

## Four morphs and a matrix

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Referring generally to Japanese and specifically to the use of *furigana* to indicate the pronunciation of Chinese characters (*kanji*), Sir George Sansom commented that «One hesitates for an epithet to describe a system of writing which is so complex that it needs the aid of another system to explain it. There is no doubt that it provides for some a fascinating field of study, but as a practical instrument it is surely without inferiors» (1928: 44).

This harsh view was anticipated half a century earlier by Fukuzawa Yukichi, who called for a radical reform of the script, and by Mori Arinori, who apparently wanted to abandon Japanese altogether in favor of a simplified form of English. Both men saw the script as hindering Japan's effort to catch up with the West.

The debate has not died out and occasionally one even hears a Chinese scholar call for a switch to the alphabet (Wang 1983). Yet the *kanji* have various useful functions, the most important of which may be for exploring how the brain processes language.

One function that may combine the fascination and impracticality of a Rube Goldberg invention is to probe sememic relationships. For example, Samuel E. Martin (1952) followed a methodology that ignored the native script in presenting his Morphophonemics of Standard Colloquial Japanese, and was distressed by the following anomaly: there are two words *kyôdai* and *keitei*, each of which means 'brothers'. In his terminology, *kyô*, *dai*, *kei*, and *tei* are four morphs. If *kyô* and *kei* (both meaning 'older brother') are taken to be the same morpheme, then *dai* and *tei* (both meaning 'younger brother') should be taken as one morpheme. Thus *kyôdai* and *keitei* would have to be the same word, even though they are in contrastive distribution. This, of course, is unacceptable.

While Martin did not indicate how *kyôdai* and *keitei* contrast, we may note that they are written with the same *kanji*, but *kyôdai* is used as the generic term for 'siblings'; *keitei* seems never to imply sisters and has more a sense of 'brethren'.

At this point we may sully the waters by introducing the term *shimai*, 'sisters', composed of the *kanji* for 'elder sister' and 'younger sister',

respectively. *Shimai* is not used for 'siblings' in general and thus stands as the specific equivalent of *keitei*.

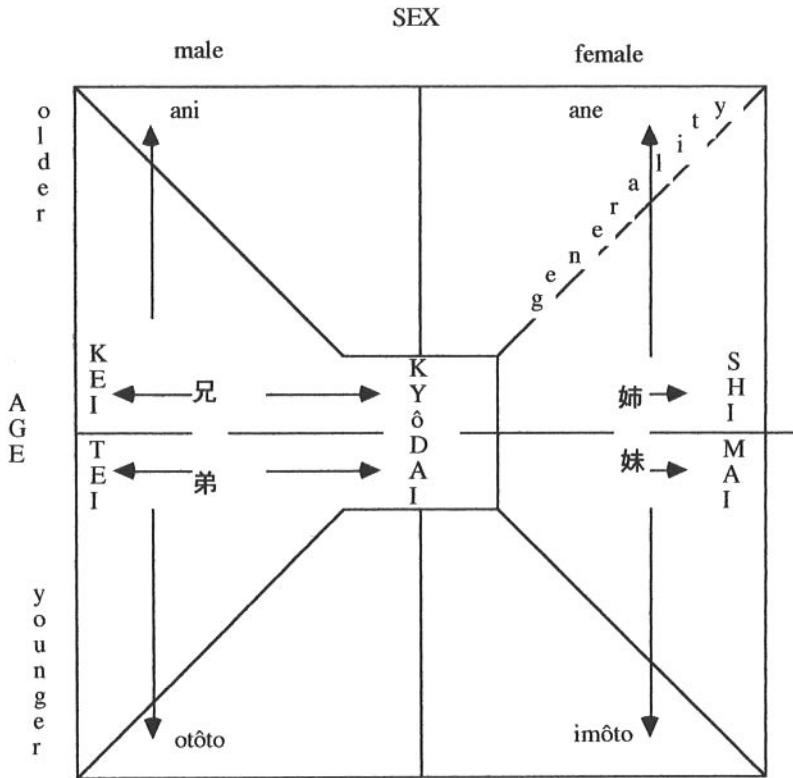


Fig. Matrix for the basic sememe 'sibling relationship'.

A three-dimensional matrix in the form of a truncated pyramid shows the grapho-semo-lexemic complexities just for the basic *sememe* 'sibling relationship'. The graph was informed by some of the relatively early thinking of Sydney Lamb (1964), who has more recently merged his perspective with contemporary notions of semiotics (Lamb 1986, for example).

The dimensions of the relative age and sex of the referent should be clear; the third dimension (represented by diagonal lines) goes «up» as the scope of the term becomes more general. That is, *kyōdai* 'siblings' is most general; *keitei* and *shimai* 'brothers' and 'sisters', respectively, are intermediate in scope and the individual sibling terms (*ani*, *ane*, *otōto*, and *imōto*) are specific. The upper case terms are Sino-Japanese and the lower case are native Japanese. One side of the smaller square is open because the same *kanji* are used for the two Sino-Japanese readings for

each of the characters. Each *kanji* has not only one or two Sino-Japanese readings, but also a native Japanese reading.

The matrix suggests that Martin's problem was an artifact of his methodology, but the example can hardly be used to inform the continuing debate over script reform which began more than a century ago. Most recently, perhaps, Unger (1996) laments the inability of American advisors during the postwar Occupation to engineer the abandonment of *kanji*, in particular, in favor of *rômaji*. Unger assumes that since language is in its essence a spoken phenomenon, the cognitive processes involved in reading and writing are basically identical with those employed in the spoken manifestations of language.

Arguments to the contrary are, it would appear, disposed of by Paradis, Hagiwara, and Hildebrandt (1985) in their compendium *Neuro-linguistic Aspects of the Japanese Writing System*. They by no means close the door on the subject, acknowledging that there is much to debate in the various studies, but suggest that further research should «help us understand the organization and processing of language and related higher cognitive functions in the brain» (Paradis, Hagiwara and Hildebrandt 1985: 199).

A position completely contrary to that of Unger's has been under development for many years by Tzeng (1983, Tzeng and Hung 1981, Chang, Hung, and Tzeng 1992) who speaks of linguistic determinism with regard to the effect of different writing systems. Even if the morpho-syllabic Chinese script is conceptually simpler than Japanese, the complexities of the script/speech relationships is still sufficient to induce the notion that «learning to read Chinese [or Japanese] may require different information processing strategies from those involved in learning to read English, an alphabetic script» (Chang, Hung, and Tzeng 1992: 121).

This argument receives support from Rozin, Poritsky and Sotsky (1971), who taught nonreading Second Graders in Philadelphia to read and compose simple English sentences using 30 Chinese characters to depict 'mother', 'big', and so forth. The characters were a way of introducing novelty to a situation which had been anathema for the children who could not recognize letters «as representing components of [...] speech» (p.1264). The modest experiment indicated that the phoneme may have been too abstract for beginning readers with dyslexia and that a type of syllabary might better help them get started.

Japanese seems wonderfully suited to exploring the cognitive processes because it employs both the «semantic» *kanji* and the «phonological» *kana*, a distinction most helpful in studying varieties of aphasia, language impairments resulting from damage to the left cerebral hemisphere (Rao 1994). A few Japanese studies suggest a right hemi-

sphere involvement (Morikawa 1981, Shimada 1981, for example), but the great bulk of work on Japanese aphasics supports Yin and Butterworth (1992), whose limited study of Chinese dyslexics revealed «no evidence that the supposedly pictorial nature of Chinese characters leads to localization of function in the right hemisphere, where picture and visual object recognition is carried out» (p.356). Incidentally, DeFrancis (1989) says that only about two per cent of currently used characters reflect pictographic origins.

Two major varieties of aphasia have long been widely recognized: an agrammatical type and a fluent type. The former seems telegraphic because the content words are often unlinked by function words, while with the fluent variety there is a problem producing content words, but the grammatical accessories are intact, for the most part (Goodglass 1968).

The telegraphic variety is usually identified with damage to Broca's area, in the third frontal convolution. For Japanese aphasics this variety mainly involves *kana* problems rather than *kanji* problems, while the *kanji* (semantic, content) problems are associated with damage to Wernicke's area, posterior to Broca's area (Sasanuma 1975). The semantic variety seems about the same as Imura's (1943) *Gogi* («word-meaning») aphasia. The picture is not really all this tidy, and apparently never was (cf. Penfield and Roberts 1959), but gradually the details are being worked out.

Different as Chinese and Japanese are, the similarity in their scripts goes beyond the obvious use of *kanji* by the Japanese. This is easier to see when we think of Chinese as morphosyllabic (DeFrancis 1989). In Japanese, *kanji* obviously contrast with *kana*, while the problems of Chinese aphasics involve whole characters (including the so-called semantic component, similar to the use of Japanese *kanji*) in contrast to efforts to draw on the phonetic components of characters (similar to the Japanese use of *kana*). Moreover, there is an interesting analogy with alphabetically based problems.

Yin and Butterworth (1992) cite Marshall and Newcombe (1973) and Patterson 1981) on findings that «support models of reading incorporating at least two, functionally and neurally separable, routines: a lexical routine that maps whole written words onto their pronunciations, or a sublexical routine that maps letters onto phonemes» (350). One group of their Chinese dyslexic patients «suffer a selective deficit to a routine that maps whole characters onto pronunciation», while a second group suffers «an impairment to a sublexical routine that utilises the phonetic radicals that make up characters» (350).

Evidently the same two-routine description may even apply more widely, as indicated, for example, in dealing with classifier problems in

Chinese aphasia (Tzeng, Chen and Hung 1991). For all of this, however, Yin and Butterworth (1992) concluded that the nature of the Chinese script precludes the possibility that readers of alphabetic and non-alphabetic scripts employ precisely the same cognitive processes.

In general, though, Unger's (1996) easy dismissal of the Japanese script may not be totally unwarranted after all. He does not address the considerable problem of homophones. Some hint of what changes alphabetization might induce should be available through a comparison of the current North Korean system, which did abandon characters for most purposes two generations ago, and the current South Korean system, which still employs characters in conjunction with the alphabet. I know of no such study, and should imagine one would have to be able to work comfortably in the north to conduct such a comparison.

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