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Mediation Effects of Character-related Tasks between Instruction Type and Character Writing in Delayed Character Introduction for Chinese as a Foreign Language Learners

Chenxuan He

Texas A&M University, College Station, United States

Abstract: Delayed Character Introduction (DCI) is commonly used in curricula for Chinese as a Foreign Language (CFL) Learners. This study further divides DCI into two sub-types: Listening/Speaking-Reading/Writing (LS-RW) - delay literacy skills (reading and writing) after acquiring oral language (listening and speaking), and Listening/Speaking/Reading-Writing (LSR-W) - delay writing skills after mastering listening, speaking, and reading skills (LSR-W). Results suggested that the LSR-W model was more effective for beginning CFL learners to acquire Chinese characters. Moreover, it was found that radical awareness and pinyin and meaning production together mediated the relationship between the type of DCI model and character writing, and pinyin and meaning production made unique contributions to character writing outcomes as a mediator.

Keywords: Chinese as a Foreign Language; Delayed character introduction; Chinese character writing; Radical awareness; Pinyin and meaning production.

1. Introduction

Packard (1990) proposed that early emphasis on writing characters may inhibit oral language development. Furthermore, learning to concurrently comprehend and speak Chinese, as well as to read and write characters, could pose a heavy cognitive load for CFL learners, which may cause them to lose the learning motivations due to feeling overwhelmed and frustrated (Wen, 1997). DCI, literally, was defined as "a time lag instruction between the time the course starts and the time the characters are introduced" (Packard, 1990). Such a lag generally lasts from one to four weeks, during which a phonetic, Romanized orthography, called pinyin, is commonly used for character reading and writing. Such a delay for the introduction of characters is believed to be beneficial to the acquisition of both literacy and oracy skills in Chinese (Packard, 1990). Advocators for DCI recommend that character reading and writing should be focused on after early oral language development in order for CFL learners to get into Chinese language learning step by step.

When CFL learners have developed preliminary oral language skills, the next difficulty is Chinese character recognition. Several components are important in this character recognition process including character pronunciation (called pinyin in Chinese), character meaning, and orthography. In Chinese morpho-syllabic orthography, radicals usually provide information for character pronunciation and character meaning. Therefore, the skill of using the information provided from radicals plays an important role in learning character pronunciation and understanding character meaning. This present study takes a further step to propose two sub-models under DCI through a quasi-experiment to explore the relationships between the important components of character recognition.

2. Literature Review

2.1. Pinyin and Character Meaning

The pronunciation of Chinese character is presented as an official Romanization system called pinyin. Pinyin (pronunciation cue) and the English equivalent (meaning or translation) are usually provided to CFL learners when they are learning a new character. Early research has proved that the use of pinyin was an effective strategy for CFL learners to pronounce and remember new characters much easier (Chen, 1983; Dai & Lu, 1985; Jordan, 1971). Therefore, the instructional strategy of pairing a character with its pinyin and meaning simultaneously has become the most popular pedagogy in Chinese character teaching and learning (Chung, 2002, 2007).

2.2. Radical Awareness

In the Chinese morpho-syllabic writing system, morphemes play an important role in orthography. Radicals (bù shǒu) are known as the most common form of these Chinese morphemes (e.g., 氵, 木, 扌, etc.) and usually function as a semantic cue in a character (e.g., 氵 stands for water in 湖 (lake), 木 stands for tree in 森林 (forest), etc.). Radical awareness is defined as "the functional understanding of the role of radicals in forming Chinese characters and the ability to use this knowledge consciously in learning characters" (Shen & Ke, 2007, p.100). Radical awareness has found to be an effective strategy for CFL learners' Chinese character recognition (Chen et al., 2013; Taft & Chung, 1999; Tong & Yip, 2015; Zhang et al., 2016) and researchers have studied how CFL learners use radical information on Chinese character acquisition (Chen, 2019; Williams, 2013). Radical knowledge and prior character knowledge contributed to character retention independently and jointly (Chen, 2019). Previous research has focused on the mediation effect of radical awareness in CFL learners' character reading and

writing skills, but it still remains unclear to interpret the relationship based on their findings (Zhang & Roberts, 2019). Thus, the present study aims to fill this gap by providing more empirical evidence based on a mediation model of radical awareness in character writing for CFL beginning learners.

2.3. The Present Study

The present study further divides DCI into two sub-types: Listening/Speaking-Reading/Writing (LS-RW) - delay literacy skills (reading and writing) after acquiring oral language (listening and speaking), and Listening/Speaking/Reading-Writing (LSR-W) - delay writing skills after mastering listening, speaking, and reading skills (LSR-W). The LS-RW model follows the traditional DCI belief that literacy skills (character reading and writing) should be delayed after oracy skills are developed (listening and speaking). Compared with the LS-RW model in which both character reading and writing are delayed after listening and speaking, in the LSR-W model, only character writing is delayed and character reading is introduced earlier with listening and speaking together.

The purpose of this study is to compare the effectiveness between the LSR-W model and the LS-RW model on Chinese character acquisition for CFL beginning learners. It further extends to examine the mediation effects through two character-related tasks - radical awareness and pinyin and meaning production between the type of instruction model and character writing. Previous Chinese language learning experiences may potentially interfere the character learning outcome, thus is controlled for the mediation effects.

3. Method

3.1. Participants

Thirty-nine college students were recruited from two beginning-level CFL classes in a public university in Central Texas. The average age of the participants was 18.8. There was a diverse ethnicity distribution among the participants with 58.33% self-identified as Caucasian, 19.44% as Hispanic, 16.67% as Asian, 5.56% as African American. The participants also came from diverse majors including History, Political Science, International Studies, Biomedical Science, and Engineering. Among the 39 participants, seven students self-reported to have prior Chinese learning experience.

3.2. Curriculum Design

The 15-week curriculum for this beginning-level Chinese course was developed based on the DCI model. A nonequivalent quasi-experimental design was adopted for this study. One class consisting of 18 students was assigned to the LS-RW sub-model. In the LS-RW model, the instruction for the first 8 weeks was focused on listening and speaking skills. Only pinyin was provided in the Chinese learning materials, including vocabulary, sentences, and dialogues. Character reading and writing were introduced after 8 weeks. The other class consisting of 21 students was assigned to the LSR-W sub-model. In the LSR-W model, in addition to the focus of listening and speaking skills in the first 8 weeks, character reading was introduced as well. Both character and pinyin were provided in the Chinese learning materials, in which the students were given the opportunity to make connections between character and pinyin in the first 8 weeks. The only task left after 8 weeks was character writing.

3.3. Measures

3.3.1. Radical Awareness Task

The radical awareness task in this study was adapted from the Chinese Orthographic Knowledge Test in Chen et al. (2013). Two types of the three subtests in the Chinese Orthographic Knowledge Test (Chen et al., 2013) were included in this radical awareness task: radical recognition test and semantic radical awareness test. The radical recognition test was aimed at testing whether participants were able to recognize and identify the characters given the target radicals. The Cronbach's α value was .947 (Chen et al., 2013).

Sample question:

Which character has the radical (symbol) 氵 (shuǐ, water)?

A. 说 (shuō, speak) B. 冷 (lěng, cold) C. 泳 (yǒng, swim) D. 壮 (zhuàng, strong)

The semantic radical awareness test was aimed at testing whether participants were able to tell the position of a specific radical in a character and the relationship between the radical and the character. The Cronbach's α value was .881 (Chen et al., 2013).

Sample question:

Which character is most associated with the meaning of the character 水 (shuǐ, water)?

A. 汁 (zhī, juice) B. 叶 (yè, leaf) C. 影 (yǐng, shade) D. 坝 (bà, dam)

In the radical awareness pre-task (given in Week 9 before radicals were formally introduced) consisting of total eight items, there were four items in the radical recognition test and semantic radical awareness test, respectively. The items in the radical recognition test and semantic radical awareness test were paired together by the same radical. A total of four typical radicals in Chinese orthography were tested (i.e., 木, wood; 艹, grass; 氵, water; 饣, eat). The radical awareness post-task (given in Week 14 at the end of the course) was in the same format of pre-task but with doubled volume (16 items) and different content from pre-task in order to reduce the influence on test takers' memorization due to repeated measure.

3.3.2. Pinyin and Meaning Production Task

In this pinyin and meaning production task, participants were asked to write pinyin and English meaning for the 10 two-character words. The pinyin of one character was graded as correct only if the tone was also marked accurately. The testing words were selected from the learning materials in the first 8 weeks and this test was given in Week 9.

3.3.3. Character Writing Test

The character writing test was a followed-up test at the end of each week from Week 10 to Week 13 and was conducted totally four times. The testing characters were selected from the learning materials for that certain week. This character writing test consisted of two parts. The first part was to ask the participants to write characters based on the given pinyin and English meaning, which was the reverse test of the previous pinyin and meaning production task. The second part was to write the correct stroke orders of the given characters.

4. Results

Regular independent sample t-tests were used for the four measures. The results are presented in Table 1. Statistically significant differences were found in radical awareness pre-

task and pinyin and meaning production task between the LSR-W group and the LS-RW group.

Table 1. CFL Independent Sample t-test for All Measures by Condition

	LSR-W (1)				LS-RW (0)						
Measures	*n*	M	SD	SE	*n*	M	SD	SE	*df*	*t*	*p*
RA pre	21	6.95	0.86	0.19	18	6.22	1.26	0.30	37	2.13*	.04
PM task	21	5.69	4.04	0.88	18	2.14	3.36	0.79	37	2.95**	.005
RA post	21	7.60	0.78	0.17	18	7.19	0.35	0.08	37	2.00	.05
CW test	21	17.36	1.58	0.35	18	17.00	1.69	0.40	37	0.68	.50

Note: * $p < .05$, ** $p < .01$

The result of the seemingly unrelated regressions for the mediation model 1 is shown in Figure 1. The pinyin and meaning production task score in the LSR-W group was 3.86 higher than in the LS-RW group in average controlling for Chinese background (a1=3.86, z(36)=3.60, p< .001). Condition and Chinese background accounted for 33% of the variance in pinyin and meaning production task (R2=0.33, p= .0001). The radical awareness pre-task score in the LSR-W group was 0.76 higher than in the LS-RW group in average controlling for Chinese background (a2=0.76, z (36) =2.30, p= .02). Condition and Chinese background accounted for 13% of the variance in radical awareness pre-task (R2=0.13, p= .06), however, which was not statistically significant. The predictor of pinyin and meaning production task made unique contribution to the character writing test (b1=0.19, z(34)=2.68, p= .007). The pinyin and meaning production task, radical awareness pre-task, condition and Chinese background together accounted for 24% of the variance in character writing test (R2=0.24, p= .01).

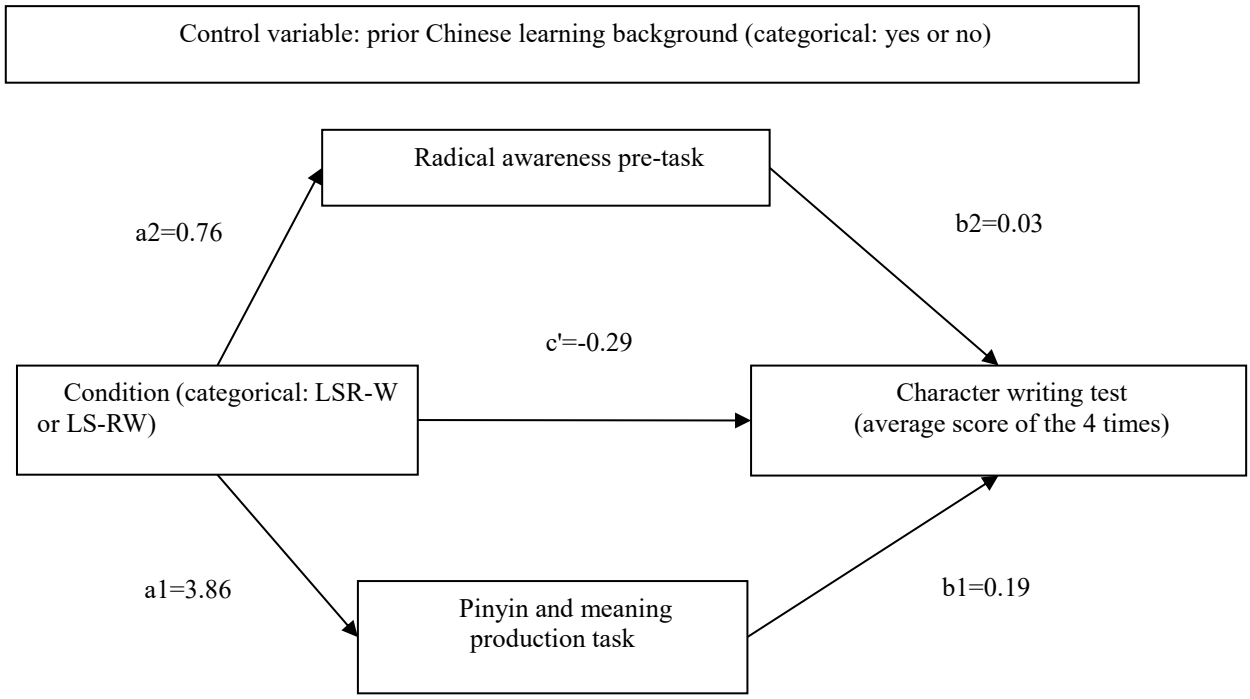


Figure 1. CFL Mediation Model 1 with Coefficients (with Radical Awareness Pre-task)

The indirect effects of the mediation model 1 are summarized below. The character writing test score in the LSR-W group was 0.72 higher than in the LS-RW group in average through the mediation effect of pinyin and meaning production task controlling for Chinese background (a1*b1=0.72, z=2.15, p= .03). The 95% bootstrap bias-corrected confidence interval of this indirect effect was [.06, 1.37], indicating a statistically significant indirect effect mediated through pinyin and meaning production task. The character writing test score in the LSR-W group was 0.02 higher than in the LS-RW group in average via the mediation through radical awareness pre-task controlling for Chinese background (a2*b2=0.02, z=0.13, p= .90). However, the 95% bootstrap bias-corrected confidence interval [-.31, .36] indicated that this indirect effect mediated through radical awareness pre-task was not statistically significant. The total indirect effect was found statistically significant (a1*b1+a2*b2=0.74, z=2.16, p= .03, 95% bootstrap CI=[.07, 1.41]). The effect size measured by partially standardized indirect effect was 0.46, which was a large effect size, suggesting that character writing test score in the LSR-W group was 0.46 standard deviation higher than in the LS-RW group in average through the total indirect mediation effect controlling for Chinese background. The results of seemingly unrelated regressions and indirect effects for the mediation model 2 were similar to those of the mediation model 1.

5. Discussion

5.1. Differences between the LSR-W Curriculum and the LS-RW Curriculum

According to the t-test results, the beginning CFL learners who followed the LSR-W curriculum performed better in radical awareness pre-task and pinyin and meaning production task than those given the LS-RW curriculum. In the LSR-W curriculum, immersing character reading in oral

language proficiency development provided an opportunity for learners to establish the connection between pinyin and character earlier. Such earlier connection could make significant contributions to developing radical awareness and further facilitating character recognition even though the radicals were not formally introduced in class (Chen et al., 2013; Taft & Chung, 1999; Tong & Yip, 2015; Zhang et al., 2016). In other words, the beginning CFL learners could make use of the earlier visual input of characters to understand the role of a radical in a character and then infer the meaning of a new character using the information of the same radical (Chen, 2019). Therefore, the LSR-W group outperformed their LS-RW peers in the radical awareness pre-task and pinyin and meaning production task in Week 9.

5.2. Mediation Effects of Radical Awareness and Pinyin and Meaning Production

The mediation analyses explored how the type of DCI model affected character writing through radical awareness and pinyin and meaning production. The results demonstrated that radical awareness and pinyin and meaning production together mediated the relationship between the type of DCI model and character writing, indicating that these character-related tasks play an important role in determining the relationship between the type of instruction and character writing in DCI. The total positive indirect effect was considered as a large effect size, suggesting the existence of a strong mediation.

In terms of the mediation effect separately, pinyin and meaning production made unique contributions to character writing outcomes as a mediator. It was reasonable that for the character writing task in which the CFL learners were asked to write the characters directly from none to complete given the corresponding pinyin and meaning, the reverse task to identify pinyin and meaning given the characters played as the stepping-stone for the more difficult character writing task. However, the radical awareness task did not mediate the effect of instruction type on character writing, which comes to the same conclusion in Zhang and Roberts (2019). For beginning CFL learners with the alphabetic first language (L1) background, especially for adult learners, they tended to transfer their phonological awareness in L1 to Chinese character writing. Also, for beginning CFL learners, their radical awareness was still underdeveloped for them to connect the radicals with the corresponding characters all the time.

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