

A Computerized Assessment System for Chinese Reading in Grade One

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Abstract: The present study aims to develop a computerized assessment system for Chinese reading. The purpose of study was to collect data conveniently and efficiently. The study investigated the relation between literacy skills (word recognition and reading fluency) and reading-related skills for grade1 students by using Structural Equation Modeling (SEM). Two hundreds and six Chinese-speaking Taiwanese children were assessed on phonological awareness, rapid naming speed, orthographic knowledge, morphological awareness and visual perception skills. The results of structural equation modeling (SEM) showed the goodness-of-fit of the proposed model. The proposed system is adaptive to assess students' Chinese reading skills.

Keywords: Chinese, reading, computerized, assessment

1. Introduction

Reading is an important skill for children to construct knowledge in their own language. There are components of reading instruction that are essential to successfully teach children how to read, including phonemic awareness, phonics and word study, fluency, vocabulary, and comprehension (National Reading Panel, 2000). Previous studies have pointed out that the word recognition and reading fluency were related to phonological awareness, rapid naming speed, orthographic knowledge, and morphological awareness (Chow, McBride-Chang & Burgess, 2005; Chik, Ho, Yenng, Chan, & Luan, 2011; Ho, Chan, Tsang, & Lee, 2002; Ho, Chan, Lee, Tsang, and Luan, 2004; Shu, McBride-Chang, Wu, & Liu, 2000).

There are disadvantages and limitations in the conventional test versions, including: limited sample size, inaccurate response time and error scoring, inconsistent presentation, and higher chance of human error. Liao and Kuo (2011) developed the Web-Based Assessment for assessing phonological awareness, rapid automatized naming (RAN) and one-minute word reading. The results showed that traditional paper-pencil tests and web-based versions were equally predictive of Chinese reading measures. The system was originally developed for grade 6 students, in the present study, grade 1 reading test battery was developed using the system. To examine the contribution of different predictors on reading-related processing skills and literacy skills, structural equation modeling (SEM) was used.

2. Methods

2.1 Computerized assessment system for Chinese reading

Ten web-based tests were developed in the present study, including rapid automatized naming (colour naming, digit naming, Zhu-Yin-Fu-Hao naming), orthographic knowledge (two non-character recognition tests, radical position), morphological awareness (two morphological construction tests,

homophone recognition), and reading fluency test (one minute reading). The interface of one minute reading and RAN colours showed in Figure 1 and Figure 2. The visual perception tests include visual memory and visual spatial relationship. The phonological awareness has three tests: Tone Recognition, Onset Detection and Rhyme Detection.

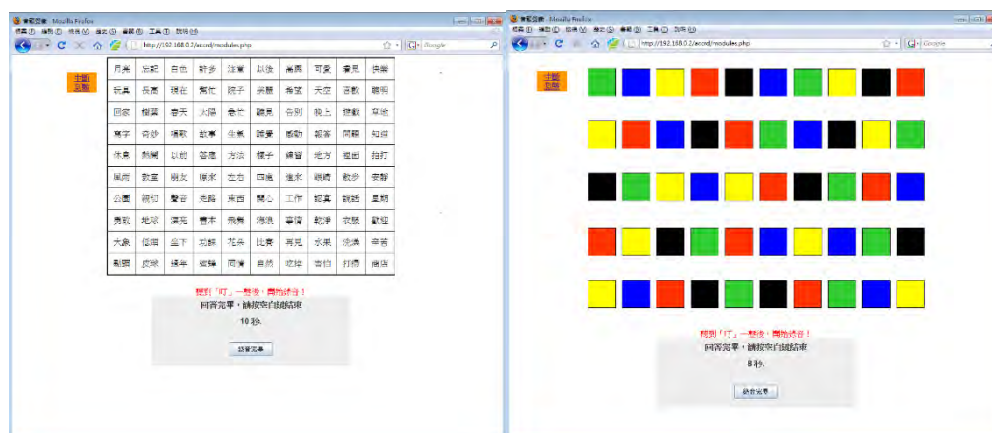


Figure 1. One minute reading and RAN Colours.



Figure 2. Morphological Construction.

2.2 Participants

Participants were 206 (109 boys, 97 girls) grade one students from 7 classes of an elementary school in Taichung, Taiwan. None of the children was previously diagnosed with any emotional, behavioral or sensory difficulties.

3. Results

The results of Structural Equation Modeling (SEM) showed in Figure 3. As indicated by the fit indices, CFI, TLI, RMSEA, SRMR, the model yielded a good fit to the data (CFI=0.937, TLI=0.921, RMSEA=0.044, SRMR=0.061). Moreover, the finding showed that orthography processing, visual perception skills, and phonological awareness were the strongest predictors for reading-related processing skills in grade 1 (factor loadings=.857, .762, .688). Moreover, the standardized coefficients showed that the relation between reading-related skills and literacy skills was strong, in which reading-related skills explained 91.2% of the variance in literacy skills. The result indicates that the reading-related skills assessed in the present study were significant predictors in Chinese literacy skills.

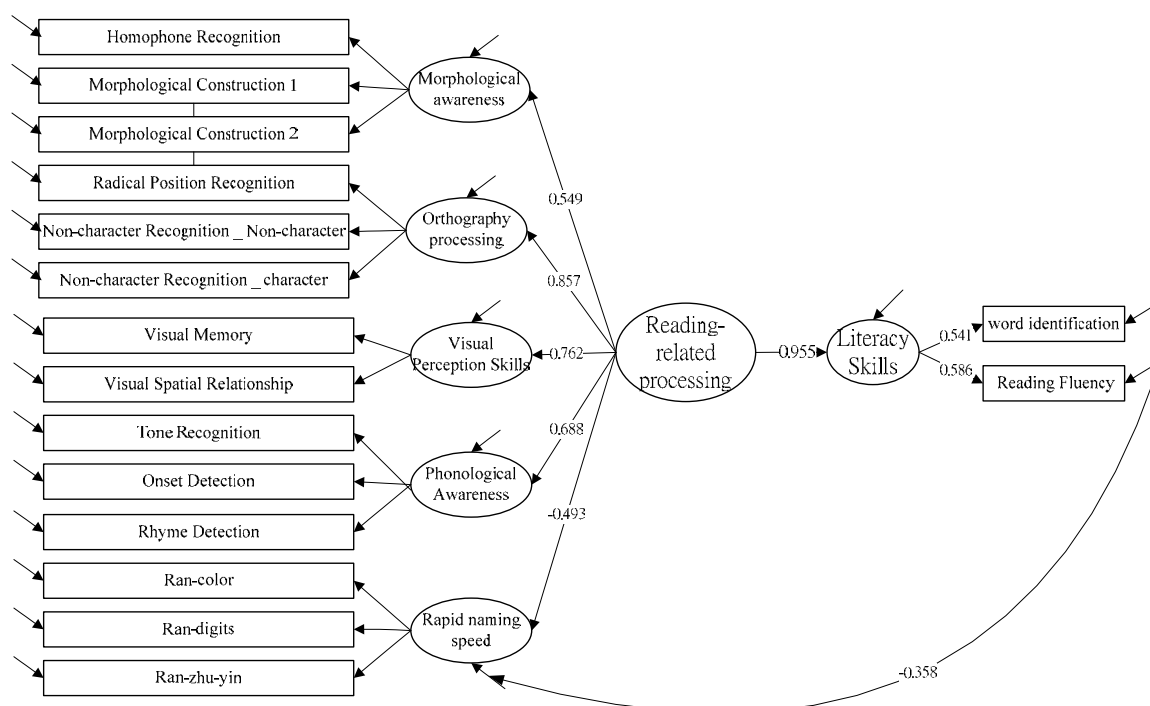


Figure 3. The relations between reading-related processing skills and literacy skills.

4. Conclusions and future works

The presented study developed a computerized assessment system for Chinese reading in grade 1 and examined the contribution of different predictors on reading-related processing skills and literacy skills by using SEM. The results showed that reading-related skills assessed in the present study were significant predictors in Chinese literacy skills. With the system, larger sample size will be able to be collected conveniently and efficiently. Moreover, in the future, the system can also be used to assess and diagnose children with/without reading difficulties.

Acknowledgements

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