

Abstract

Developmental dyslexia has been a key research topic in cognitive psychology and neuropsychology because the condition affects all languages and negatively impacts millions of children and adults worldwide from all cultures. A lot of research studying alphabetic languages confirmed that visual specialization for words is detectable by a stronger occipito-temporal N1 signal occurring within 200 milliseconds when printed words are presented instead of symbols. However, it is unclear whether such neurophysiological activity shares the same pattern in orthographic languages, and whether such print tuning effect is present in Chinese dyslexic children to the same extent as same-age proficient readers. 23 normal-reading and 19 dyslexic Primary 2 and 3 Hong Kong students participated in a one-back repetition detection task with Chinese (word) and Korean (symbol) stimuli. Event-related potential (ERP) maps and waveforms were analyzed. Interestingly, normal-reading children displayed stronger right-lateralized P1 signal for symbol. N1 specialization for Chinese and word-vs-symbol N1 difference were not only found in both groups, but also with very similar waveform and magnitude, indicating coarse print tuning was present across participants. Left lateralization, an indication of expertise in reading, were noted in both groups of subjects also. Thus, ERP data analyzed in this study found that print tuning effect was not reduced in Chinese dyslexia. However, the magnitude of both the N1 signal and the word-vs-symbol N1 difference in this logographic language study is much smaller in comparison to signals found in alphabetic language studies. Surprisingly, clear differences between signals triggered by Chinese versus Korean stimuli occurred at a later P2 signal (264 - 402 msec), showing the possibility that processing latency is much longer for visually more complicated Chinese characters versus simpler alphabetic words used in Western research. Hence, direct comparison of only the robust word marker N1 might not be appropriate across various language systems.