THE INFLUENCES OF PHONOLOGICAL vs. ORTHOGRAPHIC WORKING MEMORY ON CHINESE WORD READING AND SPELLING IN HONG KONG PRIMARY STUDENTS

Abstract

The significance of phonological working memory for literacy development has been widely demonstrated in alphabetic languages. Another type of working memory, orthographic working memory, may also play an important role, particularly in visually complex writing systems, such as Chinese. Indeed, several studies have recognized the impact of orthographic working memory in predicting children's Chinese word reading as well as written spelling in recent years, but the relative importance of the two types of working memory for Chinese literacy development remains to be investigated. In the current study, four hundred and forty-seven Chinese students (274 for P1, 103 for P2, and 70 for P3) in Hong Kong were recruited and longitudinally traced. Specifically, their phonological (backward digit span) and orthographic working memory (delayed copying), vocabulary knowledge and non-verbal IQ were tested at Time 1; Chinese word reading and spelling (dictation) were tested at Time 1 and Time 2, with a one-year interval. Two hierarchical regression models were conducted to examine the relative influence of Time 1 phonological and orthographic working memory on Time 2 Chinese word reading and spelling, with demographic features, non-verbal IQ, vocabulary knowledge, and Chinese word reading/spelling at Time 1 controlled, respectively. The results revealed that with orthographic working memory significantly contributed to subsequent word reading and spelling, nevertheless phonological working memory only had an impact on word spelling. Overall, the results suggest a relatively more crucial role of orthographic working memory in Chinese literacy development at early stage, compared with phonological working memory. These findings shed lights on theoretical understanding the distinctive roles of working memory across different domains in learning Chinese for primary students in early grades, in turn, suggest a potential direction of training to facilitate children's early literacy development in Chinese.

Key Words: Phonological working memory, orthographic working memory, Chinese word reading, Chinese word spelling

Steps	Model	DV: T2 Chinese Word Reading β	$\Delta R2$	Model	DV: T2 Chinese Word Spelling β	$\Delta R2$
1	Gender		.124***	Gender		.001
		-.043			.063	
	T1 Age	-.092		T1 Age	-.298***	
	T1 Grade	-.053		T1 Grade	-.061	
2	T1 Non-verbal IQ	-.008	.664***	T1 Non-verbal IQ	-.031	.419***
	T1 Chinese Vocabulary Knowledge	.046		T1 Chinese Vocabulary Knowledge	.166**	
	T1 Chinese Word Reading	.886***		T1 Chinese Spelling	.566***	
3	T1 Phonological WM (Backward Digit Span)	.008	.004#	T1 Phonological WM (Backward Digit Span)	.123*	.025**
	T1 Orthographic WM (Delayed Copying)	.066*		T1 Orthographic WM (Delayed Copying)	.117*	

*p < 0.05, **p < 0.01, ***p < 0.001, #p = 0.086