



Cross Linguistic Transfer of Phonological Awareness and Word Recognition: An Exploratory Study on English Language Learners

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Abstract: Bilingual studies on cross-linguistic transfer of phonological awareness and word recognition emphasize the relevance of nature of language and orthography. The current study was designed to examine the significance of language and orthographic structure for phonological awareness and word recognition skills in children who are native speakers of Malayalam language learning English at school. The association of phonological awareness and word recognition in 30 Malayalam speaking preschool English Language Learners (ELL's) was tested using a set of stimuli in both English and Malayalam. Results revealed that word recognition was associated with phoneme awareness in English whereas in Malayalam, all the three levels tested in this study (rhyme, syllable and phoneme awareness) showed association with word recognition. However, considering the cross-linguistic associations, Malayalam word recognition was related to all levels of phonological awareness in English whereas no strong association was observed for word recognition in Malayalam with phonological awareness in English. Regression analysis revealed phoneme awareness in English as a strong predictor of word recognition in both the languages. These findings highlight the cross-linguistic transfer of phonological awareness between English and Malayalam supporting the Transfer Facilitation Model (TFM). Pedagogical implications of these findings on ELLs are discussed.

Keywords: cross- linguistic transfer, phonological awareness, word recognition, Malayalam, English Language Learners

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1. Introduction

Over the last few decades, reading researchers have shifted their attention towards reading acquisition in non-alphabetic languages instead of Anglocentric or Eurocentric studies. Studies in non-alphabetic languages evidenced that models developed for reading in English speaking children are not universally applicable. Reading acquisition in alpha-syllabic (Mc Bride-Chang, *et al.*, 2005; Nag & Snowling, 2012) and morpho-syllabic (Wang *et al.*, 2006) languages are different from alphabetic language such as English. Research also reports that nature of writing system and orthography strongly influences reading acquisition (Frost, 1992; Joshi & McCauley, 2017; Prakash & Joshi, 1995; Prema, 2006; Share, 2008). Many studies report that among the various metalinguistic and metacognitive skills, phonological awareness (PA) is a stronger predictor of later reading skills in alphabetic language (Lonigan, *et al.*, 2000; Scarborough, 1998). However, the predictive role of PA for reading acquisition in English is not true for non- alphabetic writing systems and alpha-syllabic orthographies (Karanth & Prakash, 1996; Rekha, 1997). These studies suggest that the role of PA varies depending on the level of representation of phonological units on orthographic units. In an alphabetic script, phonological information is encoded at the phoneme level whereas in an alpha syllabic script like Kannada, Malayalam, Tamil, etc., encoding happens both at the syllable and phoneme levels. Due to this dual representation of phonological information, in alpha-syllabic languages both phoneme and syllable awareness are important for reading where syllable awareness is more essential than phoneme awareness (Karanth & Prakash, 1996; Nag & Snowling, 2011; Prema, 1997). However, recent studies demonstrate that phoneme awareness is also equally important as syllable awareness in reading alpha-syllabic language, as the syllables are decomposable into phonemes (Nag, 2007; Nakamura *et al.*, 2014; Reddy & Koda, 2012) and also due to the influence of English language (Mishra & Stainthorpe, 2006). However, dual representation of phonological information and orthographic complexity lead Share and Daniels (2014) to question the terminology 'alpha-syllabic' for Brahmi- derived scripts. They contend that instead of 'alphasyllabic', terminology 'abugida' is more appropriate for Brahmi script.

Given the variation in phonological encoding of written information in different languages, a growing body of research is available on the influence of these factors on reading and writing development. Word recognition is a very closely investigated skill in this line of interest. Word recognition refers to the process of retrieving context-appropriate meaning of words. It encompasses processes such as analyzing a grapheme, extracting phonological or morphological information from the grapheme and the retrieval of word meaning. For skilled readers, orthographic processing occurs automatically without letter by letter processing. However, as evidenced by eye movement studies, during reading, majority of words in text are systematically processed, followed by retrieval of word meaning for each word (Kinstch, 1998; Rayner & Bertera, 1979) to derive contextual meaning. Hence, word recognition is very important in reading as it helps the learner to retrieve stored information for text comprehension which is the ultimate goal of reading. Accordingly, ability to access, store, and manipulate phonological as well as morphological information is essential for word recognition (Koda, 2015). Finally, word meaning as well as the context appropriate meaning of the word will be retrieved. Though word recognition is a universally required skill for reading, the processes or sub-skills required are expected to vary across languages depending on the nature of orthography. Orthography refers to the visual representation of spoken language and Orthographic Depth Hypothesis (Katz & Frost, 1992) explains how regularity in grapheme-phoneme correspondence affects phonological information extraction in alphabetic system. Majority of the studies reported in literature on word recognition has been conducted on monolingual children. Hence, it would be interesting to understand the processes involved in word recognition in bilingual children who learn two different types of scripts. As per Psycholinguistic Grain Size Theory (Ziegler & Goswami, 2005), there are differences in the grain size of lexical representation due to difference in the orthography. In other words, refinement in the representation of phonological units is characterized by the orthographic units at which phonology is represented.

In the current scenario majority of world's population is either bilingual or multilingual and English is considered as universally acceptable language. Due to the tremendous increase in bilingual or multilingual population, recent studies in reading are focused on reading development in children learning English at school other than their native language. Children who learn English language at school and any languages other than English at home are referred to as 'English Language Learners (ELLs). Terms like English as Second Language Learners (ELLs), and Dual Language Learners (DLLs) are also used interchangeably and in the current study term ELL is used to refer to these children. Literature on reading development in ELL children is focused on the pattern of reading acquisition in both



the languages and cross linguistic influence of literacy skills. Cross linguistic influence of native language (L1) on second language (L2) (Bailey, *et al.*, 1974; Cummins, 1981; Nagy & Anderson, 1984) and influence of L2 competencies on L1 literacy teaching (Chen *et al.*, 2010; Nakamura *et al.*, 2012) have been reported in studies on second language learning and biliteracy acquisition. Literature also supports bidirectional transfer of metalinguistic skills provided there is proficiency in both the languages. Such bidirectional cross-linguistic transfer of skills is explained in Transfer Facilitation Model (TFM; Koda, 2005) which states that metalinguistic resources developed in one language through exposure should be readily available for learning in other languages. Hence, phonological awareness acquired in one language facilitates the acquisition of phonological awareness in the second language as well as in learning to read. Many studies provide empirical support to the TFM reporting cross-language influence of phonological awareness skills (Geva, 2008; Reddy & Koda, 2012; Scarborough, 1998). However, literature also evidences that the cross-linguistic relation between phonological awareness depends on similarity in phonological encoding between the languages involved. Hence, it may be speculated that in children learning English (alphabetic language) and an Indian language (dual level phonological representation), the phonological awareness pattern may be different compared to those children who learn two alphabetic languages simultaneously.

Till date, there is, limited number of studies conducted to explore the above premise. Reddy and Koda (2012) suggest a close relation between phonological awareness in Kannada and English and phoneme awareness as the mediator of cross-linguistic resource sharing. A study by Mishra and Stainthorp (2007) on reading in Oriya-English bilingual children revealed that phoneme awareness correlated with reading in Oriya concluding that literacy instruction in English alters the processing of phoneme level information in Oriya. Tiwari *et al.*, (2011) studied reading acquisition in Malayalam – English bilingual children from Grade I to Grade VII and showed significantly better phonological awareness in English than Malayalam. They also reported presence of cross-language transfer of phonological awareness, word reading, and orthographic knowledge between English and Malayalam and attributed this to similarity in processing of these two scripts. Nevertheless, most of the studies in Indic scripts are on word or non-word decoding in primary or secondary school children and absolutely no studies on ELL children with Malayalam as native language. While it is reported that word recognition in adults is influenced by word frequency and letter sequence (Frost, 2012). In children who are in the early stage of literacy acquisition do these factors exercise similar influence? In view of paucity of studies in this direction, there is a need to address the above question.

Cross-linguistic transfer of phonological awareness is an area that has been less explored especially in preschool ELLs. Development of phonological awareness in English and Malayalam in preschool ELLs with Malayalam as the native language and the relation of these skills with word recognition would provide better understanding of the cross linguistic transfer. Study on preschool children is expected to throw more light on the role of phonological awareness in word recognition.

The aim of the present study was to investigate the relationship between word recognition and phonological awareness in preschool ELLs with Malayalam as their native language. The objective was to compare phonological awareness and word recognition skills within and between languages. Further, development of phonological awareness at various levels of speech sound units, i.e., rhyme, syllable, and phoneme, in both Malayalam and English was also traced. Research objectives addressed in the present study on preschool ELLs were:

- a) To trace development of phonological awareness and word recognition in English and Malayalam languages in ELL children
- b) To examine association if any, between phonological awareness and word recognition in English and Malayalam
- c) Does phonological awareness in Malayalam predict word recognition in English or vice-versa?

2. Method

2.1 Participants

Thirty preschool ELLs in the age range of 4-5 years who were attending preschools with English as the medium of instruction participated in the current study. Participants were selected from three districts of south Kerala (Southern state of India) where Malayalam is the native language. All the participants had good exposure to Malayalam at home and to English only at school. Participants with average academic performance as per teachers'



report were considered for the study. WHO Ten question disability screening checklist (Singhi, et al., 2007) was used to rule out any sensory or motor disabilities.

2.2 Stimuli

Stimuli used in the current study was developed as a part of thesis by the first author (Anjana, 2019). Measures to assess phonological awareness and word recognition were developed in both English and Malayalam based on a detailed review of literature. Three main tasks for phonological awareness with subtasks for each and one task for word recognition were developed the details of which are given below:

Phonological awareness tasks were designed at three levels of sound units, i.e., rhyme, syllable, and phoneme level in both English and Malayalam.

Rhyme Awareness (RA): The tasks included Rhyme recognition (RR), Rhyme judgment (RJ) and Rhyme production (RP). For RR, participants were given three pictures and were asked to find out the word, which rhymes with the word which investigator said. For RJ, investigator presented two words verbally and the participant had to judge whether the two words rhymed or not. If the two words rhymes, the participant was instructed to say 'yes' and 'no' if not. In RP, the participant was instructed to say one word which rhymes with the word which investigator presented verbally. Each task included two practice items and five test stimuli. Score '1' was given for each correct response and '0' for the incorrect response.

Syllable Awareness (SA): The tasks included Syllable Blending (SB), Syllable Segmentation (SS), and Syllable Deletion (SD). For SB, investigator presented the syllables with one second gap in between and instructed the child to combine the syllable to find the word. For SS, 2-3 syllable words were presented verbally by the investigator. The participants were instructed to separate the words into syllables and tap for each syllable. For SD, participants were asked to delete a particular syllable in a word and say the remaining word. Each task consisted of two practice items and five test stimuli and all the stimuli were presented verbally. Score '1' was given for each correct response and '0' for incorrect response.

Phoneme Awareness (PA): Phoneme Blending (PB), Phoneme Segmentation (PS), and Phoneme Deletion (PD) tasks were incorporated in PA. The tasks and instructions were similar to syllable awareness except that the sound units were phonemes instead of syllables. For PB, child was given phonemes and was instructed to join the phonemes and say the correct word. For PS, investigator presented the words verbally and asked the participant to segment the words into phonemes. PA tasks used 2-3 syllable familiar words and Score '1' was given for each correct response and '0' for the incorrect response. Two practice trials were given for the participant to become familiar with the task. Repetitions were provided only for practice items and not for test items. Number of syllables or phonemes in the stimuli words in each language was matched to control the effect of syllable/phoneme length on these tasks. Separate stimuli were prepared for English and Malayalam.

Word Recognition: As the current study was carried out on preschool ELLs, word recognition tasks were designed in a simpler way than the word reading tasks used for primary or secondary school children. Five very simple and familiar words in each language were selected from the textbooks of preschoolers. Each word along with the corresponding picture and three other pictures were presented to the participants in a card. Investigator asked the participants to read the words and point to the corresponding pictures from the group.

Ethical formalities: Informed written consent was taken from the school Head and parents. The study was conducted following Biobehavioural guidelines for research of the institute where the study was conducted.

2.3 Procedure

The investigator administered all the tasks individually in a quiet room during school hours. Order of presentation of stimuli in both the languages was counterbalanced, but items within each language were presented in the same order. Instructions were given in respective language and if the child had difficulty in understanding instructions in English, instructions were provided in Malayalam language. Total scores for each of the tasks were tabulated and subjected to statistical analysis



3. Results and Discussion

In order to trace the development of phonological awareness and word recognition in English and Malayalam languages in ELL children, performance of all the 30 participants was compared using non-parametric tests (Friedman test and Wilcoxon signed rank test) as the data was not following assumptions of normality at 0.05 level of significance based on Shapiro-Wilks test of normality.

Spearman correlation was done in order to find out the predictors of word recognition in both the languages, step wise multiple regression analysis was done. The results are presented in the following section and discussed. Table 1 shows mean, median, and standard deviation for word recognition and phonological awareness in English and Malayalam. There was no difference in the performance of 30 preschool ELLs on word recognition and phonological awareness between English and Malayalam. Comparison of performance on phonological awareness between Malayalam and English indicated no significant difference for rhyme ($|z| = 0.46$), syllable ($|z| = 0.28$) and phoneme ($|z| = 0.57$) at 0.05 level of significance. Similarly, no significant difference was observed between English and Malayalam on word recognition skills ($|z| = 0.80$). Overall, language differences were not observed on either word recognition or on phonological awareness in 3–4-year-old preschool ELLs. These results suggest that phonological awareness in Malayalam and English develop simultaneously in preschool ELLs. In contrast, Nag (2007) and Tiwari *et al.*, (2011) report significant difference between phonological awareness in English and in alpha-syllabic language like Kannada and Malayalam, especially at phoneme level. They attribute the delay in emergence of phonological awareness to the influence of orthography on phonology. The discrepancy in findings could be due the difference in the age group considered for the study. As the current study considered preschool ELLs, phonological awareness in both the languages is likely to be in the initial stages of acquisition as postulated by psycholinguistic grain size theory (Anthony *et al.*, 2003). As per this theory, children are initially sensitized to a larger phonological units followed by further refinement of phonological sensitivity as they learn to read.

Table 1 Mean, Median, Standard Deviation (SD) and $|z|$ scores of Word Recognition and Phonological Awareness Scores in English and Malayalam.

Measures	English			Malayalam			$ z $ score
	Mean	Median	SD	Mean	Median	SD	
Word recognition (Max Score 5)	4.27	4.00	0.74	4.60	5.00	1.04	0.80
Rhyme awareness (Max Score 15)	9.67	9.00	1.73	9.83	10.00	2.07	0.46
Syllable awareness (Max Score 15)	11.60	12.00	1.81	11.60	11.50	2.30	0.28
Phoneme awareness (Max Score 15)	3.93	4.00	2.21	3.90	4.00	2.26	0.57

Correlation values of word recognition and phonological awareness at different levels of sound units are depicted in Table 2.

Analysis of correlation results revealed that English word recognition skills was associated with only phoneme awareness in English at $p < 0.05$ level of significance while Malayalam word recognition was related to phonological awareness at all levels of speech sound units, i.e., rhyme ($r_s = 0.52$) syllable ($r_s = 0.53$), and phoneme ($r_s = 0.77$). In addition, as shown in Table 2 English phonological awareness skills at all levels of speech sound units was related to Malayalam word recognition. In short, Malayalam word recognition was related to phonological awareness at different levels in both the languages, whereas English word recognition was related exclusively to phoneme awareness in English. The findings for word recognition in English are in consensus with studies suggesting that phoneme awareness predicts word reading in English (Goswami & Bryant, 1990; Lonigan & Shanahan, 2009; Torgesen, 2002; Wagner, Torgesen & Rashotte, 1994). However, with respect to Malayalam word recognition,



findings of the current study are supported by evidences that alpha-syllabic languages necessitate syllable as well as phoneme awareness due to the dual level encoding of phonological information (Nag & Snowling, 2011; Prakash & Joshi, 1995; Reddy & Koda, 2012).

Table 2 Correlation of Word Recognition and Phonological Awareness in English and Malayalam.

	EWR	ERA	ESA	EPA	MWR	MRA	MSA	MPA
EWR								
ERA	-.008							
ESA	.073	.661**						
EPA	.401*	.584**	.660**					
MWR	.199	.538**	.572**	.673**				
MRA	.218	.444*	.353	.543**	.518**			
MSA	.019	.639**	.720**	.553**	.558**	.529**		
MPA	.182	.572**	.498**	.641**	.655**	.765**	.627**	

EWR: English Word Awareness; ERA: English Rhyme Awareness; ESA: English Syllable Awareness; EPA: English Phoneme awareness; MWR: Malayalam Word Awareness; MRA: English Rhyme Awareness; MSA: Malayalam Syllable Awareness; MPA: Malayalam Phoneme awareness; * $p < 0.05$ level of significance; ** $p < 0.01$ level of significance.

Further, Spearman correlation between corresponding levels of phonological awareness in two languages showed a strong relation at the level of syllable ($r_s = 0.72$), weaker but significant relation at phoneme ($r_s = 0.64$) and rhyme level ($r_s = 0.44$). These results indicate that association of phonological awareness between the two languages varies at different phonological levels/ grain sizes. In another way, cross-linguistic association of phonological awareness varies with respect to the level of sound units. Stronger cross-linguistic association at syllable level suggests cross-linguistic transfer of syllable awareness attained in one language to the other language. Syllable awareness i.e. large grain sizes develop irrespective of language. These findings are in consensus with psycholinguistic granularity theory (Anthony *et al.*, 2003) stating that large grain sizes develop early and further refinement of phonological awareness happens as children learn to read. Additionally, as the current study was targeted on preschool ELLs, large grain sizes i.e. syllables would have been acquired by this age with fine-grained units being in the continuum of developmental stage.

Table 3 Regression models predicting word recognition

Word recognition	Phonological Awareness skills	R ²	Δ R ²	Δ F
English	EPA	0.15	0.12	5.04*
Malayalam	MPA	0.36	0.34	15.69*
	EPA	0.44	0.42	22.12**

EPA: English Phoneme Awareness; MPA: Malayalam Phoneme Awareness, * $p < 0.05$ of significance, ** $p < 0.001$ level of significance.

Though the data was not following assumptions of normality as the residuals were following normal distribution, step wise multiple regression was carried out to find the predictors of word recognition in each language separately. Within-language regression analyses in English revealed that, phoneme awareness predicts word recognition ($F(1, 28) = 5.04, p < 0.05$) while rhyme and syllable awareness showed poor predictability. Similarly, in Malayalam too phoneme awareness was the strongest predictor ($F(1, 28) = 15.67, p < 0.05$) excluding rhyme and syllable awareness. However, cross-linguistic prediction analysis revealed that Malayalam word recognition was better predicted by English phoneme awareness ($F(1, 28) = 22.12, p < 0.001$) excluding Malayalam phoneme awareness at step 2 ($t = 1.69, p > .05$). These findings indicate phoneme awareness as the only predictor for word recognition in English in consensus with various studies suggesting that for alphabetic language like English phoneme awareness is the best predictor of word or non-word decoding (Nakamura *et al.*, 2014; Torgesen, 2002). Similarly, in Malayalam also, phoneme awareness is the best predictor compared to syllable awareness. As, majority of studies report that dual level awareness i.e. syllable and phoneme level is needed for decoding words in alpha-syllabic languages (Nag,



2007; Prema, 1997; Reddy & Koda, 2012) it was expected that both syllable and phoneme awareness would be predictors of Malayalam word recognition. The difference in findings could be attributed to the language considered for the current study. Most of the previous studies in Indian languages on reading acquisition have been done in Kannada language and these findings have been generalized to other alphasyllabic languages. However, subtle differences in the orthography of alphasyllabic languages as reported by Prema (2006), i.e. Malayalam has more phonemic script compared to other south Indian languages might be the reason for the difference in findings. As it is easy for a Malayalam reader to visualize both consonant and vowels in diacritic forms predictive power of phoneme awareness on word recognition may be more in Malayalam compared to Kannada and Tamil. In addition, English literacy instructions at school could have facilitated the processing of phoneme level information in alpha-syllabic script as reported in literature (Mishra & Stainthorp, 2007; Reddy & Koda, 2012). However, with respect to cross-linguistic prediction, English phoneme awareness was better predictor of Malayalam word recognition than Malayalam phoneme awareness, suggesting a cross-linguistic transfer of skills through phoneme awareness. Study by Anjana (2019) suggest that phonological awareness in English and Malayalam transfers across languages and therefore may be considered as a language universal aspect. Adding to this Tiwari *et al.*, (2011), reported that phoneme awareness in English precedes Malayalam phoneme awareness. Taking into consideration the findings of the above studies it may be said that, though there was no significant difference between English and Malayalam phoneme awareness, phoneme awareness that developed for English would have facilitated phoneme awareness for Malayalam and thereby facilitating word recognition in Malayalam. Exposure of preschool ELLs to school instructions in English more than Malayalam would be a major factor contributing to this. To be more specific, findings of the current study reveal influence of second language on reading acquisition in native language. Therefore, it may be interpreted that phoneme awareness is the mediator of cross-linguistic transfer. In summary, these findings strongly suggest cross-linguistic transfer of skills in reverse direction i.e. from second language to native language in ELLs. The findings support the Transfer Facilitation Model (TFM) which states that cross-linguistic transfer occurs bidirectionally and metalinguistic skills developed in one language facilitate the acquisition of the same in another language.

Table 4 Results of Wilcoxon signed rank test comparing awareness for phonological pairs in English and Malayalam.

Pairs	English		Malayalam	
	z	p-value	z	p-value
Rhyme awareness –Syllable awareness	4.32	<0.001	3.76	<0.001
Rhyme awareness-Phoneme awareness	4.80	<0.001	4.80	<0.001
Syllable awareness-Phoneme awareness	4.80	<0.001	4.80	<0.001

Though not included in the objective, comparison of phonological awareness at different speech sound units was carried out for each language separately to find out the pattern of development of phonological awareness in preschool ELLs. Significant difference was observed across three levels of phonological awareness in both Malayalam ($\chi^2 = 54.00$, $p < 0.001$) and English ($\chi^2 = 55.20$, $p < 0.001$). Further, pair wise comparison revealed significant difference between all pairs in both the languages ($p < 0.05$). Table 4 depicts the results of pair wise comparison on different phonological awareness tasks in English and Malayalam. Hence, it may be interpreted that, syllable awareness was acquired earlier than rhyme awareness in both the languages in preschool ELL children. Compared to syllable and rhyme awareness, phoneme awareness was acquired at a later stage and was still in the emergence stage, whereas the former two reached ceiling by 3-4 year itself. These findings are in line with the earlier studies reporting that rhyme and syllable awareness develop equally, whereas phoneme awareness lag behind the larger grain size units (Seetha, 2002; Swaroopa, 2001). These findings indicate that order of acquisition of phonological awareness in Malayalam and English in preschool ELL's is from large to fine grain sizes i.e., from syllable to rhyme followed by phoneme. These findings are in consensus with many other studies which suggest that syllable awareness is universal whereas phoneme awareness develops after learning to read specific scripts (Goswami & Brayant, 2016). Findings of the study support Psycholinguistic Grain Size theory, according to which children develop sensitivity from larger units to smaller units gradually and refinement of phonology depends on orthographic units in which phonology is represented.



4. Summary and Conclusion

Objective of the study was to find out relation between phonological awareness at different levels of sound units and word recognition in preschool ELLs. The study also aimed at identifying cross-linguistic transfer of phonological awareness skills between English and Malayalam. Findings of the study indicate that word recognition in both the languages is predicted by phoneme awareness and these skills transfer between languages. This is in accordance with Transfer Facilitation Model (TFM). Findings of the study shed light on the nature of development of phonological awareness and word recognition in preschool ELLs. This may help in identifying children at risk for learning difficulties and to find out any language specific difficulties. These findings can be implemented in the curriculum planning or classroom practices of preschool ESL children. Results of the study imply that pedagogical methods focused on anglocentrism would be beneficial for preschool ELLs with Malayalam as native language. Future studies on a longitudinal basis with other parameters like spelling, alphabet knowledge might widen our knowledge on literacy acquisition of Malayalam preschool ELLs.

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Does this article screened for similarity?

Yes

Ethics Approval

Ethics approval was sought from the Institutional Review Board (IRB).

Informed Consent

Written consent was obtained from the parents.

Author Contributions

Anjana A V: Designed the analysis, Collected the data, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing and review; **K S Prema:** Conceived and designed the analysis, Manuscript preparation, Manuscript editing and review. All the authors read and approved the final version of the manuscript.

Conflict of interest

The Author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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