

PHONOLOGICAL PROFILE IN KANNADA – AN ASSESSMENT TOOL

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Introduction

There are several procedures for phonological assessment in children. Some are based on standardised tests (ex: articulation tests) and some on linguistic profiles. Over the last twenty years, the focus has been shifted from the standardized tests to the linguistic profiles in the assessment of speech language impaired. The aim of a linguistic profile is to provide an assessment tool that gives a total picture of the disorders. Crystal (1982) defines a profile as follows: A linguistic profile is a principled description of just those features of a person's ----- use of language which will enable him to be identified for a specific purpose. Profiles are comprehensive within one particular level of linguistic analysis i.e., syntax profile or phonological profile.

Need

Many authors report that phonological profiles focus on individual's phonological problems, which are exceptions as a rule. These throw light on the appropriate management techniques to be adopted for a particular child. In a multi-lingual country like India, phonological profiles need to be developed in various Indian languages. This enables to study the characteristic features of phonological disorders existing in children speaking different Indian languages. No phonological profile has been developed in any of the Indian languages. Hence, an attempt was made to develop the phonological profile in Kannada, a Dravidian language.

Review

Some of the profiles which have been developed in English are as follows:

1. Crystal (1982) developed segmental phonological profile (PROPH).
2. Grunweil (1985) designed the profile, phonological analysis of child speech (PACS).

3. Iris Vardi (1991) developed the manual, phonological profile for the hearing impaired.

These are some of the major comprehensive phonological profiles. PROPH and PACS consist of a bundle of different profile charts. These two profiles require rich data, take long time to administer, analyze and to transfer from the data charts to the analysis charts whereas, Vardi's profile is comprehensive and less time consuming which are essential features for the clinical practice. However, the profile is applicable only for English speakers. This cannot be adapted to speakers belonging to any of the Indian languages, as the profiles are language specific. There is dearth of phonological profiles in Indian languages. Hence, a study was undertaken to develop the phonological profile in Kannada.

Aim of the study

To develop a phonological profile in Kannada language for phonological assessment in children.

Method

As a part of doctoral study (Rama Devi K.J.S., 2006), the Phonological profile in Kannada was developed. It constitutes two parts:

Part I. Development of the test material

Part II. Development of the phonological profile

Part I: Development of the test material

The test material developed constitutes the following:

1. Stimulus cards - Set A
2. Stimulus word list - A
3. Stimulus cards - Set B
4. Stimulus word list - B
5. Story charts - Set C

1. Stimulus cards - Set A

Set A has ninety-two pictures, one picture on each card (stimulus 1, S1). Pictures are line drawings drawn on the cards of 6" x 4". At the bottom of each card written word (using Kannada graphemes) of the picture (stimulus 2, S2) can be presented, when needed and at all other times it is covered with paper or a scale. The profile is designed to test the production of ten vowels (a, aa, i, ii, u, uu, e, ee, o & oo), two

diphthongs (ai & au), two glides (y & v), and thirty consonants (k, kh, g, gh, c, ch, j, jh, T, Th, D, Dh, N, t, th, d, dh, n, p, ph, b, bh, m, r, l, sh, S, s, h & L).

2. Stimulus word list-A

Stimulus word list - A has ninety-two words. It is used along with the Set - A to record the responses. The list has words, where vowels are tested in initial, medial and final position. Long vowels (/i, ee, aa, oo, uu/) usually do not occur in the word final position in Kannada. Hence, these are not tested in the final position. Production of diphthongs is tapped in all three position of the word. Consonants are tested in initial and medial positions in which they occur naturally. In some borrowed words, consonants may occur in the final position. However, occurrence of a consonant in the final position is not a feature in Kannada. Hence, consonants are not tested in the final position. A few aspirated consonants such as /ch/, /jh/ and /Dh/ are not tested in the medial position as they occur very rarely in the language. Also retroflex nasal /N/ and retroflex lateral /L/ are not tested in the initial position as they do not occur in the word initial position.

In the word list, there are two response columns against each word. In the first column, responses are recorded on the presentation of the stimulus 1. In the second column, responses are recorded on the presentation of the S1+S2, which is presented when failed to obtain a correct response for the stimulus 1. In case, an incorrect response is obtained for the picture stimulus 1, one of the clues may be provided as stimulus 2: a) the subject may be asked to repeat the word uttered by the examiner or b) the subject may be asked to read the written word of the picture shown. If the child has not acquired reading skills, repetition task can be employed.

In the stimulus word list-A sheet, a note is also made regarding speech mechanism, voice, prosody and other factors affecting speech intelligibility of the subject. Stimulus word list A is illustrated here.

STIMULUS WORD LIST A

Name:

No.:

Date:

Age and Sex:

Tester:

Name of the school:

Response for S1+S2: Reading / Repetition

Stimulus	S1	S1+S2	Stimulus	S1	S1+S2
1	/aLilu/		32	/yama/	
2	/karaDi/		33	/tenginakaayi/	
3	/mola/		34	/vimaana/	

4	/aane/		35	/kivi/		
5	/kaaru/		36	/waacu/		
6	/lii/		37	/haawu/		
7	/giLi/		38	/kudure/		
8	/ettinagaaDi/		39	/bekku/		
9	/iiruLLi/		40	/khaDga/		
10	/niiru/		41	/mukha/		
11	/uyyaale/		42	/gaNapati/		
12	/kuri/		43	/naalige/		
13	/miinu/		44	/ghanTe/		
14	/uuTa/		45	/meegha/		
15	/muuru/		46	/ciTTe/		
16	/ele/		47	/camaca/		
17	/beralu/		48	/chatri/		
18	/guube/		49	/jaarobanDe/		
19	/eeNi/		50	/cimpanji/		
20	/Teebal/		51	/jhiibra/		
21	/onTe/		52	/Tivi/		
22	/moTTe/		53	/gaalipaTa/		
23	/aaTo/		54	/Thasse/		
24	/ooTa/		55	/piTha/		
25	/kooLi/		56	/Dabba/		
26	/aidu/		57	/gaDiyaara/		

27	/rali/			58	/Dhakke/		
28	/kai/			59	/KaNNu/		
29	/auSadha/			60	/taTTe/		
30	/sauTu/			61	/kattari/		
31	/baubau/			62	/thaDi/		

	Stimulus	S1	S1+S2
63	/ratha/		
64	/daara/		
65	/badaneKaayi/		
66	/dhanassu/		
67	/bandhana/		
68	/navilu/		
69	/mane/		
70	/pennu/		
71	/kappe/		
72	/phala/		
73	/jiraaphe/		
74	/baagilu/		
75	/seebinahaNNu/		
76	/bharaNi/		
77	/sabhe/		
78	/maavinahaNNu/		

79	/aame/		
80	/raste/		
81	/mara/		
82	/langa/		
83	/huli/		
84	/shankha/		
85	/kaLasha/		
86	/SaTkona/		
87	/ruSi/		
88	/sara/		
89	/bassu/		
90	/hasu/		
91	/simha/		
92	/maLe/		

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Note: a) target phonemes are in bold letters

b) position and use of

i. Lips

ii. Tongue -

iii. Nose -

iv. Larynx -

c) i. Voice -

ii. Prosody -

iii. Others -

3. Stimulus cards - Set B

It has one hundred and three words written using Kannada graphemes, one word on each card of 6" x 4". Each word has a cluster in different word position. The test is constituted to tap the production of clusters. The task may be carried out, by asking the child to repeat the words uttered by the tester or to read the words shown. If the child has acquired reading skills, any one of the options may be used. When reading skills are not achieved, repetition may be employed.

4. Stimulus word list - B

The word list has one hundred and three words in it. The words have

- (i) Geminated clusters (CC/C₁C₁) in the medial position.
- (ii) Non-Geminated clusters (CC/C₁C₂) in the initial position
- (iii) Non-Geminated clusters (CC/C₁C₂) in the medial position.
- (iv) Non-geminated clusters (CCC/C₁C₂C₃) in the initial position
- (v) Non-geminated clusters (CCC/C₁C₂C₃) in the medial position.

It is used along with the Set - B to record the responses. There is a column to record the responses against each word. Stimulus word list B is illustrated here.

PHONOLOGICAL PROFILE IN KANNADA**STIMULUS WORD LIST B (CLUSTERS)**

Name: _____ No.: _____
 Date: _____ Age and Sex: _____
 Tester: _____ Name of the school: _____
 Response: Reading/Repetition

Geminated Clusters			Non-Geminated Clusters		
Medial (CC)			Initial (CC)		
1	/akka/		19	/krimi/	
2	/hagga/		20	/klesha/	
3	/accu/		21	/khyaata/	
4	/ajji/		22	/glaani/	
5	/kaTTige/		23	/graama/	
6	/duDDu/		24	/tyaagi/	
7	/ettu/		25	/drooha/	
8	/haddu/		26	/dvitiya/	
9	/anna/		27	/dhyeeya/	
10	/appa/		28	/dhvaja/	
11	/habba/		29	/nyaaya/	
12	/amma/		30	/pradeesha/	
13	/ayya/		31	/brahma/	
14	/karrage/		32	/bleedu/	
15	/kallu/		33	/skuuTar/	
16	/avva/		34	/sTampu/	
17	/manassu/		35	/stambha/	
18	/kaLLa/		36	/snaana/	
			37	/spandhana/	
			38	/sraava/	
			39	/svacha/	
			40	/hrasva/	
			Initial (CCC)		
			41	/skruu/	

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Note: Target clusters are in bold letters

Non-Geminated Clusters				
Medial (CC)				
42	/rakta/		74	/janapriya/
43	/vaakya/		75	/viplava/
44	/cakra/		76	/shabda/
45	/vikhyaata/		77	/abhyaasa/
46	/agni/		78	/sambhrama/
47	/aarogya/		79	/taamra/
48	/anugraha/		80	/aamla/
49	/krutagnate/		81	/baydu/
50	/shiighra/		82	/shilpa/
51	/suucya/		83	/palya/
52	/raajya/		84	/kartavya/
53	/vajra/		85	/aashcarya/
54	/caTni/		86	/parishrama/
55	/naaTya/		87	/vishva/
56	/iDli/		88	/sruSTi/
57	/jaaNme/		89	/niSThe/
58	/araNya/		90	/puSpa/
59	/taatkaalika/		91	/bhaviSya/
60	/ratna/		92	/biskaTu/
61	/taatparya/		93	/poosTbaaksu/
62	/agatya/		94	/aasti/
63	/gaatra/		95	/paristhiti/
64	/utsaaha/		96	/vismaya/
65	/udgaara/		97	/sasya/
66	/yuddha/		98	/sahasra/
67	/padya/		99	/baahya/
68	/candra/		100	/aahlada/
69	/adhyakSa/			
70	/maalinya/			
			Medial (CCC)	
71	/anveeSaNe/		101	/svaatantrya/
72	/trupti/		102	/astra/
73	/svapna/		103	/raaSTriiya/

5. Story charts - Set C

Set C comprises of a set of stories. Each story is depicted in the picture form, which is accommodated in a single page. These story charts are used to elicit spontaneous speech.

Ex: a) The thirsty crow b) Monkey and capseller c) The clever fox d) The Lion and the rat e) The clever crow f) Unity is strength g) The golden egg

Part II. Development of the Phonological profile

The profile has the inventory of vowels, diphthongs, consonants and clusters. The Phonological profile has five sub sections:

- Subsection 1. Consonant Analysis
- Subsection 2. Cluster Analysis
- Subsection 3. Vowel and Diphthong inventory and their processes
- Subsection 4. a) Speech Intelligibility scale b) Factors affecting intelligibility
- Subsection 5. Phonological summary

Subsection 1. Consonant Analysis

The consonants are analysed in five ways:

- a) according to position in the word
- b) according to place of articulation
- c) according to manner of articulation
- d) according to phonological processes involved
- e) according to the developmental model

The analysis of position in the word is divided into initial and medial positions, as consonants do not occur in the final position in Kannada language. The place and manner analysis is accomplished through the use of consonant grouping for manner and color coding for place. The profile has separate sections for recording substitution processes, assimilation processes and syllable structure processes.

The inventory of Kannada phonemes is divided into developmental stages. It allows an assessor to see whether or not the child is following a normal hearing developmental pattern. A pilot study was carried out to study the normal phonological processes occurring in children. The results obtained are given in the Table 1.

Table 1: Phonological processes occurring in normal children

	Stage 1 2 years	Stage 2 3 years	Stage 3 4 years	Stage 4 > 4 years
1	Fronting of Retroflex	Fronting of Retroflex	Fronting of Retroflex	h deletion
2	Stopping	Stopping	Cluster reduction	Deaspiration
3	Fronting of palatals	Devoicing	h deletion	Cluster reduction
4	Metathesis	h deletion	Deaspiration	
5	Initial consonant deletion	Lateral replacing flap	Disappearing processes	
6	h deletion	Deaspiration	Lateral replacing flap	
7	r deletion	Cluster reduction	Devoicing	
8	Cluster reduction	Assimilation	Stopping	
9	Devoicing	Nasalization		
10	Deaspiration	Voicing		
		Disappearing processes		
		Metathesis		
		Fronting of palatals		
		Initial consonant deletion		
		r deletion		

The information given in the Table 1, guides in dividing the inventory of Kannada phonemes into developmental stages. These stages are not discrete but grouped as such for ease of usage. The approximate age (+/- 6 months) for normal hearing child is as follows:

Stage 1 - 2 years

Stage 2 - 3 years

Stage 3 - 4 years

Stage 4 > 4 years

Subsection 2. Cluster Analysis

The clusters are classified into geminated and non-geminated clusters and two and three consonant cluster categories. The cluster analysis is also divided into initial and medial positions.

Subsection 3. Vowel and Diphthong inventory and their processes

Vowels are classified into front, central and back vowels. They are seen in initial, medial and final positions. Long vowels do not usually occur in the final position. Diphthongs are also analysed in initial, medial and final positions. The boxes in the profile allow to record the phonological process affecting vowels, diphthongs and consonants against each of the phonemes.

Subsection 4. Speech Intelligibility

a) Speech Intelligibility scale reflects the number of words which could be understood out of the total number of words spoken. Speech intelligibility may be measured from the recorded continuous speech sample and analyzed. The percentage of words understood is transferred to the scale in the profile.

b) Factors affecting intelligibility are voice (in terms of pitch, volume, nasality and tongue position), prosody (in terms of stress, intonation, pausing and rating) and others such as listening skills, use of aids, etc. All these aspects are evaluated from the continuous speech sample and are noted in stimulus word list A sheet in the space provided for the same.

Subsection 5. Phonological summary

The phonological summary helps the assessor to examine the various views of the data that the profile provides. The examiner can find out the stage the child is at. He can determine the vowels, consonants, clusters the child has acquired and what needs to be worked upon. The color coded aspect of the profile helps the assessor to examine if any specific place of production is causing difficulty. Similarly, the examiner can see whether different grouping of consonants reveals any pattern of error in the manner of production. The process section encompasses all the processes involved. The layout of the vowel information allows for a high/low and front/back examination of error pattern. The clusters are examined separately. The assessor considers the developmental stage the child is at, before setting any goals that address cluster production. The phonological summary also provides information about the developmental stage of the child and its speech intelligibility. Phonological profile developed in Kannada, which is on both sides of a sheet is being sent as two attachments (A side and B side).

Procedure

Phonological assessment involves three tasks. The test is to be carried out in a quiet, undisturbed environment.

Task 1 – Elicitation of picture naming

The subject is shown one picture (S1) at a time using Set A covering the word written at the bottom of the page. The subject is instructed to name the picture shown. The examiner would ask, what is this? What is he doing? or What is it doing? depending on the target word to be elicited. If a correct response is

obtained, a ✓ is put, if an incorrect is obtained, it is simultaneously transcribed using broad transcription in the first response column against the stimulus word, in the stimulus word list A. For the incorrect response, a clue is provided, written word of the picture (S2) is shown by uncovering the written word. If a correct response is obtained, then a ✓ is put or if an incorrect is obtained, it is simultaneously transcribed using broad transcription in the second response column against the stimulus word. Then, the next picture is shown covering the written word. In the stimulus word list A, two columns are provided to record the responses in two conditions. One of the conditions (S1) is, only when picture is shown and the second condition (S1+S2) is, when both picture and written word are shown. The inclusion of the second stimuli in the picture naming task enhances the elicitation of the phoneme production as per the results of the study carried out by Ramadevi and Prema (2002). The bold letter indicates the target phoneme but focus is on the whole word. Each word transcribed is analyzed later for the phonological processes involved.

Task 2 – Elicitation of words having clusters

The subject is asked to read the written word as each card is shown from the Set B. If a correct response is obtained then a ✓ is put or if an incorrect response is obtained, the whole word is simultaneously transcribed in the response column of the stimulus word list B. The bold letters indicate the target clusters.

Task 3 – Elicitation of spontaneous speech

Story charts are shown to obtain spontaneous speech sample. The subject is asked to narrate the stories looking at the pictures. When he fails to do so, he is asked to narrate any incident or story or he is involved in a conversation to elicit a continuous speech sample. A sample of 15-20 utterances is taken. The responses obtained for all the three tasks are tape recorded.

Transcription

The whole-word broad transcription method is employed, i.e., client's entire production is recorded. The focus of transcription is not on the production of a target sound in a specific position, but on the production of the whole word. All sounds in the word are considered. While making transcriptions, assessor relies primarily upon auditory perceptual judgments. The symbols used in the study are given by Schiffman, H (1979) for Kannada phonology.

Transference of information to the profile

1. The patient identification details are filled first.
2. The voice and suprasegmental information on the cover page of the profile is completed.
3. Phonological Details

Each word transcribed in the wordlists A and B are analyzed for phonological processes involved. Phoneme and process information are transferred to the phonological analysis section of the profile. Information about every target phoneme would appear on the profile. A tally of the occurrence of each sound production is included. For ex: Child has produced initial /k/ as: /t/ (4 times), /d/ (once), /g/ (twice) and /p/ (twice) in the nine examples of intended /k/ from the data. All of this needs to be noted on the inventory.

Whilst filling out the inventory, the processes sections are also completed. The consonant inventory includes a line for each consonant's substitution processes. If a consonant production is correct a ✓ is put against the consonant in the appropriate column. When an inappropriate production is obtained, the process involved is listed on the line. For e.g. the student who produces /s/, 5 times as /t/ and 3 times as /ʃ/ is showing the processes of both stopping and palatalization for the phoneme /s/ both of which are noted on the relevant line. Assimilation is noted in the assimilation section. Consonant syllabic changes are noted in the syllabic processes section. In the vowel and diphthong inventory for the correct phoneme production a ✓ is put. For incorrect responses vowel and diphthong processes are noted and transferred to the processes affecting vowels and diphthongs section. When the production of clusters in the word is correct, a ✓ is put, against the target cluster in the cluster section. If the cluster production is faulty, the resultant form is recorded against the target cluster.

The percentage of words understood in the spontaneous speech sample is transferred to the Speech Intelligibility rating scale.

Conclusion

The present study is carried out to design a tool for phonological assessment in children. The profile gives information about the production of vowels, diphthongs, consonants and clusters of Kannada language. It also provides details regarding phonological processes involved and speech intelligibility. Details of the construction and description and methods of administration of the profile and recording and analyzing the responses are mentioned.

The Phonological profile designed provides an in depth phonological assessment of Kannada speaking normal children and also children exhibiting phonological disorders. Children with hearing-impairment, mental retardation, autism, speech disorders, language disorders, speech and language disorders, apraxia, specific language impairment, et.c. may be associated with phonological disorders for whom the assessment tool forms a very useful device.

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