

## **Rhyme and Phonemic Awareness Skills in Kannada Speaking Children with Cerebral Palsy**

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**Abstract**

Rhyme and phoneme awareness are skills that are essential for learning to read and spell. Their significance has been well established in alphabetic languages. Few studies have ventured to understand these skills in an alpha-syllabary language such as Kannada, where their significance has been debated. However, research related to these skills in childhood conditions like cerebral palsy is scarce. The present study aimed to understand the rhyme and phonemic awareness skills through the tasks of rhyme recognition, phoneme stripping and phoneme oddity for non-words using Metaphonological Skills Test (Prema, 1997). The participants were Kannada speaking children with cerebral palsy (n=12) and language-age (> 8 years) matched, typically developing peers (n=30). The results showed a significant difference between groups for phoneme stripping alone. This implies a lag in the development of phoneme awareness skills in children with cerebral palsy (CWCP). This necessitates early metaphonological instruction and inclusion in the educational curriculum of CWCP.

**Key words:** Rhyme awareness, phoneme awareness, syllabary, Kannada language, cerebral palsy, phoneme stripping, phoneme oddity.

## **Introduction**

Metaphonological awareness is the ability to consciously and purposefully reflect on the sound structure of language (Gillon, 2004). It is an umbrella term that includes word, syllable, onset-rime and phoneme awareness. Phoneme awareness is the last skill to develop (Catts, 1991) following word, syllable and onset-rime awareness. This skill is not possessed by pre-literate children (Dodd & Gillon, 2001) but develops with exposure to literacy (Anthony & Francis, 2005). Rhyme awareness includes the ability to identify, generate and judge rhymes whereas phoneme awareness involves being able to blend, segment and manipulate phonemes.

In alphabetic languages, rhyme and phoneme awareness play an important role in learning literacy skills (Adams, 1990). Phoneme awareness influences spelling (Juel, Griffith & Gough, 1986) and along with letter knowledge, aids in sounding out unfamiliar words (Muter, 1996). Rhyme awareness aids children in reading unfamiliar words (Goswami & Bryant, 1990), adds advantage to reading by analogy (Anthony & Lonigan, 2004) and may aid in reading and spelling words that are similar (Goswami & Bryant, 1990). Sensitivity to rhyme predicts reading and spelling skills (Goswami & Bryant, 1990; Muter, Hulme, Snowling, & Taylor, 1998). Children who learn to read quickly possess better rhyme and phoneme detection ability (Wagner & Torgesen, 1987). Development of phoneme awareness and the ability to reliably identify rhymes occurs within 5-7 years of age (Hodson, 2005, cited in Rhyner, 2009).

Although these metaphonological skills have been less studied in non-alphabetic languages (Mann, 1986; Leong, 1991; Loureiro et al., 2004), rhyme

**Language in India** [www.languageinindia.com](http://www.languageinindia.com) ISSN 1930-2940 **15:1 January 2015**

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awareness and phoneme awareness have been investigated in Kannada by few researchers in typically developing children (Prakash & Rekha, 1992; Prema, 1997; Ramakishan, 1989). Rhyme recognition develops earlier with scores approximating maximum in Grade 3 while the skills of phoneme deletion and oddity improve across grades to beyond fifth grade (Prema, 1997). The skills of rhyme recognition, phoneme oddity and phoneme deletion show significant correlation to reading performance in Grade 2 whereas in Grade 3, only phoneme deletion continues to show a significant correlation with reading (Prakash, Rekha, Nigam, & Karanth, 1993). At present, a consensus exists that these skills may not play as crucial a role in reading in alpha-syllabary languages when compared to alphabetic languages. However, instruction focussing on improving metaphonological skills in Kannada-speaking (Shilpashri, 2004) and Malayalam-speaking dyslexics (Ponnumani, 2003) has proved beneficial.

In CWCP, the development of phonological skills is influenced by the accompanying dysarthric speech impairment. Rhyme recognition skills of verbal CWCP were on par with typically developing children when stimuli were presented verbally (Bishop & Robson, 1989). Children with impaired but intelligible speech performed significantly poorer on phoneme awareness tasks compared to children with natural speech (Vandervelden & Siegel, 1999). Brewis (2002, cited in Card & Dodd, 2006) stated that structured training of phonological awareness skills is necessary in CWCP based on observations of their literacy learning. The domain of rhyme and phoneme awareness in CWCP exposed to Kannada has not been explored. The aim of this study was to understand the rhyme and phonemic awareness skills in Kannada-speaking verbal CWCP. The objectives were to compare the skills of rhyme recognition,

phoneme stripping and phoneme oddity between CWCP and typically developing peers.

## **Methodology**

This observational study which utilised convenience sampling was part of a larger study delving into the metaphonological skills of CWCP speaking Kannada. It included the study of syllable awareness skills (Selvakumar, John, Kanaka & Rajashekhar, 2014) which involved the same study participants who were allocated into two groups. Group 1 comprised of CWCP (n=12; 08 – spastic cerebral palsy, 04 – mixed cerebral palsy) while Group 2 (n=30), of typically developing peers matched for language age of 8 years through informal language evaluation. The chronological age of CWCP ranged from 10 to 19 years while that of typically developing peers was 8 years. CWCP were in a special school with an average of 6.25 years of literacy experience. Typically developing children were in a regular school with an average of 3.8 years of literacy experience. The native language of all the children was Kannada and both groups had normal hearing and vision. Those with multiple disabilities and recurrent middle ear infections were excluded from the study. Informed consent was obtained from all the study participants and their parents/teachers. This study received ethical clearance.

The test of choice was the Metaphonological Skills Test (Prema, 1997) containing the sections of rhyme recognition, phoneme stripping and phoneme oddity (non-words). Prior to test administration, practice items were presented and the children familiarized with the task. Responses were recorded and analysed. Maximum obtainable score in each section is 12. For the task of *rhyme recognition*, two words were presented at a time. Each child was required to say verbally if the two words rhymed or not, or else point to a correct mark to

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indicate ‘rhyming’ and an incorrect mark to indicate ‘not rhyming’. Three practice items were administered first. For the task of *phoneme stripping*, the participants were instructed to produce a said word after deleting a target sound from it. e.g.: /se:du - s/ = ? Their understanding of the task was checked by administering the eight practice items, followed by the 12 test items. In *phoneme oddity*, four words were presented in order and the children were instructed to indicate which word was the ‘odd one out’ through either of two response modes i.e. a verbal response or else a pointing response wherein he/she was shown four squares each containing a number from one to four, among which he/she was required to point to the number of word which was the ‘odd one out’. Four practice items were completed initially. The 12 test items were administered later.

Mean and Standard deviation were obtained for rhyme recognition, phoneme stripping and phoneme oddity. SPSS software (version 16.0) was used to perform the Student t-test (independent samples) to compare the performance of both groups (p value < 0.5).

## **Results & Discussion**

The current study aimed to investigate the rhyme and phonemic awareness skills in Kannada speaking CWCP. The results are discussed below in terms of the performance in rhyme recognition, phoneme stripping and detection of phoneme oddity for non-words.

### **Rhyme Recognition**

In rhyme recognition, CWCP had a mean of 11.33 (SD=1.23) and typically developing children, 11.73 (SD=0.69) as depicted in Table 1. No statistically significant difference between the means of both groups was

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evident. A lack of significant difference between both groups along with the fact that performance had almost approximated the maximum indicates that this task was relatively easy.

Table 1 - Overall mean performances in rhyme recognition

<i>Sub-tests</i>	<b>Group 1*</b>		<b>Group 2*</b>		<i>t value</i>	<i>'p' value</i>
	<i>Mean</i>	<i>S.D</i>	<i>Mean</i>	<i>S.D</i>		
<b>Rhyme Recognition</b>	11.33	1.23	11.73	0.69	-1.34	0.188

(\*Group 1 = CWCP, \*Group 2 = Typically developing children)

Dahlgren Sandberg (1998) explained that rhyme recognition would be the easiest among different phonological awareness tasks since a bigger unit is involved here, the processing steps involved are few (perception of stimuli, holding them in memory, comparing and making the judgement) and no active manipulation of the sound is required. Prema (1997), Akila (2000) and Seetha (2002) have reported that rhyme recognition abilities approximate the maximum by Grade 3 i.e. by 8 years of age in typically developing children exposed to non-alphabetic languages of Kannada, Tamil and Malayalam respectively. The findings of this study are in consonance with their findings since children in both groups had a language age greater than 8 years of age. Card and Dodd (2006) also reported that verbal CWCP with age comparable to that in the current study performed as well as typically developing controls on the spoken rhyme recognition task.

### **Phoneme Stripping**

In phoneme stripping, CWCP exhibited a mean of 5.5 (SD=2.59) and typically developing children, 8.03 (SD=2.60) as shown in Table 2. Statistically

significant difference was obtained between the means of both groups with a ‘p’ value of 0.011 indicating that the performance of typically developing children was significantly better than CWCP.

Table 2 - Overall mean performances in phoneme stripping

Task	Group 1*		Group 2*		t value	‘p’ value
	Mean	SD	Mean	SD		
Phoneme Stripping	5.5	2.59	8.03	2.60	-2.66	0.011

(\*Group 1 = CWCP, \*Group 2 = Typically developing children)

Card and Dodd (2006) explained that this task of phoneme deletion depends on an access to the articulatory code wherein children must covertly rehearse the stimulus in order to be able to delete the target sound or else in order to execute this task they must be able to mentally visualize the stimulus, delete the phoneme and read out the answer. Peeters, Verhoeven, de Moor and van Balkom (2009) also highlighted on the facilitating role of overt or covert speech, explaining that children who use overt or covert skills in different phonological awareness tasks are likely to have better phonological awareness skills. In the current study, it was observed that children tended to overtly repeat the stimulus before responding with the answer. This was more so in CWCP i.e. they relied on the articulatory code to a greater extent rather than depending on the mentalised visual representation. Hence, the poor performance of CWCP is not due to difficulty in accessing the articulatory code but to insufficient exposure to Kannada orthography. The significantly better performance of typically developing children in this task could possibly be attributed to their awareness of Kannada orthography since non-alphabetic scripts also facilitate

development of phonemic awareness due to alphabetic like features of the script (Morais, Cary, Alegria, & Bertelson, 1979; Akila, 2000).

When an error analysis was done, it revealed that deletion of a phoneme from a consonant cluster was very difficult and that children from both groups tended to delete the entire cluster/syllable. For example, if /s/ is to be removed from /svΛru:pΛ/, the expected answer is /vΛrupΛ/. However, majority of children in both groups came up with the answer of /rupΛ/ by deleting the syllable /svΛ/. This response was observed recurrently. This finding is in consonance with that of Anthony and Francis (2005) who reported that in phoneme level tasks, consonants in clusters are relatively difficult to manipulate. Another study that lends support to this finding is that of Bruce (1964), who reported that phoneme deletion tasks involving clusters in words is difficult until age 9 or 10 for most children.

It was also observed that typically developing children tended to produce the word after removing the entire syllable containing the target phoneme to be deleted instead of producing the word after deleting the target phoneme alone. For example, if /m/ was to be removed from /mi:nu/ , the expected answer was /i:nu/. However, the observed response was /nu/. In spoken Kannada, the smallest unit is a syllable, not a phoneme wherein the consonant has primary position with the attached vowel being represented in a secondary form. When a consonant phoneme is to be deleted from a syllable, the secondary form of the vowel is to be retained. Since the children were unable to retain the secondary features of the vowel, it implies that they treated the syllable as the smallest unit and deleted it. It can therefore be hypothesised that the phoneme deletion skills of the typically developing children can further improve with the provision of more explicit instruction in English.

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## Phoneme Oddity

With respect to phoneme oddity in non-words, CWCP had a mean of 5.45 (SD=1.43) and typically developing children had a mean of 5.82 (SD=1.80) as shown in Table 3. No statistically significant difference between the means of both groups was obtained.

Table 3 - Overall mean performances in phoneme oddity

	Group 1*		Group 2*			
<i>Sub-tests</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>t value</i>	<i>'p' value</i>
Phoneme Oddity	5.45	1.43	5.82	1.80	-0.601	0.55

(\*Group 1 = CWCP, \*Group 2 = Typically developing children)

The performance of both groups was nearly the same with the poorest scores being obtained on this task when compared to all the other tasks. In general, oddity tasks are reported to be more difficult than deletion tasks and they develop later since they require mediation of higher cognitive skills apart from metaphonological skills as reported by Van Kleeck (1982). Prema (1997), Akila (2000) and Seetha (2002) also have reported poorest performance on phoneme oddity tasks when compared to other tasks in Kannada, Tamil and Malayalam respectively. They reported that scores on this task did not approximate maximum even by seventh grade (12 years of age) suggesting that the development of this metaphonological skill is not complete by 12 years of age and progresses beyond that age.

In phoneme oddity, CWCP found it more difficult to detect the 'odd one out' among the four words when the common phoneme was a vowel rather than

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a consonant. Similar findings were noted for the typically developing children. For example, the children found it more difficult to detect which word was the odd one out if the stimulus was /soVΛ - ture - dike - bΛtʃe/ rather than /tʃoti - bikΛ - tʃemΛ - tʃuli/. (In the above examples, the ‘odd one out’ has been underlined.) Prakash et al., (1993) reported that typically developing, native Kannada speakers found deletion of a consonant phoneme in the phoneme deletion task easier than deletion of a vowel phoneme. This is attributed to the fact that in Kannada, it is the consonant that is stressed in a syllable. Hence, they reported that more attention is paid to the consonant which occurs in its primary form and less attention to the vowel which commonly occurs in secondary form when in combination with a consonant. This can be extrapolated to support the finding in the current study i.e. detection of phoneme oddity when the common phoneme is a consonant is easier than when it is a vowel phoneme since it is the consonant which is stressed.

Despite CWCP having almost double the years of school exposure compared to the typically developing children, performance on the metaphonological skills tasks was not equivalent. This could be due to the academic curriculum followed in a special school being simpler and less demanding than that followed in regular schools. Further, less time is devoted to education as compared to regular schools since children with special needs often require other services such as physiotherapy, occupational therapy and speech therapy.

## **Conclusion**

Despite the fact that both the groups of children were matched for language age of greater than 8 years, the metaphonological skills of CWCP

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were poorer than the typically developing group on the phoneme deletion task. This implies a lag in their development of phoneme awareness skills and is attributable to insufficient exposure to Kannada orthography. This emphasizes the need to target metaphonological instruction early and have it as a part of the educational curriculum of children with cerebral palsy. Focused training in phonological abilities with early practice with word games, manipulation of sounds, and rhymes should be a vital part of their education along with letter knowledge.

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