

Promoting Chinese and English Bi-Scriptal Reading Development through Phonological Training: Behavioural Intervention and Neural Evaluation

Considerable theoretical and empirical research suggests that phonological awareness (i.e., the ability to identify and manipulate basic units of sounds (i.e., phonemes)), plays a fundamental role in reading development across languages. However, increasing evidence shows that Hong Kong children exhibit difficulties in learning basic phonological skills in Chinese and demonstrate limited phonological awareness in English compared to Taiwanese and Mainland Chinese children. It is well known that Taiwanese and Mainland Chinese children use Zhu-Yin-Fu-Hao and Pinyin, respectively, as aids to learn their L1 Chinese, and derive assistance from English phonics to learn their L2. It remains unclear, however, whether Pinyin and English phonemic training effectively facilitate the acquisition of phonological awareness and, if they do, whether L1 and L2 reading skills will improve.

This study will combine behavioural training and a neurophysiological approach (i.e., event-related potentials (ERPs)) to investigate three key questions: 1) Does Pinyin-to-Chinese training program (i.e., designed to teach children Pinyin knowledge) enhance Hong Kong trilingual children's phonological awareness in L1 Chinese and word reading? 2) Does Phoneme-to-English phonemic training program (i.e., designed to teach children's English phonemic knowledge) facilitate L2 English phonological awareness and word reading? 3) Is there any possible transfer effect of Pinyin training on children's English phonological skills and word reading? 4) Are there any changes at the neural level after receiving Pinyin and English phonemic training and, if so, how do the behavioural training effects correlate with brain activities? Employing a randomized controlled trial design, we will randomly assign ninety 5- to 6-year-old typically developing kindergarteners into Pinyin-to-Chinese and Phoneme-to-English training and control groups ($N = 30$ for each group). Children in the Pinyin-to-Chinese and Phoneme-to-English training groups will receive 8 weeks of explicit instruction on Pinyin and English phonemic knowledge. Tasks of nonverbal IQ, phonological awareness, and word reading in Chinese and English, as well as brain activities of speech perception in both L1 Chinese and L2 English, will be administered before and after the training.

Findings of this study will provide key behavioural and neural evidence on the effectiveness of Pinyin and English phonemic training to facilitate Hong Kong children's phonological skills and word reading in both L1 and L2, which, in turn, can inform educational policy and guide Chinese and English curriculum design. Findings of this study

will also shed light on the neural plasticity of learning related to intervention, which suggests the need to accelerate phonological learning and reading acquisition.