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Relationship between Phonological Awareness and Reading Abilities in Malayalam Speaking Typically Developing Children

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Introduction

Human communication demands listening and speaking and the use of acoustic and articulatory speech signals which entails phonological processing. Phonological processing refers to cognitive operations that rely on the phonological structure of language for their execution, especially those associated with the recognition, comprehension, storage, retrieval and production of linguistic codes. Phonological processing operations typically function automatically, such as during real time speech perception, but skilled language users gradually

develop the ability to consciously consider and manipulate phonological information (Catts, Fey, Zhang, & Tomblin, 1999).

Phonological processing is in its own right worthy of extensive investigation, but it is the relationship of phonological processing with the development and performance of literate acts, most notably reading and spelling, that confers its prominence for those who study how children and adults use phonological information. It is critical for the development of proficient literacy skills, principally because alphabetic orthographies encode lexical entries more or less at the level of the phoneme, the smallest segment of a spoken language's phonological structure that cues meaningful differences between words.

Researchers have determined three kinds of phonological processing skills that are positively correlated to early reading skills: phonological (phoneme) awareness, phonological memory and phonological naming. Phonological awareness is one's awareness of and access to the sound structure of oral language and refers to the awareness of constituent sounds of words and the ability to detect and eventually manipulate auditory units that do not necessarily hold syntactic meaning (Goswami, 2000; Sodoro, Allinder, & Rankin-Erickson, 2002). According to Torgesen (1996), phonological memory (sometimes called memory span) is a process by which individuals store phonological codes in their working or short-term memory. Phonological naming refers to the rapid retrieval of phonological codes or information from long-term memory, typically assessed by tasks that involve rapidly named items such as pictures of common objects, colors, digits, or letters (Wolf, Bowers & Biddle, 2000).

Phonological Awareness and Reading

The relationship between reading and phonological awareness was studied by Liberman and colleagues since 1970s (Liberman, 1973; Liberman, Shankweiler, Fisher, & Carter, 1974). The difficulty in phonological awareness has an impact on one's ability to learn to read, as learning about letters and the sounds they represent requires an awareness of the phonemes in words. During the past three decades, voluminous amount of research supports the existence of causal relation between phonological awareness and reading acquisition in alphabetical languages.

Many studies on first language reading have consistently found that among phonological awareness skills, phonemic awareness is a powerful predictor of future reading success (Liberman, Shankweiler, Fischer, & Carter, 1974; Lundberg, Wal, & Olofsson, 1980; Mann & Liberman, 1984; Share, Jorm, MacLean, & Mathews, 1984; Stanovich, Cunningham, & Cramer, 1984; Tunmer & Nesdale, 1985). Later Hulme et al., (2002) also reported that the phonemic awareness is a better predictor of early reading skills than onset-rime awareness.

Some research indicates that explicit training in phonemic tasks improves reading achievement (Bradley & Bryant, 1985; Lundberg, Frost, & Peterson, 1988; Cunningham, 1990; Ball & Blachman, 1991; Lie, 1991). In a longitudinal study Lonigan, Burgess, and Anthony (2000) followed a group of children from late preschool into kindergarten and first grade, and found that phonological awareness was the most stable and strong indicator of later reading skills, compared to many other predictors.

In another set of data, Catts, Fey, Zhang, and Tomblin (2001) identified that a kindergarten measure of phonological awareness was one of five factors that predicted the presence of a reading disability in second grade. Morais and colleagues (1979) showed that Portuguese adults who had not learned to read performed poorly on phonological awareness tasks than adults, who were illiterates but had subsequently learned to read. McBride-Chang and Kail (2002) measured phonological awareness in Chinese children and English speakers and found that syllable awareness predicted reading in Chinese children and in English speakers reading was predicted by syllable and phonemic awareness.

The relationship between phonological awareness and reading appears to exist even after accounting for variance due to factors such as IQ, vocabulary, memory, and social class (Bryant, MacLean, Bradley, & Crossland, 1990). The importance of phonological awareness assessment has been extended to separate good readers from poor readers. Smith, Simmons and Kameenui, (1995) stated that the presence of phonological awareness was a hallmark characteristic of good readers while its absence was a consistent characteristic of poor readers.

In general, there are three different views about the relations between phonological awareness and reading. The first view is that phonological awareness abilities influence

subsequent reading skills. Persuasive evidence for this view comes from longitudinal studies that showed phonological awareness to be a significant predictor of later reading skills (Wagner, Torgeseen, & Rashotte, 1994), and from intervention studies that showed children to progress in reading abilities due to training programs aimed at the improvement of phonological awareness (Hatcher et al., 2006).

In addition, reading programs that have included explicit instruction in phonological awareness and phonetic decoding skills have shown improved reading performance in children who have low phonological awareness (Torgesen, Wagner, & Rashotte, 1994). Advocates of this view state that the relation between phonological awareness and reading is stable across time.

The second view is that phonological awareness develops as a consequence of learning to read, as demonstrated by research that showed illiterate adults and readers of a non-alphabetic script to have no awareness of phonemes (Lukatela, Carello, Shankweiler, & Liberman, 1995).

The last view is that the relation is bidirectional: the more rudimentary levels of phonological awareness promote the reading development, and, in turn, reading skills may influence the higher levels of phonological awareness (Perfetti, Beck, Bell, & Hughes, 1987).

Researchers have also found that training in phonological awareness resulted in improved reading scores (Chaney, 1998). Bradley & Bryant (1983) reported that children who get training in phonological awareness skills such as rhyme and phoneme categorization will be reading better than children who were not trained in phonological awareness skills. In a longitudinal study done in England by Bradly and Bryant (1983, 1985) in 400 children of four to five years of age, reading and spelling achievement were measured before and after three years. They found that the phonological awareness training improved the skill of connecting the sound segments in words to their corresponding letter symbols. And after three years when they see for the spelling, reading achievement increased due to phonological awareness training. They also point out that phonological awareness skills are precursors to reading.

Byrne and Feilding-Barnsly (1991, 1993) conducted a longitudinal study in 128 preschool children who were 4 years of age. Here in 1991 the control groups were given regular preschool training and the experimental groups were given phonological awareness training, and

at the end of the training they were taught the letters that represented each phoneme. The experimental group outperformed the control group in both trained and untrained sounds, and the experimental group outperformed control group in word recognition test by decoding unfamiliar words. The experimental group also performed better in letter knowledge.

This provides evidence that the phonological awareness along with the letter knowledge instruction results in acquiring alphabetic principle. In the follow up study in 1993 tests like phoneme identification, phoneme omission, alphabet knowledge, word identification, non-word identification and spelling were administered in 63 experimental group children and 56 control group children. And the results showed that there were only two significant differences between the groups that are the group which was trained in phonological awareness skills performed better in reading non-words and identifying the final phonemes. As the individual differences in phonological skills in kindergarten are causally related to individual differences in subsequent growth of reading skills, it provides an important confirmation of phonological deficits as a possible cause of early reading failure (Torgesen, Wagner, & Rashotte, 1994).

Phonological Awareness: Indian Linguistic Context

Unlike in alphabetical languages phonological awareness is found to be not an important factor in children learning to read in alphasylabillary languages like Kannada and Malayalam (Rekha, 1997; Dinesh, 2002). Nag (2007) reported that syllable awareness is better compared to phoneme awareness in Kannada because of the unstable sound unit in the orthographic representations in the language. And she also reported that the phonemic awareness is better at the later developmental stages.

Gokani (1992) did a study in Gujarati speaking children in both English medium and Gujarati medium and found a relationship between phonological awareness and orthographic features in learning to read. The finding revealed that the syllable stripping task of phonological awareness had better scores for children who were exposed to semi-syllabic script than for those children who were exposed to alphabetical script. And in phoneme stripping task of phonological awareness the scores were better for children who were exposed to the alphabetic language. This is because the phoneme stripping tasks are very sensitive to orthographic variations.

Iyyer (2000) did a study in Malayalam speaking children of grades one through four to find the relationship between reading acquisition and metaphonological awareness in Malayalam speaking children. The participants were Malayalam speaking children of four groups, i.e., 20 students each of first to fourth grade. The results showed that the phonological awareness is a significant factor in Malayalam reading, which is proved to be an important factor in reading alphabetic orthographies.

Tiwari, Krishnan, Rajashekhar and Chengappa (2011) investigated the reading acquisition in Malayalam – English biliterates. The participants were 210 children, 30 students each from 1st to 7th grade who were learning to read and write two distinct writing systems alphasyllabic and alphabetic at the same time. Assessments were done on phonological awareness word and non-word reading and orthographic knowledge task in each language. Rhyme recognition, syllable deletion, phoneme deletion and phoneme oddity were the phonological awareness tasks tested. Assessment of reading was done by two reading tasks, words and non-words in each language and orthographic knowledge task checked recognition and recall of letter or akshara in both languages. From this study they found a developmental trend on all tested skills in both languages. In the development of phonological awareness there was an evident difference across the languages and there was a gradual emergence of phonological knowledge in Malayalam when compared to English. They also observed that there was a maturational difference in the phonological awareness tasks across languages. Among the phonological awareness tasks the rhyme recognition and syllable deletion matured faster than phoneme deletion and phoneme oddity.

It is well documented that developmental reading disabilities are a problem with global dimensions (Katzir, Shaul, Breznitz & Wolf, 2004). Emerging data suggests that reading problems manifests in distinctively varied ways in different languages (Katzir, Shaul, Breznitz & Wolf, 2004).

However, most of what is known about the nature and origin of dyslexia comes from studies conducted in English-speaking countries. In fact, about two-thirds of all publications on the topic were conducted with English-speaking children (Ziegler, Perry, Ma-Wyatt, Ladner,

Schulte-Korne, 2003). Nevertheless, behavioral cross-linguistic studies suggest that the nature and prevalence of dyslexia might differ between orthographies (Ziegler & Goswami, 2005).

Although many researchers claim a causal relationship between phonological processing and reading, some claim that additional research should be conducted to provide unequivocal evidence for a causal relationship (Castles & Coltheart, 2004). Phonological processing skills are reported to have a crucial role in reading English (Wagner, Desmond, Demb, Glover, & Gabrieli, 1997).

Studies have shown that depending on the type of orthography of the language learned, phonological processing skills seem to affect reading to different degrees. Unlike English language which is alphabetical in nature, the understanding of contribution of phonological processing skills on reading abilities cannot be generalized to any other languages with different type of orthography, especially Dravidian languages which are transparent, shallow and alpha-syllabic in nature. This requires systematic, well controlled empirical studies to deduce any further understanding.

In 1990's a few Indian languages were studied exploring the relationship between phonological processing skills and reading abilities. However, to be precise, the focus was more on biliterate individuals. The general conclusion of a number of different studies in India is that phonological awareness is a factor in learning to read both alphasyllabary as well as alphabetic languages like English. The understanding of the present literature search revealed that the studies related to these issues are few in Indian languages, Malayalam in particular. The aim of this study is to unveil the relationship between phonological awareness and phonological naming with reading abilities in typically developing Malayalam speaking children within the age range of 5.7 to 8.6 years.

Method

Participants

A total of 60 typically developing children within the age range of 5.7 to 8.6 years participated in this study. All the participants were native speakers of Malayalam selected from

different schools of Malayalam medium in Calicut, Kerala. The participants were divided into three groups based on their age range and standard in which they were studying.

The current study followed a cross-sectional study design and convenient sampling method to select the students from primary schools. The table I depicts details of 60 students selected for the study, in which 20 were from first standard (mean age 6.2 years and age range between 5.7 - 6.6 years), 20 from second standard (mean age 7.1 year and age range between 6.7 -7.6 years) and another 20 students from third standard (mean age 8.2 year and age range between 7.7 -8.6 years). The groups are designated as group1, group2, and group3 for 1st, 2nd and 3rd standard children respectively. In each group the male to female ratio was maintained, with 10 male students and 10 female students.

Groups	Standard	Age – range	Mean age	Female	Male	Total
I	I standard	5.7 - 6.6 years	6.2 years	10	10	20
II	II standard	6.7 - 7.6 years	7.1 years	10	10	20
III	III standard	7.7 - 8.6 years	8.2 years	10	10	20
	Total number					60

Table. I: Details of different participant groups

All the children who participated in the study were selected based on the Inclusion and Exclusion criteria. The inclusion criteria defined was, the participant should fit into the age and standard criteria. They were from the Malayalam medium schools for typically developing children speaking Malayalam as the native language. All the children had average to above average intelligence and reported to have average and above average scholastic performance by the class teacher. The children had normal speech and language development ascertained by an experienced speech language pathologist. All the children had normal hearing sensitivity and normal/corrected normal vision. The children who were not co-operative during the testing and faced difficulty in following the instructions were excluded. All the participants were devoid of

cognitive, sensory, emotional/behavioral deficits. The children with significant reading, writing and mathematical deficits identified by the class teacher were excluded from the study.

Material and Procedures

1. Assessment of Phonological Awareness Skills

In the current study, to assess phonological awareness skills in Malayalam, the stimulus material was separately prepared under various metaphonological tasks. The phonological awareness was assessed at rhyme, syllable and phoneme levels. The tasks included for the study were rhyme recognition, syllable stripping, syllable reversal, and phoneme detection. The developed stimuli were validated by three subject experts with more than five years of experience in the field. Later, the necessary modification was done to have a content validated material for the assessment of phonological awareness skills in Malayalam. Following are the brief description of the material, administration procedure and scoring involved in the assessment of various tasks selected for the study.

a. Rhyme Recognition

It consists of five pairs of practice words and twelve pairs of stimuli words with equal number of rhyming and non-rhyming words which were further randomized in the stimulus list. Prior to the actual testing, child was familiarized with the test procedure. During this process, feedback was given regarding the correctness of the response. There was no feedback given during the experiment. The standard instructions given before the testing was "Listen carefully, I will tell you two words, and you have to tell me whether the words are rhyming or not". Every correct response was scored '1' and '0' for incorrect response.

b. Syllabic Stripping

The developed stimulus list consists of three practice words and fourteen two or three syllabic experimental words. All the stimuli in the list were randomized. Here the child's task was to delete a part of the word (first, second or third syllable) specified by the examiner and to say the remaining part of a word. The order of the missing syllable was varied across trials. The

actual testing preceded a trial testing to familiarize the task to the child. During the trials, child was given the feedback of correctness of the response. Each child was instructed with the standard instruction like "I will tell you a word. Listen carefully. Then, you have to remove a specified part of the word and say the remaining part". The correct responses were scored '1' and '0' for incorrect response.

c. Syllable Reversal

Here the stimulus list consisted of three practice words and twelve experimental words. The task was to reproduce the word in the reverse order, at the syllable level. The task was familiarized to the child using the practice items. Incorrect responses were corrected and the correct responses were praised and no such feedbacks were given during the experimental trials. Every child was instructed using standard instructions "I will tell you a word; listen carefully. Then, you should say the same word again in the reverse order". The test was orally presented and the responses were scored as '1' for correct response and '0' for incorrect response.

d. Phoneme Detection

This task assesses the child's ability to detect phonemes through a categorization task. The stimulus consisted of five practice trials and ten experimental trials. The child's task was to identify the word beginning with a target sound specified from a group of three words. Initially the child was familiarized with practice items. Incorrect responses were corrected and the correct responses were praised and no such feedbacks were given during the experimental trials. Once, the child was familiarized actual testing begun with the experimental trials. The standard instructions were "Listen to the words carefully; your job is to identify the word in which you hear a sound specified by me". The correct identification of the word in which the specified phoneme was heard was scored '1' and incorrect identification of the word was scored '0'.

2. Assessment of Reading Skills

In order to asses reading abilities in Malayalam, initially 400 words were selected from the child's school curriculum from 1st standard to 3rd standard and organized from very simple to complex based on the orthographic representations of words. Later, the words were given for familiarity rating by 3 speech pathologist and 3 school teachers. The rating incorporated was, most familiar (FM), familiar (F) and unfamiliar (UF). The final list of 150 words was prepared utilizing the words which were rated as most familiar in the rating. All the words were organized into simple to complex based on the orthographic representations. The study also involved identification of 51 letters of Malayalam script (15 vowels and 36 consonants). The participants were presented with the words visually and instructed to read out loudly. The accuracy of reading was calculated by scoring '1' for correct and '0' for incorrectly read words and alphabets. The order of presentation was identical, with word reading preceding the alphabet reading.

Results and Discussion

The aim of the current study was to find the relationship between phonological awareness and reading ability in typically developing Malayalam speaking primary school children. A total number of 60 children from first standard to third standards between the age ranges of 5.7 to 8.6 years were selected for the study. They were further divided into three groups group1 (1st standard), group2 (2nd standard) and group3 (3rd standard). All the children were tested for phonological awareness and reading abilities in Malayalam.

Phonological Awareness

The table II and figure 1 shows the mean and standard deviation for all the sub-tests of phonological awareness. In general, the scores of various phonological awareness sub-tests except the phoneme detection score indicate that, the overall performance of group3 was higher when compared to group2 and group1. It is evident from the table II, that the performance of group1 children was poorer in all the tasks except phoneme detection when compared to other two higher groups. The group2 children performed intermediate between group1 and group3 children. These patterns of performance show a definite interaction of the age on phonological awareness skills. The results demonstrated that, rhyme recognition skills were completely

acquired by 2nd standard (7 years), but for the syllable stripping and syllable reversals skills the development is underway even at 3rd grade (8 years). On the contrary, Prema (1997) observed in her study that, the children by grade III approximated the maximum score of 12 on rhyme recognition and syllable stripping in Kannada which is an another Dravidian alphasyllabary language. These discrepancies indicate that the phonological awareness skill development followed different paths within the Dravidian languages. This contradictory findings also demonstrates that, the variation within the alphasyllabary languages itself has an effect on phonological acquisition though the hierarchy in the ease of acquisition remains unchanged. Our findings that the rhyme recognition and syllable stripping were the easiest among other skills under study were supported by her findings.

As it is evident from Table II, amongst phonological awareness skills, the hierarchy of task performance in terms of increasing order of complexity in all the groups was observed to be phoneme detection, rhyme recognition, syllable stripping and syllable reversals. The consistent performance on phoneme detection reaching the maximum score of 10 by all the groups proves that, phoneme detection task is the easiest task amongst all phonological awareness tasks considered in this study. Conversely, the performance of the children in group1, group2 and group3 on syllable reversals were seen to be having mean of 7.55 (SD of 1.50), 9.45 (SD of 1.23) and 11.1 (SD of .97) respectively.

Thus, the poor performance on syllable reversals indicates the complex nature of the task among the phonological skills assessed in the present study. However, the syllable stripping and rhyme recognition skills were placed intermediate. Moreover the rhyme recognition skills were better than syllable stripping skills. The trends of the phonological awareness in the present study are in line with the findings of Sethu (2003) who compared the metaphonological skills of typically developing children with Down's syndrome in Malayalam.

Though the performance was observed to be poorer in children with Down's syndrome in comparison with typically developing children, the performance difference across the tasks would be due to the operational procedure adopted for the task.

The rhyme recognition and phoneme detection item in the present study incorporated comparison tasks which involved the children to make comparison between the sounds in different words.

On the other hand syllable reversals and syllable stripping were the segmentation tasks which involved the children to reverse or delete the individual phonemes in words. In line with our observation, Catts and his colleagues (Catts, Wilcox, Wood-Jackson, Larrivee & Scott, 1997) also claimed that sound comparison tasks are easiest when compared to segmentation and blending tasks. Sound comparison measures are the sensitive at the emergent levels, while blending and segmentation measures are sensitive to difference among children during the later stages of phonological awareness development, which involves the refinements in explicit level of phonological awareness (Torgesen, 1998).

Skills	Maximum scores	1st standard		2nd standard		3rd standard	
		Mean	SD	Mean	SD	Mean	SD
Rhyme recognition	12	11.7	.571	12	0	12	0
Syllable stripping	15	8.95	2.58	12.7	1.884	14.7	.66
Syllable reversal	12	7.55	1.50	9.45	1.23	11.1	.97
Phoneme detection	10	10	0	10	0	10	0

Table II: Describes the mean and standard deviation of sub-tests of phonological awareness for all the three groups.

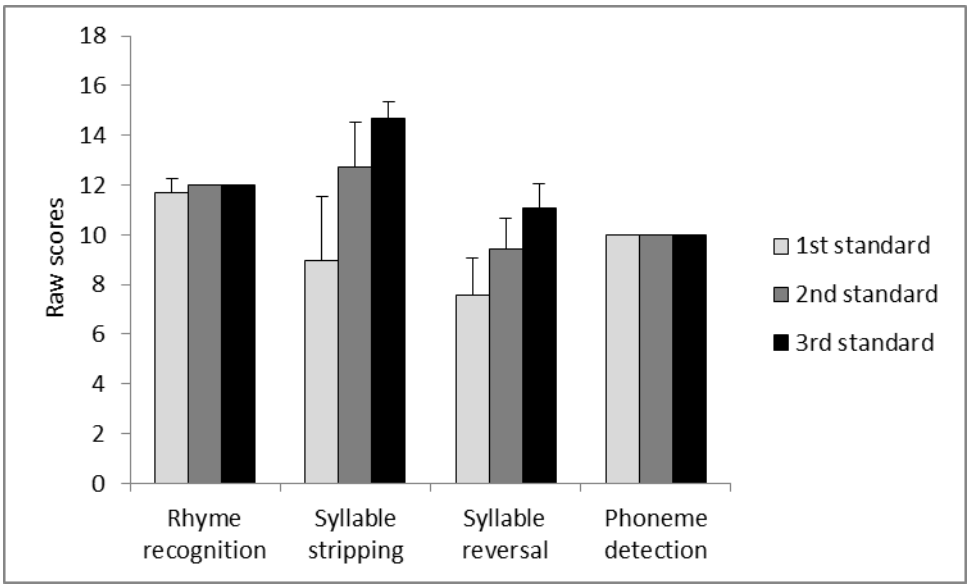

Figure 1: Bar chart depicting the mean scores and standard deviation for all the age group on phonological awareness tasks.

Reading skills

The mean performance of all the three groups on reading letters and words are shown in the table III. In general the performance on reading letters showed increase in the scores as the age increased. The lowest scores were obtained by group1, maximum scores obtained by group3 and group2 being intermediate in line with the observations for other skills. Figure 2, bar chart depicting the mean and standard deviation of reading letters and words for all the three groups. According to the results, it is clear that, no group obtained maximum mean scores (51) and however, group2 and group3 just approximated the maximum score of 51. Thus, it indicates that, the development of reading letters is not yet fully completed even at the age of 8 years; however the acquisition improved from 6 years to 8 years of age. One-way ANOVA showed that all the groups performed significantly different [$F(2, 57) = 74.51$, $p<0.005$]. Subsequent Post-hoc Bonferroni revealed that, all the groups performed significantly different from one another at 0.05 levels of significance. Therefore, the performance of the children increases as the age increases. In contrary, Sethu (2003) compared the reading abilities of children with Down's syndrome and mental age matched typically developing children between the age ranges of 6 to 7.6 years. She confronted that, all the children including children with Down's syndrome

identified all the letters obtaining the maximum score of 51. However in the current study, maximum number of children identified all the letters at the age ranges of 6.7 to 7.6 and 7.7 to 8.6 years.

Tests		1st standard			2nd standard			3rd standard	
	Mean	Mean %	SD	Mean	Mean %	SD	Mean	Mean %	SD
Reading letters	42.05	82%	3.28	48.1	94%	1.65	50.2	98%	.95
Reading words	93.05	62%	25.57	140.8	93%	4.15	148.9	98%	2.38

Table III: Depicting the mean scores, mean percentage and standard deviation of reading letters and words for all the three groups.

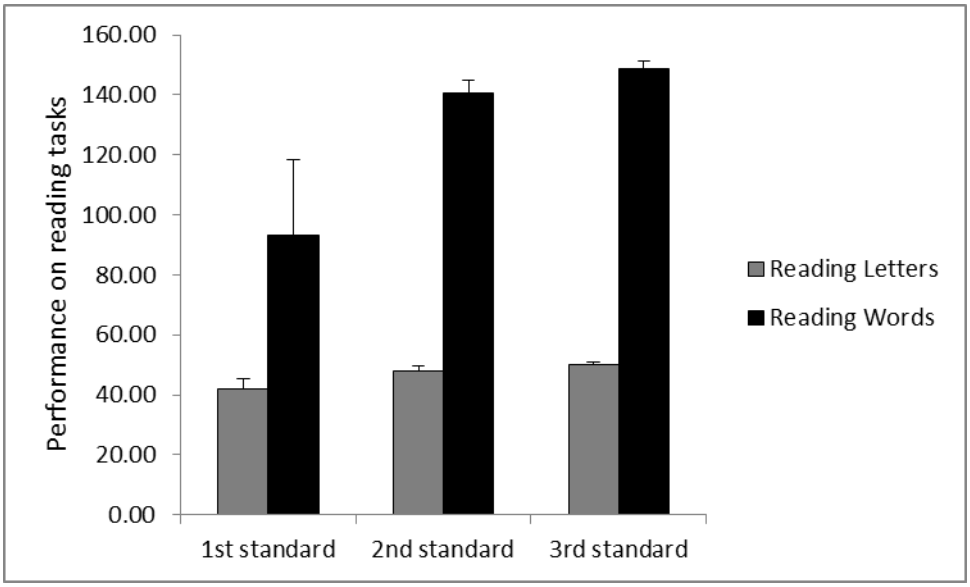

Figure 2: Bar chart depicting mean scores and standard deviation for reading letters and words for all the three groups

Table III also shows, the mean, mean percentage and standard deviation of reading skills at word level for all the three groups. In general, the mean scores of the reading words increased

with the age, group1 is being inferior, group2 being intermediate and group three being superior in performance. This indicates the development of reading skills in a hierarchical manner. One-way ANOVA revealed significant main effect of all the groups [F (2, 57) = 74.51, p < 0.05]. Further, post-hoc pair-wise comparison revealed that the group1 performed significantly different from group2 and group3 at p <0.05. Moreover, the performance of group2 and group3 was statistically insignificant (p >0.05). Therefore, the results of the present study infer that, the reading skills of 6 year old were poorer and different from 7 years and 8 years. However, there is no difference between the performance of 7 year and 8 year old children indicative of plateau in the performance. The present findings are in accordance with the Sethu (2003) observations.

Relationship between Phonological Awareness and Reading Abilities

In order to find the relationship between phonological awareness and reading abilities, Pearson's correlation co-efficient was calculated for the mean scores obtained in all the skills. A two-tailed test to check the significance of correlation was employed and it was calculated separately for each group. From the table IV, it can be observed that, phonological awareness correlated positively with the reading skills.

	PA	Reading
PA	1	0.747**
Reading	0.747**	1

**. Correlations is significant at the 0.01 level (2-tailed)

Table IV: Shows correlation matrix of all the skills for group1.

The correlation analysis did not reveal any significant relationship between phonological awareness skills and reading for group2 and group3, as it can be seen in the table V and VI.

	PA	Reading
PA	1	0.266
Reading	0.266	1

*.Correlation is significant at the 0.05 level (2-tailed)

Table. V: Shows the correlation matrix of all the skills for group2.

	PA	Reading
PA	1	0.041
Reading	0.41	1

**. Correlation is significant at the 0.01 level (2-tailed)

Table. VI: Shows the correlation matrix of all the skills for group3.

The consistency of phonological awareness in predicting the reading and spelling development in typically developing children as well as children with spelling difficulties in many alphabetic writing systems are well established (Muller & Brady, 2001; Caravolas, 2004, 2005). However, this consistency has been questioned by few of the Indian researchers in alphasyllabary languages owing to the change the orthography of the languages itself. Iyyer (2000) conducted a developmental study in Malayalam to understand the contribution of metaphonological skills in reading an Alphasyllabary language in children between I grade to IV grade. She found that phonological awareness appears to be an important factor in reading Malayalam like in any other alphabetical language systems. But, Rekha (1987) failed to observe the same relationship in Kannada language, yet another language possessing the similarities with Malayalam. She concluded that children, who are exposed to semi syllabic scripts thus, can become proficient readers without being good in phonological segmentation tasks. Furthermore, unlike in alphabetical languages phonological awareness is found to be not an important factor in children learning to read in Alphasylabillary languages like Kannada and Malayalam (Rekha, 1997; Dinesh, 2002). However, in the present study, the relationship between phonological

awareness and reading was observed only for the lower age group, i.e., 1st standard children. But this relationship was not seen for group2 and group3. These findings partially support the bidirectional view of phonological awareness and reading which states that, the more rudimentary levels of phonological awareness promote the reading development, and, in turn, reading skills may influence the higher levels of phonological awareness (Perfetti, Beck, Bell, & Hughes, 1987).

Conclusion

Like any other transparent or opaque orthography, in Malayalam too developmental trajectories for phonological awareness, phonological naming and reading have been observed. Regarding the development of phonological awareness, it can be concluded that, phonological awareness development was not completed even at the age of 8 years. Since, there was an existence of strong correlations between phonological processing skills with reading, it can be concluded that, both phonological awareness plays an important role in the acquisition of reading skills. However, in view of insignificant correlations at later age groups between phonological awareness and reading, it can be concluded that the phonological awareness skills are crucial at the younger age but not later in learning to read.

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