Typical phonemic and phonological development of three year old Sri Lankan Tamil – speaking children in the Colombo District

Shakeela Saleem Shyamani Hettiarachchi

Abstract

Language specific norms for phonological development are essential in order to differentiate between delay or deviance in phonology.

Objective of the study is to establish reliable norms on phonological acquisition of three year old Sri Lankan Tamil speaking children in Colombo district.

A speech sample of 80 children, aged between 3;0 – 3;11 years, assessed using an informal picture based assessment tool based on the *Diagnostic Evaluation of Articulation and Phonology (DEAP)* (Dodd et al, 2002).

It was found that 75% of speech sounds are acquired by the age of 4;0 by Sri Lankan Tamil speaking children. Children's phonological skills develop with age. Most of the phonemes except fricatives were acquired earlier in Sri Lankan Tamil speaking children compared to English

norms. The findings indicate a statistically significant influence of age but not on gender or socio- dialectical variation.

The findings can be used as tentative norms in clinical practice for Sri Lankan Tamil speaking children.

Keywords: Phoneme; Phonology; Age; Gender; Socio dialectical variation

Introduction

Approximately 6% of the pre-school/school population is referred to speech and language therapy (Enderby&Phillipp 1986 as cited in Dodd et al. 2003).

In Sri Lanka, speech and language therapists currently use standardized English language norms in clinical practice for diagnosis and when planning intervention for speech disorders.

Cross-linguistic studies have shown that languages have universal and specific features. Language specific normative data is critical to speech and language therapists, as it facilitates the differentiation between true speech- language pathology and speech- language difference. Without

these norms, misdiagnoses and unnecessary or inappropriate treatment is likely (Naidoo, 2003).

The need to obtain language specific normative data of speech development for the children in Sri Lanka is essential for assessment and differential diagnoses.

Objectives

To provide reliable developmental norms for Sri Lankan Tamil speaking 3; 0-3; 11 year old children in the Colombo district. The main objective was achieved by means of two sub aims.

- To determine which speech sounds were present in the speech of Sri Lankan Tamil speaking children in the two age groups(3;0 – 3;5 years and 3;6 – 3;11 years)
- To determine what the phonological error patterns were identified in Sri Lankan Tamil speaking children in the two age groups(3;0 – 3;5 years and 3;6 – 3;11 years)

Secondly, to compare the speech sounds and phonological error patterns across age groups, gender and social dialectal variation (Sri Lankan Tamil and Sri Lankan Muslim Tamil) of Sri Lankan Tamil

Literature review

Early studies of speech sound acquisition included research by Wellman et al. (1931) and Poole(1934) and some more recent studies have been by Templin (1957) , Sander (1972), Prather, Hedrick, & Kern (1975), Smit et al. (1990) and Dodd et al.(2003).

Some cross linguistic studies have reported on the cross linguistic differences (language-specific features) in the phonetic and phonological acquisition of languages compared to Standard English norms.

Putonghua study (Hua Z. & Dodd B. 2000), they found initial consonant deletion and backing which are considered to be atypical error patterns in English. Cantonese study
(So. L. K. H. & Dodd, B. 1995), Affrication of /s/was much more common.
This is unusual in English-speaking children (they acquire affricates later than fricatives). Arabic study (Smit.A, 2003), /f/ /t/ /l/- earlier sounds and /h/ /dʒ/ /j/ /ð/ - developed later than English. Turkish study, fricatives are acquired later and affricates are acquired earlier, vice versa in English .

Some norms have been developed on South Indian Tamil. Barathy (2001) has done a study on 3-4 year old children's phonological development and Nadiya (2005) has developed normative data for 2.6 – 5 year old Tamil-speaking children. In a bilingual study done by Venkatash, Ramsankar, Nagaraja, and Srinivasan, (2010) they found 14 phonological processes in Tamil speaking children. However, the Sri Lankan dialect of Tamil differs sharply from the Indian dialect of Tamil, especially at the phonological level (Suseendirarajah, 1999). So, it is clear that using Indian norms will not be appropriate in the Sri Lankan clinical setting.

Methodology

Study design: Descriptive Cross- Sectional study

Study participants: 80 children of 3;0-3;5 and 3;6-3;11 year old, first language speakers of Sri Lankan Tamil in Colombo district.

Sampling method: purposive sampling.

No exclusion criteria was used .

Data collection method: Questionnaire and Informal picture-based assessment of Sri Lankan Tamil based on *Diagnostic Evaluation of Articulation and Phonology* (DEAP).

Ethical considerations – Approval from the Ethical Research Committee, Faculty of Medicine, University of Kelaniya, Ragama .

Data collection process - Participants were tested individually at their nursery.

Data recording - Data was audio recorded and simultaneous phonetically transcribed on a record sheet using the International Phonetic Alphabet (IPA, 2005) .

Data reliability - 10% of recorded data was re transcribed by a colleague. There is no discrepancy between the transcription done by the researcher and colleague.

A pilot study of the assessment tool - A pilot study was carried out with 10% of the target participants, to measure the duration of the assessment procedure and to see the applicability of using the selected pictures.

Data analysis

Qualitative and quantitative measures were used for phoneme acquisition and phonological accuracy.

Phonemic inventory

Phoneme emergence – when 90% of the children in an age group produced the sound at least once either spontaneously or in imitation (Hua& Dodd. 2000).

Phonological error patterns- to be categorized as age appropriate, more than 10% of children in an age group had to exhibit the error patterns at least five times. (Dodd et al 2003).

Phonological accuracy

To determine the effect of age, gender and social dialectical variation of phonemic accuracy, three Quantitative measures (Dodd et al. 2003) were used.

- Percent consonants correct (PCC)
- Percent vowels correct (PVC)
- Percent phonemes correct (PPC)

Inferential statistics and independent samples t tests were undertaken using SPSS version 16.0 to examine the effect of age, gender and social dialectal variation on speech development.

Results

The phonemic acquisition

Older children acquired 75% and younger children acquired 61% of total phonemes in Sri Lankan Tamil.

Table 1 *Emergence of phonemes for each age band*

		Younger children 3;0 - 3;5 years	Older children 3;6 - 3;11 years
Emerged	Plosive	p, b, t, d, k, g, ʈ, ɖ, c, ɟ	p, b, t, d, k, g, ʈ, ɖ, c, ɟ
	Nasal	m, n, , ŋ	m, n, ŋ
	Fricative		s, f
	Approximant	j, v	j, v
	Trill	R	r,
	Lateral	L	L
Not emerged	Nasal	ɳ , ɲ	ɳ , ɲ
	Fricative	s, f, h, ʃ	h, ʃ
	Lateral	l	l
	Trill	r, ɾ	ɾ

The phonological error patterns

Three error patterns were found in the younger age group and none in the older age group according to the criteria given below.

Table 2 The phonological error patterns identified in more than 10% of the older and younger groups of children based on five occurrences

	Younger children (3;0 – 3;5)	Older children (3;6 – 3;11)
Typical processes	Fronting Stopping Lateralization	none were found

Error patterns which had less than 05 occurrences also observed.

- Devoicing
- Assimilation
- Backing
- Cluster reduction (CR)
- Initial consonant deletion (ICD)
- Weak syllable deletion (WSD)

Unclassifiable error patterns (UCEP) were exhibited.

/h/→/g/ (UCEP 1) /h/→/k/ (UCEP 2)
/h/→/v/ (UCEP 3) /j/→/ɟ/ (UCEP 4)
/c/→/s/ (UCEP 5) /l/→/j/ (UCEP 6)
/j/→/l/ (UCEP 7) /l/→/r/ (UCEP 8)

/r/→/d/ (UCEP 9)

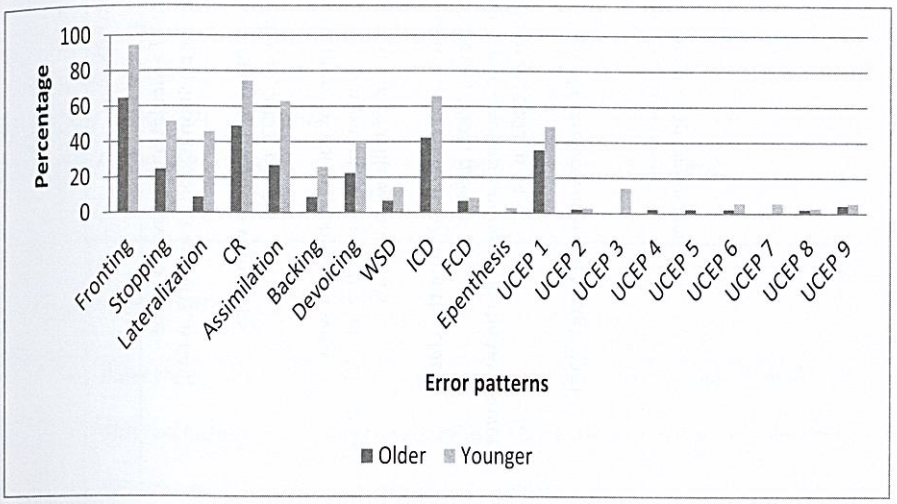

Figure 1: The identified percentage of phonological error patterns in the older and younger group of children for 1-5 occurrences.

Table 3 Descriptions and examples for error patterns

Phonological process	Description	Examples		
		Target words	Adult realization[2]	Participants' realization[1]
Fronting	Place of articulation is move to more anterior position (Dodd et al, 2003, p.643)	Chocolate	/cokleʈ/	[sokleʈ]
		Insect	/pu:cci/	[pu:tti]
		Jam	/ɟe:m/	[de:m]
Stopping	Replacement of fricatives with stops (Dodd et al, 2003, p. 643)	Bus	/bɑs/	[bɑt]
		Lion	/siŋgəm/	[tiŋəm]
		Cock	/se:vel/	[te:vel]
Devoicing	Replacement of voiced consonant with voiceless consonant (Venkatesh et al, 2010, p.129)	Bed	/beɖ/	[beʈ]
		Swing	/unɟil/	[uncil]
Lateralization	Replacement of trills with laterals	Tree	/mɑrəm/	[mɑləm]
		Roti	/roʈʈi/	[loʈʈi]
Cluster reduction	Deletion of one consonant from the cluster (Dodd et al, 2003, p.642)	Brush	/breʃ/	[be:s]
		Rambutan	/ɾɑmbuʈɑ:n/	[ɾɑbuʈɑ:n]
Assimilation	Influence of another phoneme in the target word (Dodd et al, 2003, p.643)	Tortoise	/ɑ:mə/	[mɑ:mə]
		Torch	/ʈo:c/	[co:c]
		Elephant	/jɑ:nə/	[nɑ:nə]
Epenthesis	Insertion of extra vowel in the target word	Fridge	/friɟ/	[firic]
		Brush	/breʃ/	[bire:s]
		Chocolate	/cokleʈ/	[sokuleʈ]

[1] the examples given are chosen wholly from the sample.
[2] the accurate pronunciation of adults speaking Sri Lankan Tamil.

Continued.....

Un classifiable error patterns	Target word	Adult realization	Participant realization
/h/→/g/ (UCEP 1)	Smoke	/puhə/	/pugə/
/h/→/k/ (UCEP 2)	House	/haus/	/kaus/
/h/→/v/ (UCEP 3)	Crow	/ka:hem/	/ka:vem/
/j/→/ɟ/ (UCEP 4)	Elephant	/ja:nə/	/ɟa:nə/
/c/→/s/ (UCEP 5)	Insect	/pu:cci/	/pu:ssi/
/l/→/j/ (UCEP 6)	Lizard	/palli/	/pajji/
/j/→/l/ (UCEP 7)	Elephant	/ja:nə/	/la:nə/
/l/→/r/ (UCEP 8)	Rat	/eli/	/eri/
/r/→/d/ (UCEP 9)	Tree	/marem/	/madem/

Phonological accuracy

- Older children had higher PCC ($p<0.05$) and PPC ($p<0.05$) than younger children.
- Girls had higher mean scores on each measure but these were not statistically significant.
- No statistical significant on social dialectal variation.

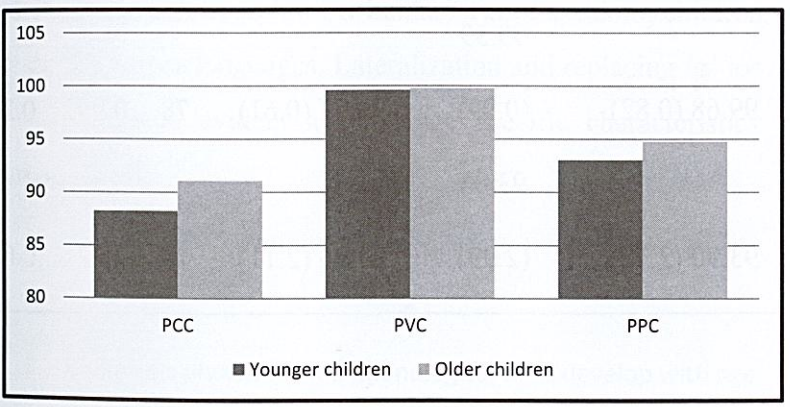

Figure 2: The mean comparison of both age group in phonological accuracy measures

Table 4 Mean correct percentage (SD) and the results of the independent samples t-tests by age group on phonological accuracy measures

	Whole Group (n=80)	3;0-3;5 (n=40)	3;6-3;11 (n=40)	df	t value	Sig.
PCC	89.66 (4.45)	88.23 (4.95)	91.08 (3.38)	78	-3.007	0.00
PVC	99.68 (0.82)	99.59 (0.99)	99.77 (0.61)	78	-0.992	0.32
PPC	93.90 (2.72)	93.04 (2.99)	94.76 (2.11)	78	-2.971	0.00

Discussion

In phonemic acquisition and phonological accuracy overall, older children performed better than the younger children showing evidence of, developmental progression across the age groups. In the phoneme acquisition/ ɳ/, / ʈ /, / ɭ/, /h/, / ʃ/ and /ɲ/ consonants were not acquired by both age groups. Among language- specific findings for Sri Lankan Tamil were the late acquisition of / ʃ /, /h/ and in early mastery of /c/, /ɟ/, /r/ compared to English norms. The functional load and frequency of phonemes used in a language directly links to phoneme acquisition. The phonological error patterns used by the children revealed both universal tendencies and language specific constraints on acquisition. Fronting and stopping were found in Sri Lankan Tamil speaking children, which are similar across languages. Lateralization and replacing /g/ for /h/ and /k/ for /h/ were evident as language specific characteristics in Sri Lankan Tamil.

Conclusion

- Children's phonemic and phonological skills develop with age.
- Comparison with English norms revealed similarities and differences in the age of phonemic acquisition.

- Language specific error patterns (e.g. Lateralization) were identified in Sri Lankan Tamil.
- Social dialectal variations do not have a statistically significant impact on phonemic and phonological development.

Implication for the service delivery

The present study investigation contributes to the small body of information available about the development of phonemic and phonological abilities of the Sri Lankan Tamil speaking children. Results of the study have significant implications for the assessment of developmental speech disorders and identification or differential diagnosis of phonological delay, phonological disorder and articulation disorder. Norms for specific language such as Sri Lankan Tamil are imperative. Using these findings, tailor made therapy approaches can be used to support each problem in articulation and phonology. Findings of this study also can be applied to general management, intervention and outcome measures of therapy.

Limitations and Recommendations

- Use of standardized assessment tool
- Large sample size

- A wider age range of children
- Study design- Long term descriptive study in order to trace sequential developmental pattern.

References

1. Amayreh, M. & Dyson, A. (1998). The acquisition of Arabic consonants. *Journal of speech, language and hearing research*. 41. p. 642-653.
2. Dodd, B. et al (2002). DEAP: Diagnostic evaluation of articulation and phonology. London: Psychological Corporation.
3. Dodd B., Holm A., Hua Z. & Crosbies S., (2003), Phonological development: a normative study of British English-speaking children. *Clinical linguistics and phonetics*. 17(8) p. 617-643.
4. Hua Z. & Dodd B. (2000), The phonological acquisition of Putonghua (Modern Standard Chinese), *Journal of child language.* 27 p. 3-42.
5. Naidoo, y. (2003). *A developmental profile of speech sound and syllable acquisition in Zulu speaking children.* A thesis submitted in partial fulfilment of the requirements of University of Pretoria for the degree of Master of Communication. Pretoria: University of Pretoria.

6. So. L. K. H. & Dodd, B. (1995). The acquisition of phonology by Cantonese-speaking children. *Journal of childlLanguage.* 22 p. 473-95.

7. Suseendirarajah, S. (1999). Phonology of Sri Lankan Tamil and Indian Tamil Contrasted. In K. Balasubramanian, K. Ratnamalar and R. Subathini (eds.) *Studies in Sri Lankan Tamil linguistics and culture.* Jaffna: University of Jaffna.

8. Zvelebil, K. V. (1966) in Rajaratnam, K. (2008) A brief contrastive analysis of Sinhala and Sri Lankan Jaffna Tamil phonology. Unpublished MSc. thesis. University of Kelaniya, Kelaniya, Sri Lanka.