

A case study of an English-Japanese Bilingual with monolingual dyslexia

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(Abstract) This reports a case study of a 16 year-old English-Japanese bilingual boy whose reading/writing difficulties are confined to English only. This boy was born in Japan to a highly literate Australian father and English mother. His spoken language at home is English. AS's reading in logographic Japanese Kanji and syllabic Kana is equivalent to that of Japanese undergraduates or graduates. In contrast, his performance in various reading/writing tests in English as well as tasks involving phonological manipulation was worse than not only that of his English but also Japanese control subjects. Thus, the data show a clear dissociation between his ability to read English and Japanese. In order to account for the dissociation, the hypothesis of granularity and transparency was postulated. It was hypothesized that any language where orthography-to-phonology mapping is transparent or even opaque or any language whose orthographic unit representing sound is coarse, (i.e., at a whole character or word level) should not produce a high incidence of developmental phonological dyslexia.

Key words: developmental phonological dyslexia, hypothesis of granularity and transparency

It is said that up to 10% of the population of the English speaking world fall into this group (Rodgers, 1986). Learning to read English is essentially acquiring complex mappings of sub-syllabic phonological components (phonemes) to the letter level (graphemes). Failure to acquire appropriate sub-syllabic skills is characteristic of developmental phonological dyslexia (Frith, 1995). Also, there is a strong correlation between the poor performance with the phonological awareness tasks (e.g., rhyme judgements, phoneme deletions/additions) and developmental phonological dyslexia (Stuart and Masterson, 1992).

In contrast, the concept of developmental dyslexia is relatively unknown in Japan despite the fact that Japanese children have to cope with not just one but three different scripts. For example, Kokuritsu Tokushu Kyoiku Sougou Kenkyuujyo (1995) collected detailed questionnaires on primary school children nationally, revealing that the percentage of children who were identified as having reading deficits decreased as they became older (from 2.279% for the second grade to 1.079% for the sixth grade). If those children are regarded as dyslexics, then the occurrence rate of dyslexia is still relatively low in Japan.

Hypothesis: The hypothesis of granularity and transparency (Wydell & Buterworth, 1999) maintains that orthographies can be described in two dimensions - 'transparency' and 'granularity'. It argues that: (1) any orthography, where the print-to-sound translation is transparent (i.e., one-to-one) will not produce a high incidence of phonological dyslexia regardless of the level of translation (phoneme/syllable/character/word). This is the 'transparency' dimension, and (2) even when this relationship is opaque and not one-to-one, any orthography whose smallest orthographic unit representing sound is coarse (whole character/word), will not produce a high incidence of phonological dyslexia. This is the 'granularity' dimension. Thus, for Japanese Kana, the granularity of the smallest orthographic unit representing phonology is finer than the whole word, but coarser than the grapheme, and its orthography-to-phonology translation is at the level of syllables/morae and one-to-one. For Kanji, however, the unit of granularity is much coarser (a character or a whole word), and the orthography-to-phonology relationship is very opaque. Therefore, by this hypothesis neither of the two orthographies used in Japanese should lead to a high incidence of phonological dyslexia. In contrast, the granularity for English is finer, and the orthography-to-phonology translation is not always transparent (e.g., cave/have; food/foot/blood). Consequently, English orthography may lead to a high incidence of phonological dyslexia. The hypothesis thus argues that it might be

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possible for an English-Japanese bilingual individual to be dyslexic in English but not in Japanese.

Case Study: Evidence supporting the hypothesis can be found in AS, an English-Japanese bilingual with monolingual dyslexia (Wydell & Butterworth, 1999). Despite his good spoken English, AS's reading and writing of single words in English were said to be below the class average at his junior high school. At the age of 13, he was diagnosed as dyslexic by the Dyslexia Institute in London (both his reading and writing were 6:1 years, while his arithmetic age was 14:6 years).

AS did not show any impairment in reading Kanji and Kana. In fact his ability to read both Kanji and Kana (in terms of accuracy and latency) at the age of 16 was superior to that of many of his Japanese contemporaries, and was well within the range of accomplished adult readers. However, it was revealed that AS has great difficulties in reading/writing in English, which go beyond any difficulties that might have been caused by lack of exposure to English. AS's performance on various reading/writing tests, and tests tapping phonological processing (e.g., rhyme judgements, Spoonerising, phoneme deletion/addition, nonword repetition) in English were always outside of the range of his age-matched English controls. This was also true with his age-matched Japanese monolingual control subjects who started to learn English at the age of 12. Further, the nature of his errors in reading/spelling is quite different from that of his Japanese contemporaries, who showed a better knowledge of grapheme-phoneme mappings. His reading errors show no regularisation errors but appear to be random guesses with a very few word substitution or lexicalization.

Discussion: AS could thus be described as a phonological dyslexic in English. Reading in English requires the acquisition of spelling-to-sound mappings at the sub-syllabic level. What is especially taxing in English is that the mappings are not always one-to-one and transparent. This kind of sub-lexical or sub-syllabic phonological processing required for English is not called upon for reading either Japanese Kana or Kanji. The data also imply that the process of phonological recoding may be organised differently for English and Japanese as suggested by Landerl et al. (1995) for a comparison between German (more transparent orthography) and English (less transparent orthography). Thus, the hypothesis of granularity and transparency successfully accounted for AS's data, and also can predict that the occurrence of developmental phonological dyslexia should be equally high with other orthographies which are similar to English in the two orthogonal dimensions of the hypothesis (e.g., Danish).

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