Comparison of initial and final endings in Sino-Korean, Mandarin, and Cantonese

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Abstract

The Korean language has "Sino-Korean" words originally written in Chinese characters and that have approximately the same meaning in both Chinese and Korean. The pronunciations of Sino-Korean words correspond to modern Mandarin and Cantonese pronunciation in certain ways. In this paper, we explore how initial and final endings of Sino-Korean, Mandarin, and Cantonese correspond to each other. This comparison allows us to see certain details in the history of the phonologies of both Chinese and Sino-Korean and to learn something about how both languages may have been pronounced in the past.

Introduction

Within the Korean language, there exist many Sino-Korean words. A "Sino-Korean" word is a word that has approximately the same meaning in Chinese and in Korean, having originated as a word borrowed from Chinese. Scholars cannot be certain when these words – and the characters representing them – were first adopted in Korean. However, most scholars agree that around the time of the Chinese Han dynasty (206BC-AD220), Koreans imported Chinese characters for use as their own writing system (Kim 1983, p. 121). Many scholars presume that the pronunciations of Sino-Korean words are borrowed from Middle or Medieval Chinese (AD 25-907) (Chen 1999, p. 2). Therefore, many Sino-Korean words correspond closely to Middle Chinese not only in meaning, but in pronunciation – their phonological structure – as well.

The objective of this paper is to examine the extent to which modern Sino-Korean words preserve features of Middle Chinese phonology and how modern Sino-Korean pronunciation corresponds to that of modern Standard Chinese. In order to probe the relationship with the Chinese language more deeply, it is useful to compare Korean to the two modern forms of Chinese, Mandarin and Cantonese. The reason is that in the development of Cantonese and Mandarin, Cantonese preserves many features of Middle Chinese that were lost in Mandarin.

This paper explores the phonological differences and similarities between the Chinese and Korean languages. In this paper all Korean Romanization is written in accordance with the Romanization rules published by the Ministry of Culture and Tourism. The Mandarin Chinese Romanization is written in Pinyin, and the International Phonetic Alphabet (IPA). Cantonese is written in IPA.

Phonology of Korean

The Korean language has more than 3,000 different syllables (Kim 1983, p. 122), while Chinese has 400 syllables, excluding tones, or 1300 syllables including tones (Taylor 1995, p. 190). Korean, unlike Chinese, has no distinction of tone. However, Korean has a distinction between the lengths of certain vowels. When Sino-Korean assimilated in Korean, it used the most similar native Korean pronunciations and lost the pronunciations that did not exist in Korean. Later these Sino-Korean words changed their pronunciations according to developments in Korean phonology (see below).

The Korean sound system uses 31 phonemes: 19 consonants- *g (k), kk, k, d (t), tt, t, b(p), pp, p, j, jj, ch, s, ss, h, n, m, ng* and *r (l)*; 10 vowels-*a, eo, o, u, eu, i, ae, e, oe,* and *wi*. Korean also has semi vowels such as *ya, yeo, yo, yu, yae, ye, wa, wae, wo, we,* and *ui* (http://www.korean.go.kr/index2.html). Korean stops are voiceless but have a contrast between aspirated and unaspirated or between tense and lax (Taylor 1995, p. 189). Aspiration is pronounced with the release of breath, as the breath in English h of "he" (American Heritage Dictionary, p. 49). The tense consonant is produced with great muscle tension by tightening the throat while a lax consonant does not involve great muscle tension. The Korean language combines its phonemes into six basic syllable structures, for example, V (Vowel), CV (Consonant-Vowel), VC, CVC, VCC, and CVCC (Taylor 1995, p. 190).

After several centuries of using the borrowed Chinese writing system, Korea also acquired an indigenous alphabetic system, called Hankul, which was invented in the 15th century by a Korean king (Lee and Ramsey 2000, p. 13; Taylor and Taylor 1995, p. 211). The Chinese writing system is a logographic one, in which the sound values of characters are not indicated in a way that is as direct, explicit, and decomposable as in an alphabet based, phonographic system (Chen 1999, p.12). This resulted in a number of limitations and inconveniences in the use of Chinese characters to write Korean. Hankul, a phonographic system that serves as both a supplement and alternative to writing with Chinese characters in Korea, handily remedied these problems. After the development of Hankul, Sino-Korean words could then be written either with the original Chinese characters or phonetically with Hankul, while native Korean vocabulary came to be written only in Hankul.

Although Hankul is very simple in design, it is nevertheless not easy to spell correctly in Korean. The reason is that Korean words and parts of Korean words – in both native Korean and Sino-Korean vocabulary – often change the way they sound depending upon the context in which the words are used (Martin 1992, p. 7).

Therefore, it is not uncommon for foreigners and others learning the language to misspell Korean words when they use Hankul. For example, when certain Korean consonants occur with other consonants, they assimilate and change to pronunciations different from those indicated by the written Hankul forms.

These kinds of changes in pronunciation are usually due to developments in Korean phonology that took place subsequent to the time when the Hankul spellings were fixed. The Hankul spellings thus represent more archaic pronunciations and help to show more clearly the origin and adaptation of Chinese sounds. Consequently, this paper focuses on only the Korean spelling pronunciations (and not the modern colloquial pronunciations), as the written Hankul pronunciations provide important historical information in our comparison of Sino-Korean, Mandarin, and Cantonese.

Table 1. Korean consonants*

Manner	**Place**				
	Bilabial	Alveolar	Post-Alveolar	Velar	Glottal
Plosive	p(ㅃ)p^h(ㅍ)b(ㅂ)	t(ㄸ)t^h(ㅌ)d(ㄷ)		k(ㄲ)k^h(ㅋ)g(ㄱ)	
Nasal	m(ㅁ)	n(ㄴ)		ŋ(ㅇ)	
Fricative		s(ㅆ)z(ㅅ)	c(ㅉ)c^h(ㅊ)ɟ(ㅈ)		h(ㅎ)
Lateral		l(ㄹ)			

* from Handbook of the International Phonetic Association (1999, p.120-121)

Table 2. Korean vowels

Monophthongs		Diphthongs	
IPA	Hankul	IPA	Hankul
I	ㅣ	je	ㅖ
e	ㅔ	jɛ	ㅒ
ɛ	ㅐ	ja	ㅑ
a	ㅏ	wi	ㅟ
O	ㅗ	we	ㅞ
u	ㅜ	wɛ	ㅙ
ʌ	ㅓ	wɑ	ㅘ
ɯ	ㅡ	ɯi	ㅢ
ø	ㅚ	jo	ㅛ
		ju	ㅠ
		jʌ	ㅕ
		wʌ	ㅝ

Phonology of Mandarin (Standard Chinese 普通話)

Individual Chinese syllables are divided into three parts: an initial, a final, and a tone. Within China, Mandarin is spoken throughout all of the North and Southwestern regions. This dialect is spoken by more than two-thirds of the Chinese people (Ramsey 1987, p. 87). Standard Chinese is based on Mandarin. There are twenty-one initial consonants in Mandarin. The final, the part of the Chinese syllable following the initial consonants, has three parts: a main vowel, medial vowel and ending. A medial vowel starts with the sounds *i-*, *u-* or *iu-*. The endings, *-n, -ng* or *-r*, come after the main vowel. Mandarin has four tones; 1st tone high-level (55), 2nd tone high-rising (35), 3rd tone low-dipping (214), and 4th tone high falling (51) (Chao 1968, p. 25-26). Mandarin also has a so-called "neutral tone," which refers to the absence of tonal contour on certain unstressed syllables.

Table 3. Mandarin initials*

Place	Manner				
	Voiceless Unaspirated	Voiced Aspiratedr	Nasal	Fricative	Lateral/ Approximate
Labial	b [p]	p [p^h]	m [m]	f [f]	
Alveolar	d [t]	t [t^h]	n [n]		l [l]
Alveolar- fricative	z [ts]	c [ts^h]		s [s]	
Retroflex	zh [tʂ]	ch [$tʂ^h$]		sh [ʂ]	r [ʐ]
Pre-palatal	j [tɕ]	q [$tɕ^h$]		x [ɕ]	
Velar	g [k]	k [k^h]		h [x]	

* from Handbook of the International Phonetic Association 1999 p.58-59

Phonology of Cantonese

Cantonese (the Yue Dialect) reflects more Middle Chinese features than Mandarin. Cantonese has 19 initial consonants. There is more nasality in Cantonese than in Mandarin. Cantonese has preserved the nasal consonant *ng-* and *m-* where Mandarin has historically lost it (Ramsey 1987, p. 101).

Cantonese has completely nasal syllables, in which m and ng function as vowels. Cantonese has seven vowel phonemes: *i, e, a, u, o, ü,* and *ö*. A characteristic of Cantonese is that a difference in length can change the quality of the vowel. For example the vowel *a* can be pronounced long as in [ka:m] meaning 'to feel' and can be pronounced short as in [kam] meaning 'brocade' (Ramsey 1987, p. 102). Korean also has this feature. For example, in Korean *a* is pronounced long in [ba:m] meaning 'chestnut' and short in [bam] meaning 'night.'

Table 4. Initials in Cantonese*

Manner	**Place**								
	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Palatal	Velar	Labial-Velar	Glottal
Plosive	p p^h			t t^h			k k^h	k^wk^{wh}	
Affricate				ts ts^h					
Nasal	m			n			ŋ		
Fricative		f		s					h
Approximant						j		w	
Lateral Approximant			l						

* from Handbook of the International Phonetic Association 1999 p.58-59

Table 5. Cantonese finals*

Monophthongs		Diphthongs	
i	iː	ai	aːi
y	yː	ɐi	
ɛ	ɛː	au	aːu
œ	œː	ɐu	
a	aː	ei	
ɔ	ɔː	ɛu	ɛːu
u	uː	ɵy	
I		ɔi	ɔːi
ɵ		ui	uːi
ɐ		iu	iːu
ʊ		ou	

* from Handbook of the International Phonetic Association 1999 p.58-59

Cantonese has more endings that Mandarin. The endings within Mandarin are usually nasal endings, *-n* and *-ng*. Cantonese has the endings *-p, -t*, and *-k* and the nasal ending *-m, -n*, and *-ng*. This feature of Cantonese creates more connection between Korean and Cantonese. Korean has more endings than either Mandarin or Cantonese.

Method Used to Compare Korean with Mandarin and Cantonese

The Sino-Korean words that are used in this study have been selected from Korean and Chinese dictionaries. We asked for the aid of two people, one fluent in Mandarin and one fluent in Cantonese. We asked them to read from the list of pre-selected words in their respective tongues and to cross out the Sino-Korean words that do not make sense in Mandarin or Cantonese. The purpose of this experiment was to collect Sino-Korean words that are used in Modern Chinese. The next step was to group the words with similar pronunciations. Below Sino-Korean, Mandarin, and Cantonese are written in Korean Romanization, Pinyin, and the International Phonetic Alphabet (IPA), respectively. The last process of this research was to analyze each group and find the similarities between Sino-Korean and the two Chinese dialects. (Sino-Korean has no tones and therefore tones will not be discussed in this paper.)

Final Correspondences

In Modern Sino-Korean there are seven final endings [n], [l], [p], [ŋ], [m] and [k]. Modern Mandarin has preserved two final endings [n] and [ŋ]. Cantonese has seven final endings [n], [t], [p], [ŋ], [m], and [k]. As shown in the above chart, Korean, Mandarin and Cantonese finals [n] and [N] correspond exactly. The final endings [p], [m], and [k] of Sino-Korean and Cantonese have completely disappeared from modern Mandarin.

Table 6. Final Correspondences

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[zero]			[zero]		[zero]	
가사	gasa	[gaza]	家事	*jia1shi4*	[tɕia1ʂʅ5]	[kɐ1si6]	housework
	[n]			[n]		[n]	
간단	*gandan*	[ga:ndan]	簡單	*jian3dan1*	[tɕiɛn3tan1]	[ka:n2ta:n1]	shortness
	[l]			[zero]		[t]	
강렬	*gangryeol*	[ganglj∧l]	强烈	*qiang2lie4*	[tɕʰiang2liə5]	[kʃŋ4lit8]	severe
	[b,p]			[zero]		[p]	
응급	*eunggeup*	[ɯŋgɯb]	應急	*ying4ji2*	[jing5tɕi2]	[jing1kɐp7b]	emergency
	[ŋ]			[ŋ]		[ŋ]	
인상	*insang*	[inzaŋ]	印象	*yin4xiang4*	[jin5ɕiaŋ5]	[jɐn1dzʃŋ6]	impression
	[m]			[n]		[m]	
임시	*imsi*	[imzi]	臨時	*lin2shi2*	[lin2ʂʅ2]	[lɐm4si4]	temporary
	[k]			[zero]		[k]	
악	*ak*	[ak]	惡	*e4*	[ə5]	[ɔk7b]	wickedness

The Sino-Korean final ending [l] corresponds to Cantonese ending [t]. Old Chinese has ten finals: *[zero], *-*j*, *-*w*, *-*k*, *-*t*, *-*wk*, *-*ng*, *-*n*, and *-*m* (Baxter 1992, p. 291). Middle Chinese has twelve finals: zero,-*w*, -*j*, -*i*, -*ng*, -*wng*, -*m*, -*n*, -*k*, -*wk*, -*p*, and -*t* (Baxter 1992, p. 61). Even when traced back to Old and Middle Chinese, the Sino-Korean final ending [l] does not appear. Baxter discusses final ending [l] in early Chinese. He claims "...Kalso missing from the list of codas [final ending] are final liquids *-l and *-r; generally, the *-r coda of other systems corresponds to my [Baxter's] *-j. Comparison with Tibeto-Burman suggests that there may have been codas like *-r or *-l or both at an earlier stage, but it is difficult to find direct evidence for them within Chinese. My [Baxter's] coda *-j generally corresponds to Karlgren's *-r" (Baxter 1992 p.291). But the Sino-Korean final ending [l] is probably not related the Old Chinese final [l], because the Korean final [l] corresponds to Middle Chinese final [t].

Korean Velar and Glottal [h]

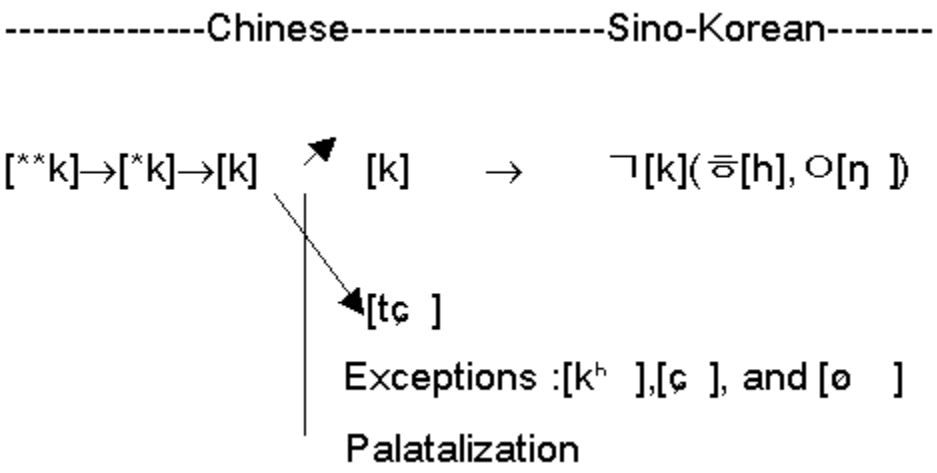
When Mandarin speaking peoples pronounce the words corresponding to Sino-Korean velar sounds they most often articulate with pre-palatals, velars or retroflexes. In Cantonese, Sino-Korean words are articulated in the velar [k], glottal [h] or labial [f]. Cantonese, Mandarin, and Sino-Korean speaking people pronounce their respective initials with a similar place of articulation. According to Yu Jaewon, Old and Middle Chinese Velars, of the Yayin 牙音, group, jian [k] (見), xi [kʰ] (溪) and qun [gʰ](群) reflect [k] (ㄱ)and [kʰ] (ㅋ) in Sino-Korean.

Table 7: Initials K(ㄲ)kʰ(ㅋ)g(ㄱ) and h(ㅎ)

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[g]				[tɕ]	[k]	
가감	*gagam*	[gagam]	加減	*jia1jian3*	[tɕia1tɕiɛn3]	[ka:1ka:m]	addition and subtraction
가격	*gagyeok*	[gagjʌŋ]	價格	*jia4ge2*	[tɕia5kə2]	[ka:3ka:k7b]	price
	[g]				[tɕʰ]	[h]	
경미	*gyeongmi*	[gjʌŋmi]	經微	*qing1wei1*	[tɕʰiŋ1wəi1]	[hiŋ1mɛɔ4]	slight
교묘	*gyomyoi*	[gjomjo]	巧妙	*qiao3mian4*	[tɕʰiau3mian5]	[hau2miu6]	dexterity
	[g]				[tɕʰ]	[k]	
가곡	*ga gok*	[gagok]	歌曲	*ge1qu3*	[kə1 tɕʰu3]	[kɔ1kuk7a]	song
결점	*gyeoljeom*	[gjʌlʧʌm]	缺點	*que1dian3*	[tɕʰuə1tiɛn3]	[kyt7b tim2]	flaw
	[g]				[ɕ]	[h]	
계통	*gyetong*	[gje tʰoŋ]	系統	*xi4tong3*	[ɕi5tʰuŋ2]	[hɐi6tuŋ2]	system
관계	*gwangye*	[gwangje]	關係	*guan1xi*	[kuan1ɕi]	[kwa:n1hɐi6]	relation
	[g]				[k]	[k]	
개성	*gaeseong*	[gɛzʌŋ]	個性	*ge4xing4*	[kə5ɕiŋ5]	[kɔ3siŋ3]	individuality
고정	*gojeong*	[goʧʌŋ]	固定	*gu4ding4*	[ku5tiŋ5]	[ku3tiŋ6]	fixing
	[g]				[kʰ]	[h]	
가능	*ganeung*	[ga:nɯng]	可能	*ke3neng2*	[kʰə3nəŋ2]	[hɔ2nɐŋ4]	possibility
간담	*gandam*	[ga:ndam]	懇談	*ken3tan2*	[kʰən3tʰan2]	[hɐn2ta:m4]	talkfast
	[g]				[kʰ]	[f]	
고뇌	*gonoe*	[gonwe]	苦惱	*ku3nao3*	[kʰu3nau3]	[fu2lou5]	suffering
과	*gwa*	[gwa]	科	*ge1*	[kʰə1]	[fɔ1]	course
	[g]				[tɕʰ]	[kʰ]	
곡선	*gokseon*	[gokzʌn]	曲線	*qu1xian4*	[tɕʰu1ɕiɛn5]	[kʰuk7sin3]	curved line
	[kʰ]				[kʰ]	[f]	
쾌락	*kwaerak*	[kʰwɛlag]	快樂	*kuai4le4*	[kʰuai5lə5]	[fa:i3lɔk8]	pleasure
Glottal							
	[h]				[ɕ]	[h]	
학문	*hakmun*	[hagmun]	學問	*xue2wen*	[ɕuə2wən]	[hɔk8mɐn]	studying
하등	*hadeung*	[hadɯŋ]	下等	*xia4deng3*	[ɕia5təŋ]	[hɐ6tɐŋ]	inferiority
	[h]				[h]	[h]	
한기	*han gi*	[han gi]	寒氣	*han2qi4*	[han2tɕʰi5]	[hɔn4hɛɔ3]	the cold
합리	*hapli*	[habli]	合利	*he2li3*	[hə2li3]	[hɐp8lɛɔ5]	rationality

	[h]			[kʰ]		[k]	
확대	*hwakdae*	[hwagdɛ]	擴大	*kuo4da4*	[kʰuo5ta5]	[kwɔŋ3tɐi3]	magnification
	[h]			[tɕ]		[k,h]	
해고	*haego*	[hɛgo]	解雇	*jie3gu4*	[tɕiə3ku5]	[ka:i2ku3]	lay off
	[h]			[h]		[w]	
혼돈	*hondon*	[hondon]	混沌	*hun4dun4*	[hun5tun5]	[wɐn6tɔ6]	chaos
혹시	*hoksi*	[hogzi]	或是	*huo4shi*	[huo5ʂɻ]	[wa:k8si6]	maybe
	[h]			[h]		[f]	
혼례	*honlye*	[honlje]	婚禮	*hun1li3*	[hun1li3]	[fɐn1lɐi5]	wedding
호응	*hoeung*	[howŋ]	呼應	*hu1ying4*	[hu1jiŋ5]	[fu1jiŋ1]	response

Table 8: Development of Velars in Chinese and Sino-Korean*



* From Yu 1995, p. 33

Cantonese has more endings that Mandarin. The endings within Mandarin are usually nasal endings, *-n* and *-ng*. Cantonese has the endings *-p, -t,* and *-k* and the nasal ending *-m, -n,* and *-ng*. This feature of Cantonese creates more connection between Korean and Cantonese. Korean has more endings than either Mandarin or Cantonese.

Table 8 shows that, *Jianmu* also reflects the Korean glottals [h] and [ŋ]. Yu (1995) thus argues that Korean [h] and [ŋ] are related to Old or Middle Chinese. This phenomenon also happens with [kʰ] (溪) and [gʰ] (群). The modern glottal sound [h] in Sino-Korean often corresponds to a [k] in Mandarin. This can explain the differentiation of Korean from Old and Middle Chinese. In the research for this paper we found that the glottal sound [h] in Sino-Korean corresponds to [ɕ] in Mandarin and [h] in Cantonese. Even the modern Mandarin palatals [tɕ] and [ɕ] are reflected by the glottal [h] in Cantonese. The Sino-Korean [h]

as well as the Cantonese [h] are both derived from the same Old and Middle Chinese root. Thus Sino-Korean and Cantonese to this day share the same [h] sound. The last examples show that the [k^h]-[k^h]-[f] sounds are rare in Sino-Korean because they developed later. The original Korean language had a few [k^h] initials. These [k^h] initials appeared later (Yu 1995 p.34).

Sino-Korean Alveolar Initials

The [t^h] and [d] sounds in modern Sino-Korean correspond to [t], [t^h],[tʂ], and [tʂ^h] in Mandarin and [t],and [ts] in Cantonese. According to Yu's analysis, modern Sino-Korean [t^h] and [d] originated from [t], [d] and [t^h] (1995, p. 42). The [t] and [d] sounds in Old and Middle Chinese are reflected by [d] and [t^h] in Sino-Korean; and [t^h] in Old and Middle Chinese are reflected by [t^h] in Sino-Korean. Jeon explains that [t] and [d] both were borrowed as [d] in Sino-Korean because when the Korean language adopted those sounds, aspiration did not have a significant role in the Korean language (Jeon 1993, p.38-40). The aspirated [t^h] developed during the 17th century independently within the Korean language. The reason that the [t^h] and [d] Sino-Korean words are pronounced [ts] in Cantonese cannot be explained in this paper. Cantonese can be considered to follow its own path in the development of this sound.

Table 9: Plosive

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[t^h]			[t]		[t]	
타개	*Tagae*	[t^hagɛ]	打開	*da3kai1*	[ta3k^{h}ai1]	[tɐ1hɔI]	break
퇴적	*Toejeok*	[t^hweɟʌk]	堆積	*dui1ji1*	[tui1tɕi1]	[tɔ1dzik7a]	accumulation
	[t^h]			[t^h]		[t]	
타협	*Tahyeop*	[t^hahjʌb]	妥協	*tuo3xie2*	[t^huo3ɕiə2]	[tɔ5hip7b]	compromise
탄력	*Tanryeok*	[t^hanljʌg]	彈力	*tan2li4*	[t^han2li5]	[ta:n6lik8]	elasticity
	[t^h]			[tʂ]		[ts]	
탁상	*Taksang*	[t^hakzaŋ]	卓上	*zhuo1shang*	[tʂuo1ʂaŋ]	[tsʃk7b sʃŋ]	on a table
	[d]			[t]		[t]	
다소	*Daso*	[dazo]	多少	*duo1shao3*	[tuo1ʂau3]	[tɔ1siu2]	many or few
단서	*Danseo*	[danzʌ]	但書	*dan4shu1*	[tan5ʂu1]	[ta:nsy1]	proviso
	[d]			[t^h]		[t]	
대개	*daegae*	[dɛgɛ]	大概	*da4gai4*	[t^ha5kai5]	[ta:i6kɔi2]	a great portion
도피	*dopi*	[dop^{h}i]	逃避	*tao2bi4*	[t^hau2pi5]	[tou4pɛɔ6]	escape
	[d]			[tʂ^h]		[ts]	
동경	*donggyeong*	[doŋgjʌŋ]	憧憬	*chong1jing3*	[tʂ^{h}uŋ1tɕiŋ3]	[tsuŋ1kiŋ2]	longing

Table 10: Nasal [n]

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[n]			[l]		[l]	
낙인	*nak in*	[nak in]	烙印	*lao4yin4*	[lau5jin5]	[lɔk7b jɐn3]	brand
낭비	*nang bi*	[naŋ bi]	浪費	*lang4fei4*	[laŋ5fəi5]	[lɔŋ6fɐi3]	waste
	[n]			[n]		[n]	
남	*nam*	[nam]	南	*nan2*	[nan2]	[na:m4]	south
남자	*namja*	[namʝa]	男子	*nan2zi3*	[nan2tsɻ3]	[na:m6dzi2]	man

The lateral alveolar is usually only preserved as an initial in the second syllables in modern Sino-Korean. (Though it is also found as an initial consonant in the speech of North Korean).

Table 11: Lateral Approximant

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[l]			[l]		[l]	
단락	*danrak*	[danlag]	段落	*duan4luo4*	[tuan5luo5]	[tyn6lɔk8]	The end of a paragraph
생략	*saengryak*	[zɛŋljag]	省略	*sheng3lüe4*	[ʂəŋ3luue5]	[sa:ŋ2hɻk8]	omission

The fricative [z] in Sino-Korean corresponds to Mandarin retroflexes [ʂ], [tʂ], and [tʂʰ] and Mandarin alveolar fricatives [s], [ts], and [tsʰ]. It also corresponds to Mandarin pre-palatal [ɕ]. The initials, [z] and [s] in Sino-Korean correspond to Cantonese alveolar fricatives [s], and [ts]. Sino-Korean [z] reflects many Old and Middle Chinese consonants such as [d], [tʰ] and [dz]. However Old and Middle Chinese [d], [tʰ] and [dz] are also reflected by [c], [cʰ] and [j] in modern Sino-Korean. Therefore the process of the adaptation of [z] in modern Sino-Korean is complex. For this reason, this paper only looks briefly at the Sino-Korean [z] that corresponds to *xin* 心 initial in Guangyun.

Table 12: Fricative [s] and [z]

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[z]			[ʂ]		[s]	
사건	*sageon*	[zagʌn]	事件	*shi4jian4*	[ʂɻ5tɕiɛn5]	[si6kin6]	event
	[z]			[s]		[s]	
사계	*sagye*	[zagje]	四季	*si4ji4*	[sɻ5tɕi5]	[sɛɔ3kwɐi3]	four season
	[z]			[ɕ]		[ts]	

사념	*sanyeom*	[zanjʌm]	邪念	*xie2nian4*	[ɕiə2niɛn5]	[tsɛɔnim6]	vicious mind
	[z]			[ɕ]		[dz]	
사례	*sarye*	[zalje]	謝禮	*xie4li3*	[ɕiə5li3]	[dzɛɔlɐi5]	gratitude
	[z]			[tsʰ]		[ts]	
사전	*sajeon*	[zaɟʌn]	辭典	*ci2dian3*	[tsʰɻ2tiɛn3]	[tsi4tin2]	dictionary
	[z]			[tʂʰ]		[ts]	
산업	*saneop*	[zanʌb]	産業	*chan3ye4*	[tʂʰan3jə5]	[tsaːn2jip8]	industry
	[z]			[tʂʰ]		[s]	
성과	*seonggwa*	[zʌŋgwa]	成果	*cheng2guo3*	[tʂʰəŋ2kuo3]	[siŋ4kwɔ]	result
	[s]			[ʂ]		[s]	
쌍	*ssang*	[saŋ]	雙	*shuang1*	[ʂuaŋ1]	[sʃŋ1]	double

Comparing Table 13 (from Yu [1995, p. 79]) with Table 12, we see the many different correspondents of Sino-Korean [z] in Chinese. In Modern Sino-Korean we found only the one example of [s], which is listed on Table 12.

Table 13*

----------Chinese ----------Sino-Korean

[**s]->[*s]->[s]->[s],[ɕ],[ts],[tsʰ],[tɕ], and [ʂ]-----reflected by [z]

* From Yu 1995, p. 79

Cantonese has more endings that Mandarin. The endings within Mandarin are usually nasal endings, *-n* and *-ng*. Cantonese has the endings *-p, -t,* and *-k* and the nasal ending *-m, -n*, and *-ng*. This feature of Cantonese creates more connection between Korean and Cantonese. Korean has more endings than either Mandarin or Cantonese.

Post-alveolar

The Old and Middle Chinese alveolars [t] and [d] were both originally borrowed in Sino-Korean as either [d] or [tʰ]. Later they palatalized and changed to [cʰ] and [j] in Korean due to native developments in Korean phonology. This makes the development of the post-alveolar initials difficult to analyze. The [cʰ] and [j] pronunciation accounts for 30% of the total Sino-Korean words listed in this paper. Also Korean initial [c] does not occur in Sino-Korean. Since the purpose of this paper was to show the similarities and differences between modern Sino-Korean, Mandarin and Cantonese, the native changes within Korean phonology will not be discussed in detail here.

Table 14 [c], [cʰ] and [j]

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[j]				[ts]	[dz]	
자기	*jagi*	[ɟagi]	自己	*zi4ji3*	[tsɻ5tɕi3]	[dzi6kɛɔ2]	oneself
	[j]				[tsʰ]	[ts]	
자선	*jaseon*	[ɟazʌn]	慈善	*ci2shan4*	[tsʰɻ2ʂan5]	[tsi4sin6]	charity
	[j]				[tɕʰ]	[ts]	
전신	*jeonsin*	[ɟʌnzin]	全身	*quan2shen1*	[tɕʰuan2ʂən1]	[tsyn4sɐn1]	whole body
	[j]				[ts]	[dz]	
작사	*jaksa*	[ɟagza]	作詞	*zuo4ci2*	[tsuo5 tsʰɻ2]	[dzɔk7b tsi4]	write the lyrics
	[j]				[tʂ]	[dz]	
전사	*jeonsa*	[ɟʌnza]	戰死	*zhan4si3*	[tʂan5sɻ3]	[dzin3si2]	death in battle
	[j]				[tʂʰ]	[ts]	
전염	*jeonyeom*	[ɟʌnjʌm]	傳染	*chuan2ran3*	[tʂʰuan2ʐan3]	[tsyn4jim5]	infection
	[j]				[tɕ]	[dz]	
저격	*jeogyeok*	[ɟʌgjʌg]	狙擊	*ju1ji1*	[tɕu1tɕi1]	[dzɔ1kik7a]	shooting
	[j]				[t]	[t]	
저기압	*jeogiap*	[ɟʌgiab]	低氣壓	*di1qi4ya1*	[ti1ɕi5ja1]	[tɐi1hɛɔ3aːt7b]	a low presure
	[j]				[ʂ]	[s]	
적당	*jeokdang*	[ɟʌgdaŋ]	適當	*shi4dang4*	[ʂɻ5taŋ5]	[sik7a tɔŋ1]	fitness
	[cʰ]				[tʂʰ]	[tʃʰ]	
차	*cha*	[cʰa]	車	*che1*	[tʂʰə1]	[tʃʰɛ1]	car
	[cʰ]				[tɕ]	[dz]	
첨단	*cheomdan*	[cʰʌmdan]	尖端	*jian1duan1*	[tɕiɛn1tuan1]	[dzim1tyn1]	spearhead
	[cʰ]				[ts]	[dz]	
찬동	*chandong*	[cʰandoŋ]	贊同	*zan4tong2*	[tsan5tʰuŋ2]	[dzaːn3tuŋ4]	approval
	[cʰ]				[tʂ]	[dz]	
착수	*chaksu*	[cʰagzu]	着手	*zhuo2shou3*	[tʂuo2ʂou3]	[dzʃk8sɐ2]	starting
	[cʰ]				[tsʰ]	[ts]	
착오	*chak-o*	[cʰago]	錯誤	*cuo4wu4*	[tɕʰuə5wu5]	[tsɔ3ŋ6]	mistake
	[cʰ]				[tʂʰ]	[ts]	
차	*cha*	[cʰa]	茶	*cha2*	[tʂʰa2]	[tsɐ4]	tea
	[cʰ]				[tɕʰ]	[ts]	
처자	*cheoja*	[cʰʌza]	妻子	*qi1zi3*	[tɕʰi5tsɻ3]	[tsɐi1dzi2]	one's wife and children
	[cʰ]				[tʰ]	[t]	

천사	*cheonsa*	[cʰʌnza]	天使	*tian1shi3*	[tʰiɛn1ʂʅ3]	[tin1sɐi2]	angle
	[cʰ]				[s]	[s]	
축소	*chokso*	[cʰugzo]	縮小	*suo1xiao3*	[suo1ɕiau3]	[suk7a siu2]	reduction

In only a few examples does [pʰ] change to [m]. Most of the time [pʰ] is preserved from Old and Middle Chinese. The [pʰ] initial in Old and Middle Chinese is reflected as [b] and [pʰ] in Sino-Korean. The words listed for this study show that the [b] and [pʰ] in Sino-Korean correspond to [p], [pʰ], and [f] sound in Mandarin. The listed words also show that [b] and [pʰ] in Sino-Korean are pronounced as the [p] and [f] in Cantonese. In the Korean language there is no labial fricative sound [f]. Therefore once the Korean language had assimilated the sounds [pʰ] and [b] they did not change to [f] as they did in Mandarin and Cantonese.

Table 15 Plosive [pʰ] and [b]

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[b]			[p]		[p]	
박사	*Baksa*	[bagza]	博士	*bo2shi4*	[po2ʂʅ5]	[pɔk7bsi6]	doctor's degree
병	*byeong*	[bjʌŋ]	病	*bing4*	[piŋ5]	[pɛɔk6]	sickness
	[b]			[pʰ]		[p]	
박수	*Baksu*	[bagzu]	拍手	*pai1shou3*	[pʰai1ʂou3]	[pa:k7bsɐ2]	hand clapping
비평;	*bipyeong*	[bipjʌŋ]	批評	*pi1ping2*	[pʰi1pʰiŋ]	[pɐi1piŋ4]	criticism
	[b]			[f]		[f]	
부력	*bulyeok*	[buljʌg]	浮力	*fu2li4*	[fu2li5]	[fɐ4lik8]	byoyancy
비방	*bibang*	[bibaŋ]	誹謗	*fei3bang4*	[fəi3paŋ5]	[fɛɔ2pɔŋ3]	abuse
	[pʰ]			[pʰ]		[p]	
파견	*pagyeon*	[pʰagjʌn]	派遣	*pai4qian3*	[pʰai5tɕʰiɛn3]	[pa:i1hin2]	dispatch
파산	*pasan*	[pʰazan]	破産	*po4chan3*	[pʰo5tʂʰan3]	[pɔ3tsa:n2]	bankruptcy
	[pʰ]			[p]		[p]	
포위	*powi*	[powi]	包圍	*bao1wei2*	[pau1wəi2]	[pau1wɐi4]	a siege
표현	*pyohyeon*	[pjohjʌn]	表現	*biao3xian4*	[piau3ɕiɛn5]	[piu2jin6]	expression
	[pʰ]			[f]		[f]	
풍만	*pungman*	[pʰuŋman]	豊滿	*feng1man3*	[fəŋ1man3]	[fuŋ1mun5]	abundance
풍향	*punghyang*	[pʰuŋhjaŋ]	風向	*feng1xiang4*	[fəŋ1ɕiaŋ5]	[fuŋ1hʃŋ3]	the direction of the wind

Table 16*

Chinese ----------Korean

[**p]→[*f]→[f]→ Reflected by [pʰ] and [b]

* From Yu 1995, p. 48

Table 16 illustrates how Sino-Korean initials [pʰ] and [b] are adopted from Old and Middle Chinese. In the subsequent evolution of Chinese, but not of Korean, some of these labials differentiated to [f].

Nasal

The [m] initial has not changed in the Sino-Korean or the Chinese languages since Old and Middle Chinese. However modern Mandarin reflects Old and Middle Chinese [m] sounds as [m] and [w]. (The [w] actually stands for [zero] initial.)

Table 17

Korean (Hankul)	Hankul Romanization	Korean IPA	Chinese Characters	Mandarin Pinyin	Mandarin IPA	Cantonese IPA	English Meaning
	[m]			[m]		[m]	
모순	*mosun*	[mozun]	矛盾	*mao2dun4*	[mau2tun5]	[mau4t ɔ 5]	contradiction
문	*mun*	[mun]	門	*men2*	[mən2]	[mun4]	door
	[m]			[w]		[m]	
만능	*manneung*	[mannɯŋ]	萬能	*wan4neng2*	[wan5nəŋ2]	[ma:n6nɐŋ4]	omnipotence
무리	*muli*	[muli]	無理	*wu2li3*	[wu2li3]	[mou4lɛɔ5]	excessive

Table 18*

-------Chinese ----------Sino-Korean

[**m]->[*ɱ]->[v]->[zero]----reflected by [m]

* From Yu 1995, p. 109

Conclusion

Modern Sino-Korean shares, or has close correspondents to, modern Mandarin and Cantonese initials and finals. This study finds that the place of articulation of initials in Sino-Korean correspondents is generally similar to the place of articulation in modern Mandarin and Cantonese. While Mandarin has lost most of the final endings of Old and Middle Chinese, Cantonese has preserved a total of seven final endings from Old and Middle Chinese: [m], [n], [ŋ], [p], [t] and [k]. The Cantonese final endings correspond to the Sino-Korean final endings except for [l]. Final [l] in Sino-Korean corresponds to final [t] in Cantonese.

The Sino-Korean initial consonants [z], [c], [c^h] and [j] have been adopted from many different Old and Middle Chinese initials according to native Korean phonological rules. For example, many Old and Middle Chinese initials, such as *ts, *ts^h, *dz, *s, and *z, are somewhat randomly reflected as [z], [c], [c^h], and [j] in Korean (see Tables 12 and 14 above) and there is no consistant correspondence between Chinese aspirated *ts^h and Korean aspirated [c^h], which also reflects other, unaspirated, Chinese initials. This is in part because when Korean borrowed words with these Chinese sounds, aspiration was not a clear phonemic feature of the language and *ts^h could not be consistently distinguished in Sino-Korean. Thus, regardless of the presence or absence of aspiration in the Chinese, *ts, *ts^h, *dz, *s, and *z are mostly reflected as either [c] or [c^h] in Sino-Korean. In addition after Old Korean adopted Chinese [t] or [t^h] to [d] or [t], these changed in Sino-Korean to post-alveolar articulation.

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