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Exploring the relationship between letter knowledge and environmental print recognition in English Language Learners

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Anjana AV[1]
All India Institute of Speech and Hearing, Mysore
Dr. K.S. Prema[2]
All India Institute of Speech and Hearing, Mysore

Abstract

Environmental print recognition develops early in childhood much before the commencement of formal education. Reading acquisition models of alphabetic language propose logographic stage as the initial stage in the developmental continuum and environmental print recognition as a concurrent skill acquired in this stage. Though logographic stage is well established in alphabetic languages, literature on non-alphabetic languages reveal inconsistent results. The current study investigated the development of environmental print recognition, letter name knowledge and letter sound knowledge in preschool ELL's with Malayalam as native language. The study also aimed to identify the relation among these measures on 90 typically developing preschool children from 3-6 years. Results revealed a developmental trend in the acquisition of the above three skills. In addition, it was also observed that in the lower Grades environmental print recognition showed strong relation with letter name while in higher Grades with letter sound. Regression analyses revealed letter sound knowledge as a good predictor of environmental print recognition. The results provide insight into the logographic stage in ELL's with Malayalam as native language. Implications for the use of environmental print in facilitating literacy development by parents are discussed.

Keywords Environmental print, Letter knowledge, English Language Learners, Malayalam

1. Introduction

Environmental prints (EP) are the prints found in everyday life - in home, in stores, on the road, and on the labels and logos that appear on food, packaging, clothing, and billboards. Environmental prints are seen in our immediate surroundings and are used in our everyday lives. In contrast to standard print, environmental prints are designed deliberately to draw attention and to communicate the message quickly, like logos of different food items, and community signs. They are typically unique, colorful, and non-continuous (single or multiple words). The ubiquitous nature of environmental print provides uniform availability (Neumann & Celano, 2001) and knowledge (Korat, 2005) of environmental print for preschool children from low and high socioeconomic backgrounds. Therefore, environmental print acts as a natural resource for learning to read. Horner (2005) identified three types of environmental print; community signs (e.g. STOP, ENTER);

[1]Bio: Junior Research Fellow, Dept. of Speech Language Sciences, All India Institute of Speech and Hearing, Mysore. Corresponding author: anjanaavslpa@gmail.com

[2]Bio: Professor, Dept. of Speech Language Sciences, All India Institute of Speech and Hearing.

labels on house hold items (e.g. Coca Cola, Colgate) and child- directed prints (e.g. Barbie, crayons). It has also been reported that preschool children recognize child directed print easily than the other two types of print (Horner, 2005; Bhuvaneswari & Prakash, 2017) and as they get older environmental print knowledge also expand. Environmental print helps children to understand that print conveys meaning, prior to actually reading print (Harste, Woodward, Burke, 1984). It has been documented in literature that environmental print recognition facilitate further reading skills (McGee & Richgels, 1989; Reutzel, Fawson, Young, Morrison & Wilcox, 2003; Vera, 2007; Vukelich, Christie & Enz, 2008). While environmental print enhances children's encounter with letters, it has also been argued that the colours and logos may distract children and provide little benefit for conventional literacy skills (Ehri & Roberts, 2006).

Environmental print awareness is defined as the ability to recognize signs, symbols, and word that occur frequently in the environment and the knowledge that print carries meaning (Westwood, 2004). Everyday engagement with environmental print in their natural surroundings helps children develop concepts and construct knowledge about the functions and use of print. Therefore, as evidenced in the literature, children can recognize environmental prints much earlier to reading prints in books (Whitehurst & Lonigan, 1998). Whether preschool children are actually reading when they read environmental, print is skeptical. Most of the researchers are in agreement that during environmental print reading children are not properly decoding words. Whitehurst and Lonigan (1998) considered environmental print recognition as an emergent reading skill where the child pretends to read. They propose that children when encountered with a sign, label or logo, use their existing knowledge of environment to understand the context of the print they see and pretend to read it. The authors also state that, the ability to read environmental prints should not be misconstrued as the ability to read. In agreement with this, Bialystok and Martin (2003) also found that children consider print as a reflection of context rather than knowing print as a symbol having meaning. In addition, semantically related errors made by children when the environmental print was presented in full context and increase in difficulty when it was presented out of context support the notion that children depends more on contextual cues than actually decoding (Kassow, 2006).

1.1 Environmental print reading in models of reading acquisition

Developmental models of reading acquisition explain the different stages involved in the process of becoming a fluent reader. Frith (1985) and Ehri (1998) in their models mention the first stage of learning to read as *logographic* and *pre-alphabetic* phase respectively. Both these models propose that during this initial phase, children attempt to read by recognizing the contextual cues or non-alphabetic visual cues such as colours and pictures in which the print is embedded. Consequently, logographic stage is considered as the onset of reading acquisition, i.e. it occurs very early in the hierarchy of emergent literacy skills and solely a visual recognition process. Most children in the initial stage of reading acquisition learn to extract meaning from environmental print using logographic skills than using alphabetic decoding (Bowman & Trieman,

2004; Ehri, 1998; Frith, 1985). In logographic reading conventional decoding of words does not occur as the children don't have proper alphabet knowledge. At this stage, children use salient visual cues and logos in environmental print to decode it rather than relying on letter knowledge. Increased difficulty in reading environmental print words when contextual cues are removed or given in standard print format and failure to detect the spelling errors in environmental print, confirms that children at younger age read environmental prints logographically (Masonheimer, Drum, & Ehri, 1984). While recognition of environmental print is a developmental accomplishment of literacy acquisition (Snow, Burns & Griffin, 1998), it has not found to be strongly related to later reading (Whitehurst & Lonigan, 1998). Though, it has been reported that environmental print identification is better in elder children compared to younger children, both were better at identifying environmental print in typical format i.e. in full context (Hiebert, 1978).

Socio-cultural experiences are reported to have a strong influence on the development of these skills (Neumann, Hood, Ford & Neumann, 2011). Literature suggests that environmental print awareness develops in all children from literate cultures, and existing research is inconclusive on age of acquisition of logographic reading skill. Typically, children begin to recognize environmental print in context around 3 years of age. According to Pelatii, et al. (2014), environmental print awareness develops as a continuum with children first exhibiting an interest for print and its meaning and eventually learning that print units are related to each other. However, in the current scenario, irrespective of the socioeconomic status, most children are exposed to these logos through different media and hence it is expected that environmental print awareness develop very early in life.

Existence of logographic stage in the reading acquisition of non-alphabetic languages and validity of the models developed on alphabetic languages to explain reading acquisition in such languages is a matter of debate for several decades. Few researchers suggest logographic stage just as a stage in reading acquisition whereas others consider it as detrimental to learning process (Bradely, 1988; Ehri, 1998). Bastien-Toniazzo and Jullien (2001) reported that existence of logographic stage is questioned due to language specific effects; and even for a given language, individual variation might exist. Logographic stage is not supported in transparent orthography such as German (Wimmer & Goswami, 1994), in bilingual children (Rickard Liow, 1999) and in alphasyllabic language like Kannada (Karanth & Prakash, 1996). They suggest that logographic stage does not exist in transparent orthography and alpha syllabic languages.

Jagadish (1991) and Akshay (2012) found that in alpha syllabic language like Kannada children passes logographic stage quiet early and these skills do not pertain to any preschool age group. Bhuvaneswari and Parakash (2017) reported that children start to recognize environmental print in context around 3 years of age and the developmental trend continues beyond 4 years and is evident until 6 years. They also report that environmental print recognition in English was better than Tamil and it could be due to the increased prevalence of English environmental prints. Research also evidence that duration of logographic stage differs with the literacy

environment of the child, i.e. children from literacy rich environment have a short period of logographic stage, whereas children from poor literacy background or with certain disorders may have long period of logographic stage (Bastien-Toniazzo & Jullien, 2001). This variable length of logographic stage would have driven researchers to address the presence of this stage in different languages other than English.

1.2 Role of environmental print on later literacy skills.

Literature on the role of environmental print on emergent literacy skills or later conventional reading skills reveals inconsistent findings. Few researchers have found out that environmental print knowledge has less significant role in later literacy skills (Lonigan, Burgess & Anthony, 2000). Masonheimer et al. (1984) reported that environmental print reading is not a precursor of conventional reading skills as it depends on familiarity with the context cues and not on alphabetic cues. In consensus with this, Dickinson and Snow (1987) also pointed out that environmental print is a poor predictor of later reading achievement. The ability to identify environmental print is not related to the ability to read words fluently using letter sound analysis skills. In sum, environmental print knowledge itself may not be sufficient for standard literacy skills.

In contrast to these findings, some researcher's state environmental print helps children to develop the understanding that print conveys meaning and is functional (Goodmann, 1986). In a review study, Neumann, Hood and Ford (2012) attempted to explain the role of environmental print in emergent literacy skills. They proposed a model to explain the link between environmental print, emergent literacy skills, socio cultural experiences, and visual skills. They reported environmental print to facilitate the development of logographic reading using contextual cues and emergent literacy skills. Robin and Trieman (2009) suggest that some deep features of language and writing can be achieved through environmental print.

In recent years, researches in the area of early childhood education are more focused towards emergent literacy skills, as these skills are significant predictors of conventional reading and writing skills (Whitehurst & Lonigan, 2008; Snow, Burns & Griffin, 1998). Many emergent literacy assessment tools use environmental print as a measure. In addition, few researchers have included environmental print for classroom instructions and report significant improvement in emergent literacy skills like letter writing, letter sound knowledge, and print reading (Prior, 2003; Salewski, 1995; Vera, 2011; Wepner, 1985). Neumann, Hood and Ford (2013) used environmental print as intervention strategy and found better performance in this children than those who used standard print and no intervention. Thus, although environmental print does not automatically lead to conventional literacy skills, it may support the development of such skills, when included as a part of instructional strategy. Hence, it has been recommended to include familiar environmental print in classroom instruction.

1.3 Role of letter knowledge and letter sound knowledge in EP recognition

Though, environmental print reading is mainly considered as a logographic skill, recent research also evidences that letter knowledge and phonemic

awareness ability contributed to environmental print reading in pre-readers (Bowey, 1994; Johnston, Anderson & Holligan, 1996; Stahl & Murray, 1993). Reutzel et al. (2003) reported that letter recognition, phonemic awareness and word recognition influences environmental print reading in and out of context in children from 4-7 years. They also found that visual skills used in environmental print reading is similar to conventional reading and therefore training the child to attend to environmental print would facilitate further reading skills. Therefore, in the current era, where early childhood education is more emphasized and focused, environmental print reading could not be considered as an exclusive logographic reading skill. Conversely, Blair and Savage (2006) studied the association between phonological awareness, letter sound knowledge, and environmental print recognition. They found that phonological awareness and letter sound knowledge were not related to environmental print recognition supporting the logographic stage of using contextual cues. As reviewed above, most of research pertaining to early reading acquisition is focused on alphabetic language and on monolingual speakers and it evidences the existence of logographic reading stage as the initial phase. The current study is conducted in Kerala, a southern state in India, where the native language is Malayalam. Malayalam is a Dravidian language following Brahmi script. It is an alpha syllabic language with syllables as well as phonemes representing the individual orthographic units named as 'akshara'. The existence of logographic stage in alpha syllabic language like Malayalam and the awareness of environmental print in ELLs with Malayalam as native language are not yet studied. Majority of children in India begin literacy instruction in English not in their respective native language. As they are not proficient in English, they are considered as English Language Learners (ELL's) in the current study. ELL's refers to children who are exposed to English in their school and any other language in the home environment. ELL literature on emergent literacy shows that developmental pattern in two languages are influenced by typological as well as script similarity between languages (Anthony et al., 2009; Chan & Sylva, 2015). Also, in Indian scenario environmental prints are mostly available in English language. Hence, a study of environmental print awareness and its association with letter name and letter sound knowledge in preschool children would help in better understanding of the early stages of reading acquisition in English language learners with Malayalam as native language.
Purpose of the current study was to find out the development of environmental print recognition, letter knowledge, and letter naming in preschool ELL's with Malayalam native language. The study also focused on finding the relationship among these measures and to also to find whether letter name and letter sound knowledge could predict environmental print recognition in these children. The research questions addressed in the present study are, in ELL children

1. Is there a developmental trend in environmental print recognition, letter sound knowledge, and letter name knowledge?
2. Is there a relationship among letter name knowledge, letter sound knowledge, and environmental print recognition? /

3. Do letter name knowledge and /or letter sound knowledge predict environmental print recognition?

Hence, in the current study, we expect a developmental trend in environmental print recognition, letter name knowledge, and letter sound knowledge. Further, we hypothesize that environmental print recognition would correlate with letter name and letter sound knowledge across the grades and that letter name and letter sound knowledge would predict environmental print recognition in preschool children who are ELL's.

2. Methodology

2.1 Participants

In the current study, children who are native speakers of Malayalam attending preschools with English as the medium of instruction were selected as participants. They were selected from 10 English medium preschools of South Kerala, India. The current study was conducted as a part of doctoral research on profiling bilingual emergent literacy skills in these children. The sample consisted of 90 preschool children attending Pre-kindergarten (PKG), Lower kindergarten (LKG), and Upper kindergarten (UKG) with 30 participants in each grade. To ensure uniform literacy environment a survey of teachers and parents was conducted as part of the main study. Therefore, children whose parents and teachers scored more than 80% on the survey questionnaire were considered for the current study. Further, WHO ten questions disability screening checklist (Singhi, Kumar, Prabhjot, & Kumar, 2007) was administered to rule out developmental delay, language delay, or other sensory issues. NIMH Socioeconomic status scale revised by Venkatesan (2009) was used to select children from upper and middle socioeconomic background. Table 1 represents the demographic details of the participants.

Table 1
Demographic details of participants

Groups	Number of participants	Age range in months
PKG	30(M=13; F=17)	41-56
LKG	30 (M=18; F=12)	52-64
UKG	30(M=16; F=14)	62-74
TOTAL	90 (M=47; F=43)	41-74

Note. PKG- Pre –Kindergarten, LKG-Lower Kindergarten, UKG- Upper Kindergarten, M- Male, F- Female.

2.2 Measures

Test stimuli used in the current study were developed as part of a doctoral research on profiling emergent literacy skills. Measure considered in the current study were, Environmental Print recognition (EP), Letter Name knowledge (LN), Letter Sound knowledge (LS).

1. *Environmental print recognition (EP):* As there are no standardized measures available at present to assess the environmental print recognition, investigator selected a few commonly occurring environmental prints as

stimuli. Thirty commonly seen environmental prints were selected initially and was given for rating to five preschool teachers. The selected environmental print included product logos, road signs, institutional labels, TV shows etc. Preschool teachers were instructed to rate the environmental prints based on familiarity and frequency of occurrence on a 4 point rating scale. Environmental prints which were rated as very familiar/ familiar and commonly seen by minimum three teachers were considered for further study. Finally, 15 commonly occurring environmental prints were considered to assess environmental print recognition in preschool children. Colour logos of product labels and familiar signs, which were either photographed or captured from website, were used. Community logos and child friendly logos were included in this set. Environmental prints were either in full natural context i.e. picture + word, with same color, print style &symbols, or partial contextual cues i.e. only the logos without pictures. The environmental prints were presented in the increasing order of complexity i.e., environmental prints with full contextual cues were presented initially followed by those with partial contextual cues. Nine stimuli were presented in full contextual cues, for e.g. picture of Maggie, Horlicks, toilet etc., whereas 6 items were with only logos, for e.g. logos of dairy milk, stop, Colgate tooth paste etc. Two practice trials were given to familiarize the task. As most of the environmental prints available in the immediate environment in the current scenario are in English and children perform better in English than native language (Bhuvaneswari & Prakash, 2017), environmental prints in English was only considered for the current study. Two environmental prints were presented in a single card of A4 size with each having a size of 7×5 cm. Each card was shown to the child and asked, "what does it say?" If the child was not able to name it, clues like "where you have seen this", "what we do here" etc were asked depending on the stimuli. Single cue was given for a particular item. Even after giving cues if the child was not able to name the print, investigator moved on to the next item. The responses were recorded verbatim. Response was considered correct if they were the same as written word or semantically related. For e.g. most of the children responded to the picture of 'HP' (Hindustan Petroleum) by saying 'petrol/ diesel'. Hence, responses similar to this were considered semantically related and correct. Score '1'was given for exactly reading the written words, 0.5 for semantically related responses and '0' for incorrect response/unrelated responses/ no response. No feedback or explanations about the accuracy of responses were given.

2. *Letter name knowledge (LN):* Ten letters were randomly selected from uppercase and lower case English alphabets. Each letter was presented along with three other letters in an A4 size card. Each letter was printed in Times New Roman with font size 40. Investigator named the letter and the child was instructed to point to the corresponding letter from a group of four. Score '1'was given for correct response and '0' for incorrect response.

3. *Letter sound knowledge (LS):* Ten letters or letter combinations were used to assess letter sound knowledge. Each letter/ letter combination was presented in a single card with three other choices. Child was instructed to point to the letter or letters, which makes the sound which investigator said.

For e.g. "Show me the letter which makes the sound 'sss'". All letter/ letter combinations were presented in uppercase format.

2.3 Procedure

Children were tested individually in an ambient condition in their school premises. Parents and teachers were informed about the purpose of the study and informed consent was taken from the school authorities and parents. Children were seated comfortably and were instructed to listen carefully and to name the picture or point to the correct letter. Testing was completed in a single sitting and each session extended for 15 minutes. Responses for environmental print recognition were recorded in verbatim for further analysis.

3. Findings

Mean and standard deviation of each measure in PKG, LKG and UKG were computed and shown in Table 2. As expected, the measures showed improvement across grades i.e. an increase in performance was observed on environmental print recognition, letter name knowledge and letter sound knowledge from PKG through UKG. However, Letter name scores of LKG (M = 10, SD = 0) and UKG (M = 10, SD = 0), was found to be reaching the ceiling. This indicates that children master letter names in LKG itself. Shapiro-Wilks test of normality was done and it revealed that the data did not follow assumptions of normality ($p<.05$). Therefore, nonparametric Kruskal-Wallis H test was carried out to compare the measures across Grades. Mann-Whitney U test was also carried out to find out pair wise grade difference if any.

Table 2

Mean, median and standard deviation of environmental print recognition, letter name knowledge, letter sound knowledge across Grades

Measures	N	PKG			LKG			UKG		
		M	Median	SD	M	Median	SD	M	Median	SD
EP	30	5.80	6.00	1.54	8.50	9.00	1.94	12.46	12.00	2.02
LN	30	7.80	8.00	1.39	10.00	10.00	0.00	10.00	10.00	0.00
LS	30	2.96	3.00	1.99	6.46	6.00	2.08	9.37	10.00	1.03

Note. N= Number of participants, PKG= Pre –Kindergarten, LKG=Lower Kindergarten, UKG= Upper Kindergarten, EP=Environmental print recognition, LN=Letter name knowledge, LS = Letter sound knowledge.

Results of Kruskal- Wallis H test revealed significant difference across Grades on environmental print recognition ($x2$ (2) = 62.23, $p<.001$). Further, pair wise comparison was done using Mann-Whitney U test and the results indicated that environmental print recognition was significantly better in UKG than LKG and PKG. This indicates that from LKG through UKG children showed a developmental progression on environmental print recognition. Table 3 represents the results of Mann-Whitney U test on environmental print recognition, letter name knowledge, and letter sound knowledge in PKG, LKG and UKG. Analysis of letter name knowledge showed

significant difference across Grades (x2 (2) = 70.03, p<.001). Post hoc pair wise comparison of letter name knowledge showed no significant difference between LKG and UKG (p>0.05). Similar to environmental print recognition and letter name knowledge, significant difference was seen on letter sound knowledge across Grades (x2 (2) =63.17, p<.001). Pair wise comparison of letter sound knowledge demonstrated significantly better performance in UKG as compared to LKG and PKG. Also, significant difference was observed between LKG and PKG on letter sound knowledge.

Table 3
Results of pair wise comparison across Grades on environmental print recognition, letter name knowledge, and letter sound knowledge

Pair wise	EP		LN		LS	
comparison	|z|	*p*-value	|z|	*p*-value	|z|	*p*-value
PKG vs LKG	4.78	<0.001	6.43	<0.001	5.19	<0.001
LKG vs UKG	5.57	<0.001	0.00	>0.05	5.43	<0.001
PKG vs UKG	6.64	<0.001	6.43	<0.001	6.68	<0.001

Note. PKG= Pre –Kindergarten, LKG=Lower Kindergarten, UKG= Upper Kindergarten, EP=Environmental print recognition, LN=Letter name knowledge, LS= Letter sound knowledge.

3.1 Relationship among environmental print recognition, letter name knowledge, and letter sound knowledge

Spearman rank order correlation was done to find out the relation between environmental print recognition, letter name and letter sound knowledge. Environmental print recognition revealed a strong statistically significant positive correlation with letter name knowledge (r_s =*0* .69, p< .001) and letter sound knowledge (r_s = *0* .83, p< .001). However, a Grade wise correlation among these measures was also done, as the letter name scores reached ceiling by LKG. The results revealed that environmental print recognition was correlated with letter name only in PKG (r_s = *0*.42, p< .05), whereas, environmental print recognition was related to letter sound in LKG (r_s = *0*.54, p< .05) and UKG (r_s = *0*.46, p< .05). These results indicate that environmental print recognition showed association with letter name in PKG and letter sound in LKG respectively. In UKG, though environmental print recognition showed significant correlation with letter sound knowledge, it was weaker compared to LKG.

In order to address the last research question i.e. to check whether letter name and letter sound predicts environmental print recognition, a linear regression analysis carried out. Regression analysis to predict environmental print recognition based on letter sound resulted in deriving a significant regression equation (F (1, 88) = 155.62, p<.001) with an R^2 of .64. The final model was EP= 3.69 + 0.84 (LS) + e, where 'e' is the error factor. Therefore, it may be interpreted that for every one score increase in letter sound, environmental print recognition is expected to increase by 0.84. Similarly, regression analysis of letter name and environmental print recognition in PKG was done and the model derived was EP = 2.70 + 0.40(LN) + e, where e is the error factor. Significance level of letter name in the regression model was poor, F (1, 28) = 4.30, p= .05, with R^2 = 0.13. This low R^2 value implies that changes in environmental print recognition are not strongly related to

changes in letter name and hence LN cannot be considered as a good predictor for environmental print recognition in the current study.
Finally, though not the main concern of current study, an attempt was made to compare the performance of children between two types of EP, i.e. EP with full contextual cues and with only logos. Significant difference in performance was found for children in PKG ($z= 2.14$, $p<.05$) with better scores for environmental prints with contextual cues than with only logos, i.e. they rely on contextual cues for recognition. Though difference was observed on recognition of environmental print with and without contextual cues in LKG, the difference was not statistically significant ($p>.05$). Likewise, children in UKG did not show significant difference between two types of EP.

4. Conclusions and Discussion

Results of the current study revealed that there was significant difference in environmental print recognition, and letter sound knowledge across Grades indicating a developmental progression of these skills from PKG through UKG. Whereas, no significant difference was observed between LKG and UKG on letter name knowledge, as the scores reached ceiling suggesting that LN knowledge is mastered by LKG itself. These findings indicate that mastery of letter name knowledge occurs earlier than letter sound knowledge in preschool ELL children with Malayalam native language. These findings also points to the fact that preschool instructional strategies in Kerala focus on letter names prior to letter sounds. This is in accordance with the instructional strategies recommended for teaching preschool children (Kaul, Bhattacharjea, Chaudhary, Ramanujan, Banerji & Nanda, 2017) and the curriculum followed in most preschool textbooks. Studies on alphabetic script suggest that letter name knowledge facilitates letter sound knowledge (Foy & Man, 2006; Share, 2004). It has been reported in literature that teaching letter sounds only is not beneficial, as several graphemes in English represent more than one phoneme (for e.g. /c/ and /s/) and therefore, reading unknown words might be difficult for new readers (Adams, 1990). Accordingly, most preschool children receive literacy instructions on letter name (English) initially followed by letter sound. This pattern of instructional strategy would have resulted in the discrepancy in letter name and letter sound scores across Grades
As expected, though association was observed among measures (letter name, letter sound and environmental print recognition), grade wise differences were observed. That is environmental print recognition was related to letter name in PKG and letter sound in LKG and UKG respectively. These findings suggest that to decode environmental print, in PKG children use letter name knowledge whereas in LKG and UKG they use letter sound knowledge. This was further strengthened by the findings that the relation between environmental print recognition and letter sound knowledge was stronger in LKG ($r_s = 0.54$) than in UKG ($r_s = 0.46$). Previous studies indicate lack of consensus on the role of letter name or letter sound knowledge on environmental print recognition. Masonheimer et al. (1984) and Blair and Savage (2006), reported that children use contextual cues while reading environmental print and neither phonological awareness nor letter sound knowledge is related to environmental print recognition. In contrast, Bowey (1994), Stahl and Murray (1993) and Johnston et al. (1996) reported a

relation between environmental print and letter sound knowledge. Also, it has been reported that children communicate with their parents and peers about environmental print using their letter name knowledge much earlier (Velutino et al., 2003). Our findings support the role of letter name and letter sound knowledge in environmental print recognition. In view of the relation observed between letter name/ sound knowledge and environmental print recognition, the premise that environmental print recognition is exclusively based on contextual cues is not supported in the current study. As discussed earlier, children with knowledge of letter name start developing letter sound knowledge by LKG, and begin decoding / reading environmental print/ familiar words using their letter sound knowledge. Whereas, the less strong relation between letter sound knowledge and environmental print recognition in UKG could be due to emergence of automaticity in word recognition, which in turn would have developed with repeated exposure to environmental print.

Use of contextual cues during environmental print reading implies the existence of logographic stage/pre- alphabetic phase as explained by most of the models of reading acquisition of native English speakers (Ehri, 1998; Frith, 1985). Pre-alphabetic phase involves use of visual and contextual cues and are linked to word meaning than pronunciations (Byrne, 1992; Ehri, 2005). Whereas, use of letter name or letter sound knowledge implies the emergence of partial alphabetic phase wherein children read words using phonetic connections. Though many theories support the idea of logographic stage in reading acquisition, Stuart and Coltheart (1988) reject this concept, stating that visual and contextual cues per se do not enable the child to read. Literature on existence of logographic stage in transparent writing systems (Wimmer & Hummer, 1990; Cardoso Martins, 2001) and in non alphabetic languages are however inconclusive to date. Karanth and Prakash (1998) could not find any evidence of logographic reading in Kannada, which is an alpha syllabic language. Whereas, Jagadish (1991) and Akshay (2012) assert that logographic stage do exist in alpha-syllabic language like Kannada, but occurs at a very early age. In the current study, participants were native Malayalam speakers exposed to English as second language at school. Findings of this study further raises the debate of existence of logographic stage in non-alphabetic language especially alpha-syllabic language. Similar to English speaking children, ELL children in the current study were also expected to use only logographic stage in preschool. Nevertheless, in the current study an association of letter name knowledge with environmental print recognition was observed indicating the emergence of alphabetic stage in this Grade. In PKG, ELL children started using phonetic cues for recognizing environmental print instead of contextual cues. The current study also evidence that in PKG, children could recognize environmental print with contextual cues better than those without cues. These findings pave way to the understanding that, in PKG, children rely on letter knowledge and contextual cues as well. Combining the above two contradicting findings, it could be inferred that logographic stage occurs in preschool children but at a very early stage of learning to read, probably before three years. This could be attributed to the influence of Malayalam, which is an alpha-syllabic language. This finding is in concurrence with the

report of early occurrence of logographic stage in Kannada languages, another alpha-syllabic language (Jagadish, 1991; Akshay, 2012). During PKG, children are in the transition stage from logographic to partial alphabetic stage as they learn letter name knowledge through school instructions. As this study included children in 3-6 years, it is unfair to assume that such stage does not exist. Hence, our findings partially support the assumptions that logographic stage occur very early or lasts for a short duration similar to that seen in Kannada language learners (Jagadish, 1991; Akshay, 2012). A possible explanation for the early occurrence of logographic stage could be the influence of instructions or native language. Cardoso Martins (2001) reported that instructional method influence the duration and speed of acquisition of reading. These findings are in consensus with the findings of Toniazzo & Jullien (2001) wherein they propose that duration of logographic reading varies with environment. Children from literacy rich environment develop reading skills earlier than expected due to repeated exposure of environmental print. Supporting this Neumann et al. (2012) in their model emphasize the importance of socio cultural factors, in facilitating logographic reading skills which in turn facilitates the emergent literacy skills.

The findings of the current study suggest that, reading acquisition in ELL's follow the same developmental trend seen in native English speaking children (Robins & Treiman, 2009; Share, 2004) except for the clear cut emergence of logographic stage. The difference in early stage of reading acquisition may also be due to the influence of native language structure. It is very likely that ELL's embrace the same cognitive linguistic resources for processing second language, which is wired for processing native language suggesting that models developed for native English speakers may not be appropriate for English language learners.

Regression analyses revealed LS knowledge as a good predictor of environmental print recognition than letter name knowledge, highlighting the importance of phonics in the early stages of reading acquisition in ELL's. Hence, findings of this study suggest the use of letter sound correspondence to facilitate word reading in ELL's. This study also implies that environmental prints could be used as a mode of training emergent literacy skills as the findings indicate that children in the current study are familiar with and could recognize the print available in their surroundings. Parents may support children's early acquisition of letter names and letter sounds by directly using environmental print. Such adult scaffoldings are essential to encourage children to read environmental print and further to facilitate emergent literacy skills.

5. Limitations and future directions

Though this study is first of its kind in literature on preschool ELL's with Malayalam native language it has few limitations. As the current study was done on ELL children, assessing these measures in both languages would have resulted in better understanding of the cross language transfer of these skills if any. Validation of the measures used in the current study is required for generalization of the results. Study on much young children, less than three years would have probably provided a better insight into the existence of logographic stage. Our study did not investigate the role of instruction on

the acquisition of these measures, so future studies incorporating this aspect may lead to better understanding and generalization.

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