Theory and Research for Developing Learning Systems，1：57-69，2015
Research Initiative for Developing Learning Systems（RIDLS）

The Process of Learning Japanese Kanji（Chinese character）Words in Chinese-Native Learners of the Japanese Language:

Effects of Orthographical and Phonological Similarities between the Chinese and the Japanese Languages

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The current study examined the process of learning Chinese character words in Chinese and Japanese of Chinese-native learners of the Japanese language. We estimated the learner's learning process by examining the process of Chinese character words. We conducted 2 experiments while manipulating the degrees of orthographical and phonological similarities. Experiment 1 used a two by two factorial design with presentation language（first language, and second language）and orthographical similarity（high and low）, and Experiment 2 used a two by two factorial design with presentation language（First and second language） and phonological similarity（high and low）. These experiments suggested the following;（1）Words with high orthographical similarity have similar processing both in the first and the second language regardless of the learner's proficiency levels of the Japanese language,（2）learners with low proficiency had more active phonological representations of the native language that affected the processing of words, while learners with high proficiency had more active phonological representations of the second language that affected the processing of words. In learners of the Japanese language whose native language is Chinese, discrimination between the orthographical information of the Chinese and the Japanese languages was easy, while instant discrimination between the phonological information of the two languages was more difficult. The study elucidated that Chinese native speakers utilize both orthographical and phonological representations in their native Chinese language in learning Japanese kanji characters. The results indicate the importance of being keenly aware of the learning process where learners read Japanese kanji words using Chinese phonology.

Key Words: Kanji words of Chinese and Japanese, Orthographical Similarity, Phonological Similarity, Word Recognition, Learning Process

1. Introduction

How do native Chinese-speaking learners of the Japanese language learn kanji（Chinese）characters in the Japanese language? The current study aimed to elucidate the effects of their native language（L1）, Chinese, on the learning process of Japanese kanji characters by estimating the Chinese L1 learner's learning process through an examination of the processing of Japanese kanji words by these learners.

Chinese characters（or, kanji characters in Japanese）are a common orthography shared between the Chinese and the Japanese languages. When a Chinese L1 speaker studies Japanese as a second language（L2）, it is difficult to completely remove the effects of L1 Chinese（Fei & Matsumi, 2012）. In recent years, many studies have been conducted to examine the processing of Japanese kanji words in Chinese L1 speakers（Cai & Matsumi, 2009; Cai, Fei, & Matsumi, 2011; Fei & Matsumi, 2012; Matsumi, Fei, & Cai, 2012; Fei, 2013）. The effects of L1 Chinese on the processing of Japanese kanji words are being elucidated. Investigating the processing of a word would inform us of the acquisition status of a certain learning stage of a learner, and would allow us to understand the learning process that the learner used to achieve their current level of ability. The current study explored the learning process of kanji words of Chinese L1 speakers by examining their processing of those words.

Many previous studies examined the impact of the L1 on the processing of L2 words. In other words, these studies manipulated only one language and observed activity of the other language. Based on the past literature, the current study conducted experiments that manipulated the L1 and L2 simultaneously. By presenting both languages as stimuli, learners distinguish Chinese characters and Japanese kanji words more clearly, which enabled the study to provide direct evidence to test the "mental lexicon" model that proposes the use of shared and unshared orthographical and phonological representations（Matsumi et al., 2012）. In addition, the study was able to observe effects from the Chinese language when a learner studies Japanese kanji words, which allowed us to estimate their learning process of Japanese kanji words.

2. Overview of the Past Literature

Investigations of the processing of Japanese kanji words by Chinese L1 speakers started in 1990s. In the early stages of this line of research, most studies focused only on orthographical information of kanji words and studied the processing of cognates and non-cognates（Chiu, 2002, 2003; Chiu 2006, 2007; Cai & Matsumi, 2009）. These studies demonstrated that different processes existed for cognates and non-cognates, the former being words whose orthographical forms are similar across Chinese and Japanese, and the latter being words whose orthographical forms are not similar between the two languages. More recently, researchers started focusing not only on orthographical information but also on phonological information of kanji words（Cai et al., 2011; Matsumi et al., 2012; Nagano & Matsumi, 2013）. These studies showed that both orthographical and phonological similarities between the Chinese and the Japanese languages affect the processing of Japanese kanji words.

A lexical decision task and a naming task were administered while manipulating the orthographical and phonological similarities between the Chinese and the Japanese languages in advanced learners of Japanese in China（Cai et al., 2011）, intermediate Japanese learners in China（Matsumi et al., 2012）, and advanced learners of Japanese who were studying abroad in Japan（Nagano & Matsumi, 2013）. The results indicated that the effects of the L1 Chinese differed across these three studies.

In the lexical decision task in Cai et al.（2011）, both orthographical and phonological similarities showed facilitation effects on making a correct lexical decision, and there was no interaction of orthographical and phonological similarities. On the other hand, in the naming task, in words with high phonological similarity orthographical similarity had a suppression effect, while phonological similarity showed a facilitation effect regardless of the degree of orthographical similarity. This study demonstrated that the connection between the L2 orthography and L1 phonology was strong in advanced learners of the Japanese language in China.

In Matsumi et al.（2012）, phonological similarity facilitated accurate processing of words in both lexical decision and naming tasks. There was no main effect of orthographical similarity or the interaction of the orthographical and phonological similarities. This study indicated that the process that intermediate learners of Japanese in China used was driven by the use of Chinese language representation（both orthography and phonology）. The authors pointed out that intermediate learners study Japanese kanji words by reading them using the Chinese phonology.

In the lexical decision task in Nagano & Matsumi（2013）, phonological similarity facilitated correct responses, while there was no main effect of orthographical similarity or the interaction of the orthographical and phonological similarities. However, in a naming task, a facilitation effect of orthogonal similarity was seen only in words with low phonological similarity, and phonological similarity had a facilitation effect regardless of the degree of orthogonal similarity. The results indicated that the formation of orthogonal representations of words with low orthographic similarity became stronger, which resulted in quicker access to phonological representation in the L2 in advanced learners of Japanese who were residing in Japan.

The confluence of these studies indicates that the processing of Japanese kanji characters in Chinese L1 speakers differ depending on the learner’s proficiency level of Japanese and the experience using Japanese. These studies elucidated the impact of knowledge of Chinese characters on the processing of Japanese kanji characters. These studies led to the proposal of mental lexicon model of Chinese L1 speakers（Figure 1）. According to this model, an orthographical representation is shared between the two languages for words with high orthographical similarity（Figure 1-（a））, while independent orthographical representations exist for words with low orthographical similarity. In addition, separate and independent phonological representations are formed for the two languages for words with high phonological similarity（Figure 1-（b））. Then, what effects does Japanese（L2）have on the processing of Chinese（L1）words in Chinese native speakers?

Matsumi, Fei, & Cai（2014）investigated the effects of knowledge of Japanese kanji characters on the processing of Chinese words by using a naming task in advanced and intermediate learners of Japanese in China. The results demonstrated a facilitation effect of orthographical similarity in intermediate learners, and a facilitation effect of orthographical similarity and a suppression effect of phonological similarity in advanced learners. The study indicated that greater proficiency of L2 Japanese resulted in an increasing impact of the L2 on the processing of Chinese（L1）words. Furthermore, the study suggested that the impact of the knowledge of L1（Chinese）words on the L2 kanji processing was greater than the impact of the knowledge of L2 kanji words on L1 Chinese words.

Few studies have investigated the impact of the knowledge of L2 kanji characters on the L1 Chinese word processing. This study by Matsumi et al.（2014）made an important contribution to understanding the orthographical and phonological relationships of Chinese words in Chinese and Japanese languages.

3. Research Questions and the Purpose of the Current Study

Previous literature investigated the effects of one language on the processing of the other. There are no studies to our knowledge that manipulated the L1 and L2 simultaneously. By presenting both languages as stimuli, learners distinguish Chinese characters and Japanese kanji more clearly, which enabled the study to provide direct evidence to test the “mental lexicon” model（Matsumi et al., 2012）that proposes the shared and unshared orthographical and phonological representations（Figure 1）. In addition, the study was able to estimate the learning process of Japanese kanji words by making a learner’s distinction between Chinese and Japanese characters clearer.

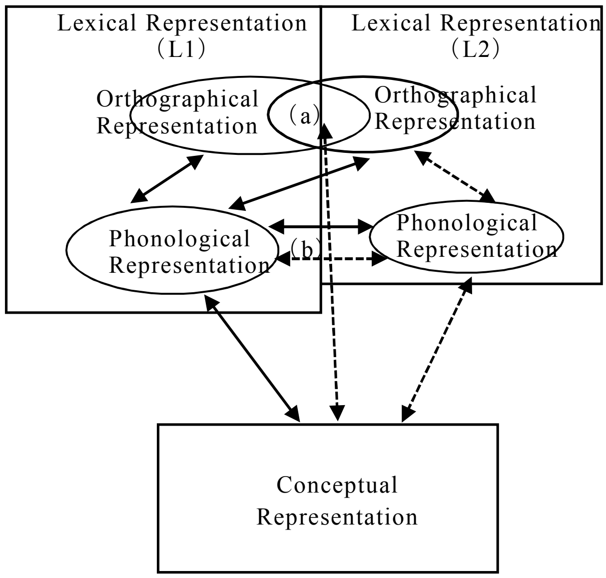

Figure 1. The Mental Lexicon Model of Chinese Native Speakers who Study Japanese （taken from Matsumi et al., 2012）

The following were the hypotheses of the current study:

[Hypothesis 1] Words with high orthographical similarity would result in shorter response times regardless of the presentation language, as their orthographical representations are shared between the Chinese and the Japanese languages（Matsumi, et al., 2012; Hypothesis 1-1）. Furthermore, in words with high orthographical similarity, no significant difference would be found in response times between the L1 and L2, while shorter response times in response to L1 words would be observed in words with low orthographical similarity （Hypothesis 1-2）.

[Hypothesis 2] Because of separate and independent phonological representations in the Chinese and the Japanese languages （Matsumi et al., 2012）, response times to L1 words would be shorter regardless of the degree of phonological similarity（Hypothesis 2-1）. When the presentation language is the L2, response time would be shorter for words with high phonological similarity, and when the presentation language is the L1, response time would be longer for words with high phonological similarity（Hypothesis 2-2）. This will be due to an increased suppression effect of the L2 on the phonological processing of the L1 in learners with greater Japanese（L2） proficiency（Matsumi et al., 2014）, and the reported facilitation effect of the L1 on the phonological processing of the L2（Nagano & Matsumi, 2013）.

4. Experiment 1

4.1 Objectives

Experiment 1 aimed to elucidate the effects of orthographical similarity between the Chinese and Japanese languages on the processing of Japanese kanji words by testing hypothesis 1.

4.2 Methods

4.2.1 Participants

Sixteen native speakers of Chinese who were advanced Japanese learners（13 women, 3 men） participated in this experiment. At the time of the participation in this study, all participants were studying at a Japanese university or graduate school, and had already passed the N1 (the most advanced) level of the Japanese Language Proficiency Test. Their duration of stay in Japan ranged from 6 months to 4 years.

4.2.2 Experimental Design

A two-factorial design was used in analyzing the response times in the lexical decision task, with the first factor consisting of two levels of the presentation language （Chinese or Japanese） and the second factor consisting of two levels of orthographical similarity（high or low）. Both factors were within-subject factors.

4.2.3 Materials

The Japanese words were chosen from the levels 3 and 4 word lists from Japan Foundation （2002）, and the Chinese words were translation equivalents of these Japanese words. Only the words with low phonological similarity were used. Twelve words each were selected for "Chinese words with high orthographical similarity", "Chinese words with low orthographical similarity," "Japanese words with high orthographical similarity," and "Japanese words with low orthographical similarity," resulting in a total of 48 words. These words were controlled for the levels of frequencies based on Amano & Kondo（2000）.

A one-way analysis of variance（ANOVA） on the frequency of words in each condition revealed no statistically significant difference in the frequency among the conditions（F（3, 44）= 0.05, p = .984, $\eta 2$ = .00）. All statistical tests were tested at an alpha of 5% in the current study. We considered the frequency to be equal among these 4 types of words.

A total of 48 non-word stimuli of the 4 different types were selected in a similar manner to the real word stimuli. Table 1 shows the examples of words and non-words used in Experiment 1.

4.2.4 Apparatus

The experimental program was created with SuperLab Pro version 4 （Cedrus Corporation）. A personal computer and peripheral devices were used in the experiment.

Table 1 Examples of words and non-words used in Experiment 1

Examples of Words（ For "Yes" Trials）			
Chinese words with high orthographical similarity	生活	Japanese words with high orthographical similarity	特別
	数学		食堂
	说明		正月
Chinese words with low orthographical similarity	小偷	Japanese words with low orthographical similarity	友達
	水果		息子
	词典		仕事
Examples of Non-Words（ For "No" Trials）			
兔产	比浅	安急	登存
锅消	百即	理記	茶立

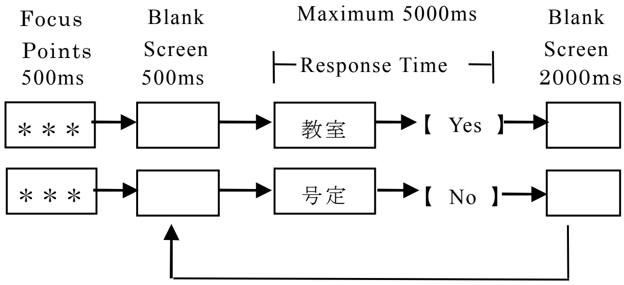

Figure 2. The Flow of Yes/No Trials in the Current Study

4.2.5 Procedures

The experiment was performed individually. There were 8 practice trials prior to commencing the task. The experimental task was a lexical decision task using visually presented stimuli. Participants were required to judge as fast and as accurate as possible whether a word shown on the computer screen was a real word in Chinese （shown in red） or in Japanese（shown in black）. In each language, the participant pressed a "Yes" key if the participant judged that it was a word in that language, and a "No" key otherwise. The Chinese language was shown in red, and the Japanese language was shown in black. The response time was automatically measured as the duration from the time a word was presented until the participant pressed the "Yes" or "No" key.

Figure 2 shows the flow of a single trial. Focus points were shown for 500 ms on the computer monitor, then, a word stimulus was visually presented following a 500ms blank period. Each word stimulus was presented for a maximum of 5000 ms. There was a 2000 ms post-stimulus interval after the participant's key press, or at the end of the 5000 ms if the participant failed to respond. The focus point was presented only before the first trial. All word stimuli were randomly presented by the SuperLab Pro program.

At the completion of the task, the participants were asked to indicate the words that they did not know, and to write down their learning history of the Japanese language.

4.3 Results

We analyzed the response times of the correctly answered "Yes" trials in the lexical decision task. Each participant' response time in error trials, no-response trials, and trials of unknown words were excluded from the analysis. The percentage of excluded trials was 2.90%.

A two-way ANOVA （see Figure 3） demonstrated that the main effect of orthographic similarity was significant, （F（1, 15） =37.16, p<.001, η^2 = .13）, with shorter response time in words with high relative to low orthographical similarity. The main effect of the presentation language was not significant, （F（1, 15）=1.47, p=.244, η^2 = .01）. Given the significant interaction of presentation language and orthographical similarity （F (1, 15) =8.41, p=.011, η^2 = .01）, simple effects were tested. The results indicated that in words with low orthographical similarity, response time was shorter when the presentation language was Chinese relative to Japanese, （F (1, 30) =6.57, p=.016, η^2 = .02）. In words with high orthographical similarity, there was no statistically significant difference between the presentation languages, F (1, 30) =0.25, p=.620, η^2 = .00. Furthermore, words with high orthographic similarity resulted in shorter response time than those with low similarity, when they were Japanese （F (1, 30) =44.58, p<.001, η^2 = .11） or Chinese （F (1, 30) =11.85, p=.002, η^2 = .03）.

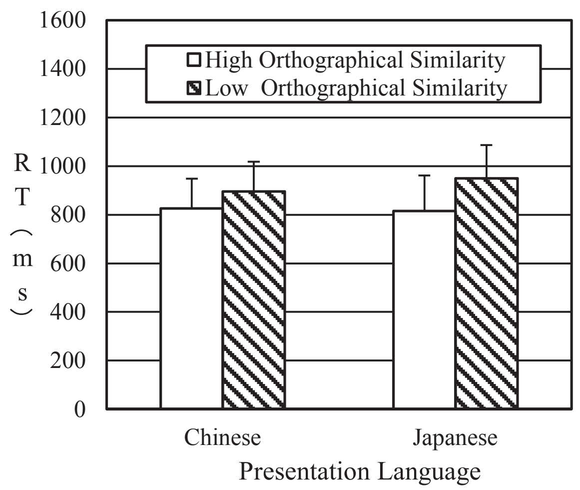

Figure 3. Average Response Times and Standard Deviations in Correctly Answered Trials in Each Condition of Experiment 1

A two-way ANOVA was also performed on the inverse sine transformed error ratios of each condition. There was no significant main effect of presentation language, （F (1, 15) =0.33, p=.577, η^2 = .01） and orthographical similarity （F (1, 15) =0.05, p=.826, η^2 = .00）, or the interaction of the two （F (1, 15) = 0.05, p=.826, η^2 = .00）. This indicated that there was no speed-accuracy trade-off where shorter response time conditions produced higher error rate. Therefore, we judged that response times obtained in the current experiment were a valid reflection of time required for performing the lexical judgment task.

Table 2 Error rates and standard deviations (*SD*) in each condition of Experiment 1

	Chinese with High Ortho-graphical Similarity	Chinese with Low Ortho-graphical Similarity	Japanese with High Ortho-graphical Similarity	Japanese with Low Ortho-graphical Similarity
Error Rate (*SD*)	1.39 (5.38)	1.94 (5.13)	0.97 (3.75)	0.97 (3.75)

5. Experiment 2

5.1 Objective

In Experiment 2, we aimed to elucidate the effects of phonological similarity between the two languages on the processing of Japanese kanji words, by testing the hypothesis 2.

5.2 Methods

5.2.1 Participants

Sixteen native speakers of Chinese who were advanced Japanese learners（14 women, 2 men） participated in the current experiment. These individuals did not participate in Experiment 1. At the time of the participation in this study, all participants were studying at a

Japanese university or graduate school, and had already passed the N1 level of the Japanese Language Proficiency Test. Their duration of stay in Japan ranged from 6 months to 4 years.

5.2.2 Experimental Design

A two-factorial design was used with the first factor consisting of two levels of the presentation language（Chinese or Japanese） and the second factor consisting of two levels （high or low）of phonological similarity. Both factors were within-subject factors.

5.2.3 Materials

Word materials were selected with criteria similar to Experiment 1. Only the words with high orthographical similarity were used. Twelve words each were selected for "Chinese words with high phonological similarity", "Chinese words with low phonological similarity," "Japanese words with high phonological similarity," and "Japanese words with low phonological similarity," resulting in a total of 48 words. These words were controlled for the levels of frequency based on Amano & Kondo (2000). A one-way ANOVA on the frequency of words in each condition revealed no statistically significant difference in the frequency among the conditions（F（3, 44）=0.41, p=.748, η^2 = .03）. We considered the frequency to be equivalent among these 4 types of words.

5.2.4 Apparatus

The apparatus was the same as in Experiment 1.

5.2.5 Procedures

The procedures were the same as in Experiment 1（See Figure 2）.

5.3 Results

We analyzed response times of the correctly answered "Yes" trials. Each participant's response time to error trials, trials with no response, and trials of unknown words were excluded from the analysis. The percentage of excluded trials was 3.68%.

A two-way ANOVA （see Figure 4） demonstrated that the main effect of presentation language was significant,（F（1, 15）=15.89, p = .001, η^2 = .03）, with shorter response time in the Chinese relative to Japanese language presentation condition. The main effect of the phonological similarity was not significant,（F（1, 15）=0.03, p=.858, η^2 = .00）. Given the significant interaction of presentation language and phonological similarity （F（1, 15）=8.33, p=.011, η^2 = .01）, simple effects were tested. The results indicated that in words with low phonological similarity, response time was shorter when the presentation language was Chinese than in Japanese,（F（1, 30）=23.87, p<.001, η^2 = .05）. In words with high phonological similarity, there was no statistically significant difference between the presentation languages, （F（1, 30）=0.93, p=.342, η^2 = .00）. Furthermore, words with high phonological similarity showed tendencies for longer response time than those with low similarity, both when they were Chinese （F（1, 30）=3.01, p=.093, η^2 = .01） and Japanese（F（1, 30）=4.05, p=.053, η^2 = .01）.

A two-way ANOVA was also performed

Table 3　Examples of word and non-word stimuli used in Experiment 2

Examples of Words（ For "Yes" Trials）			
Chinese words with high phonological similarity	教室	Japanese words with high phonological similarity	天気
	空气		散歩
	漫画		理由
Chinese words with low phonological similarity	作文	Japanese words with low phonological similarity	外国
	交通		学校
	生活		普通
Examples of Non-Words (For "No" Trials)			
们其　过叫		登陸　美凡	
谭与　见耸		円役　号定	

on the inverse sine transformed error ratios of each condition (see Table 4). There was no significant main effect of presentation language, （F（1, 15）=0.14, p=.718, η^2 = .00） and phonological similarity（F(1, 15)=1.31, p=.270, η^2 = .02）, or the interaction of the two（F（1, 15）=0.32, p=.581, η^2 = .00）.

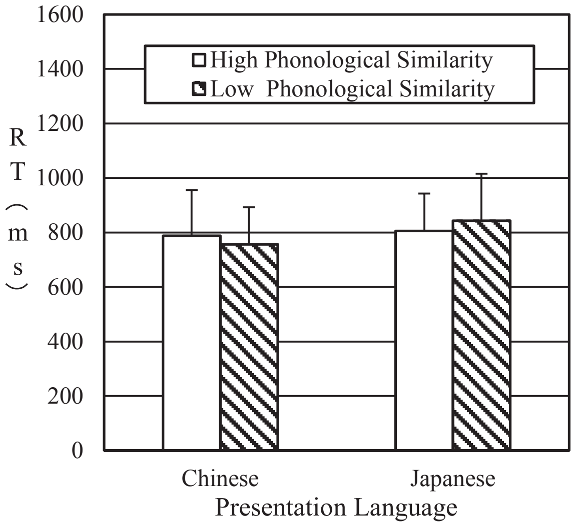

Figure 4. Average Response Times and Standard Deviations in Each of the Conditions of Experiment 2

Table 4 Error rates and standard deviations (*SD*) in each condition of Experiment 2

	Chinese with High Phono-logical Similarity	Chinese with Low Phono-logical Similarity	Japanese with High Phono-logical Similarity	Japanese with Low Phono-logical Similarity
Error rate（*SD*）	1.39（5.38）	1.94（5.13）	0.97（3.75）	0.97（3.75）

This indicated that there was no speed-accuracy trade-off where shorter response time conditions produced higher error rate.

Therefore, response times obtained in the current experiment were considered a valid reflection of time required for performing the task.

6. General Discussion

6.1 The processing of kanji/Chinese words

The current study examined the processing of Chinese（kanji）words in the Chinese and Japanese languages in Chinese native speakers who study the Japanese language, using a lexical judgment task. Experiments 1 and 2 investigated the effects of orthographical and phonological similarities on response times, respectively. The results demonstrated the following two points;（a）Regardless of the presentation language, orthographical similarity showed a facilitation effect as indicated by shorter response time, and response time in the L1 was faster than the L2 in words with low orthographical similarity only, （b）A suppression effect（i.e., longer response times）of phonological similarity was seen when the presentation was in the L1, a facilitation effect of phonological similarity was seen when the presentation was in the L2, and response time was faster in the L1 than in the L2 in words with low phonological similarity. These results indicate that orthographical and phonological similarities have different effects on the lexical judgment processing of the Chinese and Japanese kanji characters in native Chinese speakers who learn Japanese as the L2.

In Experiment 1, we examined the impact of orthographical similarity on the processing of Chinese and kanji characters. The experiment demonstrated that response times were shorter for words with greater orthographical similarity regardless of the presentation language, supporting Hypothesis 1-1. Furthermore, in words with greater orthographical similarity, there was no significant difference in response time between the L1 and L2, while in words with low orthographical similarity, response time was shorter for the L1 than for the L2, supporting hypothesis 1-2. These results support the proposition that orthographical representations are shared between the two languages in words with greater orthographical similarit（Matsumi et al., 2012）. The lack of difference in response times between the L1 and L2 in response to words with greater orthographical similarity presents direct evidence supporting the common orthographical representations. The current study and previous literature（Cai et al., 2011, Matsumi et al., 2012, Nagano & Matsumi, 2013, Matsumi et al., 2014）demonstrate that similar processing exists for the Chinese and Japanese languages for words with high orthographical similarity, regardless of the learner's Japanese proficiency. That is, orthographical similarity facilitated the accurate lexical judgment of Chinese words（L1）and kanji words（L2）.

In Experiment 2, we examined the effect of phonological similarity on the process of Chinese（kanji）words. The experiment demonstrated that faster response time in lexical judgment task was only observed in response to L1 relative to L2 words with low phonological similarity, which does not support hypothesis 2-1. In hypothesis 2-1, we predicted that response time would be shorter for the L1 relative to the L2 in words with high phonological similarity, but the experiment did not demonstrate a difference between the presentation languages. We speculate that in advanced learners of the Japanese language, the formation of phonological representations is greater for words with high phonological similarity relative to low phonological similarity. We used words with high orthographical similarity in Experiment 2. It may be that the formation of phonological representation was similar between the L1 and L2 for words with high phonological similarity, resulting in similar response times. Furthermore, hypothesis 2-2 was supported because the high phonological similarity words resulted in shorter response times when presented in the L2, and longer response times when presented in the L1. The suppression effect of phonological similarity in response to L1 words also supports the greater formation of L2 phonological representations in advanced learners of the Japanese language. This effect of phonological similarity on L1 processing is not observed in intermediate learners（Matsumi et al., 2014）but only in advanced learners. These results seem to indicate that L1 phonological representations are more activated in learners with low Japanese（L2）proficiency while L2 phonological representations are more activated in individuals with higher Japanese proficiency.

Why did orthographical similarity show a similar processing effect of Chinese/kanji characters in both the L1 and L2 while the effect of phonological similarity differed between the two languages? This may be because the extent of phonological representations and the direction of their activation depended on the levels of Japanese proficiency. It appears that it is easy for native Chinese speakers to discriminate orthographical information between the Chinese and the Japanese languages, while discriminating phonological information in a prompt manner may be more difficult.

6.2 The learning process of Japanese kanji words

What kind of learning process do Chinese native learners of the Japanese language go through in learning Japanese kanji words? Here, we discuss the learning process of kanji in Chinese native speakers by incorporating the current results with the past relevant studies.

Matsumi et al.（2012）pointed out that it is highly likely that intermediate learners of the Japanese language whose native language is Chinese would first read visually presented Japanese kanji words using the Chinese phonology. The results from the current study support Matsumi et al.'s proposition. While being at low or intermediate Japanese proficiency levels, Chinese native speakers tend to rely on orthographical information of the kanji words and ignore the phonological information. It can be inferred that these learners would covertly pronounce these kanji words using the L1 Chinese phonology, by looking at the orthographical information. Familiarity with the Japanese phonological representations would be low, and as a result the learners encounter a phenomenon of "I understand when I see but I cannot understand when I listen," which is uniquely experienced by Chinese native speakers. This indicates that improving the familiarity with the Japanese phonology is essential in the learning process of kanji words in beginning and intermediate learners.

As the learner's Japanese proficiency improves, they may continue to rely on the orthographical information of kanji words, but Japanese orthographical representations may become more accessible for words with low orthogonal similarity. We speculate that the tendency to study kanji words using the Chinese phonology would become weak as the learners progress from intermediate to advanced levels of Japanese proficiency and start to rely more on the Japanese phonological representations for kanji words. However, the learning process used during the beginning and intermediate levels of learning Japanese would continue to affect the processing of Japanese kanji words at advanced levels. This is also one of the phenomena uniquely experienced by learners of Japanese whose native language is Chinese.

The confluence of the current and the past studies demonstrate that Chinese native learners of the Japanese language utilize both Chinese orthographical and phonological information upon learning Japanese kanji words. This learning process may both positively and negatively affect Chinese native speakers in learning Japanese kanji words. In order to minimize the negative effect, attention needs to be given from the initial stage of learning the Japanese language.

7. Conclusion

The current study examined the processing of the Japanese kanji words by Chinese native learners of the Japanese language, as well as their learning process of kanji words. The study indicated that overt mastering of kanji words by Chinese native speakers may be accompanied by a cost. That is, at times, the previous learning process negatively impacts the processing of kanji words, which results in longer response times in processing those words. Studies examining the relationship between the word learning process and the processing of Japanese kanji words by Chinese native speakers are scarce, and more experimental studies are necessary.

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