Correspondence between the Korean and Mandarin Chinese pronunciations of Chinese characters: A comparison at the sub-syllabic level

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Abstract
This study explores the corresponding relationship of Chinese characters' pronunciations between modern Mandarin Chinese and modern Korean at the subsyllabic level and investigates the applicability of such correspondence in learning and reading Korean as a second language (L2) by native (L1) Mandarin Chinese speakers. Correspondence between Korean and Mandarin Chinese initial consonants and that between Korean -V(C) structures and Chinese finals were calculated based on the 1,800 Chinese characters for educational purposes in South Korea. Our results demonstrated that Korean initial consonants had either consistent or inconsistent correspondence with their Mandarin Chinese counterparts. In addition, this study proved that pure comparisons of vowels between the two languages are not reliable. Instead, the comparison between Korean -V(C) structures and Chines finals could be more practical. Ninety percent of the high frequency Chinese characters in Korean can be inferred to corresponding Chinese pronunciations based on the data provided in this study.

Key words
Chinese characters, Correspondence, Chinese, Korean, Korean as L2

1. Introduction

Due to historical cross-cultural communication between China and the Korean peninsula (Ebrey 1996), modern Korean language contains a large number of Chinese character-driven loanwords (Wang, Yeon, Zhou, Shu, & Yan 2016). These loanwords are called Sino-Korean words pronounced in Korean phonology and (typically) written in alphabetic Korean *Hangeul* (Wang et al. 2016). Sino-Korean words have the following distinctions from words in Mandarin Chinese. First, Sino-Korean words are not orthographically similar to Chinese characters. The Sino-Korean words are represented in a typical grapheme-phoneme correspondence in orthography (Pae, Kim, and Luo 2018), whereas Chinese orthography is comparatively deep in that the meaning or sound of each Chinese character may not be activated directly from visual input (Tan and Perfetti, 1999; Perfetti et al., 2013). Second, the mutually shared Sino-Korean words in Mandarin Chinese and Korean are not phonologically identical, although they have regular phonological corresponding relationship (see literature review).

According to the Bilingual Interactive Activation plus (BIA+) model (Dijkstra and Van Heuven 2002), when a bilingual individual or a second language learner visually processes printed words in the first language (L1) or the second language (L2), nonselective or parallel access to the target word will take place and cross-language neighboring words (i.e., loanwords) are activated (Dijkstra and Van Heuven 2002).The parallel access between L1 and L2 in the mental lexicon facilitates lexical processing and recognition and thus, loanwords serve as an important source for the investigation of bilingual reading.

In light of the above-mentioned features of Sino-Korean words, it is necessary to construct the phonologically corresponding relationship of Sino-Korean words between Mandarin Chinese and Korean because a phonological bridge that connects the two languages' shared words can compensate the lack of orthographic correspondence between the two languages and consequently facilitate the learning and teaching of Korean as an L2 for L1 Chinese speakers. In this sense, the present study aimed to investigate the corresponding relationship of Chinese characters' pronunciations between modern Mandarin Chinese and Korean and to discuss the practical use of such correspondence in teaching and reading Korean as an L2.

2. Literature review

Although it has been pointed out that certain Chinese initial consonants or vowels consistently correspond to their Korean counterparts when it comes to modern pronunciation of Chinese characters (Li 2003), such correspondence has yet to be fully quantified. Moon (2005) is one of the studies that attempted to quantify such corresponding relation. Based on 2,500 frequently used Chinese characters in mainland China, Moon (2005) compared and calculated the frequencies of Chinese initial consonants that correspond to Korean initial consonants in Chinese characters pronunciations. Some Korean initial consonants had comparatively straightforward corresponding relationship with their Chinese counterparts. For example, the Korean initial consonant ㄴ /n/ had a 100% correspondence rate with its Chinese counterpart /n/; ㄹ /r/ had a 99.3% correspondence rate with the Chinese consonant /l/. Other Korean initial consonants, on the other hand, had more complicated correspondence with Chinese consonants. For example, the Korean initial consonants ㄱ /g/ had 12 Chinese counterparts, among which /j/ and /g/ had the highest correspondence rates (38.7% and 26.7% respectively). Moon (2005) proposed that such quantified correspondence

between the two languages' initial consonants can help L1 Korean learners correct their Chinese pronunciation when they learn Chinese as an L2 and reduce negative transfer from their L1.

Im and Lee (2008) conducted a more comprehensive comparative study on Chinese character pronunciations in the two languages based on selected 824 Chinese characters used in Korean education as an L2. They investigated three types of correspondence: (1) Korean and Mandarin Chinese initial consonants, (2) Korean and Mandarin Chinese vowels, and (3) Korean rhymes in closed syllables and Chinese finals. Similar to Moon (2004)'s results, some Korean consonants had a more consistent corresponding relationship with their Chinese counterparts than others. In addition, Im and Lee (2008) revealed such correspondence in vowels. A small proportion of Korean vowels corresponded to their Chinese counterparts consistently. For example, ㅛ /yo/ consistently corresponded to Chinese /iao/ (100%). Other Korean vowels had less consistent correspondence with their Chinese counterparts. For example, ㅐ /ae/ had five Chinese counterparts: /ai/ (51.24%), /ei/ (12.94%), /a/ (12.44%), /ui/ (9.95%), and /ie/ (8.46%). The authors claimed that the results were able to facilitate word learning and understanding for L1 Chinese learners who learn Korean as an L2.

A recent study by Luo, Yang, and Sun (2018) further explored the corresponding relation between the two languages' Chinese characters pronunciations at the syllabic level. Based on the 1,800 frequently used Chinese characters in South Korea, Luo et al. (2018) found that a total of 409 Korean syllables were used to represent Chinese characters pronunciations in Korean. They formed what Luo et al. (2018) refer to as 'Chinese character families' based on these Korean syllables, each of which represented a family of Chinese characters that were pronounced identically in Korean. Within each family, the authors further clustered family members into subgroups based on their Mandarin Chinese pronunciations without considering tones. For example, the 신 /sin/ family contained ten members: (身, 神, 申, 伸, 愼), (新, 信, 辛), (臣, 晨) and they were pronounced identically as 신 /sin/ in Korean. They were clustered into three subgroups (marked by different parentheses) based on their Mandarin pronunciations: /shen/, /xin/, and /chen/.

Subsequently, Luo et al. (2018) calculated Korea-Chinese syllable correspondence rate (K-C rate). K-C rate was defined as the ratio between the number of family members in each subgroup and the total number of members in a Chinese character family. For example, in the 신 /sin/ family, the 신 /sin/-/shen/ pair had a K-C rate of 0.5 (= 5/10); 0.3 for the 신 /sin/-/xin/ pair and 0.2 for the 신 /shin/-/chen/ pair. Luo et al. (2018) suggested that attention should be paid to K-C pairs with K-C rates lower than 0.5 when teaching Sino-Korean words to native Chinese speakers.

3. Research gap and research questions

Since Im and Lee (2008)'s study only focused on Sino-Korean words in Korean education as an L2, the selected 824 Chinese characters might not suffice to equip L1 Chinese learners of Korean with enough Chinese characters' corresponding knowledge. On the other hand, while we agree with the choice of 1,800 Chinese characters used by L1 Korean users in Luo et al. (2018), their study did not justify the difference between the comparison at the syllabic and subsyllabic levels, and which level of comparison is more suitable for L1 Chinese learners of Korean in order to infer unlearned Sino-Korean words' pronunciations in Mandarin Chinese.

The present study attempted to investigate the corresponding relation between the Korean and Mandarin Chinese pronunciations of Chinese characters at the subsyllabic level with a more

complete set of the 1,800 Chinese characters used in Luo et al. (2018) which were optimized to evaluate the predicting effectiveness of the corresponding relation at the subsyllabic level.

It is worth noting that in this study, the concept of "comparison at the subsyllabic level" was further divided into two categories: initial consonant correspondence and "Korean -V(C) and Chinese final" correspondence. We did not compare Korean vowel and Chinese vowel correspondence directly because Korean and Chinese adopt different syllabic structures. Korean adopts a "consonant-vowel-consonant (CVC)" structure (Pae 2018:343), while the syllable structure of Chinese is traditionally identified as an "initial-final" structure (Třísková 2011:99). The initial, known as *shēngmǔ* (声母), is a consonant in the initial position while the final is named as *yùnmǔ* (韵母), which refers to the remaining part of a syllable besides the initial (Třísková 2011). The subsyllabic unit open for direct comparison between Korean and Mandarin Chinese is the initial consonant. For the rest, direct vowel to vowel and final consonant to final consonant comparisons are difficult. A major reason is that some Korean final consonants (e.g., ㄱ /k/, ㄹ /l/, ㅁ /m/, ㅂ /p/) in closed syllables do not exist in Mandarin Chinese. As a result, Im and Lee (2008) proposed to compare Korean rhyme or "-VC" structure (the rest parts in a syllable besides the initial consonant) and Mandarin Chinese finals instead.

This study is a replication of Im and Lee (2008)'s study with different research materials. The following research questions guided this study:

(1) What is the correspondence rate between the Korean and Chinese initial consonants with regards to the modern pronunciations of Chinese characters in the two languages?
(2) What is the correspondence rate between the Korean -V(C) structures and Chinese finals with regards to the modern pronunciations of Chinese characters in the two languages?
(3) To what extent can the data in this study help L1 Chinese learners of Korean infer Korean syllable's corresponding Mandarin Chinese pronunciations in Sino-Korean words?

4. Research methods

4.1 Research material

Same as Luo et al. (2018), 1,800 Chinese characters from the list of *Basic Hanja for Educational Use* (**교육용기초한자**(教育用基礎漢字)) issued by the Ministry of Education and Human Resources Development in South Korea were used for analysis.

4.2 Research method

The present study replicated Im and Lee (2008)'s research method. First, all 1,800 Chinese characters were categorized according to the initial consonant when rendered in Korean. Second, within each group, we further identified these Chinese characters' initial consonants in Mandarin Chinese. Third, we counted the frequency of different Mandarin Chinese initial consonants (F(M)) that correspond to a given Korean initial consonant and the total frequency of such Korean initial consonant (F(K)). Fourth, we calculated the Korean-Chinese initial consonant correspondence rate ((F(M)/(F(K)). The calculation was repeated for calculating the Korean -V(C) structure-Chinese final correspondence rate.

5. Results

5.1 Korean-Chinese initial consonant correspondence rates

The correspondence rates between Korean and Mandarin Chinese initial consonants in Chinese character pronunciation are demonstrated below in Table 1. In the first and fifth column, each Korean initial consonant is listed in Hangeul followed by a Romanized version of that phoneme. The romanization system used is based on the *Revised Romanization of Korean* issued in South Korea. Following each Korean consonant are their corresponding Mandarin Chinese initial consonants and respective correspondence rates. In this study, all Chinese phonemes are presented in *Hanyu Pinyin Romanization* as used in People's Republic of China. We only demonstrated the top four Mandarin Chinese initial consonants with the highest correspondence rates because low correspondence rate is unlikely to help with Korean leaners' word reading and learning.

Table 1. Korean-Chinese initial consonant correspondence rates

Korean cons.	Chinese consonants and correspondence rates (%)				Korean cons.	Chinese consonants and correspondence rates (%)			
ㄱ /g/	/j/ (42)	/g/ (26.5)	/q/ (17)	/k/ (11)	ㄴ /n/	/n/ (95.8)	/l/ (4.2)		
ㄷ /d/	/d/ (66.3)	/t/ (32.5)	/ch/ (1.3)		ㄹ /r/	/l/ (100)			
ㅁ /m/	/m/ (76.3)	/w/ (23.7)			ㅂ /b/	/f/ (47.8)	/b/ (37)	/p/ (14.5)	/m/ (0.7)
ㅅ /s/	/sh/ (47.3)	/x/ (23)	/s/ (18)	/ch/ (7.9)	ㅇ null	/y/ (65.6)	/w/ (13.7)	/r/ (11.1)	null (6.5)
ㅈ /j/	/zh/ (38)	/z/ (20.1)	/j/ (11.1)	/d/ (10.3)	ㅊ /ch/	/ch/ (26.6)	/c/ (17.7)	/zh/ (15.3)	/q/ (14.5)
ㅋ /k/	/k/ (100)				ㅌ /t/	/t/ (63.2)	/d/ (21.1)	/zh/ (10.5)	/z/ (5.3)
ㅍ /p/	/b/ (58.2)	/p/ (30.9)	/f/ (10.9)		ㅎ /h/	/h/ (55.8)	/x/ (36.1)	/g/ (2.7)	/k/ (2.0)

5.2 Korean -V(C) structure-Chinese final correspondence rates.

The correspondence rates between the Korean -V(C) structures and Mandarin Chinese finals are illustrated in Table 2. In the first and fifth column, each Korean -V(C) structure is listed in Hangeul followed by a Romanized version of the included phonemes. Following each Korean -V(C) structure, the corresponding Chinese finals and respective correspondence rates are listed. Again, we only included the top four Chinese finals with the highest correspondence rates here.

Table 2. Korean -V(C) structure-Chinese final correspondence rates

Korean -V(C)	Chinese finals and correspondence rates (%)				Korean -V(C)	Chinese finals and correspondence rates (%)			
아 /a/	/i/ (36.7)	/ia/ (14.4)	/e/ (14.4)	/a/ (13.3)	악 /ak/	/uo/ (32.6)	/o/ (18.6)	/e/ (14)	/üe/ (14)
안 /an/	/an/ (72.9)	/uan/ (12.9)	/ian/ (11.4)	/en/ (2.9)	알 /al/	/a/ (53.8)	/e/ (15.4)	/uo/ (15.4)	/ie/ (7.7)

암 /am/	/an/ (73.1)	/ian/ (26.9)		
앙 /ang/	/ang/ (67.4)	/iang/ (19.6)	/uang/ (12)	/eng/ (1.1)
애 /ae/	/ai/ (69.1)	/ei/ (17.6)	/ie/ (4.4)	/ui/ (2.9)
앵 /aeng/	/eng/ (70.0)	/ing/ (20.0)	/ang/ (10.0)	
약 /yak/	/üe/ (57.1)	/uo/ (28.6)	/iao/ (14.3)	
어 /eo/	/ü/ (54.3)	/u/ (22.9)	/i/ (20.0)	/e/ (2.9)
언 /eon/	/ian/ (54.3)	/an/ (21.7)	/üan/ (13.0)	/uan/ (10.9)
엄 /eom/	/ian/ (73.3)	/an/ (26.7)		
엉 /eong/	/ing/ (62.9)	/eng/ (34.3)	/en/ (2.9)	
여 /yeo/	/ü/ (66.7)	/u/ (16.7)	/i/ (16.7)	
연 /yeon/	/ian/ (84.0)	/üan/ (10.0)	/an/ (4.0)	/uan/ (2.0)
염 /yeom/	/ian/ (85.7)	/an/ (14.3)		
영 /yeong/	/ing/ (83.0)	/iong/ (7.5)	/eng/ (7.5)	/ong/ (1.9)
오 /o/	/u/ (48.1)	/ao/ (39.3)	/iao/ (8.9)	/ou/ (1.5)
온 /on/	/un/ (94.1)	/en/ (5.9)		
옹 /ong/	/ong/ (80.8)	/eng/ (17.3)	/iong/ (1.9)	
왁 /wak/	/uo/ (75.0)	/üe/ (25.0)		
왈 /wal/	/üe/ (50.0)	/uo/ (50.0)		
왜	/ua/	/uo/	/uai/	

압 /ap/	/a/ (50)	/ia/ (30)	/e/ (10)	/uo/ (10)
액 /aek/	/e/ (58.8)	/ai/ (29.4)	/o/ (5.9)	/uo/ (5.9)
야 /ya/	/ie/ (100.0)			
양 /yang/	/iang/ (90.5)	/ang/ (9.5)		
억 /eok/	/i/ (82.8)	/e/ (6.9)	/ai/ (3.4)	/ei/ (3.4)
얼 /eol/	/e/ (31.3)	/ie/ (31.3)	/a/ (12.5)	/üe/ (12.5)
업 /eop/	/ie/ (57.1)	/e/ (28.6)	/a/ (14.3)	
에 /e/	/i/ (80.0)	/u/ (8.0)	/ui/ (8.0)	/ai/ (4.0)
역 /yeok/	/i/ (77.8)	/e/ (16.7)	/ü/ (5.6)	
열 /yeol/	/ie/ (56.3)	/üe/ (37.5)	/e/ (6.3)	
엽 /yeop/	/ie/ (100.0)			
예 /ye/	/i/ (59.4)	/ui/ (15.6)	/ie/ (12.5)	/ei/ (6.3)
옥 /ok/	/u/ (77.3)	/ü/ (13.6)	/ao/ (4.5)	/uo/ (4.5)
올 /ol/	/u/ (66.7)	/o/ (16.7)	/uo/ (16.7)	
와 /wa/	/uo/ (45.5)	/ua/ (36.4)	/e/ (18.2)	
완 /wan/	/uan/ (100.0)			
왕 /wang/	/uang/ (100.0)			
외	/ui/	/uai/	/ao/	/ai/, /ei/

/wae/	(50.0)	(25.0)	(25.0)	
왹 /oek/	/uo/ (50.0)	/ua/ (50.0)		
요 /yo/	/iao/ (93.1)	/ao/ (3.4)	/u/ (3.4)	
용 /yong/	/iong/ (60.0)	/ong/ (40.0)		
욱 /uk/	/u/ (52.4)	/ü/ (19.0)	/uo/ (9.5)	/o/ (9.5)
울 /ul/	/u/ (70.0)	/ü/ (20.0)	/o/ (10.0)	
웅 /ung/	/ong/ (66.7)	/eng/ (22.2)	/iong/ (11.1)	
월 /wol/	/üe/ (100.0)			
위 /wi/	/ui/ (84.0)	/ü/ (8.0)	/iu/ (4.0)	/ou/ (4.0)
육 /yuk/	/ü/ (25.0)	/iu/ (25.0)	/ou/ (25.0)	/u/ (25.0)
율 /yul/	/ü/ (66.7)	/i/ (33.3)		
윽 /euk/	/e/ (55.6)	/i/ (33.3)		
을 /eul/	/i/ (100.0)			
읍 /eup/	/i/ (91.7)	/ei/ (8.3)		
의 /ui/	/i/ (100.0)			
익 /ik/	/i/ (91.7)	/e/ (8.3)		
일 /il/	/i/ (100.0)			
입 /ip/	/i/ (80.0)	/u/ (20.0)		

/oe/	(47.4)	(31.6)	(10.5)	(5.3)
욍 /oeng/	/eng/ (100.0)			
욕 /yok/	/ü/ (75.0)	u (25.0)		
우 /u/	/ou/ (30.4)	/u/ (28.0)	/iu/ (16.8)	/ü/ (12.8)
운 /un/	/ün/ (41.2)	/un/ (35.3)	/en/ (23.5)	
움 /um/	/in/ (100.0)			
원 /won/	/üan/ (100.0)			
웨 /we/	/ui/ (100.0)			
유 /yu/	/iu/ (53.6)	/ui/ (14.3)	/u/ (7.1)	/ü/ (7.1)
윤 /yun/	/un/ (66.7)	/ün/ (33.3)		
융 /yung/	/iong/ (66.7)	/ong/ (33.3)		
은 /eun/	/in/ (77.8)	/en/ (22.2)		
음 /eum/	/in/ (100.0)			
응 /eung/	/eng/ (83.3)	/ing/ (12.5)	/en/ (4.2)	
이 /i/	/i/ (80.8)	/ei/ (15.4)	/er/ (2.9)	/ü/ (1.0)
인 /in/	/in/ (50.0)	/en/ (50.0)		
임 /im/	/en/ (50.0)	/in/ (43.8)	/ün/ (6.3)	
잉 /ing/	/eng/ (60.0)	/ing/ (20.0)	/in/ (20.0)	

5.3 Predicting effectiveness of the correspondence rates

In order to answer the question of to what extent the data provided above can help L1 Chinese learners of Korean predict or infer the pronunciation of Sino-Korean words, we selected 10 Chinese characters with the highest frequencies that appeared in the *Standard Korean Language Dictionary* (Nam 1999) and tested the accuracy and predictability of the preliminary data.

The 10 Chinese characters with the highest frequencies were 法 (법), 學 (학), 性 (성), 大 (대), 子 (자), 物 (물), 地 (지), 人 (인), 動 (동), 生 (생) (Nam 1999). Based on the pronunciations of these characters in Korean, we listed all the possible Mandarin Chinese pronunciations that may correspond to a certain target Korean syllable by combining that syllable's corresponding initial Chinese consonants and finals. Then, we calculated each Chinese pronunciation's corresponding likelihood by multiplying the initial consonant's correspondence rate by the final's correspondence rate. For example, the pronunciation of the Chinese character 物 in Korean is 물 /mul/, which consists of the Korean consonant ㅁ /m/ and the Korean -VC structure 울 -/ul/. As shown in Table 1 above, ㅁ /m/ corresponds to Chinese /m/ (76.3%) and /w/ (23.7%), while Table 2 illustrates that 울 (-ul) corresponds to Chinese /u/ (70%), /ü/ (20%), and /o/ (10%). The possible Chinese pronunciations corresponding to 물 /mul/ and their chances of correspondence were thus "mu" (53.4%), "wu" (16.6%), and "mo" (7.6%). The results of the predicting effectiveness testing are listed in Table 3.

Table 3. A test of predicting effectiveness of the correspondence rates

Chinese characters with Korean readings		Predicted Mandarin Chinese Pronunciation Likelihood (%)			
		Primary	Secondary	Tertiary	Quaternary
法	법 /beop/	/bie/ (21.1)	/pie/ (8.4)	**/fa/ (6.8)**	/ba/ (5.3)
學	학 /hak/	/huo/ (18.2)	**/xue/ (7.8)**	/he/ (7.8)	/hai/ (2.6)
性	성 /seong/	/sheng/ (16.2)	**/xing/ (14.5)**	/seng/ (6.2)	/cheng/ (2.7)
大	대 /dae/	/dai/ (45.8)	/tai/ (22.5%)	/die/ (2.9)	/dui/ (1.9)
子	자 /ja/	/zhi/ (13.9)	**/zi/ (7.4)**	/zhe/ (5.5)	/zha/ (5.1)
物	물 /mul/	/mu/ (53.4)	**/wu/ (16.6)**	/mo/ (7.6)	
地	지 /ji/	/zhi/ (30.7)	/zi/ (16.2)	/ji/ (9.0)	**/di/ (8.3)**
人	인 /in/	/yin/ (32.8)	**/ren/ (5.55)**	/en/ (3.25)	/nin/, /nen/ (0.55)
動	동 /dong/	**/dong/ (53.6)**	/tong/ (26.3)	/deng/ (11.5)	/teng/ (5.6)
生	생 /saeng/	**/sheng/ (33.1)**	/seng/ (12.6)	/cheng/ (5.5)	/shang/ (4.7)

In Table 3, Chinese pronunciations and percentages in bold indicate the correct Mandarin Chinese pronunciation with regard to a given Korean syllable. These results demonstrate that the data in section 5.1 and 5.2 were useful for predicting the corresponding Chinese pronunciations of

the 10 Chinese characters. However, only two out of 10 (20%) Chinese character's Chinese pronunciation could be inferred as the primary inferences. Five out of 10 (50%) were secondary inferences. One (10%) was tertiary inference and another one (10%) was quaternary inference. One out of 10 (10%) could not be inferred based on the data in Sections 5.1 and 5.2. (대 /dae/).

6. Discussion

The purpose of this study is to quantify the corresponding relation between the Korean and Mandarin Chinese pronunciations of Chinese characters at the subsyllabic level. Correspondence between initial consonants and that between Korean -V(C) structures and Chinese finals were conducted. The results provided useful information for learning and understanding Sino-Korean words by Chinese-speaking Korean learners.

The corresponding relation between the Korean and Mandarin Chinese initial consonants demonstrated the following features. Different Korean initial consonants have varying numbers of Mandarin Chinese consonants to correspond to, ranging from 1 to 11. We refer to the Mandarin Chinese initial consonants with the highest correspondence rate as "primary consonants." Nine out of the 14 Korean initial consonants had primary Mandarin Chinese counterparts that had a correspondence rate higher than 50%, indicating a comparatively consistent correspondence relationship. Five Korean initial consonants had primary Mandarin Chinese counterparts whose correspondence rates were lower than 50%, indicating comparatively inconsistent correspondences between these Korean and Mandarin Chinese initial consonants.

The results are consistent with Im & Lee (2008)'s conclusion that the Korean initial consonants did not necessarily have high correspondence rates with their phonologically similar counterparts in Mandarin Chinese. For example, ㄱ /g/ had a higher correspondence rate with Chinese /j/ instead of Chinese /g/; ㅂ /b/ had more chance to correspond to Chinese /f/ rather than Chinese /b/; ㅅ /s/ had a much higher correspondence rate with Chinese /sh/ than /s/. This conclusion is in accordance with Im and Lee (2008)'s results and indicates that similarity is not as reliable as correspondence relationship. L1 Chinese learners of Korean who rely on similarity in Chinese characters' pronunciations between the two languages are perhaps likely to experience negative transfer from their L1.

Our data was in congruence with Im & Lee (2008) that it is reasonable to compare Korean -V(C) structures and Chinese finals instead of purely comparing Korean and Chinese vowels. For example, the Korean vowel 아 /-a/ mostly corresponded to Chinese /-i/. When it was followed by a final consonant (e.g., 악 /-ak/), it no longer corresponded to /-i/. Another example is 요 /-yo/, which mainly corresponded to Chinese /-iao/. However, when 요 /-yo/ was followed by the final consonant ㄱ /-k/ and became 욕 /-yok/, it corresponded to /-ü/ and /-u/ only.

Different from Im & Lee (2018), we provided a broader and more complete picture of initial consonant correspondence and Korean -V(C)-Chinese final correspondence. Moreover, we tested the correspondent rates' effectiveness regarding inferring Chinese characters' pronunciations in Mandarin Chinese based on their pronunciations in Korean. Even though the token size is small, the selected 10 Chinese characters have the highest frequencies in Korean dictionary. The data in this study provided a phonological bridge that connects the shared words in Mandarin Chinese and Korean and compensated for the disadvantage of lacking orthographic similarity between the two languages. Thus, it sheds light on L2 Korean pedagogy and reading strategies. For example, when

Chinese learners of Korean first see the Sino-Korean words 동물 (動物, *dong-mul*, 'animal'), they can rely on data like that in this study to infer that this word's corresponding Mandarin Chinese pronunciation might be *dong-mu*, *dong-wu*, *dong-mo*, *tong-mu*, and so on, among which *dong-wu* makes the most sense and means 'animal' in Mandarin Chinese. This example explained that this study can be used as a handy reference by Chinese learners to learn and infer Sino-Korean words' meaning.

When comparing this study to that of Luo et al. (2018), it is possible to see that correspondence at both the syllabic and subsyllabic levels has their own advantages and disadvantages. In the current study, one of the advantages was that the correspondence at the subsyllabic level is convenient and efficient for learners to master and use. If learners know a Korean consonant's corresponding Chinese consonants, they can infer the corresponding Chinese pronunciations of any Sino-Korean words that start with this Korean consonant. However, correspondence at the subsyllabic level may skew Korean-Chinese syllable correspondence rate. For example, in this study, the 법 /beob/-/fa/ correspondence had a correspondence rate of 6.8% only but actually the 법 /beob/ has a 100% correspondence rate with the Chinese /fa/. By contrast, the correspondence at the syllable level has an accurate correspondence rate between the Korean and Chinese syllables, but there is too much information, making it difficult to master. Hence, we suggest that a combination of both syllabic and subsyllabic correspondence between Korean and Mandarin Chinese could be more helpful for L1 Chinese learners of Korean.

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