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Second language learners who are at-risk for reading disabilities: A growth mixture model study



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ABSTRACT

This one-year longitudinal study examined the developmental trajectories of English reading in Chinese children learning English as a second language (ESL) and identified cognitive profiles of children who are at risk for English reading disability. One hundred and eighty-four Chinese ESL children from eight Hong Kong kindergartens were measured four times during their last year of kindergarten for phonological awareness, letter knowledge, vocabulary and English word reading. Growth mixture modeling was applied to classify the children based on their growth trajectories in English word reading. Four subgroups of word reading growth were classified, namely high-achieving, fast-growth, slow-growth and low-achieving groups. The cognitive-linguistic skills were compared across different groups with age, non-verbal intelligence and receptive vocabulary in L1 controlled. The results showed that low-achieving groups, who were expected to be at-risk for L2 reading disability, showed deficits in letter-name knowledge, phonemic awareness, and receptive and expressive vocabulary. Fast-growth and high-achieving groups were not distinguishable on the measured cognitive-linguistic skills. Children in the low-growth groups were significantly weaker in phonemic awareness, receptive vocabulary and expressive vocabulary than children in the high-achieving group. Our findings identified specific cognitive-linguistic deficits that were associated with children who are at-risk for reading disability. Implications for the early identification of L2 reading disability were discussed.

1. Introduction

1.1. Learning to read in a second language (L2)

Most countries around the world have become multilingual in the past decades. More and more students are learning English-as-a-Second-Language (ESL). In many countries, reading instruction in a second language (L2) starts in the early years. For example, in Hong Kong, it usually starts at the age of three in kindergartens. Not surprisingly, some ESL children may struggle in learning to read in their L2. As a consequence, these children may be at risk of future failure in education as well as social and emotional problems (Mugnaini, Lassi, La Malfa, & Albertini, 2009). Given the importance of early identification of children who are at-risk for reading disabilities (Lesaux & Siegel, 2003; Vellutino, Scanlon, Zhang, & Schatschneider, 2008), the primary aim of the present study was to examine the developmental trajectories of English reading in Chinese ESL kindergarten children and its associated cognitive profiles. Specifically, by adopting growth mixture modeling that classified the children according to their growth in performance over time, a group of children with L2 reading difficulties was identified and their cognitive profiles were compared to children with typical development in L2 reading. It was anticipated that the findings would provide important insights into early identification of

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struggling readers in L2 so that appropriate and early support could be provided to these children in the early stages of their reading development.

1.2. Reading disability in L2

Despite the argument that diagnosis of reading disabilities in L2 is controversial (McCardle, Keller-Allen, & Shuy, 2008), there is a growing body of research on bilingual or ESL children who are at risk for reading disabilities in L2 (e.g. Chiappe & Siegel, 2006; Chua, Rockard-Liow, & Yeong, 2016; Lipka & Siegel, 2010). For example, Kieffer and colleagues found that Spanish-English bilinguals were at an elevated risk of experiencing reading difficulties at grade 3 as compared to their monolingual counterparts. Studies involving children with diverse linguistic backgrounds have shown that strategies including early identification of the at-risk status and intervention with component skills of reading can reduce the incidence of reading disability significantly in L2 (Lipka & Siegel, 2010).

Compared to their Western counterparts, Chinese ESL children from Asian educational settings seem to receive much less L2 oral language input in their learning environment. Asian ESL children also vary greatly in language background and teaching methods (Chua et al., 2016). Less is known about the L2 reading development and cognitive profiles of children who are at risk for L2 reading disabilities. Recently, some studies have involved Chinese ESL children and examined the prevalence of English reading difficulties (Chung & Ho, 2010; McBride-Chang, Liu, Wong, Wong, & Shu, 2012; Tong, Tong, & McBride-Chang, 2015; Zhou et al., 2014). Chung and Ho (2010) found that elementary school children with Chinese dyslexia also demonstrated deficits in English reading. Tong et al. (2015) found that around 50% of Grade 2 and Grade 5 Hong Kong Chinese ESL students who had reading difficulties in Chinese also showed reading difficulties in English. Around 15% of Grade 2 children demonstrated reading difficulties in English only.

1.3. Identification of children at-risk for L2 reading disability

Most studies in this area have identified poor L2 readers using arbitrary cut-off points at one or two time points of development (e.g., Swanson, Orosco, & Lussier, 2012). In some other studies, theoretical frameworks such as a phonological deficit hypothesis or a double deficit hypothesis have been adopted to identify children at risk of reading disability in L2 (e.g., Hedman, 2012). Other studies have tried to examine the utility of using certain screening tools to identify ESL children who are at risk of reading disability in L2 (e.g., Chua et al., 2016).

Distinct from past studies, we employed the analysis approach of growth mixture modeling which allowed us to identify children with poor L2 reading based on their growth in English reading at age 5. There were two reasons for examining L2 reading development at such an early age. First, as mentioned earlier, early identification is important for children who are at risk for reading difficulties (Gabrieli, 2009). Examining the cognitive profiles of these children would allow us to identify these children early given that cognitive-linguistic skills are early predictors of future reading outcomes (Lyytinen et al., 2006). Second, for Hong Kong Chinese ESL children, L2 reading instruction begins early. By age 5, children from Hong Kong have been learning to read English for two years. They are expected to be able to write simple sentences before entering elementary education at age 6. Therefore, examining the L2 reading development and associated cognitive profiles would be practically crucial for early intervention for ESL children in Asian context.

1.4. Cognitive and language foundation of L2 reading difficulties

A range of skills has been identified as precursors of L2 in ESL children. In this study, we have focused on phonological awareness, letter knowledge, and vocabulary because these skills have been found to be predictive of L2 reading outcomes in Chinese ESL children in the early years.

1.4.1. Phonological awareness

Several studies involving Chinese-English bilinguals have found that children with poor English reading (but not Chinese) are characterized by poor phonological awareness (McBride-Chang et al., 2012; Tong et al., 2015). For example, McBride et al. (2012) compared the longitudinal profile of cognitive linguistic skills in four groups of Chinese ESL children at ages 5–9: children with English reading difficulties, children with Chinese reading difficulties, children with both English and Chinese reading difficulties and children without any reading difficulties. They found that the Chinese ESL children with English reading difficulties showed poorer skills in phonological awareness than those with average reading skills.

In young Chinese ESL children, phonological awareness at the syllable level is argued to be important for English reading (McBride-Chang & Ho, 2005). Chinese children tend to develop syllable awareness early and to have weak phonemic awareness, and this serves as a good predictor of later word reading skill (e.g., McBride-Chang, Bialystok, Chong, & Li, 2004; McBride-Chang & Ho, 2005). However, more recent evidence shows that phonemic awareness is an important longitudinal predictor of English reading and spelling in Chinese ESL children (Liu, Yeung, Lin, & Wong, 2017; Yeung & Chan, 2013). Therefore, in this study, phonological awareness at syllable and phoneme level was compared in at-risk children and typical children.

1.4.2. Letter knowledge

Letter knowledge is the earliest form of orthography-phonology mapping. For monolingual English learners, the letter knowledge task is used as a screening tool for reading difficulties under the Response to Intervention Model (Vellutino, Scanlon, Small, & Fanuele, 2006). The letter knowledge task has also been included in other screening batteries (Bishop & League, 2006; Catts, Fey,

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