

Phonological Strategies in Writing Chinese Ideographs by CSL Learners: A Preliminary Study

LIANG, Yuan SUN, Zhengliang

Abstract

Chinese characters are traditionally regarded as ideographic, thus potential benefits underlying the phonological encoding of each character have been neglected. This paper attempts to examine what phonological behaviors second language learners of Chinese (CSL) consciously use when they face difficulties of writing Chinese ideographs (CW). Preliminary results of a questionnaire about learning strategies of CW indicate that: (i) CSL learners rely heavily on *Hanyu Pinyin* strategies throughout the whole learning progress of CW, and (ii) the homophony effect of Chinese characters has a less important role in CW but would become increasingly important as learners' Chinese proficiency levels rise.

Keywords: phonological strategies, writing Chinese ideographs, CSL learners

LIANG, Yuan, Department of Chinese Language Studies, The Education University of Hong Kong, HK.
E-mail: yliang@eduhk.hk.
SUN, Zhengliang, The Education University of Hong Kong, HK.

0 Introduction

Chinese characters are traditionally considered as ideographic, such that the basic writing unit (i.e. the character) is mapped onto the morpheme as a whole and cannot be phonemically decomposed (Leong, 1973; Mattingly, 1992). Unlike alphabetic writings, such as English, a Chinese character phonetically must at least represent one syllable and become available as a homophonic loangraph. Homophony can also be augmented with a semantic radical to become a phonetic-semantic compound, which comprises more than 80% of commonly used Chinese characters (Qian, 1990).

For students who learn Chinese as a second language (CSL), especially those whose native languages are alphabetic, writing Chinese ideographs (CW) is always considered as one of the major intimidations (Everson, 1998; Ke, 1998; Yin, 2003). To keep learning Chinese characters, the CSL students need to develop specific strategies when facing learning difficulties. Prevalent among these is the utilization of *Hanyu Pinyin*, i.e. the romanization of Chinese, which not only transcribes the sound of Chinese characters but also functions as an alternative for CSL beginners when they do not know how to write the scripts (Chung, 2002; Zhu, 2012). Despite the rapid growth in interest and enrollment of learning Chinese as a second language in recent years, research about strategies in learning CW are rare (Wu, 2007). This paper aims to fill this research gap, by using a questionnaire to examine phonological behaviors that CSL learners consciously use to overcome difficulties in learning CW. Such strategic patterns may serve as indicators to how and how well the students learn Chinese and inform classroom teachers about the importance of phonological encoding of Chinese ideographs.

Following this introduction, section 2 reviews the studies of learning strategies and addresses the discrepancy between processes of recognizing and writing Chinese characters. In section 3, the methods of connecting strategies in learning CW with phonology and the questionnaire design are described. Section 4 presents the results and section 5 offers an explanation.

1 Strategies in learning CW by CSL learners

Learning strategies refer to specific actions of learners that aid the acquisition, storage, retrieval and use of information (Cohen, 2011). The selection of learning strategies may heavily affect the learning outcomes. In 1990, Oxford developed the famous *Strategy Inventory for Language Learning* (SILL) (version 7.0) to measure general strategies used by English speakers in learning other languages, and further divided strategies into two groups — direct and indirect strategies — linking with four language skills: listening, speaking, reading and writing, the main target language skills for foreign learners (Oxford, 2011). The SILL (version 7.0) has been used in the field of CSL (Chen, 1995; Jiang, 2000; Ye & Liang, 2019). However, due to the uniqueness of Chinese writing system, many researchers believed that specific measurement surveys should be designed.

Ke (1998) used a questionnaire containing 11 statements to examine whether CSL students' perceptions of Chinese characters are predictors of their Chinese achievement. He found that students who favored learning character elements (such as the phonetic and semantic components) rather than character stroke order produced higher scores in the test. However, McGinnis (1999) and Jiang and Zhao (2001) had different observations. McGinnis found that the use of repetition and creation of mnemonics is more frequent than that of radical or phonetic components strategies. Jiang and Zhao (2001) developed an inventory specifically to collect strategies in learning Chinese characters by CSL beginners. According to their report, the most often used strategy was memorizing the whole character, while the least used strategy was inducing and using semantic and phonetic components. Interestingly, the whole-character strategy might not be effective in learning Chinese character, based on a further study on the correlation between learning strategies and the language proficiency by Zhao and Jiang (2002). Zhou and Yu (2004) employed the verbal report and got more than 20 specific behaviors used by CSL learners in learning Chinese characters, including copy painting, copying, homophone word grouping and consulting the dictionary. Shen (2005)

adopted an open-ended questionnaire to identify the character learning strategies by 32 CSL learners from the intermediate and advanced classes. After the factor analysis, she found that the orthographic knowledge-based cognitive strategies were commonly used.

According to the experience of CSL teachers, writing Chinese characters is more difficult than recognizing them (Zhou 2007). This observation is supported by a number of studies in which the accuracy of writing-to-dictation was much lower than either character naming or character recognition (Zhang et al, 1999; Meng et al, 2000; Lau et al, 2015). Researchers proposed models to explain the difference: in character recognition, learners receive orthographic input and produce phonological or semantic output, while in character writing they incorporate phonological or semantic input and produce orthographic output (Luan, Shu & Zhang, 2001). Since most of the strategies in previous studies were intended to learn how students read or recognize Chinese characters, an in-depth study of strategies for learning CW is needed.

2 Methods

As writing Chinese ideographs present an intimidating task, CSL learners in the early stage are usually required to study *Hanyu Pinyin* before exposure to Chinese characters (Everson, 1998). They are even allowed to write *Hanyu Pinyin* when they do not know how to write Chinese characters (McGinnis, 1999; Ren, 2017). On the other hands, phonological transparency of Chinese is low (only 4.7% of the common characters' pronunciations are identical to their phonetic radicals (such as “清”) (Ye, 1965)) and lexical ambiguities are great due to the large number of homophones (Chinese has 1300 distinct syllable-tone combinations with an average of 5.4 morphemes per syllable (Duanmu, 1999)). Therefore, it is comparatively harder for CSL learners to make use of phonological correlations when they learn CW. However, it is suspected that the role of phonology would become increasingly important as learners' Chinese proficiency rise (Ho & Bryant,

1997; Weekes, Yin, Su, & Chen, 2006), because learners would generate new rules and consciously compare and contrast the phonological representations through more CW practices. To examine these hypotheses, a cross-sectional study on the learning strategies by CSL learners with different Chinese proficiency levels is employed in this paper.

2.1 Participants

A total of 44 adult CSL learners with different proficiency levels of Chinese are recruited from a university in mainland China. Students' average age is 26.30 years, with standard deviation (SD) of 6.57. They are divided into three groups according to the proficiency levels of Chinese, following three criteria: (i) placement test results; (ii) instructional levels in the university reported by teachers of the university; and (iii) studying time of Chinese (especially the studying experience of CW). To ensure the basic writing skill of Chinese, the beginning learners should have a minimum of one year of Chinese studying experience, the intermediate learners should have at least two years and so on. In order to eliminate the confounding effects of learners' mother languages (and the first writing system), CSL learners from countries of Sinosphere and non-Sinosphere were both included (Table 1).

Table 1
Number and background of participants

Group	Number	Native language
Beginning	15	English, Germany, Hungarian, Japanese, Kiswahili, Korean, Russian, Spanish, Tai,
Intermediate	15	Danish, French, German, Kazakh, Korean, Norwegian, Russian, Spanish, Ukrainian,
Advanced	14	Arabic, English, Indonesian, Japanese, Korean, Portuguese, Russian, Spanish, Ukrainian,
Total	44	

2.2 Questionnaire of phonological strategy

There are various approaches available for investigating CSL learners' background and learning strategies, including observation, verbal report, oral interviews and written questionnaires (Wu, 2007; Cohen, 2011). This paper uses a written questionnaire to elicit learners' responses (Zoltán, 2010), following a 5-point Likert scale: 1 ("never or almost never"), 2 ("usually not"), 3 ("sometimes"), 4 ("often") and 5 ("always or almost always").

The written questionnaire consists of two sections. Section 1 collects learners' demographic characteristics and level of education. Section 2 contains 25 behavior statements of CSL learners in learning CW, among which there are four statements related to Chinese phonology and one to the character form as a comparison with the impact of phonology. They are listed in Table 2 (Q10-Q13).

Table 2
Statements relate to the phonology of Chinese in CW

No.	Statement of learning strategy
Q10	If I don't know how to write a Chinese character, I will write <i>Hanyu Pinyin</i> .
Q11	When I hear a Chinese character but don't know how to write it, I will write <i>Hanyu Pinyin</i> .
Q12	When I hear a Chinese character but don't know how to write it, I will write the homonym.
Q13	When I hear a Chinese character, but do not know how to write it, I will look up the word in a dictionary using <i>Hanyu Pinyin</i> .
Q15	If I can't think of how to write a Chinese character, I will write one similar form that I know.

As can be seen from Table 2, Q10, Q11 and Q13 are phonological strategies directly related to *Hanyu Pinyin*; Q10 and Q11 represent CW situation with or without sound stimulus; Q12 probes the impact of phonological correlations of Chinese characters in learning CW; Q15 is not a phonological strategy but frequently used by both L1 and L2 Chinese learners which is included as a control to the phonological strategies. These strategies address how L2 learners continue

their CW learning with limited abilities, belonging to Oxford’s categories of compensatory strategies (Oxford, 1990).

3 Result

The overall mean and SD for each statement in Table 2 are calculated and shown in Table 3.

Table 3
The overall mean and SD

Categories		Q10	Q11	Q12	Q13	Q15
N(Valid)		44	44	40	43	43
	Missing	0	0	4	1	1
Mean		3.93	3.80	2.68	3.77	2.86
Std. Deviation		1.265	1.231	1.328	1.212	1.505
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

As can be seen from Table 3, the phonological strategies of using *Hanyu Pinyin* (Q10, Q11 and Q13) are more frequent by CSL learners in CW than homonym and similar form strategies (Q12 and Q15). CSL learners not only write *Hanyu Pinyin*, they also use *Hanyu Pinyin* as a tool to remember the sound of the characters so as to seek help from dictionaries. The mean of homonym strategy usage is lower than *Hanyu Pinyin* strategies, even a little bit lower than the similar form strategy, indicating that students may adjust their learning methods for different tasks in L2 learning (Bonin et al. 2015).

Cohen (2011) assumed that the choice and use of strategies by L2 learners may transform with the improvement of learning achievement. Following this assumption, the frequency of strategies used by CSL learners in Table 3 are examined against their level of Chinese proficiencies respectively. Results are show in Table 4 and Figure 1 below.

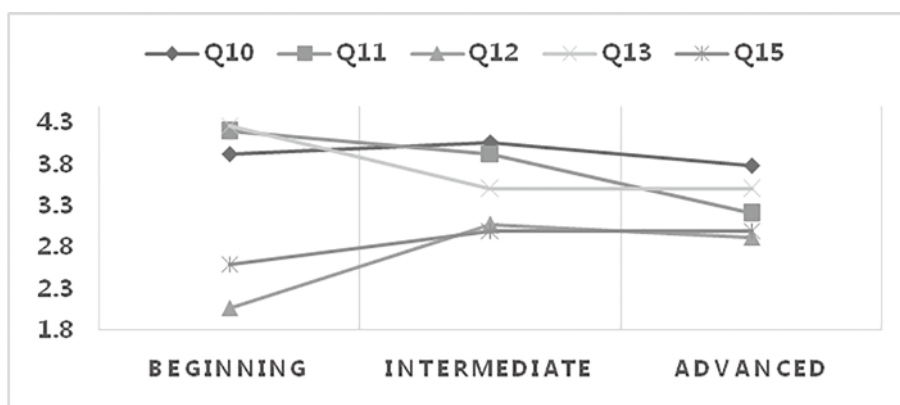
Table 4

Use of strategies against L2 learners' Chinese level

Level		Q10	Q11	Q12	Q13	Q15	
Beginning	N	Valid	15	15	14	15	15
		Missing	0	0	1	0	0
	Mean		3.93	4.20	2.07	4.27	2.60
	Std. Deviation		1.280	1.014	1.141	1.100	1.502
	Minimum		1	2	1	1	1
	Maximum		5	5	4	5	5
Intermediate	N	Valid	15	15	14	14	15
		Missing	0	0	1	1	0
	Mean		4.07	3.93	3.07	3.50	3.00
	Std. Deviation		1.223	1.163	1.328	1.225	1.558
	Minimum		2	2	1	2	1
	Maximum		5	5	5	5	5
Advanced	N	Valid	14	14	12	14	13
		Missing	0	0	2	0	1
	Mean		3.79	3.21	2.92	3.50	3.00
	Std. Deviation		1.369	1.369	1.379	1.225	1.528
	Minimum		2	1	1	1	1
	Maximum		5	5	5	5	5

Figure 1

Mean use of strategies against L2 learners' Chinese level



Results in Table 4 roughly show that the strategy of writing *Hanyu Pinyin* (Q10) is continuously used by CSL learners across different learner groups. When learners' Chinese proficiency rises, the use of *Hanyu Pinyin* as sound cues to look up dictionaries (Q13) or replacing unknown Chinese characters in CW (Q11) decreases, while the use of homonym (Q12) and similar form (Q15) strategies in CW increases. The curvature of means across different groups can be captured in Figure 1.

In order to compare the effect of CSL learners' proficiency level on the use of phonological strategies, a one-way ANOVA is conducted with learners' responses based on the 5-point Likert scale as dependence list and the groups of learners' Chinese proficiency level as factor. Results are shown in Table 5.

Table 5
Correlation between use of strategy and learners' proficiency level

		Sum of Squares	df	Mean Square	F	Sig.
Q10	Between Groups	.572	2	.286	.172	.843
	Within Groups	68.224	41	1.664		
	Total	68.795	43			
Q11	Between Groups	7.469	2	3.734	2.654	.082
	Within Groups	57.690	41	1.407		
	Total	65.159	43			
Q12	Between Groups	8.001	2	4.001	2.436	.101
	Within Groups	60.774	37	1.643		
	Total	68.775	39			
Q13	Between Groups	5.741	2	2.871	2.053	.142
	Within Groups	55.933	40	1.398		
	Total	61.674	42			
Q15	Between Groups	1.563	2	.781	.334	.718
	Within Groups	93.600	40	2.340		
	Total	95.163	42			

It is shown that all p-values in Table 5 are greater than 0.05, and therefore, there is no statistically significant difference between the use of strategies of different groups. Since the ANOVA results are partly inconsistent with the observations obtained from Figure 1, there is not enough evidence to reject the null hypothesis that the population means are all equal. One may suspect that the grouping of participants, i.e. the Chinese proficiency levels, is not so powerful to detect a difference that is practically significant. Thus, an independent-samples t-test is conducted to compare the means of strategic frequency from beginning and intermediate + advanced groups, as well as from beginning + intermediate and advanced groups. It is interesting that there is a significant difference in the means for beginning and intermediate + advanced groups in Q12 ($p=0.033$) and Q13 ($p=0.047$), and there is also a significant difference in the means for beginning + intermediate and advanced groups in Q11 ($p=0.031$), as shown in Table 6.

Table 6
Results of independent-samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
beginning + intermediate and advanced groups										
Q11	Equal variances assumed	1.127	.294	2.237	42	.031	.852	.381	.083	1.621
	Equal variances not assumed			2.051	20.871	.053	.852	.416	-.012	1.717
beginning and intermediate + advanced groups										
Q12	Equal variances assumed	.009	.925	-2.212	38	.033	-.929	.420	-1.778	-.079
	Equal variances not assumed			-2.316	30.427	.027	-.929	.401	-1.747	-.110
Q13	Equal variances assumed	1.539	.222	2.051	41	.047	.767	.374	.012	1.521
	Equal variances not assumed			2.108	31.053	.043	.767	.364	.025	1.508

Although CSL learners favor using and writing *Hanyu Pinyin* to Chinese characters, they are only allowed to replace unknown Chinese characters by *Hanyu Pinyin* in early CW learning stage. Thus, the mean of Q11 decreases when students become advanced learners. The mean of Q13 decreases earlier when learners complete their beginning stage, indicating that they have acquired more methods of looking up the dictionaries. The mean of Q12 increases also when learners complete their beginning stage, indicating that the homophony effect on learning CW is greater with the improvement of learning achievement.

4 Conclusion

This paper attempts to examine what phonological behaviors that CSL learners use to overcome difficulties in learning CW. Based on the result of data analysis, the preliminary conclusion is: (i) CSL learners prefer *Hanyu Pinyin* over Chinese characters when facing difficulties in learning CW; (ii) the homophony effect of Chinese characters has a less important role in CW, but it would become increasingly important as learners' Chinese proficiency levels rise.

Although the phonological transparency is low and lexical ambiguities are great due to the large number of homophones, Chinese characters are not purely ideographic (Pollatsek, Tan & Ryner, 2000). The phonological correlations of Chinese character reflect two ways of making characters in three thousand years ago: employing pictographs of concrete objects to stand for homophonous words and using two symbols to construct a character which indicated the pronunciation and categorical meaning of the word respectively. In this study, the higher use of homonym strategy by intermediate and advanced learners compared with the beginners is consistent with findings of Liang (2019), picking out the role of phonology in the acquisition of Chinese characters by CSL learners.

The preliminary findings of this study may alert the instructors of CSL to pay attention to the overuse of phonological strategies (especially the *Hanyu Pinyin* strategies) by learners with different proficiency levels. It is worth to investigate

what behaviors CSL learners would take if *Hanyu Pinyin* were not taught to them at the early stage of learning. On the other hand, Chinese instructors should introduce various strategies to CSL learners with a high vocabulary proficiency. Currently, the over-reliance of *Hanyu Pinyin* also brings about the curriculum reform on Chinese teaching, such as delaying the teaching of *Hanyu Pinyin* to provide learners with more exposure of Chinese characters.

Finally, the limitation of this study that there are a small number of participants must be considered. Further, whether the teaching methodology is the main factor affecting CW learning strategies, and whether the familiarity with Chinese characters by students from countries of Chinese character circle would affect the use of learning strategy, these would need to be explored for a future research.

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漢語二語學習者漢字書寫語音策略初探

梁源、孫正樑

摘要

漢字在傳統上被認為是一種表意文字，因而，漢字語音構成對於漢字書寫的潛在作用受到忽視。本研究採用調查問卷的方法，探討漢語作為第二語言學習者在面對漢字書寫困難時有意識使用語音策略的情況。調查對象為 44 名某大學成人留學生，他們的漢語水平根據評定分為高、中、低三級。調查結果顯示：二語學習者在整個漢字學習過程中較為依賴漢語拼音策略；漢字同音效應對於二語學習者漢字書寫的作用不明顯，但其作用隨着學習者漢語水平的提高而增加。

關鍵詞：語音策略 漢字書寫 漢語作為第二語言學習者