

Phonological Development Profile in Typically Developing Hindi Speaking Children

Ravali Pyata, MASLP., Ph.D. Scholar
Dr. Arun Banik, Ph.D.

=====

Abstract

The present cross sectional study aimed to delineate the phonological development across 2 ½ to 6 ½ years of typically developing Hindi speaking children. A total of 80 children from Mumbai who were further sub divided into 4 groups i.e. 2 ½ - 3 ½ years, 3 ½ -4 ½ years, 4 ½ -5 ½ years and 5 ½ - 6 ½ years with each group constituting 10 females and 10 males participated in the study. The inclusion criteria for the children was native Hindi speaking with normal oral peripheral mechanism, attending Hindi medium school and with no associated problems. The Photo articulation test in Hindi was administered on all the children. A total of 16 vowels, 30 consonants and 11 blends were assessed. The children responses were recorded using Sony digital audio recorder and further transcribed in broad IPA by the researcher. A phoneme acquisition criterion of 80% and above was selected for all the phonemes to be considered as acquired. The data was subjected to descriptive statistical analysis to identify mean and standard deviation values and further the mean scores were converted into percentages. The results indicated a clear correlation between the features of the phonemes and their age of acquisition. This age wise wide range of data will add to the present normative information in Hindi speaking population and can be used to differentiate between phonological disorders and normal acquisition.

Keywords: Phonology, Hindi, Acquisition, Normative

Introduction

Phonology refers to the branch of linguistics that deals with sound systems and sound patterns (Edwards, 1997). It involves the study of classification and organization of speech sounds in a language (Vihman, 1996).

The child's language development is commonly divided into pre-linguistic behavior, i.e., vocalizations prior to first true words and linguistic development, which starts with the appearance of the first words. As the child's vocabulary increases, there is also increase in phonological system. Children learn the entire range of phonemes of their language gradually from simpler to more complex sounds. The acquisition of various speech sounds is closely related to the child's overall language development (Bauman & Waengler, 2004). It has been observed in available literature till date, that all the phonemes of a language are acquired by 6-7 years of age and it is largely dependent on individual language characteristics in typically developing children.

The beginning of phonological development is often associated with child's first meaningful words. As per Dodd et al (2003) phonological development refers to speech development and is concerned with how humans develop from having no speech to a stage of being able to use speech in its full adult form. It is a well-known fact that all the sounds are not acquired together but there is rather an order in which they are acquired. Over the years many investigators among them speech language pathologists are one who has tried to determine approximate ages of individual sounds mastery in specific groups of children.

The acquisition of speech sounds in children has been studied extensively since 1930's to gain norms and to gain a better understanding regarding the age and the development of the sounds with respect to various languages.

Amayreh and Dyson (1998) conducted a study on Jordanian children from Amman. The primary goal of the study was to obtain the order of acquisition of sounds in Arabic. Around 12 consonants were reported not to be acquired by the oldest age group

i.e. 6-6.4 and all of these late consonants had dialectal forms that are commonly used in Jordanian Spoken Arabic. The author concluded that Standard Arabic consonants would be eventually acquired by approximately 8.6-9.0 years of age.

Banu (1977) evaluated articulatory acquisition in Kannada speaking children by using the Diagnostic Kannada Articulation test. The sample size of the study was 180 children in the age range of 3 to 6.6 years. The study results indicated that there was a significant difference in the articulation scores for different age groups and there was no significant difference between girls and boys for articulation scores in any of the age groups considered. Another study conducted by Banik (2003) in 240 Oriya speaking typical developing and hearing impaired children indicated that normal hearing children manifested a higher level of articulation development by the age of 2 to 3 yrs. The hearing impaired children however exhibited increase in articulation around the age of 6 to 8yrs. The results also indicated superior articulation development in female children compared to male counterparts. The author also suggested for in depth evaluation of articulation development in normal hearing children below the age of 3 yrs.

According to Census 2001 Hindi is found to be the most commonly spoken language in India, i.e. 41.03% as compared to other languages. The Constitution of India has effectively instituted the usage of Hindi and English as the two languages of communication for the Union Government. Most government documentation is prepared in 3 languages, i.e. English, Hindi and the primary official language of the local state, if it is not Hindi or English.

Within the area of Speech Language Pathology the topics that have drawn the interest of Indian researchers over the past few decades include the acquisition of languages in children and the disorders of language in children and in adults (Karanth, 2003). So far studies done on phonological development in Hindi speaking children have been limited in various aspects such as the number of subjects, age ranges, number of phonemes studied and number of male and female participants etc.

Hence, the present cross sectional study on phonological development of Hindi speaking typically developing children in a wide age range was attempted.

Aim and Objective

1. The aim of the study was to delineate the phonological development across four age groups i.e. 2 ½ - 3 ½, 3 ½ -4 ½, 4 ½ -5 ½ and 5 ½ - 6 ½ years of typically developing Hindi speaking children.

2. To compare the phonemes acquisition across age and position of the words (initial, medial and final) in typically developing Hindi speaking children.

Methodology

A total of 80 typically developing native Hindi speaking children in the age range of 2 ½ to 6 ½ years from Mumbai were included in the study. The subjects were further sub divided into 4 groups i.e. 2 ½ - 3 ½ years, 3 ½ -4 ½ years, 4 ½ -5 ½ years and 5 ½ - 6 ½ years with each group constituting 10 females and 10 males. The inclusion criterion for the children was native Hindi speaking with normal oral peripheral mechanism, attending Hindi medium school and with no associated problems. The Photo articulation test (Developed by AYJNIHH) in Hindi was administered on all the children. A total of 16 vowels, 30 consonants in initial, medial and final position and 11 blends were assessed. Initially consent for the study was sought from the parents of the children. The children were made comfortable and rapport was built. The examiner showed the pictures of the test and the child was asked to name the pictures and if the child was not able to identify the picture, verbal cues followed by modeling were utilized. The responses were recorded using Sony digital audio recorder. Further all the responses from the participants were transcribed in broad IPA by the researcher. To assess the inter judge reliability few speech samples were randomly picked and transcribed and analyzed by an experienced speech language pathologist. The inter judge reliability was found to be 95.44%. A criterion of phoneme acquisition of 80% and above was selected for all the phonemes in all the age ranges to be considered as acquired. The data was tabulated and subjected to

descriptive statistical analysis to identify mean and standard deviation values and further the mean scores were converted into percentages.

Results and Discussion

Consonants

The results of all consonants acquired are presented in Table 1 below.

Table 1: Consonants acquisition across four age groups and word positions

PHONEMES	AGE RANGE											
	2 ½ to 3 ½ yrs			3 ½ to 4 ½ yrs			4 ½ to 5 ½ yrs			5 ½ to 6 ½ yrs		
	SCORES IN %											
	I	M	F	I	M	F	I	M	F	I	M	F
/p/	100	100	100	100	100	100	100	100	100	100	100	100
/b/	100	100	100	100	100	100	100	100	100	100	100	100
/p ^h /	100	100	100	100	100	100	100	100	100	100	100	100
/b ^h /	100	100	100	100	100	100	100	100	100	100	100	100
/t̪/	100	100	80	100	100	80	100	100	90	100	100	100
/d̪/	100	100	100	100	100	100	100	100	100	100	100	100
/t̪ ^h /	100	75	60	100	80	80	100	85	80	100	100	100
/d̪ ^h /	75	75	75	85	80	80	90	85	90	100	100	100
/t/	100	100	100	100	100	100	100	100	100	100	100	100
/d/	75	75	60	80	80	80	90	90	80	100	100	100
/t ^h /	80	80	80	90	95	92	100	100	95	100	100	100
/d ^h /	100	100	85	100	100	90	100	100	96	100	100	100
/k/	100	100	100	100	100	100	100	100	100	100	100	100
/g/	100	100	100	100	100	100	100	100	100	100	100	100
/k ^h /	100	100	100	100	100	100	100	100	100	100	100	100
/g ^h /	100	100	90	100	100	100	100	100	100	100	100	100
/m/	100	100	100	100	100	100	100	100	100	100	100	100
/n/	100	100	100	100	100	100	100	100	100	100	100	100
/ŋ/	50	50	55	60	60	65	60	65	75	75	72	78

/r/	50	50	55	75	79	78	83	80	87	100	100	100
/s/	100	90	85	100	96	90	100	100	100	100	100	100
/ʃ/	80	60	70	80	82	80	87	82	85	100	100	100
/h/	100	100	100	100	100	100	100	100	100	100	100	100
/tʃ/	80	75	70	88	82	80	92	87	85	100	100	100
/dʒ/	100	100	80	100	100	92	100	100	100	100	100	100
/tʃ ^h /	80	60	70	80	72	80	87	82	85	100	100	100
/dʒ ^h /	100	100	80	100	100	88	100	100	92	100	100	100
/l/	100	100	100	100	100	100	100	100	100	100	100	100
/v/	100	100	100	100	100	100	100	100	100	100	100	100
/j/	100	100	100	100	100	100	100	100	100	100	100	100

[I= Initial, M= Medial, F= Final]

Stops such as /p/, /b/, /t/, /d/, /t/, /k/ and /g/ were achieved by 3 ½ yrs of age at all the positions of word i.e. initial, medial and final by 80 to 100% of the children. /d/ was achieved by 4 ½ yrs and above by 80 % children.

Fricatives such as /f/, /s/, /h/ and /v/ were achieved in all positions of the word i.e. 80% by the age of 3 ½ years.

Affricates such as /dʒ/ was achieved by 3 ½ years of age 80% in all the positions and /tʃ/ was achieved by 3 ½ years 80% only in the initial position and by 4 ½ years of age 80% in the medial and final position.

Aspirated sounds such as /b^h/, /k^h/, /g^h/, /t^h/, /d^h/ and /dʒ^h/ were achieved in the initial, medial and final position by the age of 3 ½ years in 80 % of the children and /ʃ/ was acquired by 4 ½ yrs. However /tʃ^h/ was achieved only in the initial position by 3 ½ years of age, final position was achieved by 4 ½ years of age and medial position by 5 ½ years of age. Consonants /t^h/ and /d^h/ were achieved by 4 ½ years of age by 80% and above.

Nasals such as /m/ and /n/ were achieved by 100% of the children in the initial, medial and final position by 3 ½ years of age. However /ŋ/ was not completely achieved by 6 ½ years of age.

Liquids such as /l/ were achieved by 100% of the children in the initial, medial and final position by 3 ½ years of age. /r/ however was achieved 80% by the age of 5 ½ years in all positions.

Semi vowel such as /j/ was acquired by 100% of the children in all the positions by the age of 3 ½ years.

Vowels: All the vowels assessed were achieved by 2 ½ to 3 ½ years of age (100%) in all positions of a word. The results are presented in the Table 2 below.

Table 2: Vowel acquisition across 2 ½ to 3 ½ years age group and positions of words

VOWELS	2 ½ TO 3 ½ YEARS		
	INITIAL	MEDIAL	FINAL
/i/	100%	100%	100%
/I/	100%	100%	100%
/e/	100%	100%	100%
/a/	100%	100%	100%
/ə/	100%	100%	100%
/O/	100%	100%	100%
/o/	100%	100%	100%
/u/	100%	100%	100%
/ĩ /	100%	100%	100%
/Ĩ /	100%	100%	100%
/ẽ /	100%	100%	100%
/ã /	100%	100%	100%
/ə̃ /	100%	100%	100%

/õ/	100%	100%	100%
/ɔ̃/	100%	100%	100%
/ũ/	100%	100%	100%

Blends

On analysis of clusters acquisition it was observed that clusters /tʃtʃ^h/ /lh/ /vj/ were acquired 80% by 3 ½ years of age. Blends /br/, /tr/, /dr/, /kr/, /gr/, /rtʃ^h/ were acquired 80% by 4 ½ years of age and /mr/ was acquired 80% by the age of 5 ½ years. Upto 6 ½ years all blends were found to be acquired except /dʒr/ which was acquired by only 60%. The results of blends acquisition are presented in Table 3 as following.

Table 3: Blends acquisition across 2 ½ to 6 ½ years of age

BLENDS	2 ½ to 3 ½ YEARS	3 ½ to 4 ½ YEARS	4 ½ to 5 ½ YEARS	5 ½ to 6 ½ YEARS
/tʃtʃ ^h /	80%	83%	95%	100%
/lh/	80%	95%	100%	100%
/vj/	80%	88%	95%	100%
/br/	69%	80%	95%	100%
/tr/	65%	80%	95%	100%
/dr/	75%	80%	90%	100%
/kr/	60%	80%	90%	100%
/gr/	63%	80%	85%	100%
/rtʃ ^h /	65%	80%	92%	100%
/mr/	55%	63%	80%	100%
/dʒr/	0%	22%	40%	60%

From the present study results it can be noted that most of the stops, fricatives and affricatives are achieved by the age of 3 ½ years in the initial position and by the age of 4 ½ years in minimum 80% children in all the positions. It was also noted that few blends begin to develop by 3 ½ years of age however the complete development was not

accomplished by 6 ½ years of age. These findings are supported by the studies of Banik (1988) who conducted in Bengali, Maya (1990) who conducted in Malayalam and Kaur & Rao (2015) in Hindi speaking children. However in comparison to these studies with the present study minor variations were observed in age of acquisition of some of the consonants in particular positions this could be partly due to the language differences or the methodological differences of the study e.g. like criteria used, method of elicitation etc. The present study utilized Photo articulation test in Hindi which was developed almost three decades back and while testing it was felt that some of the vocabulary in the test to be obsolete and the participants required modelling. Hence, in the present scenario with increasing awareness and clientele in Speech language pathology and changes in children vocabulary, there is an immense need for various new or revised language specific assessment tools.

Summary and Conclusion

The present study was an attempt to map the phonological development in typically developing Hindi speaking children from 2 ½ to 6 ½ years of age. The results indicated a clear correlation between the features of the phonemes and their age of acquisition. This age wise wide range of data will add to the present normative information in Hindi speaking population. This data can be used to differentiate between phonological disorders and normal acquisition. This study was a preliminary attempt to extract normative however similar studies in larger population and various aspects of language are needed. The authors also feel an immense need of development of language specific assessment tools and revision of existing tools for various language aspects.

=====

References

Amayreh and Dyson. (1998). The acquisition of Arabic consonants. Journal of Speech Language Hearing Research.41:642-53

- Banu, T. (1977). Articulatory acquisition in Kannada. A study of normal children 3-6.6 years. Unpublished masters dissertation submitted in part –fulfillment for the masters degree in Speech and Hearing. University of Mysore.
- Banik, A. (1988). Articulation test in Bengali. Unpublished Masters dissertation submitted in part –fulfillment for the masters degree in Speech and Hearing. University of Mysore.
- Banik, A. (2003). Development of articulation among normal and hearing impaired Oriya children. Unpublished PhD thesis submitted in part –fulfillment for the Doctoral degree in Speech and Hearing. University of Bhubaneswar.
- Bauman-Waengler (2004). Articulatory And Phonological Impairments: A Clinical Focus 4th Edition, Allyn & Bacon Communication Sciences And Disorders.
- Dodd & et al. (2003). Phonological development: a normative study of British English speaking children. Clinical linguistics and phonetics. 17:617-643
- Edwards, M.L.(1997). Historical overview of clinical phonology. In Perspectives in applied phonology. Hodson, B.W., & Edwards, M.L. Eds: Butler, K. G. Aspen Publishers.
- Kaur, R., & Rao, T.A.S.(2015). Descriptive Analyses of Phonological Development in Typically Developing Hindi-Speaking Children. Language in India. 15:5.
- Karant, P. (2003). A Cross-Linguistic Study of Acquired Reading Disorders: Implications for Reading Models, Disorders, Acquisition and Teaching. Kluwer Academic: New York.
- Maya.(1990). An articulation test battery in Malayalam. Unpublished masters dissertation submitted in part –fulfillment for the masters degree in Speech and Hearing. University of Mysore.
- Vihman, M. M. (1996). Phonological Development: the Origins of Language in the Child. Clinical Linguistics and Phonetics. 12 (2):149-152

=====

Ravali Pyata, Ph.D. Scholar
Lecturer (Speech and Hearing)
Ali Yavar Jung National Institute for the Hearing Handicapped
K.C Marg, Bandra Reclamation

Language in India www.languageinindia.com ISSN 1930-2940 **16:3 March 2016**

Ravali Pyata, MASLP., Ph.D. Scholar and Dr. Arun Banik, Ph.D.

Phonological Development Profile in Typically Developing Hindi Speaking Children

Mumbai 400050
Maharashtra
India
ravali.p@rediffmail.com

Dr. Arun Banik, Ph.D.
Reader & Head of the Department of Speech and Hearing
Ali Yavar Jung National Institute for the Hearing Handicapped
K.C Marg, Bandra Reclamation
Mumbai 400050
Maharashtra
India
drbanik@gmail.com