PHONOLOGICAL AWARENESS SKILLS AND READING IN CHILDREN WHO ARE AT RISK FOR LEARNING DISABILITY: ROLE IN THE INDIAN CONTEXT?

***Jayashree C. Shanbal, **Goswami S.P., ***Chaitra S., ****Prathima S.**

Abstract

Phonological awareness in young school going children has always been the emphasis on children learning to read and write English, especially in the western context. Its importance and relevance to children learning English in the Indian context has just begun. Whether phonological awareness skills are equally crucial for literacy skills in young Indian children is still been explored. Yet another challenge is to study these skills in children who are at risk for learning disability. Hence, the present study necessitates to research phonological awareness skills in typically developing children and in children who are at risk for learning disability. The aim was to study phonological awareness skills and reading in typically developing children and children who are at risk for learning disability. Two groups of subjects in the age range of 3-6 years participated in the present study. The control group consisted of sixty typically developing children (N = 60) and the clinical group consisted of twelve children (N=12) who are at risk for learning disability. All the children studied in schools with English as the medium of instruction. The results of this study indicated that in phonological awareness, the older children (5-6years) fulfilled 60% criteria on phoneme blending, phoneme identification and phoneme substitution tasks. Other skills were still in the process of development. Children who are at risk for LD did not score on any of the sub-skills of phonological awareness. Typically developing children scored better for reading words than reading non words. Children at risk for LD, performed poorer on both reading words and non words when compared to typically developing children. Overall, performance on reading task was better than phonological awareness tasks. This study has implications on early identification and remediation for children at risk for learning disability.

Key words: phonological awareness, reading, assessment, early identification, at risk for learning disability.

To develop reading skills, children must learn the code used by their culture for representing speech as a series of visual symbols. Learning to read is thus fundamentally a process of matching distinctive visual symbols to units of sound referred to as phonology. Mastery of this system allows children to access thousands of words already present in their spoken lexicons. Phonological awareness, also referred to as *phonological sensitivity*, comprises the ability to recognize, identify, or manipulate any phonological unit within a word, be it phoneme, rime or syllable (Goswami & Bryant, 1990). Over the decades researchers have investigated phonological awareness and its association with reading skills. A large number of studies have shown that good phonological awareness skills characterize good readers, whereas poor phonological awareness skills characterize poor readers (Adams, 1990; Brady & Shankweiler, 1991; Scarborough, 1998; Wagner & Torgesen, 1987).

Research has widely focussed to study the links between different levels of phonological awareness and literacy development which are carried out on preschool and young school-aged children.

While, there may be links between awareness of syllables and progress in literacy, there are

Lecturer, Department of Speech Language Pathology, All India Institute of Speech and Hearing (AIISH), Manasagangothri, Mysore-6, **Reader & Head, Department of Clinical Services, AIISH, Mysore-6, * Research Officer, Department of Clinical Services, AIISH, Mysore-6, ****Research Officer, Department of Clinical Services, AIISH, Mysore-6.*

stronger indications that awareness of phonemes and intrasyllabic units may play a greater role in the successful development of literacy (Bradley & Bryant, 1983).It also seems likely that during the early stages of literacy learning there is a reciprocal relationship between certain aspects of phonological awareness, such as the awareness of sounds, and literacy development (Cataldo & Ellis, 1988).

Most work on phonological awareness and literacy development are on monolingual English-speaking children. However, there are few studies, Durgunoglu, Nagy and Hancin-Bhatt (1993, Spanish/ English: Spanish); Campell and Sais (1995, Italian/ English: English); Bruck and Genesee (1995, French /English: English); Holm and Dodd (1996), Jackson (1996) (Chinese/English: English), that have considered phonological processing and literacy in bilingual children concentrating on only one of the children's languages in the Indian context.

Phonological awareness is proved to be a primary factor underlying early reading development in children (Ehri, Nunes, Willows, Schuster Yaghoub-Zadeh & Shanahan, 2001). Wagner, Torgesen, Rashotte, Hecht, Barker, Burgess, Danahue and Garon (1997) experimented the amount of information that a measure of phonological awareness could add to the prediction of reading, once a measure of current word reading and vocabulary was considered. The results revealed that the phonological awareness was more predictive to reading in the younger age and less efficient in prediction of reading as the child gets older. These differences have also been found among the sub-level skills of phonological awareness like word level, syllable level, onset-rime level and phoneme level skills. Goswami and Bryant (1990) studied development of phonological awareness skills in English language. The results revealed that preschoolers demonstrated good phonological awareness of syllables, onsets, and rimes in most languages. Syllable awareness was usually present by about age 3 to 4, and onset–rime awareness was usually present by about age 4 to 5 years. Phoneme awareness only develops once children are taught to read and write, irrespective of the age at which reading and writing is taught. A longitudinal study by Bradley and Bryant (1983) and Blachman (1984) observed that performances on tasks of phonological awareness skills in nursery or grade I is a powerful predictor of reading achievement.

There are a few Indian studies available to date on metalinguistic skills and reading development in Indian children. Prema (1997) studied meta-phonological skills such as rhyming, syllable and phoneme related skills in Kannada speaking children. The reports revealed the importance of metalingusitic skills for reading acquisition in Indian children. However, contradicting to this was a study reported by Sunitha (1995) and Rekha (1996) who reported that meta-phonological skills are not essential for learning to read a non-alphabetic script (Kannada), rather they reported that the knowledge of orthographic principles seem to be more significant. Samasthitha (2009) studied meta-phonological and reading skills in monolingual (Kannada) and bilingual (Kannada and English) children, in the age range of 8-9 years. Results revealed that, there is a developmental trend in the acquisition of meta-phonological skills. Rhyme and syllable awareness appears to be the earliest skills to be developed followed by phoneme awareness. Results also showed that bilingual group performed better than the monolingual group on the meta-phonological and reading tests.

According to Read, Zhang, Nie and Ding (1986) some aspects of phonological awareness are not natural result of maturation but may be a consequence of learning an alphabetic orthography. They also reported that without this instruction, individuals may gain only minimal overt knowledge or awareness of phonemic units.

Loizou and Stuart (2003) examined levels of phonological awareness in monolingual and bilingual English and Greek five-year-old children. The participants were divided in four groups: two bilingual (English-Greek, Greek-English) and two monolingual (English, Greek). A set of six phonological tasks were compared. Bilingual children were tested in both English and Greek versions of the tasks; monolingual children were tested for the phonological tasks in their mother tongue only. The results showed that the bilingual English-Greek children significantly outperformed the monolingual English children, but this pattern was not replicated in the bilingual Greek-English/monolingual Greek comparisons. This difference is discussed in terms of the bilingual

enhancement effect. Results also showed that English-Greek bilingual children performed significantly better than Greek-English bilinguals, especially on tasks requiring phoneme awareness. They concluded that learning to read in an alphabetic language promotes the level of phonological awareness.

Liberman, Shankweiler, Fischer and Carter (1974) used a tapping task to measure the development of phonological awareness at the syllable and phoneme levels in normally developing American children. Results revealed that- no 4 year-olds and only 17% of 5-year-olds could manage the phoneme version of the task, whereas 70% of 6-year-olds reached a criterion of six consecutive correct responses. Cossu, Shankweiler, Liberman, Katz and Tola (1988) tested phonological awareness in Italian children and the results showed that the majority of preschoolers (ages 4 and 5 years) could not manage the phoneme task (20% reached criterion), whereas older children already at school (7- and 8-year-olds) were very proficient (97% reached criterion). Criterion at the syllable level was reached by 67% of the 4-year-olds, 80% of the 5-year-olds, and 100% of the school-age sample.

Reading acquisition should be more rapid in orthographies in which letter–sound relationships are highly consistent. Indeed, a number of monolingual studies carried out in relatively consistent writing systems have reported high accuracy scores for recoding words and nonwords toward the end of Grade 1. For example, Greek children read on average 90% of real words correctly compared with 89% for nonwords (Porpodas, Pantelis & Hantziou, 1990). Italian children read on average 94% of real words correctly compared with 82% for nonwords (Cossu, Gugliotta & Marshall, 1995). French children read about 87% of words and 80% of nonwords correctly (Sprenger-Charolles et al., 1998). Even in a Semitic language, such as Hebrew, decoding accuracy was found to be around 80% at the end of Grade 1 (Share & Levin, 1999). Note that Hebrew children learn to read pointed Hebrew, which has almost perfect grapheme-to-phoneme correspondences. These quite high accuracy scores for phonological decoding stand in sharp contrast to the performance of English children a year later, at the end of Grade 2 (Share & Levin, 1999). English has very inconsistent grapheme–phoneme relations, and in a representative study, children learning to read English scored no more than 70% correct in word reading and 45% correct in nonword reading (Frith, Wimmer & Landerl, 1998).

Blaiklock (2004) conducted a longitudinal study examining the relationship between phonological awareness and reading for a group of children during their first two years at school. Children showed rhyme awareness before they began to read but were unable to perform a phoneme deletion task until after they had developed word-reading skills. Prakash (1993) investigated the development of reading proficiency in relation to meta-linguistic awareness and reported that the acquisition of literacy in children reading a non-alphabetic script follows two successive stages, firstly the syllable decoding and secondly the syllable decoding + comprehension stages. He accounted these stages to a probable interaction between the nature of orthography and instructional process rather than meta-phonological skills per se.

Need for the study

In western context extensive research are conducted to study the development of phonological awareness and reading skills. To study the development of phonological awareness and reading skills extensive researches are carried out in the western context. It is not possible to directly generalize such studies to the Indian context because children in India are generally exposed to varied culture and language. Though there is dearth of studies in the Indian context, these studies are conducted for the older group of children. Therefore, it is essential to develop a screening tool, which assesses phonological awareness and reading skills especially in the younger age group. This in turn would aid in the early identification of children who are at risk for learning disability. Hence, there is need to study the developmental pattern of phonological awareness and reading skills in younger group of children through a tool, which will further help in the identification of children who may be at risk for learning disability.

Aims of the study

The aim of the study was to examine the relationship between phonological awareness and

reading in children.

Following were the objectives considered for the study:

- To study the relationship between phonological awareness and reading skills in typically developing children (TDC).
- To examine the difference in pattern of development amongst children who are at risk for developing learning disability (ARLD).

This study was carried out as part of an ongoing research project funded by AIISH research fund titled "Development of Early Literacy Screening Tool".

Method

Subjects: Two groups of children participated in the study. All children studied in schools with English as the medium of instruction. The control group consisted of sixty typically developing children (N=60) in the age range of 3-6 years who were selected randomly from schools in different localities of Mysore city. They were sub divided into three groups with an inter age interval of one year (3-4 years, 4-5 years and 5-6 years). Each sub group comprised of 20 subjects including 10 boys and 10 girls. So a total of 60 subjects were considered in the first group. The clinical group consisted of twelve children (N=12) in the age range of 3-6 years with poor academic skills as reported by the teachers.

The subjects were selected based on the following criteria:

- Native speakers of Kannada, being reared in an urban ambient environment of Kannada.
- Belonging to middle socio economic status.
- Exposed to English language in their school set up.
- Attended schools which followed similar teaching methods.
- Those who passed the WHO Ten-Question Disability Screening checklist (cited in Singhi, Kumar, Prabhjot & Kumar, 2007) which screens for any speech, language and hearing deficits.

Test material: Initially test items for the tasks of phonological awareness and reading were developed by reviewing journals, books, internet and age appropriate academic books. The compiled material was rated by five Speech Language Pathologists. They were expected to rate the test items on a five point rating scale for the 14 parameters listed. E.g.: Simplicity of the test material, familiarity of the test stimuli etc. Using this material, a pilot study was conducted on a group of 20 children in the age range of 3-6 years. After analysing the piloted data, the test items which were most relevant was chosen to form the test materials for the final administration of the test.

Procedure: Participants were withdrawn from the class and worked with the examiner in a quiet room in the school. Phonological awareness tasks and reading tasks were administered to all children. Phonological awareness section consisted of 6 subsections: phoneme counting, phoneme blending, phoneme identification, phoneme substitution, phoneme deletion and phoneme oddity. Each subsection consisted of two practice items and one test item.

Reading task consisted of reading three words and three non words. Words were selected from their curriculum books which were appropriate to their age and the non words were formed based on the premise that they followed the phonotactic rules of the English language. (See Appendix-I for the test material)

Scoring and analysis: For both the tasks a gross score of '1' and '0'was given for correct and incorrect responses respectively. Scoring was immediately noted by the examiner on a scoring sheet. The scores were coded and then subjected to statistical analysis. From the scores obtained, mean, standard deviation were calculated for each age group. Passing criteria of 60% was set for all the skills considering that minimum of 60% of the subjects had to perform each of the tasks correctly.

Results

The objectives considered for the study were:

- To study the relationship between phonological awareness and reading skills in typically developing children (TDC).
- To examine the difference in pattern of development amongst children who are at risk for developing learning disability (ARLD).

The results presented in the following sections are those of the main cohort of 60 children, who were identified as developing literacy (in English) without difficulties and 12 children who were identified as at risk for learning disability. Since the focus of this paper is the development of task, we give here only descriptive statistics, by which we mean the

aggregate means and standard deviations of the children's scores. For ease of comparison across the age ranges and between the two groups the task results are given as proportions and displayed in a series of graphs.

Table1 shows the overall mean and SD for phonological awareness skills and reading skills across three groups of typically developing children (3-4 years, 4-5 years and 5-6 years). From the Table1 and Figure1 and 2 it is evident that, in both the groups of children a developmental trend was observed for phonological awareness and reading skills across the age range. There was a drastic improvement observed from 4-5 years to 5-6 years for both the skills. Children at risk for LD scored lesser than the typically developing children in both the skills. Another salient feature observed was that, reading scores were better than phonological awareness skills in both typically developing and children who are at risk for LD.

Tasks		Typically developing Children			Children At Risk for LD		
		3-4 Years	4-5 Years	5-6 Years	3-4 Years	4-5 Years	5-6 Years
Phonological Awareness	Mean	0	.65	3.3	0	0	0
	SD	0	1.5	1.3	0	0	0
Reading Skills	Mean	0	1.5	4.35	0	0.25	1
	SD	0	1.7	1	0	0.50	0.81

Table 1: Mean and SD for Phonological awareness and reading skills of TDC and ARLD across age. (Maximum score= 6.00 each for Phonological awareness and reading skills)

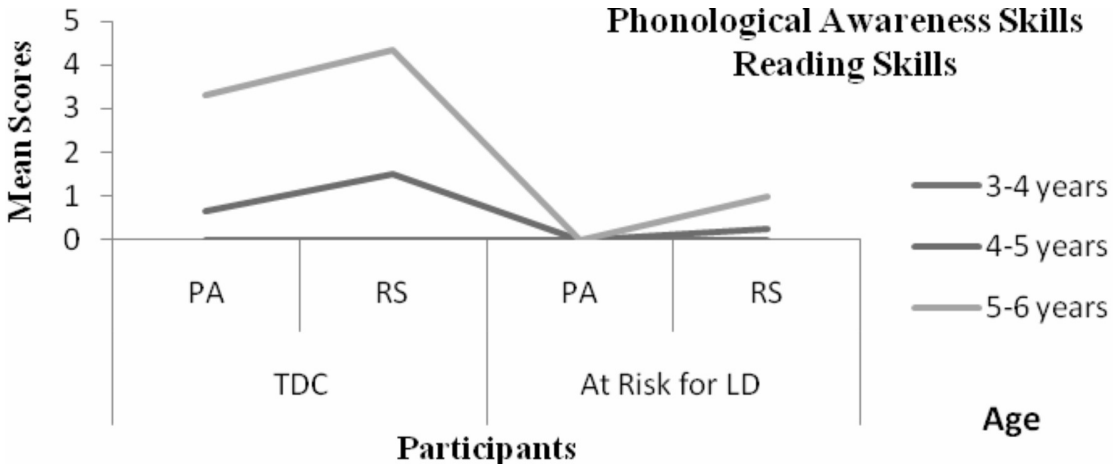

Figure1: Mean scores of Phonological awareness and reading skills of TDC and ARLD across age.

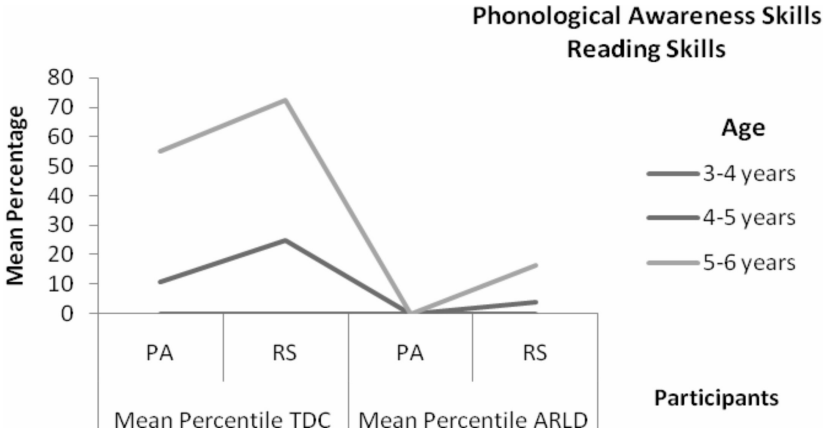

Figure 2: Mean percentile scores of Phonological awareness and reading skills of TDC and ARLD across age.

Tasks	Typically developing Children			Children at risk for LD		
	3-4 Years	4-5 Years	5-6 Years	3-4 Years	4-5 Years	5-6 Years
PC	0	5	50	0	0	0
PB	0	15	95	0	0	0
PI	0	15	65	0	0	0
PD	0	10	35	0	0	0
PS	0	15	65	0	0	0
PO	0	5	20	0	0	0

Table 2: Mean percentile scores for sub-skills of Phonological awareness in TDC and ARLD across age.

Further descriptive statistics was conducted separately for all the sub-skills of phonological awareness and reading.

Performance of children on Phonological Awareness Skills

In the present study, phonological awareness tasks included were phoneme counting (PC), phoneme blending (PB), phoneme identification (PI), phoneme substitution (PS), phoneme deletion (PD) and phoneme oddity (PO).

The results of the present study on phonological awareness skills revealed that, overall a developmental trend was seen across most of the sub-skills (see Table 2 & Figure 3). In sub-skills of phonological awareness, the older children (5-6 years) in typically developing group fulfilled 60% criteria on phoneme blending, phoneme identification and phoneme substitution tasks. Other sub-skills like phoneme counting (50%), phoneme deletion (35%) and phoneme oddity (20%) were still in the process of development. Even the older children (5-6 years) who are at risk for LD did not score in any of the sub-skills of phonological awareness.

Performance of children on reading words and non words

Reading task included reading a list of three words (RW) and three non-words (RNW) in English by two groups of children (TDC and ARLD) in the age range of 3-6 years. The performance of children in reading words and non words is explained below.

From Table 3 and Figure 4, it is evident that, performance of reading skills is improving from younger children to older children. Typically developing children scored better for reading words (91.6%) than reading non words (53.3%).A similar comparison could not be observed in children at risk for LD, as reading non words emerged only in the older group (5-6 years) and the performance was equal to that of reading words. However, in both reading words and non words children at risk for LD could not meet the criteria of 60%. Also, to note that children of 3-4 years in both groups (TDC & ARLD) did not score in reading section.

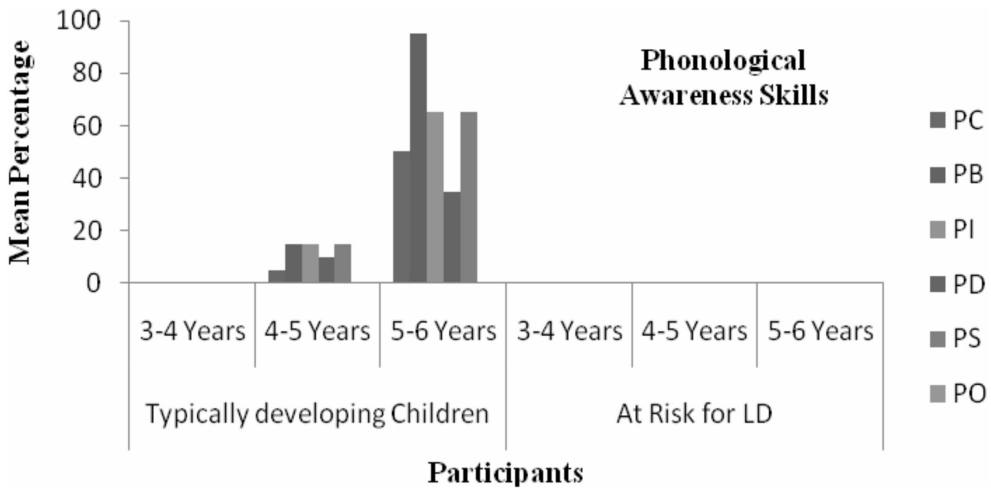

Figure 3: Mean percentile scores for sub-skills of Phonological awareness in TDC and ARLD across age.

Discussion

The present study aimed to examine the difference in pattern of development in typically developing children and children at risk for learning disability. The study also aimed to investigate the relationship between phonological awareness and reading skills in the two groups.

Analysis of results for phonological awareness skills revealed a developmental trend in typically developing children from younger to older children. The older typically developing children (5-6years) fulfilled 60% criteria on phoneme blending, phoneme identification and phoneme substitution tasks (see Table 2). Other sub-skills like phoneme counting, phoneme deletion and phoneme oddity were still in the process of development. This supports study by Cossu, Shankweiler, Liberman, Katz and Tola (1988) on phonological awareness in Italian children. Their results also revealed that majority of preschoolers (ages 4 and 5 years) could not manage the phoneme tasks (20% reached criterion), whereas older children already at school (7- and 8-year-olds) were very proficient (97% reached criterion). On the other hand in the present study even older children at risk for LD could not perform on any of the sub-skills of phonological awareness. This may be because children at risk for LD have not attained mastery of at least a few phonological awareness skills which are achieved by the typically developing children.

Analysis of results on reading skills revealed that, typically developing children in the age range of 4-6 years scored better than children who are at risk for LD (see Table 3). In typically developing children, reading words was better than reading non words. It is an accepted phenomenon that reading words in English involves the direct route and non-words involves the indirect route. Indirect which is more dependent on the phoneme-grapheme or grapheme-phoneme correspondence generally takes longer time to be decoded especially in an irregular language like English. Hence, children take longer time to read non-words than words. This difference may be significantly seen in the younger children as children would not have mastered all the skills required to decode a non-word through the indirect route. This finding supports Frith, Wimmer and Landerl (1998) in English language. Their results revealed that since English has very inconsistent grapheme–phoneme relations, children learning to read English scored better for word reading (70%) than nonword reading (45%). Children in the younger group of 3-4 years in both groups (TDC & ARLD) did not score in reading section. This can be attributed to the fact that, the children in this age range were exposed only to reading alphabets and not reading words and non words and these children were still in the process of combining letter or phoneme strings to form words for reading.

The study also revealed that performance on

Tasks	Typically developing Children			At Risk for LD		
	3-4 Years	4-5 Years	5-6 Years	3-4 Years	4-5 Years	5-6 Years
RW	0	43.3	91.6	0	8.3	16.6
RNW	0	6.6	53.3	0	0	16.6

Table 3: Mean percentile scores for sub-tasks of Reading skills in TDC and ARLD across age.

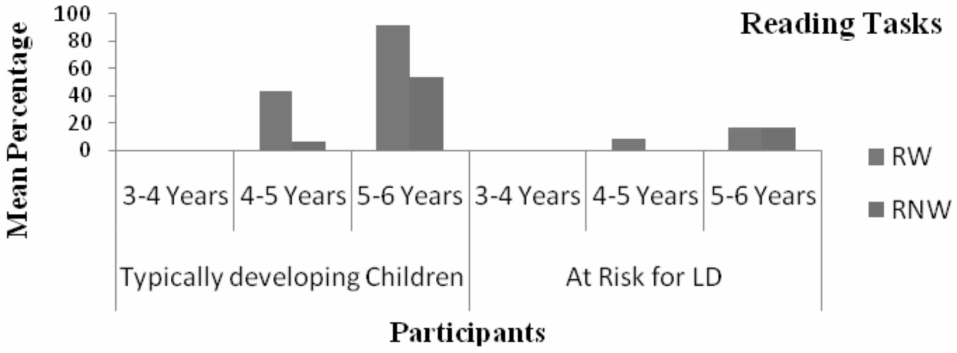

Figure 4: Mean percentile scores for sub-tasks of Reading skills in TDC and ARLD across age.

reading skills were better than phonological awareness skills. This is indicative of the fact that phonological awareness is probably an underlying skill to development of reading skills in children. This finding supports Read, Zhang, Nie and Ding (1986), phonological awareness does not appear to be a natural result of maturation but seems to be a consequence of learning an alphabetic orthography. They also reported that without this instruction, individuals may gain only minimal overt knowledge or awareness of phonemic units. Loizou and Stuart (2003) concluded that learning to read in an alphabetic language promotes the level of phonological awareness. According to Goswami and Bryant (1990) phoneme awareness only develops once children are taught to read and write, irrespective of the age at which reading and writing is taught.

Conclusions

Overall the results of this study indicated a developmental progression in both phonological awareness and reading skills. The performance of children improved from younger age to older age group. However, a slope was observed for typically developing children in the age range of 4-5 years to 5-6 years (see Figure 1 & Figure 2) and these children showed significant improvement in both phonological awareness and reading skills. This progression was not evidently noted in children who are at risk for LD. Overall, performance on reading task was better than phonological awareness tasks.

Implications

This study has implications on early identification and remediation for children at risk for learning disability. The study would have an impact in the Indian context, since the availability of the appropriate test material in assessing phonological awareness skills and reading are sparse.

Limitations of the study

This study included a small sample of 20 typically developing children in each age range. Administration of it on a large sample would help in standardization of the tool. Only 12 children who are risk for learning disability were considered in the study. Including larger number of subjects in this group would provide a better insight into the results.

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Appendix-I

Phonological Awareness Skills **Maximum score: 06**

a. Phoneme counting

Instructions: I am going to say a word and I want you to say how many sounds you hear in that word. Example: When I say cat, I hear three sounds, /k/, /a/, /t/. When I say go, I hear two sounds, /g/, /o/. Now you try.

- Van

b. Phoneme Blending

Instructions: I am going to say some words, spreading out the sounds. Guess the word I am saying. Example: If I say 'f-at', you say 'fat'. If I say 'm-ug', you say 'mug'.

- m-at

c. Phoneme Identification

Instructions: I want you to listen to just one sound in a word. Tell me the sound you hear at the beginning of each word I say.

Example: If I say 'car', the first sound in the car is /k/. In Nest, the first sound is /n/

- Time-/t/

d. Phoneme Deletion

Instructions: Now I will say a word, you will have to take off the first sound and make a whole new word.

Example: If I say 'cat', you say 'at'. If I say 'eat', you say 'at'.

- Meat /m/ eat

e. Phoneme Substitution:

Instructions: Now let us play another game. I will give you a word. Listen to it carefully and change one phoneme to another as indicated by me and tell the whole new word.

Example: If I Say the word 'goat' by changing the /g/ to /b/ it becomes 'boat'.

- Hat-mat (change /h/ to /m/)

f. Phoneme Oddity

Instructions: Now I will tell four words, you have to listen to it carefully and pick the odd one out

Example: bat, cat, mat, elephant

- Sun, gun, rat ,fun

Reading skills **Maximum score: 06**

Task: Ask the subject to read the words.

Note: Check for G-P-C skills for scoring.

Sl No	Words	Non-Words
1	Ant	Gog
2	Cap	Dar
3	Bag	Nat