Reading and writing: Insights from the alphasyllabaries of South and Southeast Asia

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A written text, at its core, brings a linguistic message to a reader visually through a specific system of graphs organised around mapping principles and display conventions. The wide variety of the world's writing systems suggests that literacy is partly a matter of adaptations to the specific demands made by these systems. Graphs that map phonemes (alphabetic writing) shape reading in ways different from graphs that map syllables (Japanese Kana) and graphs that map morpheme-syllables (Chinese). Among these varied systems is one that, despite its use by several hundred millions of people (exceeded perhaps only by Chinese), has been under represented in the English language literature on literacy. In this Special Issue[i], we have sought to bring attention to the distinctive aspects of the alphasyllabaries that are widely used across South and Southeast Asia and how these distinctive aspects penetrate literacy.

Alphasyllabaries have features that overlap with both alphabetic systems and syllabic systems, and this perhaps has been a factor in some classification systems (e.g., Gelb, 1952) that recognised just three writing systems—alphabets, syllabaries and logographs. Whether every orthography (the specific implementations of a writing system for a given language) falls neatly into a single writing system category is not always straightforward. In our view, what is important is to illuminate the specific features of an orthography that are relevant for the spoken language it is encoding. In the case of alphasyllabaries, this means placing orthographies into the contexts of their historical development, of their use in contemporary spoken languages, and of their effects on literacy acquisition and skilled literacy.

HISTORICAL PERSPECTIVE AND TYPOLOGICAL FEATURES OF ALPHASYLLABARIES

Several languages in contemporary South and Southeast Asia use orthographies derived from the ancient Brahmi writing system. The origins of Brahmi are a contested topic among epigraphists, historians and more recently, cognitive scientists. Influence on the design of early Brahmi has been variously assigned to Sri Lankan Prakrit, Early Tamil, Ashokan and other varieties of Prakrit, and the Epic, Buddhist and Classical forms of Sanskrit. The Brahmi from third-century Ashokan edicts are the most extensive early material available (the earlier material being potsherds) of Northern Brahmi. While opinion is divided as to whether the Ashokan Brahmi is still a rudimentary form or already mature, there is consensus that, over the next centuries, it was the Ashokan variety, and the Pallava Grantha variety of Southern Brahmi, that were the template for many South and Southeast Asian orthographies.

Brahmi-derived orthographies share common architectural features that together define the writing system as an alphasyllabary. A second typological label for the writing system is abugida, a term used to refer to both the Brahmi-derived (or Indic) systems and the Ethiopian writing systems. Other names have also been used: semi-alphabetic and semisyllabic, sub-syllabic—all of which are attempts to capture a linguistic and visuo-spatial design the essence of which does not neatly fit into a typology that has as its starting point the alphabet, the syllabary and the logograph.

The orthographic unit of Brahmi-derived orthographies is called 'akshara'. The term is recognisable in most host languages: e.g., 'aksharamu' in Telugu, 'akshar' in Hindi, 'okkhor' in Bengali. (Non-Indic speakers may sometimes sound out the final 'a' in 'akshara' as a long vowel—aksharaa—but this is a mispronunciation, not aligning to any Indic language). The fundamental organisation of the akshara is that of a vowel with one or

more consonants attached to it (schematically, V, CV, CCV, etc.). Sometimes all akshara in a word represent true syllables such as in sa.ti which is spelled as sa-ti, but other times there is re-syllabification so that words such as sat.ya are written as sa-tya.

READING IN AN ALPHASYLLABARY: BROADER IMPLICATIONS

We turn now to some of the common themes and more general conclusions that emerge from the individual papers. The common themes include aspects of reading development and skilled reading that allow comparisons with literacy in the more studied writing systems. Beyond these themes are some issues of literacy instruction that, while not directly addressed in the papers, are intimately related to the demands an alphasyllabary places on learning to read.

The Development of Reading and Effects on Reading Processes

Several papers in the Special Issue throw fresh light on what the architecture of the writing system might mean for literacy acquisition and skilled reading. Children who are more skilled readers show greater phonemic awareness, and appear to exploit the segmental information within the orthographic unit (Nakamura, Koda, & Joshi, 2014; Wijayathilake & Parrila, 2014). Those akshara that represent true syllables or the body of syllables are less prone to errors than those that represent a re-syllabification (Nag, 2014). Later in development, orthographic representations are shown to affect the perception of specific phonemic units (Bhide, Gadgil, Zelinsky, & Perfetti, 2014), and a unique predictor of lexical decision time is the number of phonemes marked in the orthography (Rimzhim, Katz, & Fowler, 2014). Taken together, these findings highlight the role of segmental markers in processing the writing system, thus aligning with the assumption that spoken language units are universally functional for readers. But also importantly, the influence of the orthographic syllable is substantial, particularly where phonemic information is left unmarked (akshara with inherent vowels) and where re-syllabification makes direct demands on phonemic transcription (see error analysis in Nag, 2014).

The languages of South and Southeast Asia are particularly well placed to throw light on non-linear orthographic arrangements and processing and what the orthography-specific influences on literacy processes might mean for reading models. This is because of the rich use of the space in all quarters around a base symbol in all akshara-derived orthographies. Perhaps more widely known is the non-linear location of vowel markers in the different akshara-orthographies (e.g., see Lew, 2014). Lesser known are the orderings of akshara in the orthographies of Indonesia and the Philippines where displacement of a marker may be more than one phonemic unit away in the phonological string (Miller, 2014). One clear implication of such non-linear arrangements is that reading would show increases in processing time and reduce accuracy rates. But the eye tracking study by Winskel and Perea (2014) also suggests that the high incidence of non-linear arrangements does not challenge a serial processing account of reading. An intriguing possibility is that there may be a signature pattern of eye saccades to accommodate the visuo-spatial characteristics of the writing system, with the Winskel and Perea study giving some pointers of what this might be.

Thus, the papers in the Special Issue help to locate reading in an alphasyllabary in relation to reading in other writing systems. Moreover, the papers provide a platform for examining further the possible cognitive-linguistic factors that influence and interact with specific orthographic factors. In contrast, perhaps reflecting the field of akshara research in general, there is very little mention in the papers of issues related to intervention and instruction. There are however several pointers of what may be important in intervention, as we discuss next.

Instruction in the Akshara Languages

The akshara may be taught either starting with the phoneme markers and building up to the orthographic syllable, or starting with the akshara and showing its phonemic composition. A judicious mix of both would be a third alternative. The available ethnographic studies from the region show a near-universal preference to start with the whole akshara. Early literacy programmes use traditionally laid out lists of singleton akshara asking learners to recite the phonological syllables each represents. An example of the recitation is the string 'ka-kaa-ki-kii-ku-kuu…'. The recited string of syllables has a common onset with changing pairings with the several vowels in the language, and when coupled with a printed chart, shows how a common symbol is a placeholder for each of the vowel diacritics in the orthography. Beyond these syllable-akshara recitations, programmes vary in how the phonemic markers are taught. Learners watching an akshara being written down

may begin to recognise the segments. Copying practice may provide insight into the motor routines for stacking the phonemic markers in the akshara. A particularly common didactic tool is pithy statements and jingles that draw attention to what-goes-with-what (e.g., see reports by Marathi speakers in Bhide et al., 2014; Lao textbooks in Lew, 2014; and historic accounts from Southern Sumatra, in Miller, 2014). Depending on the prominence given to activities such as these, akshara instruction may be more or less explicitly segmental in its approach. In instances where the akshara are discussed only as wholes, the writing system is treated as if it were a syllabary (e.g., Sinhala in the Sri Lankan schools in Wijayathilake & Parrila, 2014), leaving learners to infer details implicit in the akshara.

Integral to the akshara system is the phenomenon of nil markers. As a result, a unique learning target is knowledge about implicit information carried by orthographic units. The central example of the phenomenon is the inherent vowel (for historical variations, see Miller, 2014). A lesser known example is the inherent tone (in Lao, see Lew, 2014). In both of these instances, the inherent information is assumed to be dropped when other markers are inserted: vowel markers for the inherent vowel and tone markers for the inherent tone. This logic is sometimes explicated through instruction but oftentimes left to be inferred. Additional learning is also called upon for instances when the inherent information should be suppressed, much like the disambiguation needed for the letter 'k' in 'kit' and 'knit'. A default interpretation of inherent information appears to be strongly entrenched in processing the writing system even by skilled adult readers (see errors on Marathi schwa processing, Bhide et al., 2014 and Kannada decoding errors in Nag, 2014). An interesting research question is whether the default trigger for inherent information is stronger with certain instruction regimens, with preliminary adult interviews reported in Bhide et al. (2014) suggesting that the pithy statements about akshara construction taught in the early years interfere with akshara representations that require alternative interpretations.

Rules to construct the akshara unit are conditional but entirely predictable. An obvious rule stems from relative position in a phonological sequence. For example, vowel diacritics always combine with a consonant when the vowel follows the consonant. A common way to teach this combinatorial rule is with a consonant+vowel matrix showing how the entire range of vowel markers link with all consonant symbols in the language. Another teaching method, the contemporary use of which is not entirely clear, is with mock akshara. A classic example is the complex stacking of phoneme markers from Southern Sumatra (see Miller, 2014). These mock akshara are phonotactically implausible but orthographically legal units and therefore, easy to see why they may be considered a useful teaching tool. Another, more phonotactically sound method, is the stacking of multiple vowel markers on a base consonant and then sounding each consonant-vowel pairing, one after the other (see, pedagogic practice in South Sulawasi and Philippines in Miller, 2014). Mock akshara drills appear to allow practice of positional rules, ligaturing rules and most importantly, the acceptable sounding-out sequence for non-linear arrangements. The reading of these nonsense akshara is akin to practice of phonemic decoding skills on lists of nonwords in Latin-derived orthographies.

The decontextualised, singleton akshara is an efficient point of introduction to the writing system because the syllable is phonologically more accessible than the phoneme. But there are several lines of evidence to show that it is knowledge about the transcription principles of the writing system that aids mastery. Specifically covered in this Special Issue is evidence related to the pace of attainment of simple and complex akshara (Wijayathilake & Parrila, 2014) and word decoding (Nakamura et al., 2014), the nature of coda representation and the phenomenon of re-syllabification (Nag, 2014), the nature of schwa representation and the occurrence of schwa suppression (Bhide et al., 2014) and the functional efficiency of a transcription that must accommodate morpho-phonemic changes in the language (Rimzhim et al., 2014). Among these, the issues related to coda representation, schwa suppression and word formation concern mapping principles around the akshara. It is plausible that one parameter that will explain differences in the development of segmental knowledge about the writing system would be the explicitness with which the transcription is explained to the learner. Another parameter that might set apart akshara instruction programmes is the centrality given to spoken language inputs. This point gains salience when representation by akshara systems is considered to be not just at the surface level of a phonological string but also at the deep level of prosody, morphology and morpho-phonemic aspects of the mental lexicon. For there to be consistency in the representation of the deep layers of a word, it may well be that there is some inconsistency at the level of sequences of segmental markers.

There are several pointers in the Special Issue to show how and why literacy in the akshara systems is firmly intertwined with skilled language use. At the level of the orthographic unit, the symbols run into several hundreds. Since only the more common among these are taught (Nag, 2014) and recognition for the extensive set can be expected to remain at different levels of mastery (Wijayathilake & Parrila, 2014; Nakamura et al.,

2014), even skilled readers encounter unfamiliar akshara. Disambiguating a word with unrecognised akshara would then depend on contextual cues and vocabulary knowledge. At the level of morpho-orthography, recognising morpho-phonological rules are fundamental to decoding in this writing system as are spelling rules about akshara formation, coda representation and schwa suppression. For this, a useful linguistic resource would be knowledge about phonotactics (which sound sequences are legal in the language). Another linguistic resource is prosodic knowledge. Two lines of study give clarity to why knowledge about prosody of words is critical in this writing system. First are accounts about the historical adaptations of the writing system to accommodate codas (e.g., Miller, 2014; Rimzhim et al., 2014), and second is a framework that uses both syllable weight and foot structure to disambiguate syllable-final representation (Pandey, 2014). Other potentially influential orthography-specific factors are spelling rules to mark syllables in Lao (Lew, 2014), and akshara that represent sounds across word boundaries (Miller, 2014). Turning to sentence level processes, a close association exists between inference making on a listening task and Kannada reading comprehension (Nakamura et al., 2014). Lao and Thai are unique among akshara languages because they do not have word boundaries and each have several non-linear arrangements that can potentially assign phonemic markers to the wrong word in the sentence. The nature of eye-saccades in sentence reading, however, does not indicate parallel processing of words to account for these orthography-specific characteristics (in Thai, Winskel & Perea, 2014).

We conclude this Introduction highlighting the finding that literacy attainment in several countries of the South and Southeast Asia lag behind other regions. There is converging evidence that literacy attainments especially plateau off because skills for decoding are not yet mastered in middle school, and language proficiency and comprehension of texts remain shaky into high school and beyond. The problem is most acute in low income, multilingual contexts. There is an urgent need for research into instruction methods that can comprehensively tackle the region's requirements for mass-scale literacy instruction. One clear guidance for practice that emerges from the papers in this Special Issue is to prioritise oral language inputs because it is language skills that will give reliable and efficient insights into how written material connects the reader to meaningful information.

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