

Phonological Processes in Hindi Speaking Typically Developing Children Across Rural and Urban Areas

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Abstract

Language refers to a rule based system of symbolic communication involving a set of small unit (syllables or words) that can be combined to yield an infinite number of larger language forms. As the literature review suggests, there are three structures of phonological processes in Hindi speaking children. All these studies have been done in Urban children as subjects. Despite of this, limited amount of research studies focus on children residing in these rural areas of India. The knowledge of phonological development has a great significance in the clinical population to determine whether a child is phonologically disordered and needs intervention. The objective of the study is to describe the percentage and types of phonological processes exhibited by 3-4 year old, Hindi speaking typically developing Urban and Rural children. The results revealed that the mean percentage of correct responses was higher in the Urban children. Children of both the groups demonstrated a wide array of phonological processes. The higher percentage of Phonological Processes in Rural children when compared to those in Urban children could be attributed to the limited educational facilities and lack of parental attention given to a rural child's utterances. It was also noted during the study that people living in urban India have much better living and health conditions than those in rural areas. Rural areas are generally economically very poor when compared to urban areas, especially in India, and the amount of attention and care given to children is very limited.

Key words: Phonological processes, urban children, rural children, language

Introduction

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Language refers to a rule based system of symbolic communication involving a set of small unit (syllables or words) that can be combined to yield an infinite number of larger language forms (Hoff & Naigles, 2002). Phonology refers to the speech sound systems of a language. It involves the study of classification and organization of speech sounds in a language (Vihman, 1996). Phonology encompasses all aspects of the sound system including the speech production and perception. Phonological structure has two components, a limited repertoire of sounds (phonemes) representing various classes (based on physiological and acoustic characteristics) and a set of phonotactic rules defining how these phonemes can be arranged into syllables (Hodson & Paden, 1991). Moreover, the term ‘Articulation’ refers to the actual movements of the articulators during speech production.

As children expand their vocabulary of words, they also demonstrate an emerging phonological system. The development of phonology is not an immediate process. Children cannot immediately learn the entire array of phonemes instead they progress gradually from mastery of the simpler sounds and then arrangement to these sounds into more complex ones. Developmental phonologists have observed that a young child usually makes these substitutions and omissions in predictable ways. Thus, even the child’s technique for coping with speech inadequacies is systematic (Markman, Wasow & Hansen, 2003)

Over the years, the study of phonological development has shifted from the analysis of individual speech sound errors toward the analyses of phonological processes that are rule governed simplifications of adult speech. The phonological process analyses is fast emerging as a popular technique to meet the demand for a more comprehensive means of assessing children who exhibit multiple speech sound production. The concept of phonological process was first introduced by Stampe (1973), according to him learning of sound system requires suppression of a number of innate simplifying processes and simultaneously increasing number of contact sounds.

According to Hodson & Paden (1981) phonological processes is defined as regularly occurring deviations from standard adult speech patterns that may occur across a class of sounds, a syllable shape or syllable sequence. In short, processes are description of regularly occurring

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patterns observed in child's speech, which operate to simplify adult targets. The literature reports that there are more than forty such different processes operating during children's phonological development (Hodson, 1980).

An abundant research in western languages focuses on phonological development and various processes seen in developing children. Goldstein & Iglesias (2001) examined the effect of dialect on phonological analyses in Spanish-speaking children. The results indicated that the number of consonant errors, percentage of consonants correct, number of errors within individual sound classes, and percentage of occurrence for phonological processes all differed based on the accounting of dialect features.

Dodd, Holm, Hua & Crosbie (2003) indicated that the role of various factors such as gender and socio-economic status in speech and language development remains controversial. First, the controversy highlights speech and language development as a very complicated phenomenon. Conceivably, some but not all aspects of language ability are subject to gender or socio-economic status-related variations. The cross-comparison of the development of different aspects, as well as inconsistency in measures and criteria, makes generalization less viable. Second, the controversy also indicates that, in most cases, the combination of a number of variables or factors works together and shape children's speech and language development. Some variables may exert direct influence. Some variables may function indirectly. Some variables may have no influence on their own but interact with other variables to influence a child's speech and language development. Some variables such as socio-economic status are macro-variables composed of several parameters. Wells (1985, 1986) showed how different grouping among parameters could result in opposite interpretations of the same data. Finding ways to measure and specify a macro-variable in studies on the relationship between social and individual factors and speech and language development needs further exploration. Third, the controversy reflects the dynamic nature of social and individual variables and their influence on the speech and language development. Some factors used to play an important role, but these could become less important or insignificant if the environment or the mechanism through which these factors exert influence, change.

Dodd & Crosbie (2004) reported that Socio-economic background did not affect the phonological accuracy measures of any age group. Smith, Hand, Freilinger, Bernthal & Bird (1990) similarly found no significant effect of socio-economic background on the age of acquisition of speech sounds. However, socio-economic background has been reported to affect other areas of language development: vocabulary (Bates, Marchman, Thal, Fenson, Dale, Reznick, Hartung, 1994); phonological awareness (Burt, Holm & Dodd, 1999); cognitive, linguistic and pre-reading measures (Robertson, 1998). Factors associated with low socio-economic background are reduced quality of the linguistic environment, poor interpersonal interactions and decreased exposure to books.

Other aspects of language may be more susceptible to impairment under circumstances of increased deprivation. According to Bishop (1997) the link between socio-economic background and speech and language impairment is weak. Law (1992) suggested that poor socio-economic background accounts for a only slight variation in language development. It is more likely that a combination of detrimental factors contribute to impairment.

Research in Indian Languages

The literature on phonological processes is mostly from Western languages. However, in the recent past, various studies have been done focusing on the Indian languages.

S. No.	Author	Language	Age Group	Common Processes
1	Sunil (1998)	Kannada	3-4 years	Fronting, cluster reduction, initial consonant deletion and affrication
2	Jayashree (1999)	Kannada	4-5 years	Fronting, cluster reduction and stopping

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3	Ramadevi (2001)	Kannada	5-6 years	Stridency deletion, deaspiration and retroflex deletion
4	Sameer (1998)	Malayalam	3-4 years	Cluster reduction, final consonant deletion, epenthesis and deaffrication
5	Bharathy (2001)	Tamil	3-4 years	Epenthesis, cluster reduction, gliding, nasal assimilation, voicing, deaffrication and fronting
6	Ranjan (1999)	Hindi	4-5 years	Cluster reduction, partial reduplication and aspiration
7	Santhosh (2001)	Hindi	3-4 years	Cluster reduction, epenthesis, fronting, gliding, metathesis, nasalization etc.
8	Rahul (2006)	Hindi	2-3 years	Retroflex fronting, affrication, stopping

Table 1: Studies on Phonological processes in Indian languages

As the literature review suggests, there are three structures of phonological processes in Hindi speaking children. All these studies have been done in Urban children as subjects. Despite of this, limited amount of research studies focus on children residing in these rural areas of India. The knowledge of phonological development has a great significance in the clinical population to determine whether a child is phonologically disordered and needs intervention. However, a limited understanding of phonological development and a scarcity of data to evaluate differences between the language conditions seen in Urban and Rural children might lead to a risk of misdiagnosis.

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Hence, the present study focuses on comparing the phonological processes across Urban and Rural Hindi speaking children of India.

Aim

The objectives of the study are:

- To describe the percentage and types of phonological processes exhibited by 3-4 year old, Hindi speaking typically developing Urban and Rural children.
- To compare the percentage and types of phonological processes across the two groups of children, Urban and Rural.

Methodology

Subjects

Thirty typically developing children, age ranging from 3-4years (Mean 3.5 years) participated in the study. Among these, fifteen children were selected from the Urban areas of Delhi and Haryana district, with middle- to high-socioeconomic status. The other group (fifteen) of children was selected from the Rural areas of Delhi and Haryana district, with low socio-economic status. All participants were native speakers of Hindi and some of them were attending play school at the time of testing.

Stimuli

The study included compilation of speech samples using two stimuli. One, being a connected speech sample of each child and the other included elicitation of single word production.

1. **Connected Speech Sample:** The connected speech sample of children helped in three ways:
 - a) Assessing overall intelligibility of Speech
 - b) Analyzing the use of speech sounds in a natural setting
 - c) Providing a wider database to judge the accuracy of individual sounds, patterns of errors and consistency of misarticulations.

In order to collect data in a connected speech the child was assessed in two tasks:

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- i) **Spontaneous Conversation**, with mother/teacher, about a familiar topic like a favorite TV show or hobbies of the child.
- ii) **Story Narration**: The child listens to a story with pictures and then is asked to narrate the story with/ without the help of pictures.

2. Single Word Production

A Hindi Articulation Test was administered on each child after presenting adequate test trials and instructions. The test included target consonants, diphthongs and vowels to be tested in all Initial and Final position. For each target word in the test, the child was shown a set of pictures each representing the target word. The pictures were standardized by thirty native speakers of Hindi who were parents of three to four year old children. Among a set of ninety pictures, forty pictures were chosen which had the selected phonemes of Hindi in Initial and Final positions. The target words were arranged in a random order. All the selected words were:

- Easy to produce
- Picturable
- Unambiguous
- Regularly used in functional day to day life
- Match with general core vocabulary for the children

Procedure

The speech sample (minimum 50 utterances) was recorded from each child in a quiet room at home or school environment. Subjects were seated comfortably and rapport was build up with the child before eliciting the target speech sample. Each child was presented with the pictures one after another using DMDX software (Kenneth & Forster, 2003). The responses of every child were recorded. In the instances when spontaneous utterances could not be elicited, questions were asked related to the test item to which the target word is expected to be the answer. Maximum attempts were made to obtain the spontaneous production of all the target words. In case they failed, imitation was used for elicitation of response.

The responses of all the subjects was recorded in PRAAT (5.3.43; Boersma & Weenink, 2012) using a Lenevo z560 laptop and digital sound stereo headphones (SSD-HP-202).

Results and Discussion

The phonological processes were abundant among both the groups, Urban as well as Rural children. Table 2 shows the mean percentage and standard deviation of correct responses produced by children in the two groups.

GROUP	MEAN PERCENTAGE SCORES	STANDARD DEVIATION
URBAN CHILDREN (3-4 years)	59%	8.05
RURAL CHILDREN (3-4 years)	36%	11.22

Table 3: The Mean and Standard Deviation of percentage of correct responses among the Urban and Rural children

The Mean correct responses among the two groups were 59% (Urban) and 36% (Rural). Hence, though all the children in the two groups were of the similar age range, unexpectedly, the Urban children produced higher number of correct responses when compared to the Rural children.

Qualitative Analyses

The recorded samples were analyzed qualitatively. Each word uttered was analyzed for phonological process involved. The whole word was analyzed and not only the target phoneme in the word. The analyses of data revealed a total of 25 phonological processes in the Rural group and 20 phonological processes among the Urban group. The occurrence of each process in all the subjects, Urban and Rural, is provided in Table 3 and 4 respectively.

S. N. O.	PP	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15

1	RF	9	8	13	8	11	15	16	9	6	7	11	12	9	5	8
2	DeA	10	10	10	8	6	7	11	10	12	8	7	8	9	5	8
3	St	4	1	8	3	-	6	9	5	1	11	12	1	1	9	4
4	VF	2	-	1	-	1	11	9	4	-	8	8	-	1	-	8
5	BK	-	-	-	-	-	-	1	-	-	-	1	1	1	-	-
6	ICR	6	6	-	9	-	8	8	6	5	-	10	8	-	-	-
7	FCR	5	5	4	3	5	-	3	-	3	2	-	2	4	-	1
8	AF	12	7	6	8	9	12	12	12	3	9	13	13	5	5	2
9	DeN	5	2	8	5	5	4	6	4	4	7	5	2	5	5	5
10	NS	-	1	1	-	-	-	3	1	1	6	-	-	-	-	4
11	DeV	2	2	2	4	3	1	6	-	-	4	3	4	3	2	2
12	ICD	-	-	-2	1	1	1	-	1	-	1	-	1	1	1	1
13	FCD	-	-	1	-	3	1	1	5	2	2	5	2	-	6	5
14	/r/Del	2	4	4	6	6	-	5	3	3	2	-	-	2	1	2
15	Epn	1	-	-	-	-	1	1	1	2	-	2	2	2	1	1
16	/h/del	2	2	2	2	1	1	12	1	1	1	1	3	1	2	2
17	VS	2	-	1	2	-	3	1	2	1	2	3	1	-	-	-
18	Voc	-	-	-	1	1	1	-	-	-	-	-	1	1	-	-
19	GL	2	1	-	2	-	2	1	-	-	4	1	-	2	1	1
20	Ass	-	-	-	1	1	1	-	-	-	2	1	-	-	-	1

Table 4: Distribution of different Phonological Processes among Urban children

S. N O.	PP	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15
1	RF	8	8	13	8	11	15	16	9	6	7	11	12	9	5	8
2	DeA	12	15	10	8	6	7	11	10	12	8	7	8	9	5	8
3	St	4	3	8	3	-	6	9	5	1	11	12	1	1	9	4
4	VF	2	-	3	-	5	12	9	4	-	8	8	-	1	-	8

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5	BK	-	-	-	-	-	-	1	-	-	-	1	1	1	-	-
6	ICR	7	6	-	9	-	8	8	6	5	-	10	8	-	-	-
7	FCR	6	5	4	3	5	-	3	-	3	2	-	2	4	-	1
8	AF	13	7	6	8	9	12	12	12	3	9	13	13	5	5	2
9	DeN	8	2	8	5	5	4	6	4	4	7	5	2	5	5	5
10	NS	-	1	1	-	-	-	3	1	1	6	-	-	-	-	4
11	DeV	3	2	2	4	3	1	6	-	-	4	3	4	3	2	2
12	ICD	-	-	-2	1	1	1	-	1	-	1	-	1	1	1	1
13	FCD	-	-	1	-	3	1	1	5	2	2	5	2	-	6	5
14	/r/Del	3	4	4	6	6	-	5	3	3	2	-	-	2	1	2
15	Epn	1	-	-	-	-	1	1	1	2	-	2	2	2	1	1
16	/h/del	2	2	2	2	1	1	12	1	1	1	1	3	1	2	2
17	VS	2	-	1	2	-	3	1	2	1	2	3	1	-	-	-
18	Voc	-	-	-	1	1	1	-	-	-	-	-	1	1	-	-
19	GL	2	1	-	2	-	2	1	-	-	4	1	-	2	1	1
20	Ass	-	-	-	1	1	1	-	-	-	2	1	-	-	-	1
21	l/r Su	5	5	-	-	-	5	8	-	3	3	3	-	5	4	3
22	VR	2	1	-	1	1	1	-	-	-	-	-	1	1	-	-
23	VL	3	3	-	2	-	2	1	-	-	4	1	-	2	1	1
24	IVD	-	1	-	1	1	1	-	-	-	2	1	-	-	-	1
25	Mono	3	1	-	-	-	5	8	-	3	3	3	-	5	4	3

Table 5: Distribution of different Phonological Processes among Rural children

[**Symbols Used:** **RF:** Retroflex Fronting; **FR:** Fronting; **ICR:** Initial Consonant reduction; **AF:** Affrication; **NS:** Nasal Substitution; **ICD:** Initial Consonant Deletion; **Epn:** Epenthesis; **GL:** Gliding; **Vs:** Vowel Shortening; **VL:** Vowel lowering; **Mono:** Monothongization; **St:** Stopping; **BK:** Backing; **FCR:** Final Consonant Reduction; **Den:** Denasalization; **FCD:** Final Consonant Deletion; **VOC:** Vocalisation; **Ass:** Assimilation; **VR:** Velar Fronting; **IVD:** Initial Vowel Deletion].

Furthermore, the phonological processes were classified into the three groups, namely:

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1. Syllable Structure Processes
2. Substitution Processes
3. Assimilation Processes

The comparison of two groups, Urban and Rural, in terms of percentage of subjects is indicated in Tables 6, 7 and 8 and graphically represented in Figure 1, 2 and 3.

Syllable-Structure Processes

S. No.	PHONOLOGICAL PROCESSES	No. of Subjects exhibiting the process (RURAL)	% of Subjects exhibiting the process (RURAL)	No. of Subjects exhibiting the process (URBAN)	% of Subjects exhibiting the process (URBAN)
1	Initial Consonant Deletion	8	50	4	21.43
2	Final Consonant Deletion	8	50	7	42.86
3	Cluster Reduction	11	71	11	71.43
4	Epenthesis	9	57	5	28.52
5	/r/ Deletion	10	64	10	64.29
6	/h/ deletion	15	100	12	78.57
7	Nasal substitution	8	50	7	42.86
8	Initial Vowel deletion	4	21	-	-

Table 6: Urban and Rural children exhibiting Phonological Processes in category of Syllable-Structure Processes

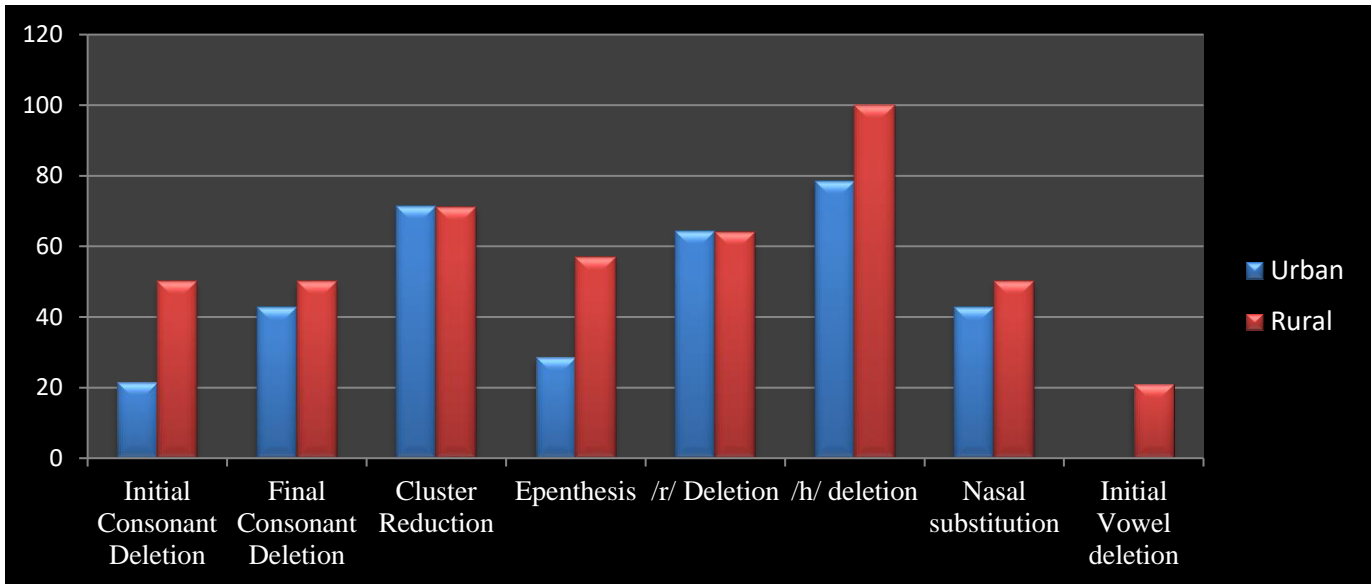


Figure1: Percentage of subjects who exhibit different phonological processes in two groups

The Table 6 and Figure 1 shows that among the Rural children, cluster reduction, Final Consonant Deletion: and Initial Consonant Deletion were observed to be the highest number of Phonological Processes. Similarly among the Urban group also, cluster reduction seems to be highest in occurrence. However, consonant deletions seemed to be much lower. Final Consonant Deletion was observed to be present in 50% of the subjects in Rural group and 42.86% of subjects in Urban group. Initial Consonant Deletion was observed to be present in 50% of the subjects in Rural group and only 21.43% of subjects in Urban group. The Final Cluster Reduction was observed to be present in 71% of the subjects in Rural group and 71.43% of subjects in Urban group.

The Initial Cluster Reduction was present in 64% of the subjects in Rural group and 57.41% of subjects in Urban group. Moreover, in both Urban and Rural group /h/ deletion seemed to be the maximum. It was observed to be present in 100% of the subjects in Rural group and 78.57% of subjects in Urban group. Apart from this, Epenthesis was observed to be present in 57% of the subjects in Rural group and 28.52% of subjects in Urban group. Nasal Substitution was observed to be present in 50% of the subjects in Rural group and 42.86% of subjects in Urban group.

/r/ deletion was observed to be present in only 21% of the subjects in Rural group and 64.29% of subjects in Urban group. Initial Vowel Deletion was present only in Rural group for in 21% of the subjects. The above results are depicted in Figure 1.

Feature Contrast/ Substitution Processes

S. No.	PHONOLOGICAL PROCESSES	No. of Subjects exhibiting the process (RURAL)	% of Subjects exhibiting the process (RURAL)	No. of Subjects exhibiting the process (URBAN)	% of Subjects exhibiting the process (URBAN)
1.	Stopping	12	80	12	78.57
2.	Fronting	15	100	11	71.43
3.	Backing	4	21	4	21
4.	Affrication	15	100	14	93.33
5.	Deaffrication	15	100	12	78.57
6.	Denasalization	15	100	14	93.33
7.	Deaspiration	15	100	12	78.57
8.	Vowel shortening	11	71	8	50.00

Table 7: Urban and Rural children exhibiting Phonological Processes in category of Substitution Processes

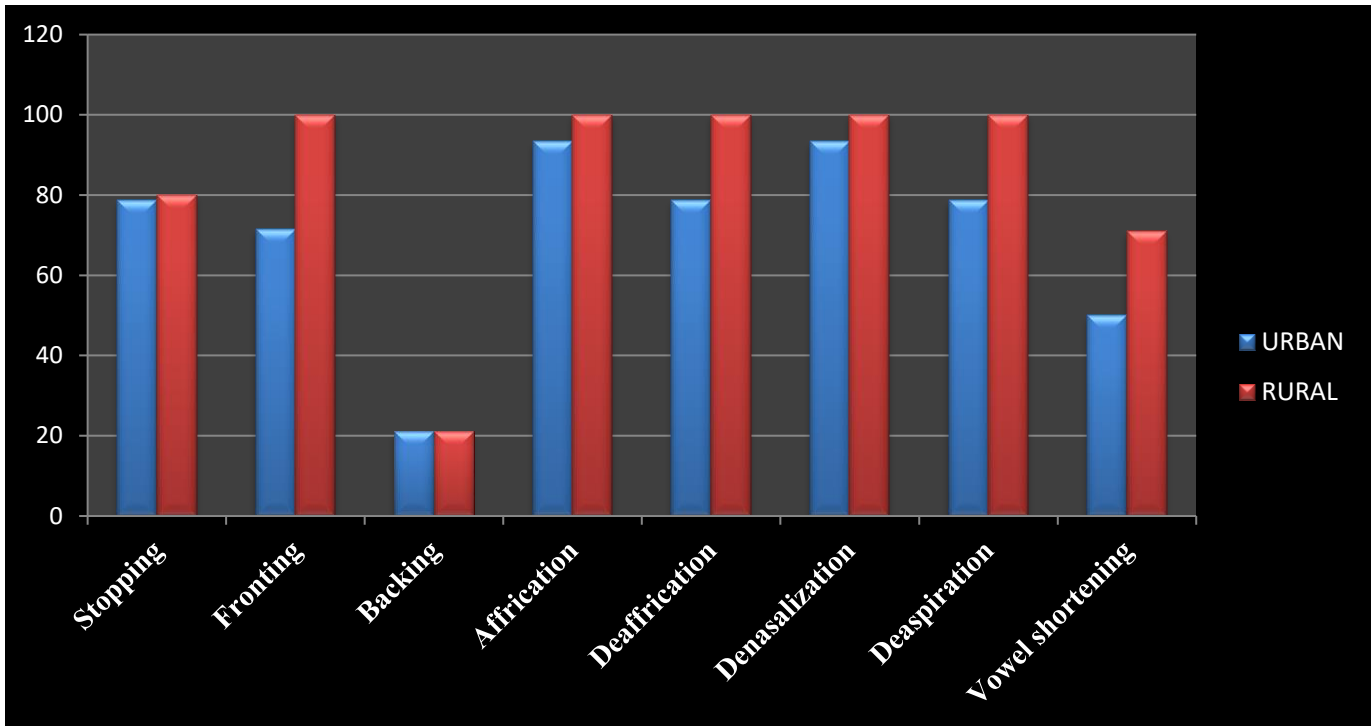


Figure 2: Percentage of subjects who exhibit different phonological processes in two groups

The Table 7 and Figure 2 shows that among Rural children the highest processes were Retroflex Fronting, affrication, deaffrication, denasalization and deaspiration. However, among Urban children the highest processes were affrication and denasalization followed by stopping, deaffrication and deaspiration. Retroflex Fronting was observed to be 100% among Rural group and 71.43% in Urban group. Earlier research in Hindi (Ranjan, 1999; Santhosh, 2001), Kannada (Ramadevi, Prema & Sreedevi, 2005), Malayalam (Sameer, 1998) have also reported that Retroflex Fronting is a frequently occurring process. This is very frequent process in Indian languages. However, in Western studies, this is not the case because retroflex as a place of articulation is absent in them, especially in English. Perhaps, this process is frequently occurring because retroflex is a difficult sound to produce as it involves the tongue to curl back and touch the palate. Thus, we find retroflex sounds most often replaced by a front sound.

The Affrication was observed to be present in 100% of the subjects in Rural group and 93.33% of subjects in Urban group. Generally, affricates are learned before fricatives. Children in

this study from Rural areas did not achieve frication and those from Urban areas also showed limited frication. Thus, the production of affrication was not achieved in these children.

Also, Denasalization was present in 100% of the subjects in Rural group and 93.33% of subjects in Urban group. Deaspiration was seen in 100% of the subjects in Rural group but only in 78.57% of subjects in Urban group. Stopping was evident in 80% of the in Rural subjects and 78.57% of subjects in Urban group. Backing was present only in Rural group in 21% of the subjects.

Vowel Shortening was also observed to be present only in Rural group in 71% of the subjects. The results are depicted in Figure 2.

Assimilation Processes

S. No.	PHONOLOGICAL PROCESSES	No. of Subjects exhibiting the process (RURAL)	% of Subjects exhibiting the process (RURAL)	No. of Subjects exhibiting the process (URBAN)	% of Subjects exhibiting the process (URBAN)
1.	l/r Substitution	10	64	10	64.29
2.	Gliding	10	64	3	14.29
3.	Monothongization	15	100	13	85.71
4.	Devoicing	12	80	13	85.71
5.	Velar fronting	10	64	-	-
6.	Assimilation	6	35	3	14.29
7.	Vowel lowering	6	35	8	50.00
8.	Vocalization	3	14	-	-

Table 8: Urban and Rural children exhibiting Phonological Processes in category of Assimilation Processes

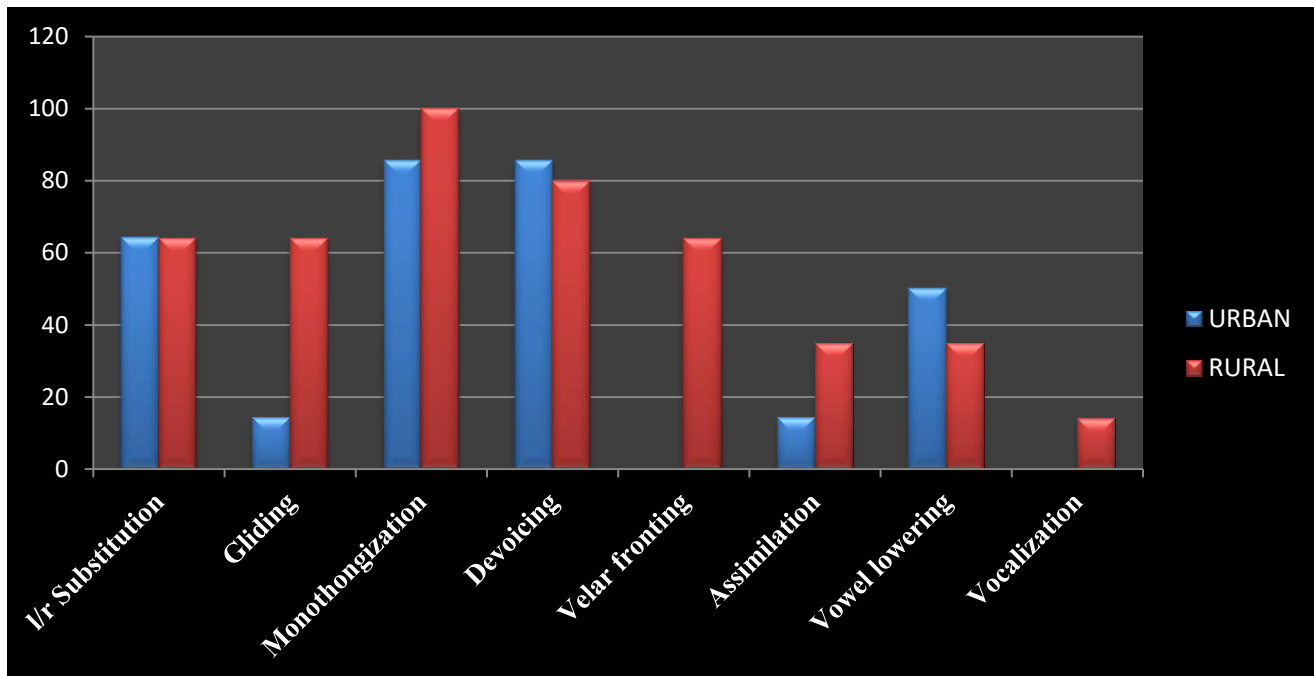


Figure 3: Percentage of subjects who exhibit different phonological processes in two groups

The Table 8 and Figure 3 represents that Rural group showed highest Phonological processes in Monothongization category. This was observed to be present in 100% of the subjects in Rural group and only 85.71% in Urban group. Devoicing was observed to be present in 80% of the subjects in Rural group and 85.71% of subjects in Urban group. Substitution of l/r was observed to be present in 64% of Rural children and 64.29% of the Urban children. The velar Fronting: processes were observed to be present in 64% of Rural children and only 28.52% of the Urban children. Similarly, Gliding was exhibited by 64% of the subjects in Rural group and only 14.29% of subjects in Urban group. Assimilation and Vowel lowering was observed to be present only in Rural group, with 35% of occurrences in both categories. Similarly, Vowel Raising and Vocalization was observed to be present in 14.29% of subjects in both Rural and Urban group.

Furthermore, after the percentage of subjects exhibiting each process was calculated, these processes are classified into three major categories. This is depicted in Table 9. The percentage of Phonological Processes was calculated based on the method used by Ramadevi (2006) and Rahul (2006). The classification is as follows:

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1. First category, comparison of Phonological Processes occurring in 20% or less than 20% of subjects. These are considered as **occasionally occurring Phonological Processes**.
2. Second category of Phonological Processes occurring in more than 20% and less than 60% of the subjects. These are considered as **frequently occurring Phonological Processes**.
3. Third category, comparison of Phonological Processes occurring in more than 60% of the subjects. These are considered as **Phonological Processes occurring most of the time**.

S.NO	RURAL CHILDREN			URBAN CHILDREN		
	Percentage of subjects exhibiting the Phonological Processes			Percentage of subjects exhibiting the Phonological Processes		
	Less Than 20%	20-60%	More Than 60%	Less Than 20%	20-60%	More Than 60%
1	Vocalization	Velar Fronting	Retroflex Fronting	VR	Initial Consonant Deletion	/r/ deletion
2		Initial Consonant Deletion	Deaspiration	Gliding	Epenthesis	l/r Substitution
3		Backing	Affrication		Velar Fronting	Final Cluster Reduction
4		Vowel Lowering	Denasalisation		Final Consonant Deletion	Retroflex Fronting
5		Assimilation	/h/ Deletion		Nasal Substitution	Stopping
6		Final Consonant Deletion	Monoph-thongization		Velar Stopping	/h/ Deletion

7		Initial Consonant Deletion	Stopping		Initial Cluster Reduction	Deaspiration
8		Nasal Substitution	Devoicing			Devoicing
9		Epenthesis	Final Cluster Reduction			Monothong- -gization
10			Velar Stopping			Denasalization
11			Velar Fronting			Affrication
12			Initial Cluster Reduction			
13			l/r Substitution			
14			Gliding			
15			/r/ deletion			

Table 9: Categorization of Phonological Processes, based on percentage of subjects exhibiting the processes.

From the above table 9 it is clear that more than 60% of the subjects in both groups had **Phonological Processes occurring frequently** (second category) **or most of the time** (third category). There were 9 frequently occurring processes in Rural group and 7 frequently occurring processes in Urban group. Moreover, both Rural and Urban group had maximum process in the third category i.e. ‘Phonological Processes occurring most of the time’. In the Rural group, there were 15 processes in this category and the Urban group had 11 processes in this category. Thus, the Rural group exhibited more number of processes in this category.

On summarizing the above findings, it was noted that in the Urban group of children, Phonological Processes were abundant in 3-4years. Among the complete utterances produced, the mean of correct responses was 59%. On the other hand, Rural children were somewhat different. The mean correct responses were lower (36%) in these children.

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Comparisons across the two groups revealed difference in terms of the mean correct responses which is higher in Urban children relative to Rural children. ANOVA reveals significant difference between the two groups. However the types of PPs reveal no significant difference. Most of the PPs are common to both the groups, though Rural group was seen to produce various dialectal differences, which were common not only in children but even in adults. Thus, these dialectal differences were not taken into consideration.

Discussion

The discussion over the findings reveal that the occurrence of Phonological Processes in 3-4years old Urban and Rural children is a common phenomenon, attributed to an incomplete/developing speech sound acquisition thereby, giving rise to simplification of phonological aspects. The study revealed similar types of Phonological Processes across both groups with Consonant deletion, weak syllable deletion, epenthesis, fronting, palatalization, stopping, and aspiration being the common types. The findings correlated with those of Pootheri (1998) who revealed cluster reduction, epenthesis, stopping, fronting and palatalization to be common among 3-4years old Malayalam speaking children. Also, Stoel-Gammon & Dunn (1985) observed cluster reduction, epenthesis, stopping, depalatalization and devoicing at 3years of age.

In Indian context, earlier research in Hindi (Ranjan, 1999; Santhosh, 2001), Kannada (Ramadevi, Prema & Sreedevi, 2005), Malayalam (Sameer, 1998) have also reported similar results with Retroflex Fronting being one of the frequently occurring processes among children speaking Indian languages. However, in Western studies, this is not the case because various sounds present in Indian languages (including retroflex) as a place of articulation is absent in Western languages, especially in English. Perhaps, this process is frequently occurring because retroflex is a difficult sound to produce as it involves the tongue to curl back and touch the palate. Thus, we find retroflex sounds most often replaced by a front sound.

The second finding of the study revealed lower percentage of correct responses and hence higher Phonological Processes in Rural children when compared to those in Urban children.

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Perhaps, the limited educational facilities and lack of parental attention given to a child's utterances can be attributable to the greater number of errors seen in Rural children. It was noted during the study that people living in urban India have much better living and health conditions than those in rural areas. Rural areas are generally economically very poor when compared to urban areas, especially in India, and the amount of attention and care given to children is very limited. Thus, perhaps the rural children make more errors (simplification) of sounds without any means of learning the correct production. Also, in rural India, parents seldom educate their children, and even if they do the quality of educate is much lower than that in urban areas. This might lead to less developed metalinguistic and cognitive skills. Thus, being one of the major reasons for more Phonological Processes. The standard of living, health care and other facilities might also minimally contribute to the linguistic differences seen in Urban and Rural children.

Summary and Conclusion

The present study revealed that the mean percentage of correct responses was higher in the Urban children. Children of both the groups demonstrated a wide array of phonological processes. The higher percentage of Phonological Processes in Rural children when compared to those in Urban children could be attributed to the limited educational facilities and lack of parental attention given to a rural child's utterances. It was also noted during the study that people living in urban India have much better living and health conditions than those in rural areas. Rural areas are generally economically very poor when compared to urban areas, especially in India, and the amount of attention and care given to children is very limited.

Thereby, to summarize, all the children use phonological processes during speech sound acquisition in order to simplify adult targets to their level of speech understanding and production. However, the socio-economic status plays an important role in the acquisition and usage of speech sounds. Thereby, this parameter should be necessarily taken into account while assessing children for their language. Moreover, to confirm the above findings, future research should focus on similar aspects across various language pairs and different rural conditions.

Implications of the Study

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- The study provides detailed understanding of phonological development among Hindi speaking Urban as well as Rural children. Thereby, highlighting the differences between the two groups which would help in further assessment and intervention of these children in clinical settings.
- Provides an overview over emerging and suppressing patterns of phonological processes among native Hindi speaking 3-4 year old children.
- The study also provides basis for planning of phonological remediation.

Future Directions

- The present study is a pilot study which involved limited number of children. Future studies should focus on broader data collection.
- Also, further research focusing on different Urban and Rural regions is important in order to confirm the present findings.
- Furthermore, future studies should involve comparison across children in different age groups.

References

- Bankson, N. & Bernthal, J. (1998). *Articulation and phonological disorder*. N.J. Eaglewood Cliffs: Prentice Hall.
- Bates, M., Marchman, A., Thal, K. S., Fenson, M., Dale, H., Reznick J. S., & Hartung, U. (1994). Phonological disorders I: A diagnostic classification system. *Journal of Speech and hearing Disorders*, 47, 226-241.
- Bauman-Waengler, J. A. (2004). *Articulatory and phonological impairments: A clinical Focus*. Boston: Allyn and Bacon.
- Bharathy, R. (2001). *Development of phonological processes of 3-4 years old normal Tamil speaking children*. Unpublished Masters Dissertation submitted to the University of Mysore, India.
- Bishop (1997). Early phonological development. In J.E. Bernthal, and N. W. Bankson (3rd Eds.), *Articulation and phonological disorders* (pp 63-110). New Jersey: Prentice Hall.

- Boersma, P., & Weenink, D. (2013). Praat: doing phonetics by computer [Computer program]. Version 5.3.43, retrieved 27 March 2013 from <http://www.praat.org/>
- Burt, M. A, Holm, D. & Dodd, K. (1999). Certain language skills in children; their development and interrelationships. *Institute of Child Welfare, Monograph, 26*. Minneapolis: The University of Minnesota Press.
- Dodd, K., Holm, D., Hua, C. & Crosbie, L. (2003). Vowel systems of normally developing and phonologically disordered children. *Clinical Linguistics and Phonetics, 4*, 145-160.
- Dodd, K. & Crosbie, L. (2004). *Normal and abnormal phonology in children*. Austin Texas: Pro-Ed. Inc.
- Edwards, M. L., & Shriberg, L. D. (1983). *Phonology: Applications in communicative disorders*. San Diego: College-Hill Press.
- Goldstein, B. & Iglesias, A. (2001). Young children's representation of prosodic phonology: evidence from English-speakers' weak syllable productions. *American Journal of Speech-Language Pathology, 10*, 394-4060. DOI:10.1044/1058-0360(2001/034).
- Grunwell, P. (1983). Phonological development in phonological disability. *Topics in Language Disorders, 3*, 62-76.
- Hodson, B. W., & Paden, E. P. (1981). Phonological Processes which characterize intelligible and unintelligible speech in early childhood. *Journal of Speech and Hearing Disorders, 46*, 369-373.
- Hodson, B.W. (1980). *The assessment of phonological processes*. Danville, IL: Interstate Printers & Publishers.
- Hoff, E. L., Naigles, M. (2002). "How children use input to acquire a lexicon". *Child Development, 73*, 2, 418–433. DOI:10.1111/1467-8624.00415.
- Ingram, D. (1976). *Phonological Disability in children*. London: Edward Arnold. Baltimore: University Park Press.
- Ingram, D. (1981). *Procedures for the Phonological Analysis of Children's Language*. Baltimore: University Park Press.

- International Phonetic Alphabet (1996). *International Phonetic Association (IPA), Handbook*, 183.
- Jayashree, B. (1999). *Phonological Development in 4-5 year old typically developing Kannada speaking children*. Unpublished Masters Dissertation submitted to University of Mysore, India.
- Kenneth, I., & Forster, J. C. (2003). DMDX: A Windows display program with millisecond accuracy, *Behavior Research Methods, Instruments, & Computers*, 35, 1, 116- 124.
- Khan, L. (1985). Strategies for phonological intervention. In *Assessment of Articulation and phonological disorder*. N. J. Eaglewood Cliffs: Prentice Hall, 1980.
- Law, S. (1992). Phonological acquisition of English children: Implications for phonological disorders. *Journal of Communication Disorders*. 32, 377-396.
- Mandel, D. R., Jusczyk, P. W., Pisoni, P. (1995). "Infants' recognition of the sound patterns of their own names". *Psychological Science*, 6, 5, 314–317. DOI:10.1111/j.1467-9280.1995.tb00517.
- Markman, E. M., Wasow, J. L., Hansen, M. B. (2003). "Use of the mutual exclusivity assumption by young word learners". *Cognitive Psychology* 47, 3, 241–275. DOI:10.1016/S0010-0285(03)00034-3.
- Poothari, M. (1998). *Signal to Syntax: Bootstrapping from Speech to Grammar in Early Acquisition*. Mahwah, NJ: Earlbaum.
- Ranjan, R. (1999). *Development of Phonological Processes in 3-4 years old Hindi speaking children*. Unpublished Masters Dissertation submitted to University of Mangalore, India.
- Rahul M. (2006). *Study of Phonological Processes of 2-3 years old Hindi-Speaking Normal Children*. Unpublished Masters Dissertation submitted to University of Mysore, India.
- Ramadevi, K. J. S. & Prema, K. S. (2002). *Phonological profile in Kannada: A study on Hearing impaired*. PhD Thesis submitted to the University of Mysore, India.
- Ramadevi, K. J. S. (2001). Phonological profiling in 5-6 years old Kannada speaking children. Unpublished Masters Dissertation submitted to University of Mysore, India.
- Robertson, W. (1998). Speech sounds of young children. University of IOWA studies. Melborne.

- Sameer, M. (1998). *Phonological Development in 3-4 year old typically developing Malayalam speaking children*. Unpublished Masters Dissertation submitted to University of Mysore, India.
- Santhosh, M. (2001). *Development of phonological processes in normal Hindi speaking children I the 3-4 years age group*. Unpublished Masters Dissertation submitted to the University of Mangalore.
- Shriberg, L. D., & Kwiatkowski, J. (1980). Phonological disorders I: A diagnostic classification system. *Journal of Speech and Hearing Disorders*, 47, 226-241.
- Smith, N. V. (1968). *The acquisition of phonology: a case study*. London: Cambridge University Press.
- Smith, N. V., Hand, K. A., Freilinger, M. C., Bernthal, S. & Bird, P. (1990). Phonetic inventories and phonological patterns of American two years old: A preliminary investigation. *Journal of Communication Disorders*, 24, 155-177.
- Stampe, D. (1973). Understanding Natural Phonology. *Phonological Disability in children*. London: Edward Arnold. Baltimore: University Park Press.
- Stampe, D. (1969). The acquisition of phonetic representation. In R.I. Binnick, A. Davison, G.M. Green, & J. L. Morgan (Eds.), *Papers from the Fifth Regional Meeting of the Chicago Linguistic Society*. Chicago: University of Chicago, Department of Linguistics.
- Stoel-Gammon, C. & Dunn, C. (1985). *Normal and disordered Phonology in children*. Baltimore, MD: University Park Press.
- Sunil, A. (1998). *Phonological Development in 3-4 year old Kannada speaking children*. Unpublished Masters Dissertation submitted to University of Mysore, India.
- Weiner, F. F. (1979). *Phonological process analysis*. Baltimore MD: University Park Press.
- Wells, W. (1985). Phonology for conversation: phonetic aspects of turn delimitation. *London Jamaican Journal of Pragmatics*, 9, 309-330.
- Wells, W. (1986). Deaccenting and the structure of English intonation. *Linguistics Journal*, 21 701-715.

Vihman, M. M. (1996). Phonological Development. *The Origins of Language in the Child*. Oxford, UK: Blackwell.

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