural	7	70	3	30	10	100	NS
	/ʃta/	Urban	1	10	9	90	10	100	0.5
		Rural	1	10	9	90	10	100	NS
	/-kṣ-/	Urban	8	80	2	20	10	100	0.265584
		Rural	9	90	1	10	10	100	NS
	/-ndr-/	Urban	5	50	5	50	10	100	0.326548
		Rural	6	60	4	40	10	100	NS

Table 3: Showing comparison of acquisition of sound across regions in3-4 years of age.

From Table3, it is clearly showing that there was a significant difference across the regions. Comparison across two regions revealed difference in terms of the correct response which is higher in urban children relative to rural children.The urban children produced higher number of correct responses when compared to rural children. Among 3-4 years age range, when compared with the regions, there was a significant difference seen for /ṭʰ/ sound and also there was no significant difference in terms of sounds like/gʰ/,/bʰ/, /kʃa/, /-kr-/, /dʰ/, /-tr-/,/ʃta/, /pha/, /-kṣ-/, /kʰ/, /h/and/-ndr-/.

4-5 yrs	/bʰ/	Urban	0	0	10	100	10	100	10	0.152451
		Rural	1	10	9	90	10	100	10	NS
	/kʃa/	Urban	6	60	4	40	10	100	10	0.164557
		Rural	8	80	2	20	10	100	10	NS
	/kʰ/	Urban	3	30	7	70	10	100	10	0.319604
		Rural	4	40	6	60	10	100	10	NS
	/gʰ/	Urban	1	10	9	90	10	100	10	0.265584
		Rural	2	20	8	80	10	100	10	NS
	/h/	Urban	3	30	7	70	10	100	10	0.180655
		Rural	5	50	5	50	10	100	10	NS
	/-kr-/	Urban	3	30	7	70	10	100	10	0.180655
		Rural	5	50	5	50	10	100	10	NS
	/ṭʰ/	Urban	0	0	10	100	10	100	10	0.152451

		Rural	1	1	0	9	9	0	1	0	1 0 0	N S
	/dʰ/	Urban	1	1	0	9	9	0	1	0	1 0 0	0.265584
		Rural	2	2	0	8	8	0	1	0	1 0 0	N S
	/sta-/	Urban	0	0		1	0	1 0 0	1	0	1 0 0	0.068019
		Rural	2	2	0	8	8	0	1	0	1 0 0	N S
	/-tr-/	Urban	3	3	0	7	7	0	1	0	1 0 0	0.319604
		Rural	4	4	0	6	6	0	1	0	1 0 0	N S
	/-pr-/	Urban	0	0		1	0	1 0 0	1	0	1 0 0	0.068019
		Rural	2	2	0	8	8	0	1	0	1 0 0	N S
	/-kṣ-/	Urban	5	5	0	5	5	0	1	0	1 0 0	0.180655
		Rural	7	7	0	3	3	0	1	0	1 0 0	N S
	/-nḏr-/	Urban	0	0		1	0	1 0 0	1	0	1 0 0	0.068019
		Rural	2	2	0	8	8	0	1	0	1 0 0	N S

Table 4: Showing comparison of acquisition of sound across regions in 4-5 years of age

Among 4-5 years age range, there was no significant difference for any of the sound such as /ʈʰ/,/ gʰ/,/bʰ/, /kʃa/, /-kr-/, /dʰ/, /-tr-/,/ʃta/, /pha/, /-kṣ-/, /kʰ/, /h/and/-nḏr-/.The results indicated that all the vowels and some of the consonants were acquired before the age of 3. The exceptional consonants were /bʰ/, /kʃa/, /l̲/, /kʰ/,/ gʰ/,/h/,/-kr-/, /ʈʰ/, /pha/, /dʰ/,/sʈ̲-/, /-sk-/, /-tr-/,/-pr-/, /ʃta/, /-kṣ-/ and /-nḏr-/ for both rural and urban areas which are acquired by 90% of children in the age range of 4-5 years in urban area. When comparing the present study with the western studies it was observed that all the sounds were produced by the childrenmuch earlier.

V. Discussion

From the above results it is clear that the acquisition ofall the vowels and some of the consonants were acquired before the age of 3. Most of the consonants were mastered by 100% of the children by 4- 5 years of age. Some of the consonants were found to be produced by children in both the regions at the age of 3 years are, Plosive /k/, /g/, /t/, /d/, /ɵ/, /tha/, /p/, /b/,/-tt/, nasals /ɳ/, /n̪/, /n/, /m/, central approximation /j/, /v/ lateral approximation /l/,/l̪/, affricates /ʧ/, fricatives /s/,/f/,/h/, medial clusters /-ndʒ/, /-nd-/, /-nk-/, /-nt-/, /nja/, and trill /r/ sounds.The exceptional consonants were /bʰ/, /kʃa/, /l̲/, /kʰ/,/gʰ/,/h/,/-kr-/, /ʈʰ/, /pha/, /dʰ/,/sʈ̲-/, /-sk-/, /-tr-/,/-pr-/, /ʃta/, /-kṣ-/ and /-nḏr-/ for both rural and urban areas. This finding is supported in previous study byPrathima (2009) and Divya (2010).

Most of the consonants were acquired by 90% of the children at the age of 3.6-4 years, and at the age of 4 years /r/ was acquired by 90% of children. By 3-3.6 years of age, all the vowels, diphthongs and consonant cluster were acquired by 90% of the children and most of the consonants were acquired by 4 years except /h/ and/ gʰ/. This finding is supported in previous study byPrathima (2009). Theconsonants such as /bʰ/, /kʃa/,/-kr-/, /dʰ/,/-tr-/,/ʃta/, /pha/, /-kṣ-/, /kʰ/ and /-nḏr-/ were acquired by 90% of the children within the age range of 4-5 years.

Compare to rural and urban area children, the phonetic inventory of urban was good.The children in the present study seemed to produce most of the sounds at a younger age compared to the earlier reports in several languages. When comparing the present study with the western studies (Fudala and Reynolds, 1986), it was observed that all the sounds were produced by the children much earlier.This finding is an agreement with previous studies in Banik(1988).

VI. Summary And Conclusion

The aim of the study was to determine the phonetic inventory in Malayalam English bilingual children with the age range of 3-5 years.The Malayalam diagnostic articulation test was administered to 40 typically developing children. Subjects were divided into two groups with an inter age interval of 12 months (3-4 years, 4-5 years) in urban and rural areas. The test comprises of 10 vowels, 38 consonants and 8 consonant clusters. All sounds were tested on the basis of whether they can produce it in initial, medial or final position, which means checking whether the child can able to produce it correctly or not.

The subjects were encouraged to name / repeat the colored photographs. Responses were analyzed sound-by-sound on a response sheet. Any sound that occurred more than once in a speech sample was considered as occurring in the phonetic inventory of that system. Correct responses (CR) were given a score of 1 and incorrect response or the sounds which the child cannot produce were given a score of 0.

The data for each age group was statistically analyzed. T- test was carried out to obtain the significant difference in phonetic inventory between the age groups (3-4 years, 4-5 years) as well as across areas (rural and urban). The results revealed that there was a significant difference ($p<0.05$) across the age groups and across regions for some phonetics. The performance varied across age groups. As age increased, the scores also increased indicating inventory of phonetics with age and regions due to neuromuscular maturation and stimulation (bilingual). However there was no significant difference observed across gender.

All the vowels tested were found that the production of vowels were acquired at/or before the age of3 years. Some of the consonants were found to be produced by children in both the regions at the age of 3 years are,Plosive /k/, /g/,/t/, /d/, /ɵ/, /tha/, /p/,/b/,/-tt/,nasals /ɳ/, /ɲ/, /n/,/m/,affricates /ʧ/, medial clusters /-ndʒ/, /-nd-/, /-nk-/, /-nt-/, /nja/, central approximation /j/, /v/ lateral approximation /l/,/l̩/, fricatives /s/,/f/,/h/, trill /r/ sounds. The child was able to produce the sounds correctly as age increases. Compare to rural and urban area children, the phonetic inventory of urban was good.The children in the present study seemed to produce most of the sounds at a younger age compared to the earlier reports in several languages. It maybecause of difference in life style and greater exposure to speech and language environment.

Implications of the study:

This study gives the information regarding the phonetic inventory in bilingual children (3-5 years).

Limitations of the study:

The present study was done only in small group of individuals.

Further directions:

- This study can be extended using more number of individuals.
- This study can be conducted in children with language disorders.
- This study can be used to compare with different Indian language.
- More clusters can be included and tested in children.

References

[1]. American Speech - Language-Hearing Association.(1982).Language [Relevant Paper].Available from www.asha.org/policy.

[2]. Banik,A.(1988).Articulation testin Bengali.Unpublishedmaster's dissertation submitted in part–fulfillment for the master's degree in speech and hearing.University of Mysore.

[3]. Divya,P.(2010).Articulatory acquisition in typically developing Malayalam speaking children: 2-3 years. Unpublished master's dissertation submitted in part–fulfillment for the master's degree in speech and hearing.University of Mysore.

[4]. Fudala&Reynolds (1986). Cited in Hegde, M. N. (2000).Assessment and treatment of articulation and phonological disorders in children. United States of America. Pro-ED Inc.

[5]. Goldstein,B.,& Washington,S.P.(2001).An Initial Investigation of Phonological Patterns in Typically Developing 4-Year-Old Spanish-English Bilingual Children.Language, Speech, and Hearing Services in Schools, 32, 153-164. doi:10.1044/0161-1461(2001/014).

[6]. Maitreyee, R. &Goswami, S. P. (2009). Language Proficiency Questionnaire: An adaptation of LEAP-Q in Indian context.

[7]. Maya,S.(1990). An articulation test battery in Malayalam. Unpublished master's dissertation submitted in part –fulfillment for the master's degree in speech and hearing. University of

[8]. Neethipriya.(2007). Aspects of phonotactics in typically developing Telugu speaking children (3-6 years). Unpublished master's dissertation submitted in part –fulfillment for the master's degree in speech and hearing. University of Mysore.

[9]. Owens, R. E. (2008). Language development; an introduction,7th Ed. New York. Pearson education, Inc.

[10]. Prathima, S., &Sreedevi, N. (2009).Articulatory acquisition in typically developing native Kannada speaking children. Unpublished master's dissertation submitted in part–fulfillment for the master's degree in speech and hearing.University of Mysore.

[11]. Serry, A.T., & Blamey, J. P. (1998).A 4-Year Investigation into Phonetic Inventory Development in Young Cochlear Implant Users.Journal of Speech, Language, and Hearing Research, 42, 141-154. doi:10.1044/jslhr.4201.141.

[12]. Sirsa, H., & Redford, A. M. (2013).The effects of native language on Indian English sounds and timing patterns.Journal of Phonetics, 41(6), 393–406.Retrieved from http://www.sciencedirect.com/science/article/pii/ S0095447013000399.

[13]. Smith, F. L., & Barlow, A. J. (2010). Interaction in bilingual phonological acquisition: evidence from phonetic inventories. International Journal of Bilingual Education and Bilingualism, 13(1), 81-97. Retrieved from http://www.tandfonline.com/doi/full/101080/136700509027835 28#.U 5U0CfmSznE

[14]. Smith, F. L., & Goldstein, A. B. (2010). Early-, Middle-, and Late-Developing Sounds in Monolingual and Bilingual Childrens: An Exploratory Investigation. American Journal of Speech-Language Pathology, 19, 66-77. doi:10.1044/10580360 (2009/08-0036).

[15]. Wiltshire, R. C., &Harnsberger, D. J. (2006).The influence of Gujarati and Tamil L1s on Indian English:a preliminary study. World English's, 25(1), 91–104.doi/10.1111/j.0083-2919.2006.00448.x/abstract.