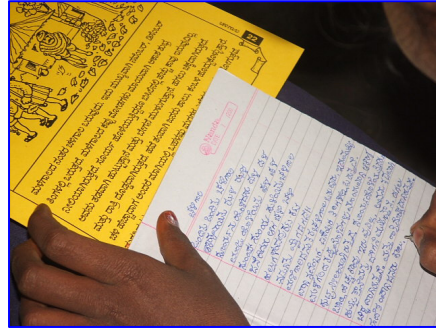




Reading difficulties in Kannada, an Indian Alphasyllabary

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Children's oral language abilities provide a critical foundation for learning to read. More specifically, it is their ability to process and manipulate speech sounds (phonological skills) that has been shown to explain the individual differences in reading development across several languages. A corollary to this is that children with **phonological processing deficits** are at high-risk for reading problems. However, to date, the majority of research on reading development and dyslexia has been undertaken in alphabetic languages in which the letters of printed words map to the speech sounds of spoken words at the level of the phonemes. Less is known about reading acquisition in non-alphabetic languages. It is against this back-drop, that we investigated the nature and causes of reading difficulties in Kannada, an Indian alphasyllabary.



In alphasyllabaries, the basic symbol unit is the **akshara**. The **akshara** usually maps to phonology at the level of the syllable. However the **akshara** also embody phoneme markers, rendering the writing system somewhat similar to the alphabetic scripts. When compared to the contained European orthographies with 24 to 32 letter units, Kannada is an **extensive orthography** with 474 CV symbols and additional diacritic marks for consonants. The symbols are **visually complex** because of the spatial arrangement of diacritics in relation to a base consonant.

Children are taught to read primarily through a process of rote learning of the names of the **akshara**. However, the Kannada orthography is **transparent** and the rules that govern the ligaturing of the vowel and additional consonants to the base consonant are systematic. Children are not taught these rules in any explicit way but there is preliminary evidence that good readers have access to this knowledge. In contrast, children slow in mastering orthographic knowledge about the **akshara** show greater reading difficulty.



The main aim of the current project between Professor Maggie Snowling, Center for Reading and Language and Dr. Sonali Nag, The Promise Foundation was to specify the cognitive skills that underpin proficient orthographic development in young readers of Kannada and to characterize the difficulties that are associated with poor reading (dyslexia).

The investigation

This project was located in a community of southern India. Here children are taught to read the Kannada script from the age of 5 years. The investigation built on data from an earlier survey of children's reading skills where the word and nonword reading skills of 411 children in grades 1 to 3 had been measured and followed up for four years (TPF-NIAS, 2004-2007). From these data, we identified a group of poor readers whose reading skills fell below the 15th centile for their grade. We compared their attainments in literacy and a range of cognitive and linguistic skills with the performance of typically developing, same age children whose reading skills were within the normal range for their grade (CA-controls). We also contrasted the literacy attainments of the poor readers with the performance of younger children with comparable oral language skills (LA-controls).

Participants and Method: 106 children, aged 8 to 12 years and studying in Grade 3 to 6, participated in the study. We collected information on a range of skills that have been implicated in dyslexia. The assessment battery comprised tests of basic reading, spelling, phonological, visual and oral processing skills.

Preliminary Findings

Akshara Knowledge development in young Kannada Readers

- Learning the extensive Kannada *akshara* set often continues well into Grades 4 and 5.
- *Akshara* teaching typically moves from CV *akshara* to CCV *akshara*. There is a close parallel between this sequence of *akshara* instruction and the patterns of mastery.
- Kannada children's vocabulary however contains a sizable number of words with complex *akshara* and children's texts have a liberal sprinkling of all *akshara* types. Children who read often gain from this exposure, leading to mastery of a few *akshara* earlier than the formal taught sequence.
- As a corollary, a poor reading habit implies low exposure to several *akshara* and the ensuing unfamiliarity delays mastery of visual features of some *akshara*.

Emerging Profile of the poor Kannada Reader

The poor reader in Kannada shows delays in multiple areas.

- delays that are equivalent to language-age-matched younger children are:
 - in reading speed.
 - in Rapid Automatic Naming.
 - in syllable processing.
 - in phoneme processing.

- delays that are substantially below language age matched younger children are:
 - in accuracy.
 - in spelling.
 - in reading comprehension.

- delay when compared to age matched peers is:
 - in visual sequential memory.

*What do children find hard to Spell in Kannada?**

- When *akshara* do not follow a consistent sound to symbol.
- When *akshara* knowledge is shaky and there is error in recall of the *akshara* of a sound. This occurs mainly when distinguishing between *akshara* that share several visual features and remembering the appropriate diacritic marks for vowels and consonant clusters.
- Making judgements about long and short vowels, keeping a geminate or turning into singleton and other such phonetic contrasts.
- Assembling all phonemes in a consonant cluster into an *akshara* based on ligaturing rules. This is easiest for geminates with visually simple details when compared to geminates that demand new feature learning. Hardest for mixed consonant clusters.
- Longer words
- When the spoken dialect is different from the written spelling (di-glossia).

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Implications of the Study

Orthography-specific and orthography independent patterns

The specific features of the *akshara* demand cognitive processes that are particular to this orthographic unit, and different from what has been documented with the alphabet. For example, syllable awareness predominates in the early stages of literacy and phoneme awareness seems to be a true consequence of literacy. The orthography-phonology mapping make unique processing demands and acquisition of *akshara* knowledge is more drawn out.

There are other patterns seen with the *akshara* that are similar to patterns documented with the alphabet. One of the key orthography-independent patterns is the finding that on the whole, the predictors of variation in typically developing children are similar. Phonological processing is crucial for improved attainments and poor reading reflects a language based disorder. Children with reading difficulties show a delay, but the profile is similar to typically developing children.

Assessment of reading difficulties:

Based on the findings from this study we suggest that the following areas be included in any assessment battery aiming at identifying reading difficulties in the *akshara* languages:

- *akshara* knowledge*
- reading accuracy*
- reading comprehension*
- spelling*
- syllable processing*
- oral language processing*
- reading speed**
- phoneme processing**
- speed of processing**
- visual sequential processing**

(* for use in school based assessments; ** for use in clinical assessments)

Supporting children with reading difficulties:

This study has thrown up several pointers for the development of an effective remedial programme in the *akshara* languages. *Akshara* knowledge is pivotal and an intervention therefore must prioritise *akshara* practice. The study has however also indicated that while *akshara* knowledge is crucial it is not sufficient for ensuring higher reading attainment. A comprehensive programme with phonological games, focus on vocabulary, other oral language skills and exposure to multiple texts would promote

reading attainment better. For an example of a language programme that lends itself to adaptation for a remedial programme see the primary school programme, **Kannada Kalika Kosha**. The study also highlights some key aspects of spelling development and this too needs special attention.

End Note: Some of the largest child populations struggling with literacy are doing so in the *akshara* languages. Information from this study is timely not only for theoretical reasons but because it gives some clear pointers for what might be the more effective and efficient pathways to *akshara* literacy.

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