

Open and Closed Mouth in Dongguk jeong'un style Sino-Korean

Cha, Ik Jong
Seoul National University, Korea

1. Introduction

This paper proposes that the concept of open (kāikǒ, 開口) and closed mouth (hékǒ, 合口) be added to the principles underlying Dongguk jeong'un style Sino-Korean along with seven sounds (七音), four tones (四聲) and 'clear and muddy' (清濁).

Dongguk jeong'un (東國正韻, The Correct Rhymes of the Eastern Country) was the rhyme dictionary that was compiled in 1447 by King Sejong's scholars for the purpose of replacing actual vernacular Sino-Korean with a new standard reading system. Although this standard sound system was adapted in the most of Korean texts until the latter half of 15th centuries, it abruptly ceased to be used in the end of 15th century, so that some scholars until now have belittled it as just an artificial one or a copy of a certain Chinese sound system.

Any scholars who would take trouble to look closely into Dongguk jeong'un style (abbreviated D style, hereafter) readings, however, will unexpectedly confront a challenging problem: the

complexity of its phonological landscape. While at first glance D style readings appear to be influenced by the sound system of the early Yuan dynasty (元) that was reflected in Gǔjīnyùnhuìjǔyào (古今韻會舉要, 1292, hereafter sometimes Jǔyào),¹⁾ some parts of D style readings have much more aspects that correspond to the sounds of Middle Chinese.²⁾ Moreover, even the similarity or correspondence to vernacular Sino-Korean is strongly observed in the finals³⁾, making the problem more complicated enough to leave the phonological origin of Dongguk jeong'un one of the unsolved research topics.

While early studies (Hong 1946, Yu 1966, Lee 1967) tried to prove the influence of Gǔjīnyùnhuìjǔyào, some studies (such as Kim 1958, 1959) put an emphasis on a closer relation with Middle Chinese.⁴⁾ Another stream has shed light on the influence of

-
- 1) Gǔjīnyùnhuìjǔyào (古今韻會舉要) has been understood to represent the transition period between Middle Chinese and Modern Chinese (Hanato 1997). This paper takes the position of Hanato (1997) and regards it as retaining the sound system of Yuan dynasty.
 - 2) The term 'Middle Chinese' is taken here for translation of Zhōnggǔyùn (中古音) that has widely been accepted by many Chinese scholars such as Dong (1968). It indicates the phonological system reflected in Qièyùn (切韻, AD 601), covering from the beginning of the seventh century to the Tang dynasty. Although this terminology is similar to that of Pulleyblank (1970), there is difference in understanding the historical position of rhyme tables of Song dynasty. Pulleyblank (1970) contended that the sound system of all the rhyme tables in Song dynasty were of quite a different nature from that of Qièyùn, while other scholars insisted the early rhyme tables such as Yùnjìng (Mirror of Rhymes, 韻鏡) and Qīyīnlüè (Summary of Seven Sounds, 七音略) accommodated many aspects of the Middle Chinese. According to their opinion, Yùnjìng and Qīyīnlüè can be used as auxiliary tools for reconstructing the sound system of Qièyùn (Dong 1968).
 - 3) By 'final', this paper means the medial, main vowel and coda of the syllable in accordance with terminology of Chinese phonology. In Chinese studies, syllable divides into two parts; initial and final. The former is the initial consonant of the syllable, while the latter consists of all the segments after the initial (Baxter 1992:6). Be sure not to confuse with 'final' in Korean phonology, where the final coincides with the consonantal coda of Chinese syllable.

vernacular Sino-Korean. Kang (1997, 2009) has kept the first row in claiming the comprehensive influence of vernacular readings.

More recent studies in Korea have taken a rather developed way in which they have tried to construct the empirical foundations. By elaborate comparison of Dongguk jeong'un and zìmǔyùn (字母韻) of Jǔyào (古今韻會舉要), Cho (2011) asserted that D style sound system had two phonological sides. The final system of D style Sino-Korean, according to Cho (2011), followed that of vernacular Sino-Korean of 15th century, while the initial system took that of Jǔyào. In Cho (2011) and Cha (2014), however, a very important finding was referred to, though in somewhat short and simple arguments ; D style Sino-Korean stucked to representing the open and closed mouth, a striking difference from vernacular.

This finding gives rise to some questions. Why the compilers of Dongguk jeong'un took the seemingly mismatched pattern between initial and final system? How can we understand the nature and origin of 'open and closed mouth' in Dongguk jeong'un. What principle or framework had the compilers in their mind, whether consciously or not, when they produced this final system including prescriptive readings (of open and closed)? These questions will help grasp the phonological theory of King Sejong and his scholars, let alone Dongguk jeong'un itself.

As the first step toward these topics, this paper highlights the aspect of open and closed mouth in D style Sino-Korean. Comparison with vernacular, Middle Chinese, and Jǔyào will be presented as needed to be.

4) A recent thesis from China (Song 2008) contends that the initial system of Dongguk jeong'un originated from as early as that of Qièyùn (切韻). As for the final system of Dongguk jeong'un, on the contrary, it claims the reflection of Northwestern Chinese dialect in the late Tang dynasty.

2. Open and Closed Mouth or kāihé (開合) in Chinese

The terms 'open mouth' and 'closed mouth' correspond to 'kāikǒ (開口)' and 'hekǒ (合口)', respectively. They indicate the articulatory state of lip rounding during utterance. Closed mouth means the presence of a round medial [u] or [w] or round main vowel [u], while open mouth does not (Wang 1995: 291,352). Wang (1995) and Dong (1968) transcribed both by [u], but Karlgren (1954) and Pulleyblank (1984) used [w] for medial sound to indicate its nonvocalic feature. This does not constitute a major issue in discussing open and closed, since the focal point here is just given to lip roundness itself. But this paper indicates the medial with [w] since this sound has been obviously nonvocalic in Korean. The same is the case with medial [j] and coda [w] and [j].

It was in Yùnjìng when the terms open and closed were introduced first. It would be effective to follow the description in Yùnjìng, but the labelling of open and closed in this rhyme table does not always agree with the actual lip rounding in Middle Chinese. In Yùnjìng some rhyme groups such as Jiāngshè (江攝) were classified as 'kāihé (開合, open and closed)' but actually did not contain closed mouth. The same is the case with Guǒshè (果攝) and Xiàoshè (效攝), which were given a wrong label of hé (合) that should have been labelled as kāi (開, open).

Based on the recognition that 'open and closed' or kāihe (開合)⁵⁾ was used in order to note the actual phonemic shape, not the metaphysical or theoretical ideal, scholars of historical phonology have solved these problems by critical comparison with Qīyīnlüè (七音略)⁶⁾, and finally have succeeded in reconstructing the aspects of

5) Kāihé (開合) is the compound from kāikǒ (開口) and hékǒ (合口),

6) See the footnote 2) of this paper.

open and closed in Middle Chinese. Their reconstruction has been succinctly outlined in Shin (2007), which this paper will adopt as the basis of discussion.

Follows the reconstructed definition of open and closed mouth in Middle Chinese quoted in Shin (2007)

The numbering of the left most column means 16 rhyme groups (shè, 攝) in the traditional rhyme tables since Sìshēngděngzǐ (四聲等子) where each rhyme is represented by the level tone (平聲). O/C (1) indicates the labelling of open and closed literally in Yùnjìng, while O/C (2) means the reconstructed labeling by line of Shin (2007). 'Reconst.' is the reconstructed sounds of Middle Chinese adapted from Dong (1968).

Numbers next to the rhyme title in the third column indicate the rhyme grade (děng, 等) in rhyme tables. A and B mean Zhòngniǔ (重紐) A and B respectively. For example, Dōng (東1) in the third column of the first row stands for the rhyme Dōng (東韻) representing all rhymes of the four tones: the level tone (東韻, grade I), rising tone (董韻, grade I), departing tone (送韻, grade I) and entering tone (屋韻, grade I).

	She	rhyme	O/C (1)	O/C (2)	reconst.
1	Tong (通攝)	東1	open	*closed	uŋ
		東3	open	*closed	juŋ
		冬1	open closed	*closed	uoŋ
		鍾3	open closed	*closed	juoŋ
2	Jiāng (江攝)	江2	open closed	*open	ɔŋ
3	Zhi (止攝)	支3	open closed	*open	je(A), jě(B)
		支3	closed	closed	jue(A), juě(B)
		脂3	open	open	jei, jěi
		脂3	closed	closed	juie, juěi
		之3	open	open	i
		微3	open	open	jəi
		微3	closed	closed	juəi
4	Yu (遇攝)	魚3	open	open	jo

		模1	open closed	*closed	uo
		虞3	open closed	*closed	juo
5	Xie (蟹攝)	哈1	open	open	Ai
		皆2	open	open	ɛi
		齊4	open	open	iei
		祭3	open	open	jæi(A), jæi(B)
		夬2	open	open	ai
		灰1	closed	closed	uAi
		皆2	closed	closed	uɛi
		齋4	closed	closed	iuɛi
		祭3	closed	closed	juæi(A), juæi (B)
		夬2	closed	closed	uai
		佳2	open	open	æi
		泰1	open	open	ai
		佳2	closed	closed	uæi
		泰1	closed	closed	uai
		廢3	closed	closed	jɛi
6	Zhen (臻攝)	痕1	open	open	ən
		臻3	open	open	en
		眞3	open	open	jən
		魂1	closed	closed	uən
		諄3	closed	closed	juen
		欣3	open	open	jən
		文3	closed	closed	juən
7	Shan (山攝)	山2	open	open	æn
		刪2	open	open	an
		仙3A	open	open	jæn
		山2	closed	closed	uæn
		刪2	closed	closed	uan
		仙3A	closed	closed	juæn
		寒1	open	open	an
		元3	open	open	jən
		仙3B	open	open	jæn
		先4	open	open	ien
		桓1	closed	closed	uan
		元3	closed	closed	juen
		仙3B	closed	closed	juæn
8	Xiao (效攝)	豪1	open	open	au
		肴2	open	open	au
		宵3B	open	open	jæu

Open and closed mouth in Donggukjeong'un style Sino-Korean

9	Guo (果攝)	蕭4	open	open	ieu
		宵3A	close	* open	jæu
		歌1	close	* open	a
		戈1	closed	closed	ua
		戈3	closed	closed	jua
10	Jia (假攝)	麻2	open	open	a
		麻3	open	open	ja
		麻2	closed	closed	ua
11	Dang (宕攝)	唐1	open	open	aŋ
		陽3	open	lpen	jaŋ
		唐1	closed	closed	uaŋ
		陽3	closed	closed	juan
12	Geng (梗攝)	庚2	open	open	eŋ
		清3	open	open	jeŋ
		庚2	closed	closed	ueŋ
		清3	closed	closed	jueŋ
		庚3	closed	closed	juen
		耕2	open	open	æŋ
		青4	open	open	ien
		耕2	closed	closed	uæŋ
14	Liu (流攝)	侯1	open	open	u
		尤3	open	open	ju
		幽3	open	open	jəu
		侵3	closed	* open	jem
15	Shen (深攝)	覃1	open	open	Am
		咸2	open	open	em
		鹽3	open	open	jæm
		添4	open	open	im
		談1	open	open	am
		銜2	closed	* open	am
		嚴3	closed	* open	jem
		鹽3	closed	* open	jæm
		凡4	closed	closed	juem
16	Zeng(曾攝)	登1	open	open	əŋ
		蒸3	open	open	jəŋ
		登1	closed	closed	uəŋ
		職3	closed	closed	juək

As shown in the table above, rhymes with [u] as medial or main vowel have been re-categorized into closed mouth. For example, All the rhymes belonging to Tōngshè (通攝) are redefined as closed, since their medials or main vowels have been reconstructed as [u]. Among the 16 rhyme groups, the four groups, Jiāngshè (江攝), Xiàoshè (效攝), Liúshè (流攝) and Shēnshè (深攝) are redefined as having open mouth rhymes only.

Note that other lip round back vowels [o] or [ɔ] in the position of main vowel are not defined as closed mouth (See the rhyme yú 魚3 in Yùshè 遇攝). This paper respects this reconstruction in the line of Chinese study⁷⁾, although things are different in Korean.⁸⁾

It should not be overlooked in the above table that Xiàoshè and Liúshè are defined open mouth. As both groups have [u] as coda (syllable ending in Chinese) not as main vowel, it may be accepted as accurate definition in Chinese phonology.

3. Open and Closed Mouth in Korean

When it comes to arguing about Sino-Korean, however, things about [o] and [u] need to be re-defined.

It is quite interesting that Hunmin jeong'eum Haerye (訓民正音解例, Explanations and Examples of the Correct Sounds for the Instruction of the People; hereafter sometimes abbreviated Haerye) defines [o] (ㅜ) as having lip round feature along with [u] (ㅡ). From the phonetic perspective, this would be appropriate, since both

7) According to Dong (1968:168), Chinese dialects today do not retain such main vowels as [ou] and [œ], which means the main vowel of Yùshè in Middle Chinese might have not contained the features of [back][high][round](brackets are mine).

8) This will be discussed in the next chapter.

have the common feature of [+round]. The discussion in Chejahae (制字解, Explanation of the Designing of the Letter) of Haerye famously describes the primary vowels ㅑ, ㅓ, ㅗ, and goes on to denote the feature of 8 vowels: ㅓ, ㅓ, ㅓ, ㅓ, ㅓ, ㅓ, ㅓ, ㅓ. as follows.⁹⁾

As for the following 8 vowels, when one is hé (闔), then the other is pì (闢).

(此下八聲, 一闔一闢)

ㅓ is the same as ㅓ, but lips get round when ㅓ is pronounced. Its shape is formed by combination of ㅓ and ㅓ, which is taken from the meaning that Heaven and Earth meet together for the first time.

(ㅓ與ㅓ同而口蹙, 其形則 ㅓ與ㅓ合而成, 取天地初交之義也.)

ㅓ is the same as ㅓ, but lips become spread when pronounced. Its shape is formed by combination of ㅓ and ㅓ, which is taken from the meaning that Using (用) of Heaven and Earth spreads out onto things and waits for Man to establish itself.).

(ㅓ與ㅓ同而口張, 其形則 ㅓ與ㅓ合而成, 取天地之用發於事物待人成也.)

ㅓ is the same as ㅓ, but lips get round when ㅓ is pronounced. Its shape is formed by combination of ㅓ and ㅓ, which is also taken from the meaning that Heaven and Earth meet together for the first time.

(ㅓ與ㅓ同而口蹙, 其形則 ㅓ與ㅓ合而成, 亦取天地之初交之義也.)

ㅓ is the same as ㅓ, but lips get spread when ㅓ is pronounced. Its shape is formed by combination of ㅓ and ㅓ, which is also taken from the meaning that Using (用) of Heaven and Earth comes out but waits for Man to established itself. (ㅓ與ㅓ同而口張, 其形則 ㅓ與ㅓ合而成, 亦取天地之用發於事物待人成也.)¹⁰⁾

9) Translation for the following quotation is mine.

10) The rest 4 vowels (ㅓ, ㅓ, ㅓ, ㅓ) are explained in the same line that they are of the same nature with ㅓ, ㅓ, ㅓ, ㅓ respectively, The distinction between ㅓ, ㅓ, ㅓ, ㅓ and ㅓ, ㅓ, ㅓ, ㅓ is comes from the fact that the former 4 letters generate from ㅓ.

According to Kang (1974:27), the above explanation can be simplified as below on the basis of lip rounding.

hé (闔) ㄏㄜˊ ㄏㄜˊ ㄏㄜˊ ㄏㄜˊ (lip round, 口蹙)

pì (闢) ㄆㄧˋ ㄆㄧˋ ㄆㄧˋ ㄆㄧˋ (lip spread, 口張)

Now it has been found that hé-pì (闔-闢) replaced 'kāi-hé (開合, open and closed)' to denote lip round feature in Hunmin jeong'eum.

In line with this recognition of Korean, this paper defines the feature of main vowel [o] and [u] in Sino-Korean as closed mouth. The vernacular Sino-Korean of characters that belong to Xiàoshe and Liúshè would be the typical case. In Sino-Korean, Xiàoshe has [o] as main vowel, and Liúshè [u]; the results of sound change in Korean¹¹⁾ The same is the case with D style readings. Detailed description will be given in the section 3.8.

3.1. Tōngshè (通攝)

The table below shows D style readings together with vernacular, Middle Chinese, and Jǔyào. Each rhyme is represented by level tone. 'O/C' in the first row means open and closed mouth in Middle Chinese, which was taken from the definition of the chapter 2.

'MC' in the first row indicates the reconstructed form of Middle Chinese presented in Dong (1968), while Jǔyào means the reconstructed form quoted from Hanato (1997). 'Ver.' is the vernacular Sino-Korean in 15th century, while 'DONG' stands for the Dongguk jeong'un (東國正韻) style reading. 'Examples', the right

"ㄏㄜˊ is the same as ㄏㄜˊ, but generates from ㄏㄜˊ. ㄏㄜˊ與 ㄏㄜˊ 同而起於 ㄏㄜˊ." The same pattern is applied to description on ㄆㄧˋ, ㄆㄧˋ, ㄆㄧˋ.

11) As told in the previous chapter, [u] in Xiàoshe and Liúshè in the Middle Chinese is not the main vowel, but the coda. The kind of the coda is not supposed to correlate with lip round feature in the synchronic Chinese.

Open and closed mouth in Donggukjeong'un style Sino-Korean

most column, lists the typical readings of vernacular and D style by indication like (Vernacular/D style).

A or B attached to the reconstructed sound means classification of Zhòngniǔ (重紐) in yùn (韻) of grade III. Readings of vernacular Sino-Korean are quoted from Kwon (2009a, 2009b) and Ito (2007). These indications are also applied to the next sections ahead.

Note that both D style and vernacular readings indicate their coda [ŋ] with ‘ㅇ’ not with ‘ㅇ’. It is only in D style Sino-Korean that ‘o’ is used as ending marker. In this case, ‘o’ contains no sound values.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
東1	closed	uŋ	uŋ	oŋ(으)	oŋ(으)	公(공/공) 聰(총/총)
東3	closed	juŋ	Iuŋ	uŋ(으) oŋ(으) juŋ(으) joŋ(으)	juŋ(A) uŋ(B) oŋ(B)	A: 中(중/중) 隆(룡/룡) 崇(송/송) 終(종/종) 肉(육, 육/육) B: 弓(궁/궁) 宮(궁/궁) 雄(웅/웅) 風(풍/풍) 夢(몽/몽) 鳳(봉/봉) 服(복, 복/복)
冬1	closed	uoŋ	uŋ	oŋ(으)	oŋ	功(공/공) 宗(종/종), 宋(송, 송/송) 鵠(곡/곡)
鍾3	closed	juoŋ	uŋ Iuŋ	oŋ(으) joŋ(으) juŋ(으)	oŋ joŋ	恭(공/공) 恐(공/공) 峰(봉/봉) 奉(봉/봉) 擁(옹/옹) 容(옹/옹) 勇(옹/옹) 訟(송/송) 縱(종/종) 觸(촉/촉) 辱(육, 육/육)

The first glance of the above table lets us know that the distinction between 4 rhymes has weakened in Jǔyào, to contain one single vowel [uŋ]. Rhymes of Tōngshè (通攝) have merged with themselves, so that the distinction between themselves depends only on the existence of the medial sound [I].

The vernacular Sino-Korean looks located in the middle between Middle Chinese and early Yuan (元) dynasty sound system reflected in

Jǔyào. It has still kept the distinction between the rhyme Dōng (東韻, grade I) and Dōng (東韻, grade III), but shows the phonological changes, in which the main vowel of the rhyme Dōng (冬韻, grade I) and Zhōng (鍾韻, grade III) have merged into that of Dōng (東韻, grade I)¹²⁾ But a gap is also observed; Dōng (東韻, grade III) has two main vowels, and further on shows some exceptional readings such as 風 (ㄲ), 終 (ㄱ), 服 (ㄱ).

The D style Sino-Korean has much in common with vernacular in the fact that both have much more kinds of vowels. This does not lead us to uncritically conclude that the compilers of Dongguk jeong'un simply copied the vernacular sounds. Much discrepancy is rather observed on the contrary. For example, vowels of D style are distributed uniformly by initials and Zhòngniǔ, while vernacular readings show less regular distributions with exceptions such as 終. The reading of this character has been corrected to 'ㄱ' in D style from 'ㄱ' in vernacular. This would result from the principle of the compilers of Dongguk jeong'un. As 終 belonged to 東韻3 with initial of Zhāngmǔ (章母), its final must have been corrected to juŋ (ㅇ), not joŋ (ㅇ).

Note the readings of 弓 (ㄱ/ㄱ) and 風 (ㄲ/ㄲ) underlined in 東3, too. Although 弓 and 風 belong together to Zhòngniǔ B of the rhyme Dōng (東韻, grade III), 弓 is given 'uŋ' as final in D style, while 風 'oŋ'. This is because the initial of 風 belongs to labials (脣音). The compilers of Dongguk joen'gun have allocated 'oŋ' to 風's final, which has made all the characters with lip sound (脣音) of 東3

12) Merging of Dōng (冬韻) into Dōng (東韻, grade I) is explained as an influence of Chang'an (長安) period of Tang dynasty by Arisaka (1957:295-318) and Kono (1968:311-315). According to Arisaka (1957), this is observed in the 一切經音義 by Huilin (慧琳, died 810), which provides an evidence for the assumption that the basic layer of vernacular Sino-Korean would have come from the sound system of Chang'an period of Tang dynasty. Not a few Korean scholars have accepted this interpretation (Kwon, 1997).

Open and closed mouth in Donggukjeong'un style Sino-Korean contain the same final [oŋ].

By observing the aspects shown in the table above, the characteristics of D style Sino-Korean can be outlined as follows.

- 1) Dōng (東¹), Dōng (冬) and Zhōng (鍾) have merged with themselves, containing one main vowel in D style and vernacular Sino-Korean.
- 2) 東³ has two main vowels [u, o] and has lost medial [j] in characters with lip sounds, which does not coincide with Middle Chinese and the sound system of early Yuan (元) dynasty.
- 3) The two finals [oŋ, uŋ] of 東³ in D style almost coincide with vernacular Sino-Korean. But the distribution in D style reading is obviously characterized by uniformity. That is, [oŋ] is for Zhòngniǔ A and for back tooth sounds (牙音) Zhòngniǔ B. while [uŋ] is only for lip sounds (脣音) of Zhòngniǔ B. Although this tendency is in accord with vernacular readings, the vernacular is characterized by some exceptional readings. Note 終 (𣎵/𣎵), 風 (𣎵/𣎵) for examples.
- 4) In 東³ again, characters having lip sound initials are all given [oŋ] as finals. Otherwise they would have been [uŋ] like 弓, 雄. It should be noted that this tendency is observed also in vernacular readings.

3.2. Jiāngshè (江攝)

While Jiāngshè (江攝) was read with open mouth in the Middle Chinese, readings of D style contain medial of closed mouth regularly by initials. As the table below, characters with tongue sound (舌音), tooth sound (齒音) or half tooth sound (半舌音) as initials are given [uan] as finals without exception: 幢 (당/땡), 雙 (상, 상/쌍), 捉 (착/작), 朔 (삭/작), 瀧 (룽/왕) etc.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
江2	*open	ɔŋ	aŋ laŋ uaŋ	aŋ(양) ʌk(옥)	aŋ(양) waŋ(왕)	江(강/장) 降(강, 항/장, 향) 確(확/각) 學(학/학) 樂(락/락) 幢(당/땅) 濁(탁/탁) 雙(상, 상/상) 捉(착/작) 朔(삭/작) 椿(창/왕) 窓(창/창) 瀧(룡/왕)

In Jiāngyùn (江韻), D style readings divide into two groups, [aŋ] (양) and [waŋ] (왕), the latter does not match with vernacular Sino-Korean, but coincides well with [uaŋ] in Jǔyào. Considering that the D style Sino-Korean in Tǒngshè does not reveal much similarity with Jǔyào, the coincidence in Jiāngshè needs some explanation.

The closed mouth in tongue and tooth sounds can be traced to the sound change that recorded in the rhyme tables such as Qièyùnzǐnán(切韻指南) and Qièyùnzǐzhǎngtú (切韻指掌圖). In the section of Jiāngshè, Qièyùnzǐnán said "Zhīmǔ (知母), Zhàomǔ (照母), Láimǔ (來母) and Rīmǔ (日母) belong to closed mouth (知照來日屬合)", which means that characters with initials of tongue-up (舌上音), true front-tooth (正齒音), half tongue (來母) and half tooth (日母) had changed from open mouth rhymes to closed in the sound system that were recorded in this rhyme table. Similarly, Qièyùnzǐzhǎngtú (切韻指掌圖) classified Jiāngyùn (江韻) into closed mouth rhyme. Note that Qièyùnzǐnán (切韻指南) was compiled in 1336 and Qièyùnzǐzhǎngtú (切韻指掌圖) has been thought to be produced during the end of 12th and the early 13th century. This suggests that these sound change would have occurred at least after Middle Chinese, or during Yuan (元) or early Song (宋) dynasty. Dong (1968:166,175) also attributes this phenomenon to the result of sound change after Middle Chinese when he refers to closed mouth in Jiāngshè in modern mandarin.

It is of interest to note that the readings of vernacular Sino-Korean reflect this sound change (確, 椿, 雙), though sporadically, and further contain a unique sound such as 學 (학).¹³⁾

Open and closed mouth in Donggukjeong'un style Sino-Korean

In D style readings, only characters that initiate with tongue sound and tooth sound are consistently given closed medial.

In short, the compilers of Dongguk jeong'un must have recognized this sound change between 12th and 13th century, and accepted it positively. This has made D style Sino-Korean comes out closer to Jǔyào rather than to vernacular readings or Middle Chinese. In this case the compilers adopted a part of sound system around the early Yuan dynasty.

3.3. Zhǐshè (止攝)

Among 7 rhymes of Zhǐshè, closed mouths appeared in rhymes Zhī (支韻), Zhī (脂韻) and Wēi (微韻) in the Middle Chinese. These 3 rhymes will be examined here.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
支3	closed	jue (A) juě (B)	uəi juəi	ju(유) juj(위) uj(위) wəi(웨) iə(여) iəj(예)	juj(윙) uj(윙)	A:規(규/깁)累(류/뤑) 隨(슈,쉬/썩)吹(쑤,취/쨌) 爲(위/윙,윙),瑞(셔,세/썩) B:嬌(귀/깁) 跪(궈/깁),毀(훼/뤑)
脂	closed	juei (A) juěi (B)	uəi iuəi	ju(유) juj(위) uj(위) oj(외) jəi(예) wəj(웨) juəi(웨)	ju(윙) uj(윙)	A:季(계/깁)葵(규/깁) 追(투/뤑) 椎(퇴/똥) 水(슈/썩) 萃(취/깁) 翠(취/쨌) 誅(퇴/뤑)類(류/뤑) B:龜(귀/깁) 達(규/깁) 軌(궈/깁) 位(위/윙)
微	closed	juəi	uəi i	oj(외) ui(위) wəi(웨) i(이)	uj(윙) i(잉)	歸(귀/깁) 諱(휘/뤑)威(위/뤑) 卉(훼/뤑) 虺(훼/뤑) 畏(외/뤑) 巍(외/윙) 非(비/똥)妃(비/똥) 微(미/똥)

13) Kono (1968:457) interpreted [hak] (학, 學) as a remnant of sound in the period of Liùcháo (Six Dynasty, 六朝, 3~6C AD).

Here D style readings show a clear-cut landscape; Zhī (支韻), Zhī (脂韻) and Wēi (微韻) have uniform transcriptions. As far as Zhī (支韻) and Zhī (脂韻) are concerned, the characters belonging to Zhòngniǔ A are given 'uj' (으) as final, while those belonging to Zhòngniǔ B have '으'. Again no exceptions are observed in this distribution, while vernacular readings show divergence in medials or vowels.

Readings of the rhyme Wēi (微韻) take on the similar shape, though with somewhat intriguing difference, that is, the characters having lip sound such as 非, 妃, 微 are given [i] as final. These reading correlates well with vernacular as well as with that in jǔyào. As the lip sound has basically the feature of [+round] in itself, it can effectively neutralize the following [w] or [u]. Vernacular Sino-Korean and Zìmǔyùn of Gǔjīnyùnhuìjǔyào could have been influenced by this neutralization process.

It is thus quite natural to think that the compilers of Dongguk jeong'un would have kept this tendency in mind, and applied it consistently.

3.4. Yùshè (遇攝)

As discussed in chapter 2, the rhyme Yú (魚韻) is examined here, concerned with the problem of open and closed mouth. Actually some of its readings have [o] that can be interpreted as closed mouth in vernacular Sino-Korean as well as in D style.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
魚3	open	jo	u	ə(어)	ə(영)	居(거/경)虛(허/형)渠(거/경)魚(어/영)
			Iu	jə(여)	ia(영)	除(더, 데/평) 晝(셔/성) 徐(셔/썩)
				jəi(예)		諸(저, 제, 테/정) 余(여/영)
						呂(려, 녀/령) 如(여, 셔/성)
				o(오)	o(웅)	初(초/총)助(조/쫙)所(소/송)疏(소/송)

Open and closed mouth in Donggukjeong'un style Sino-Korean

模1	closed	uo	o	o(오) u(우) jo(요)	o(옹)	孤(고/궁) 吾(오/옹) 都(도/둥) 模(모/몽) 虎(호/훙) 墓(묘/몽) 部(부/뵤)
虞3	closed	juo	u lu	o(오) u(우) ju(유) juj(윽)	u(옹) ju(옹)	拘(구/궁) 愚(우/옹) 樓(루/룽) 芻(추/충) 于(우/옹) 迂(오/옹) 夫(부/붕) 株(듀/둥) 修(슈/슝) 儒(슈/슝) 趣(취/충)

The rhyme Yú (魚韻) shows the interesting distribution of readings in D style. The characters having initials of Zhuāng series (莊系, 莊初崇生¹⁴⁾) are given [o] (ㅏ) as main vowel, while others are provided with [ə] (ㅓ), This distribution is also shown in vernacular readings. It should be noted that [ə] (ㅓ) is observed only in Sino-Korean, whether in D style or vernacular. The compilers of Dongguk jeong'un is thought to respect the open mouth [ə] (ㅓ) in vernacular Sino-Korean, the reason of which is yet to be studied.

As far as the rhymes Mú (模韻) and Yú (虞韻) are concerned, D style Sino-Korean shows rather simple transcriptions; [o] for the former, [u] for the latter. Compared with Middle Chinese, D style readings have lost the medial [u] or [w], to have become similar to those of Jǔyào and roughly to vernacular. It can be assumed that the compilers of Dongguk jeong'un could have accepted vernacular or Jǔyào as a standard for Mú (模韻) and Yú (虞韻), which means that they modeled the sound change after the Middle Chinese.

14) Zhuāng series (莊系, 莊初崇生) is the set of initials that composes a half part of right tooth sounds (正齒音). It is located at the place of second grade in the Yùnjìng (韻鏡).

3.5. Xièshè (蟹攝)

Xièshè covers 8 rhymes of closed mouth. See the table below first.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
灰1	closed	uAi ₁₅	uəi	oj(외) Ai(의)	oj(윙) Ai(잉)	灰(회/핑)推(퇴/팅)罪(죄/평) 雷(뢰/평) 對(퇴/팅)內(내/녕)未(리,뢰/평) 杯(비/빙)培(빙/평)梅(미/딩)
皆2	closed	uei	uai	oj(외) wəj(웨) ai(애)	waj(웁) ai(앵)	乖(괴/평)淮(회/평) 贖(훔/평, 웁) 拜(배/맹)
齊4	closed	iuēi	iuəi	ju(유) jəj(예)	jwəj (웁)	圭(규/평)閨(규/평) 桂(계/평)惠(혜/평)慧(혜/평)
祭3	closed	juəi (A)	uəi	jwəj (웨) jəj(예)	jwəj (웁)	贅(채/평)隳(채/평) 稅(세/평)銳(예/웁)
		juǎi (B)	uəi	wəj(웨) uj(위)	uj(윙)	蹶(괘/평) 衛(위/윙)
夬3	closed	uai	uai ai	waj(왜) wa(와) ai(애)	waj(웁) ai(앵)	夬(괘/평)快(쾌/평) 話(화/평) 敗(패/평)邁(매/맹)
佳2	closed	uəi	uəi ai	waj(왜) wa(와) Ai(의)	waj(왜) ai(애)	卦(괘/평) 畫(화/평) 賣(미/매),派(패/평)
泰1	closed	uai	uəi	oj(외)	oj(윙)	外(외/윙)膾(회/평)會(회/평) 最(최/정)
廢3	closed	juēi	uəi li	jwəj (웨) jəj(예)	jwəj (웁) jəi(앵)	喙(훔/평) 滅(예/평) 廢(폐/평)吠(폐/평)

15) 'uAi' was intentionally chosen by Dong (1968) in order to differ the main vowel of Hui (灰韻) from that of Tai (泰韻). Although both rhymes have roughly similar kinds of main vowels, the former had a closer correlation with [ə] or [e] in the Old Chinese, the latter with [a] or [ɑ] (Dong 1968)

Rhyme Huī (灰韻) has two groups of vowels in D style readings; [oj] (외) and [ɿ] (으). It appears to have a closer correlation with vernacular readings than with Middle Chinese and Jǔyào that have only one kind of vowel. But it cannot be simply said that D style Sino-Korean reflects vernacular readings, because D style Sino-Korean allocates [ɿ] (으) only to the characters having initials of lip sound; 杯 (배/빙) 培 (빙/뽕) 梅 (매/밍). Characters having other initials are given [oj] (외). The compilers of Dongguk jeong'un, therefore, must have considered vernacular '으' as erroneous pronunciation when adjacent to non labial initials. Characters such as 對, 內, of which vowels pronounced '으' in vernacular, have been corrected to '외' (외) without exception by the line of D style. This made the characters with lip sounds read almost similar to those of D style Sino-Korean.

The rest 7 rhymes show almost the same distribution of readings. The characters here are given closed mouth in D style, a reading rather different from those of vernacular. Note the readings such as '對 (되/뽕) 內 (내/뽕)' of Huī (灰韻), '淮 (회/뽕)' of Jiē (皆韻), '惠 (혜/뽕), 慧 (혜/뽕)' of Zhāi 4 (齊韻 grade IV), and '喙 (회/뽕)' of Fèi (廢韻).

Comparing with Chinese sounds or vernacular Sino-Korean, one could tell some peculiar traits. Many rhymes still have retained medial of closed mouth along with coda [j], while some rhymes have already lost the medial (Huī, 灰韻) or produced a new main vowel through the fusion of original medials and main vowels (Jì B, 祭韻 B).

Again, the characters with lip sound initials have come out as open mouth. Note the bold characters underlined in Jiē (皆韻), Guài (夬韻), Jiā (佳韻) and Fèi (廢韻) in the table above. Characters

Based on this explanation, Dong (1968)'s [A] might be understood as of a higher and more centralized place of articulation than [a].

here have lost their original medial of closed mouth, and practically become open mouth. The open mouth of reconstructed sounds in Jǔyào also has come under the same finals with D style Sino-Korean. It is interesting that these coincide also with vernacular.

This result is thought to have come from the phonetic or phonological traits of lip sounds. As lip sounds have a lip round feature in themselves, a phenomenon of neutralization is witnessed when they are followed by the medial vowel [u] or [w]. This is the phonological process that has frequently been observed in vernacular Sino-Korean, producing the similarity between D style and vernacular itself. Even in phonological history of Chinese, lip sounds followed by segments of closed mouth tended to generate phonological changes, so that closed mouth rhymes of grade III witnessed the advent of light lip sound (輕脣音) in Song dynasty.

But the striking distinction between D style Sino-Korean and Jǔyào is the fact that Dongguk jeong'un did not accept light lip sounds. Although the compilers of Dongguk jeong'un clearly recognized the advent of light lip sound of Chinese in their times, they did not import it into Sino-Korean, on the ground that this sound was not present in native Korean sound.¹⁶⁾

In short, D style Sino-Korean has made it a norm to recover closed mouth of as early as Middle Chinese, but surely with the exception that characters with lip sounds have been transcribed to be open mouth.

3.6. Zhēnshè (臻攝)

In Zhēnshè, 3 rhymes, Hún (魂韻), Zhūn (諄韻), Wén (文韻), have closed mouths.

16) See the preface of Dongguk jeong'un by Shin Suk-Ju (申叔舟), the representative compiler.

Open and closed mouth in Donggukjeong'un style Sino-Korean

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
魂1	closed	uən	uən	on(운) un(운) in(민) ¹⁷⁾ ɿl(을)	on(운) (ol, 울)	昆(곤/곤) 坤(곤/곤) 卒(졸/쥬) 奔(분/븐) 盆(분/뽀) 門(문/문) 鈍(둔/똥) 噴(분/폰) 窟(굴/꺠) 訥(눌/늑) 悶(민/문) 勃(블/뽀)
諄3	closed	juen	ɿuən	jun(운) un(운)	j u n (운)	A: 均(균/균) 輪(륜/륜) 諄(쥬/쥬) B: 窘(균/꺠) 隕(운/운) 窕(둔/똥) 遵(준/쥬)
文3	closed	juən	uən ɿuən	un(운) ul(을) il(을) ¹⁸⁾	un(운) ul(울)	君(군/군) 屈(굴/꺠) 堀(굴/꺠, 꺠) 不(블/꺠) 弗(블/꺠) 拂(블/꺠) 佛(블, 블/뽀) 物(물/꺠)

Aspects of closed mouth in Zhēnshè (臻攝) can be simply described. that is, D style readings are uniformly given closed mouth for each rhyme, quite different from vernacular. The three rhymes, Hún (魂韻), Zhūn (諄韻) and Wén (文韻) have main vowels of open mouth([o], [jun] and [u]) respectively. While some of vernacular readings take open mouth as main vowels such as [i], [ɿ], [i], D style readings are standardized into closed mouths, which might go up to as early as Middle Chinese.

With respect to the character kū 堀 (굴/꺠, 꺠), it can be understood as retaining multiple readings, since this character are given double readings in Guǎngyùn. One belonged to rhyme Wù (物韻), the entering level that fits to Wén (文韻), while the other to Méi (沒韻) that goes well along with Hún (魂韻). Based on the double readings in Guǎngyùn, ‘꺠’ should go under the rhyme of Hún (魂), so that no problems is witnessed here.

Last but not in the least important, it should be stressed that

17) ‘[in]([민]), [ɿl](을)’ appear only in characters with lip sound initials as vernacular.

18) ‘il(을)’ appears only in characters with lip sounds initials as vernacular.

the vowels of D style match well with vernacular. Here the medial and main vowels have mixed with together, which is different from Chinese. Compilers of Dongguk jeong'un did not restore the medial and main vowel as separated previously in Chinese. Instead, they approved the closed mouth that was represented in vernacular readings.

3.7. Shānshè (山攝)

Shānshè is quite a complicated rhyme group that has as many as 14 rhymes if counting A and B of Zhòngniǔ as separate ones. Closed mouths here are shown in 7 rhymes, also read the same in D style.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
山2	closed	uæn	uan	wan(완)	wan(완)	鰓(환/관) 幻(환/환) 姪(날/늑)
刪2	closed	uan	uan	wan(완) an(안)	wan(완) an(안)	關(관/관) 環(환/환) 滑(활/활) 纂(찬/찬) 慢(만/만) 八(팔/팔)
仙3A	closed	juæ n	Iuæn	jæn(연)	juæn(원)	絹(견/견) 轉(전/원) 全(전/원) 川(천/천) 緣(연/원) 缺(결/꺠) 雪(설/꺠)悅(열/꺠) 劣(렬,넌/꺠)
桓1	closed	uan	uan	wan(완) an(안)	wan(완) an(안)	官(관/관) 歡(환/환) 活(활/꺠) 端(단/단) 鑽(찬/찬) 卵(란/꺠) 般(반/반) 伴(반/꺠) 潘(반,번/꺠,꺠)*
元3	closed	juæn	an Iuε?*	wæn(원) æn(연) an(안) wal(왈)*	wæn(원) æn(연)	願(원/원) 原(원/원) 苑(원/꺠) 闕(꺠/꺠) 月(월/꺠) 飯(반/꺠) 晚(만/꺠) 萬(만/꺠) 煩(번/꺠) 翻(번/꺠) 伐(벌/꺠) 曰(왈/꺠)* ¹⁹⁾
仙3B	closed	juā n	Iuæn	wæn(원) jæn(연)	wæn(원) jæn(연)	卷(권/꺠) 權(권/꺠) 員(원/꺠) 變(변/꺠) 卞(변/꺠)*
先4	closed	iuæn	Iuæn iæn	Jæn(연)	juæn(원)	涓(견/꺠) 犬(견/꺠) 淵(연/꺠) 旋(선/꺠) 血(혈/꺠) 邊(변/꺠)

Here again, D style readings are given medial of closed mouth except for characters with lip sound initials. As far as the rhymes Ziān (仙韻) and Xiān (先韻) are concerned, the readings of D style look closer to those of Middle Chinese or Jiao rather than vernacular.

With respect to the characters with lip sounds, two things can be observed. Xiān B (仙韻, B) is given two vowels, [wən] and [jən] with the latter solely for the characters that initiates with lip sounds. Since Xiān A (仙韻, A) does not have lip sound initials, it can be assumed that the distinction between Zhòngniǔ A and B has been neutralized in rhyme Xiān (仙韻).

Secondly, in Shānshè overall, the readings of characters with lip sound have a tendency to lose their lip round medial in D style as well as vernacular. This tendency was already confirmed in the previous sections.

A minor explanation is needed for the letter pān (潘), which has double readings [an] and [ən] in D style as well as in vernacular. [ən] is thought to represent the reading of Xiān (仙韻, grade III, B). Although pān (潘) had only a single reading in Guǎngyùn, it was listed with double readings in Gǔjīnyùnhuìjǔyào. The added reading here belongs to the rhyme Xiān (仙韻, grade B). As this sound coincides with [ən] in D style readings of Xiān (仙韻, grade III, B), this paper excludes it from the rhyme of Huán (桓韻) of D style Sino-Korean.

3.8. Xiàoshè (效攝) and Líushè (流攝)

19)'wal', the vernacular reading of '臼' is quite unique, since the final [al] is not witnessed in other cases than in this character. Note that 'iuε?' of Jǔyào is correspondent only to '臼'. The compilers of Dongguk jeong'un corrected it to 'wəl?' like the other characters.

Xiàoshè and Líushè are treated together as open mouth in Chinese, but pronounced as closed mouth in D style and vernacular. It is also interesting that both are given '몽' as syllable ending in Dongguk jeong'un. Considering these commonality and the effectiveness for discussion, these two rhyme groups will be examined in this section together. Discussion on the ending sign of '몽' will be done at the latter part of this section.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
豪1	open	au	au	o(오) jo(요) oj(외)	o(을)	高(교/골) 逃(도/똥) 遭(조/줄) 惱(노,로/놀) 毫(호/힐) 勞(로/룰) 草(초/출) 牢(로,뢰/룰) 寶(보/불) 帽(모/몰)
肴2	open	au	au ïau	jo(요) o(오)	jo(을) o(오)	交(교/골) 巧(교/골) 肴(효/힐) 茅(모/몰) 卯(묘/몰)
宵3B	open	jæu	ïeu	jo(요)	jo(을)	驕(교/골) 朝(묘/똥,똥) 超(묘/똥) 召(쇼/쑤) 照(조/쑤) 少(쇼/쑤) 妖(요/욤) 饒(쇼,요/욤) 表(표/똥) 廟(묘/똥)
蕭4	open	ïeu	ïeu ïeu	jo(요)	jo(을)	堯(요/욤) 鳥(묘/똥) 調(묘/똥)* 蕭(쇼/쑤)
宵3A	open	jæu	ïeu ïeu	jo(요)	jo(을)	蹺(교/골) 焦(조/쑤) 小(쇼/쑤) 消(쇼/쑤) 要(요/욤) 漂(표/똥)* 妙(묘/똥)

<Rhymes and their readings of Xiàoshè>

Xiàoshè (效攝) has [o] as main vowels without any exception, which is quite different from the case of Chinese. In Chinese, whether in Middle chinese or in the sound system of Yuan dynasty, the segment of lip round (u or w) is located at the coda of the syllable. In vernacular Sino-Korean, however, one can easily witness that its main vowel [o] has been produced from the fusion of the Chinese main vowel [a, æ, æ̃, ɛ] and coda [u] (or [w]).

Open and closed mouth in Donggukjeong'un style Sino-Korean

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
侯1	open	u	əu Iəu	u(우) o(오) jo(요)	u(우)	口(구/꺠) 兜(도/똥) 偷(투/툼) 頭(두/똥) 奏(주/줄) 侯(후/훤) 樓(루, 누/룸) 部(부/뽕) ²⁰⁾ 剖(부/푼) 茂(무/물) 母(모/물) 畝(모, 묘/물)
尤3	open	ju	əu Iəu	u(우) o(오) ju(유) juj(위)	u(우) ju(유)	鳩(구/꺠) 丘(구/꺠) 牛(우/우) 牟(모/물) 富(부/불, 붕) 優(우/훤) 右(우/우) 休(휴/훤) 朽(후/훤) 周(주/줄) 鷗(주/줄) 修(슈/쑤) 就(취, 주/쑤) 油(유/유) 猶(유/유) 流(류/류)
幽3	open	jəu	Iəu	ju(유)	ju(유)	糾(구/꺠) 幽(유/유) 幼(유/유) 謬(뉴/물)

< Rhymes and their readings of Liúshè >

Aspects of Liúshè (流攝) are parallel to Xiàoshè. Readings of D style contain [u] as main vowel with distinction of medial in grade I and III. The same is almost the case with vernacular, though the various vowels in vernacular have been corrected simply to [u] or [ju] in D style.

As is the case with Xiàoshè, the main vowel of D style readings and vernacular retains the phonetic feature of lip rounding, which makes both Xiàoshè and Liúshè in Sino-Korean defined as closed mouth.

Last but perhaps one of the most important topics in this section is understanding of 'ㄹ' that is consistently used as syllable ending. According to Hunmin jeong'eum Haerye (訓民正音解例, Explanations and Examples of the Correct Sounds for the Instruction of the People), 'ㄹ' is made for marking 'light labial (脣輕) not-clear not-muddy' (不清不濁)' sound, which would technically

20) Dongguk jeong'un listed another sound '뽕' for 部. But this appears belong to rhyme Mú(模韻) of Yùshè(遇攝).

mean a fricative of 'ㄱ', the labial nasal consonant.

In D style readings, however, the phonetic feature of ㄹ cannot practically be interpreted as fricative of 'ㄱ'. It can be easily confirmed in the actual texts of 15th century that adopted D style Sino-Korean, When the last syllables of Sino-Korean words belong to Xiàoshè or Liúshè and the nominal suffixes need to be attached to them, the very letter 'ㄹ' is always followed by 'ㅣ' not by 'ㅇ'²¹⁾ The same is the case with the other sets of nominal suffixes: '을, 를', and '은, 는'. These phonological distribution means that 'ㄹ' cannot be considered to have consonantal feature. Nor can it be treated to be as [w] or [u] as the original coda of Xiàoshè and Liúshè in Chinese, because the original Chinese coda [w] or [u] have merged into the main vowel to produce the new main vowel with [+round] feature in D style.

'ㄹ' might have therefore been introduced by the compilers of Dongguk jeong'un in order to function as a technical marker to remind of the Chinese origin.

3.9. Guǒshè (果攝) and Jiǎshè (假攝)

Guǒshè and Jiǎshè have been treated as complementary rhyme groups with distinction in grade and main vowel. This section examines rhymes both rhyme groups together, excluding the rhyme Má (麻韻), the open mouth.

21) In middle Korean, the nominal suffixes for subject case had two alternations: 'ㅣ, ㅇ'.

'ㅇ' was used in the place after 'closed' syllables that end with the consonants, while 'ㅣ' was applied to the place after 'open' syllables without consonantal coda.

Open and closed mouth in Donggukjeong'un style Sino-Korean

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
戈1 (果攝)	closed	ua	uo	wa(와) a(아) i(이)	wa(왕) a(앙)	戈(과/광) 科(과/광) 臥(와/왕) 鎖(좌,사/상) 坐(좌,자/장) 倭(와/왕) 墮(타/탕, 땅) 唾(타/탕) 螺(라/랑) 波(바,과/방) 摩(마/망) 跛(피/방)
尤3 (果攝)	closed	jua	lue	a(아) wa(와)	wa(왕)	癩(가/깡) 靴(화/황)
麻2 (假攝)	closed	ua	ua	wa(와)	wa(왕)	瓜(과/광) 花(화/황) 華(화/황) 瓦(와/왕) 樸(좌/왕)

Except the characters with lip sound in rhyme Gē (戈韻), all the vowels of D style readings are [wa].

As already shown in previous sections, characters with lip sound have lost the closed medial [w] or [u]; 波 (바,과/방) 摩 (마/망) 跛 (피/방).

3.10. Dàngshè (宕攝)

The 4 rhymes of Dàngshè have the same final [aŋ] in Middle Chinese. The only difference between them comes from the kinds of medials: [j], [u], [ju] and zero. This section examines only the rhymes that contain closed medials.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
唐1	closed	uaŋ	uaŋ uaŋ	waŋ(왕)	waŋ(왕)	光(광/광) 黃(황/황) 郭(곽/곽)
陽3	closed	juan	uaŋ	waŋ(왕) jak(약)*	waŋ(왕)	狂(광/광) 王(왕/왕) 況(황/황) 躑(황/황) 簍(약/약)*

Dàngshè shows rather a simple aspect; medials of closed mouth have maintained their place regardless of their origin, whether from Chinese or Sino-Korean.

As the closed mouth rhymes of Táng (唐韻) and Yáng (陽韻)

list only characters with tooth sound (牙音) and throat sounds (喉音), one cannot discuss on lip sound initials.

'jak (약)' is only for the reading of yuè '簾' in vernacular Sino-Korean. Surely the compilers of Dongguk jeong'un have not forgotten correcting this exceptional and unique pronunciation to the normal final [wa] in D style.

3.11. Gěngshè (梗攝)

Gěngshè has been treated as of one the complicated rhyme groups along with Zhǐshè (止攝), Xièshè (蟹攝), Zhēnshè (臻攝) and Shānshè (山攝) in Chinese phonology. In this section, the five closed mouth rhymes, Gēng (庚韻 grade II, III), Gēng (耕韻), Qīng (清韻), and Qīng (青韻) will be examined.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
庚2	closed	uəŋ	uŋ	oŋ(왕)	oŋ(왕)	觥(공/공) 橫(형/형) 號(곡/곡)
清3	closed	juəŋ	Iuəŋ	jəŋ(영)	juəŋ(왕)	兄(형/형) 榮(영/왕) 永(영/왕)
庚3	closed	juəŋ	Iuəŋ	jəŋ(영)	juəŋ(왕)	傾(경/왕) 瓊(경/왕) 營(영/왕) 役(역/왕) 疫(역/왕)
耕2	closed	uəŋ	uŋ	oŋ(영)	oŋ(왕)	宏(공/공) 獲(획/획) 畫(획/획) ²²⁾
青4	closed	iuəŋ	Iuəŋ	jəŋ(영)	juəŋ(왕)	螢(형/형) 扃(경/왕)

The table above shows a sound change in Chinese, in which medials have taken the place of main vowel (See Gēng 庚韻2 and Gēng 耕韻 2 in Jǔyào). Readings of vernacular Sino-Korean have also

22) '畫' have double readings in D style as well as in vernacular. The sound that is not presented in this table is '화(vernacular)/행(D style)'. which belongs to Xieshè(蟹攝).

Open and closed mouth in Donggukjeong'un style Sino-Korean

undergone a phonological change, especially in some rhymes that have lost closed mouth medial: Qīng (清韻), Gēng (庚韻³), and Qīng (青韻).

The compilers of Dongguk jeong'un, however, have uniformly restored closed mouth medial of Middle Chinese.

3.12. Xiánshe (咸攝)

As far as Xiánshe is concerned, only the rhyme Fán (凡韻) has been defined as closed mouth.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
凡4	closed	juem	am	əm(엄) ip(입)	əm(엄)	凡(범/뵂) 梵(범/뵂) 法(법/뵂) 乏(핍/뵂) ²³⁾ *

Fán (凡韻) consists of the characters that have only lip sound initials. Although it was defined in Middle chinese as closed mouth rhyme, the compilers of Dongguk jeong'un fixed it to be open mouth. They appeared to take into account the phonological feature of lip sound, which was supposed to neutralize the following closed medial in Sino-Korean. This lip round feature seemed to keep the compilers from restoring closed mouth medial.

3.13. Zēngshè (曾攝)

Zēngshè has 2 rhymes, Dēng (登韻) and Zhí (職韻)²⁴⁾.

rhyme	O/C	MC	Jǔyào	Ver.	DONG	Examples
登1	closed	uəŋ	uŋ	uŋ(웅) ojŋ(왕)	ojŋ(왕)	薨(흥/황, 황) 國(국/꺅)

23) The unique final of 'ip(입) in Xiánshe is found only with 乏(핍/뵂). Ito(2007) interpreted it as an analogical error that was confused with 逼(핍/벽, 蒸韻, 曾攝).

24) Rhyme Zhí (職韻) has only entering tone (入聲).

			uɛʔ ²⁵⁾	ɪŋ(으) oŋ(으)	ujŋ(으)	肱(굉, 궁, 궁/굉) 弘(홍/횡) 或(혹/획)
職3	closed	juək	uɛʔ	jək(역)	juək (웁)	域(역/획) 洫(혁/획)

All the readings of D style here have medial of closed mouth, a repetition of the pattern that has been confirmed so far in this paper.

4. Open and Closed Mouth as the fourth Underlying Principle

We have so far examined 15 rhymes groups that contain closed mouth as medial or main vowel in Sino-Korean.²⁶⁾ By examining the distribution of open and closed mouth in D style, we have revealed some findings as below.

- 1) Except the characters with lip sound initials, sounds with closed mouth in Middle Chinese were uniformly restored in D style readings, which has produce a clear difference from vernacular readings especially in Shānshè (山攝), Guǒshè (果攝), Gěngshè (梗攝) and Zēngshè (曾攝).
- 2) In Jiāngshè (江攝), characters with tongue sound (舌音), tooth sound (齒音), and semi tooth sound (反舌音) are given closed medial [w] in D style reading unlike those in vernacular readings. Here the closed mouth medial is obviously correspondent to that represented in Gǔjīnyùnhuìjǔyào (古今韻會舉要), which can be assumed to reflect the sound change in the period after Middle

25) 'uɛʔ'^{*} is the reconstructed final of '國, 或'.

26) The only rhyme group untouched is Shēnshè(深攝), which is classified as open mouth.

Chinese. The compilers of Dongguk jeong'un would have recognized and accepted this sound change.

- 3) In the rhyme Yú (魚韻) of Yùshè (遇攝), characters with Zhuāng series initials (莊系, 莊初崇生) are consistently given closed main vowel [o] (初, 所), so that they have come under the rhyme Mú (模韻), while those with other kinds of initials are transcribed with [ə]. This distribution coincides with vernacular.
- 4) Xiàoshè (效攝) and Liúshè (流攝) have [o] and [u] as main vowels respectively in vernacular Sino-Korean. Readings of D style set the line of vernacular as the standard, rather than simply restoring the original Chinese vowels most of which rhymes had [u] or [w] as coda.
- 5) Characters with lip sounds initials have lost closed mouth medial in D style readings as well as in vernacular. This pattern can be observed so strongly that Fán (凡韻), the only close mouth rhyme in Xiánshe (咸攝) in Middle Chinese, was not given closed mouth in D style readings. This might be because Fán (凡韻) composes only characters with lip sounds.
- 6) D style Sino-Korean is characterized by an absolute uniformity in the sense that it permits almost no exception.

These findings lead us to strongly suspect that the phonological framework of Dongguk jeong'un would not originate from a certain Chinese rhyme dictionary (Guǎngyùn, Gujiyùnhuiuyao or whatever). Neither can it be merely reconstructed from the vernacular readings.

Although much of closed mouth rhymes in D style readings can be retraced to Middle Chinese, some can be understood as taken from the sound change after Middle Chinese. Jiāngshè (江攝), Xiàoshè (效攝) and Liúshè (流攝) are the typical examples. As for D style readings' correlation with vernacular, some of rhyme groups (including a part of one; Jiāngshè 江攝) contain the readings

restored from Chinese sound system, while some other groups have conformed to vernacular readings. As for Xiàoshè and Liúshè in particular, it can be stated that D style readings have accepted vernacular, with ㄹ, a technical or symbolic indication to remind the original Chinese coda [u] or [w].

Note that these two-way aspects or two-sidedness looks incompatible with the uniformity mentioned at (6). A key to solve this seemingly paradoxical aspect in D style reading would be obtained by proposing a hypothesis or perspective of open and closed mouth. The compilers of Dongguk jeong'un might have taken the concept of open and closed Mouth as a general principle that towers over any actual sound systems, regardless of its times. To the compilers, it would not be important whether sounds are embodied in vernacular Sino-Korean, Middle Chinese, or sounds in Yuan dynasty. They embodied the definition of open and closed mouth as shown in Middle Chinese in the one hand, and then went forward to accept closed mouth that had appeared in the period after Middle Chinese on the other hand. Even vernacular readings were taken as normal if only they showed a consistent tendency on closed mouth; Xiàoshè (效攝), Liúshè (流攝), and some of the rhyme yú (魚韻).

But here the emphasis seemed to be given on transcription of closed mouth, since the D style readings have positively accepted the sound change toward closed mouth rather than toward open mouth. The compilers would have a very highly regard on the transcription of closed mouth. What this emphasis suggests would yet need further studies.

Anyway, this perspective on final system would help to understand the D style Sino-Korean together with initial system. It is well known that the Shin Suk-Ju's preface of Dongguk jeong'un deplored and described the erroneous vernacular readings that had resulted

Open and closed mouth in Donggukjeong'un style Sino-Korean from 4 kinds of sound changes²⁷⁾.

- 1) As for tooth sounds (牙音), k' (partly clear 溪母) is pronounced as k (full clear, 見母), which has resulted from the change of initials (字母之變).
Some characters with k' have merged into h (partly clear throat sounds, 曉母), which has resulted from the change of 7 sounds (七音之變).
- 2) There are no wholly muddy consonants (全濁音) in vernacular Sino-Korean, while our native language sounds have kept distinctiveness between clear and muddy (清濁). This must have resulted from the change of clear and muddy (清濁之變).
- 3) Though there is distinctiveness between tones in our native sounds, only our vernacular Sino-Korean have not witnessed distinction between rising tone (上聲) and departing tone (去聲). In addition, the coda of Zhì (質韻) and Wù (勿韻) that should be t (端母) is pronounced as l (來母) in vernacular Sino-Korean. These readings have made the sounds slow and does not fit into entering sound (入聲), which has resulted from the change of four sounds (四聲之變).

Change of initials, change of 7 sounds, change of clear & muddy, and that of 4 sounds, these 4 kinds of sound changes were actually recognized in Dongguk jeong'un, which have made the readings of D style look so different from those of vernacular.

By looking closely into the above 4 kinds of changes, however, one could easily notice that only tone (聲調) is referred to as the case of final system. Based on Shin Suk-Ju's discussion above, the compilers of Dongguk jeong'un seemed to apply their prescriptive and conservative attitude mainly toward initial system, while they left much room for vernacular readings in final system, except with the case of tones.

But by examining D style readings, so far, this paper has found

27) Translation is mine.

that the concept of open and closed mouth were applied deeply to D style readings with almost no exception. Therefore, this concept of open and closed mouth - the emphasis on closed mouth, to be accurate - should be added to the principles underlying D style Sino-Korean. As the change of initials (字母之變) can be understood as a part of that of 7 sounds (七音之變), the existing principles can be re-arranged as three principles²⁸⁾ ; seven sounds (七音), clear and muddy (清濁) and four tones (四聲 - not to be confused with the four tones of contemporary Mandarin). With the concept of open and closed mouth, we now have four principles underlying D style Sino-Korean.

But why the concept 'open and closed' was not described in the preface as explicitly as the other 3 principles is yet to be studied. An effective key to total understanding would be found in Hunmin jeong'eun Haerye. As quoted previously in the chapter three, the discussion in Haerye classified 8 basic vowels into two groups of hé (闔) and pì (闢), by the feature of lip round (口蹙) and lip spread (口張).

Here the concept of hé (闔, closed) and pì (闢, open) is taken, instead of kāihe (開合, open and closed). Interestingly and fortunately, the expression hé (闔) and pì (闢) is also in the very preface of Dongguk jeong'un. In the other part of the preface, just before describing the realities of vernacular Sino-Korean as quoted above, the writer (Shin Suk-Ju) describes the general theory of sound change as below.²⁹⁾

28) Throughout in several paragraphs or sentences in Shin Suk-Ju's preface of Dongguk jeong'un, the phrases 'seven sounds (七音), clear and muddy (清濁) and four tones (四聲)' are frequently found. 'Change of initials (字母之變)' is used once to describe the confusion of wholly clear (全清) and partly clear (次清), so that it can be understood as a part of change of seven sounds (七音).

29) Translation is mine.

Open and closed mouth in Donggukjeong'un style Sino-Korean

Generally it is not the case that there is distinction between sounds, rather the case is that there is difference between people. Not the case that there is distinction between people, rather the case is that there is difference between locals ... Our country makes itself a single local, so that our customs or dispositions are supposed to be different from those of China. How could our breathing fit into sounds of Chinese?

Thus the disparities between sounds of our language and China's should be necessarily generated. As for the sounds of characters, although ours are supposed to fit to Chinese, the actual movements of light and heavy (輕重) and closed and open (闔關) are inevitably, of themselves, drawn to the sounds of language. That is why the sounds of characters have also been changed.

This description supports the understanding that the compilers of Dongguk jeong'un would have tried to restore 'the actual movements of closed and open that were drawn to the sounds of languages'. In this context, *hé-pì* (闔關) can be interpreted as the same term as *'kāihé* (開合), although the order of two characters was switched.³⁰⁾

5. Conclusion

Although the compilers of Dongguk jeong'un described the realities of vernacular Sino-Korean in the preface of Dongguk jeong'un, their examples and explanations were devoted mainly to the initial system. As for standardized final system in particular, little was mentioned except tones.

This paper has examined the finals of Dongguk jeong'un Style Sino-Koreans with focus on open and closed mouth, and has found some meaningful patterns.

30) It is also noteworthy that the words 'light and heavy (輕重)' were used in *Qiyīnlüè* (七韻略) to note 'open and closed mouth' instead of *kāihé* (開合).

- 1) Dongguk joeong'un style Sino-Korean restored or strengthened closed mouth rhymes, which has produced the difference from vernacular readings.
- 2) While much of the prescriptive closed mouth are the restoration of Middle Chinese, some of rhyme groups such as Xiàoshè (效攝) and Liúshè (流攝), (or some parts of rhyme as in Jiāngshè 江攝) were given closed mouth, the result from the sound change after Middle Chinese.
As for Xiàoshè and Liúshè in particular, they have [o] and [u] as main vowels respectively in vernacular Sino-Korean. Readings of D style set this line of vernacular as the standard, not just restoring the original Chinese vowels most of which rhymes were [u] or [w] as coda.
- 3) Characters with lip sounds initials are transcribed as open mouth in D style readings following the line of vernacular. This attitude has been kept so deep and strong that Fán (凡韻), the close mouth rhyme in Chinese but with only lip sounds initials, has given open mouth in D style readings.
- 4) D style is characterized by an absolute uniformity in the sense that it permits no exception.
- 5) Based on these findings, the finals of D style Sino-Korean should not be understood as a result of a mere acceptance of a certain Chinese sound system, nor just an adaptation of vernacular.
- 6) The concept of open and closed would be the principle for finals, regardless of its origins, whether from Middle Chinese, sounds of Yuan dynasty or vernaculars. This concept is correspondent to both of kāihé (開合) in Yùnjìng (韻鏡) and hé-pì (闔闔) in Hunmin jeong'un Haerye (訓民正音解例).

References

- Ahn, Byeong Hui 안병희 (2007), *Hunminjeongeum Yeonku* (『訓民正音研究』, *Studies in Hunminjeongeum*, Seoul: Seoul National University Press).
- Baxter, William (1992), *A Handbook of Old Chinese Phonology*, Berlin, New York: Mouton de Gruyter.
- Arisaka, Hideo 有坂秀世 (1957), *Kokugo Oninshino Kenkyo* (『國語音韻史の研究』, 増補新版, *Studies in the Phonological History of Japanese*, revised ed. Tokyo, Sanshodo).
- Cha, Ik Jong 차익중 (2014a), *Dongguk jeong'unsik Hanja'eum Yeonku* (『東國正韻式 漢字音 研究』, 서울대학교 박사학위 논문, *A Study on Sino-Korean Transcription Adapted from Dongguk jeong'un in 15th Century Korean Texts and Literatures*, PhD. Dissertation, Seoul National University).
- (2014b), *Dongguk jeong'un'eui Jungseong Baeyeol Wonri'e Daehayeo* (동국정운의 중성 배열 원리에 대하여, *On Arrangemental Order of Rhymes in Dongguk jeong'un : From the Viewpoint of Hunminjeongeum Haerye*, *Journal of Korean Linguistics* 70, Society of Korean Linguistics), 157-183.
- Cho, Un-Seong 조운성 (2011), *Donggukjeongun Hanjaeumeui Seongmowa Unmu Chegye Yoenku*, 동국정운 한자음의 성모와 운모 체계 연구, 연세대학교 박사학위 논문, *A Study on the Initial and Final System of Sino-Korean of Donggukjeongun*, PhD. Dissertation, Yonsei University)
- Dong, Tonghe 董同龢 (1968), *Hanyuyinyunxhe* (『漢語音韻學』, *A Study in Chinese Phonology*, Taipei: Wenshizhe Chubanshe).
- Hanato, Masahiro 花登正宏 (1997), *Kokoninkaikyoyo Kenkyo*(『古今韻會舉要研究 : 中國近世音韻史の一側面』, *A Study on Gujinyunhuijuyao*, Tokyo: Kyokoshoin).
- Hong, Ki-Moon 홍기문 (1946), *Jeongeum Baldalsa* (『正音發達史』, *History of Development of Hunminjeongeum*, Seoul: Seoul Shinmunsa Press).

Proceedings of the SCRIPTA 2014, Seoul, Oct. 10-13, 2014

- Ito, Chiyuki 伊藤智ゆき (2007), *Chosen Kanjion Kenkyo* (『朝鮮漢字音研究』, *A Study on Sino-Korean*, Tokyo: Kyokoshoin).
- Kang, Shinhang (1997), *The Vowel System of the Korean Alphabet and Korean Readings of Chinese Characters*, Kim-Renaud (1997), 117-129.
- 강신항 (2000), *Hankukeui Unseo* (『韓國의 韻書』, *The Rhyme Dictionaries of Korea*), Seoul: Taehaksa.
- 강신항 (2003), *Hunminjeongeum Yeonku* (『訓民正音研究』, *Studies in Hunminjeongeum*), Seoul: Sungkyunkwan University Press.
- (2009), Josun Chogi Hanchaeumkwa Dongguk jeongun Hanchaeum Bigyopyo (朝鮮初期漢字音과 東國正韻漢字音 比較表, 『韓國語研究』 6, Comparative Table of Early Chosun Sino-Korean and Donggukjeongun Style Sino-Korean, Society of Korean Language Studies, 『*Studies on Korean Language*』 6) Paju:Taehaksa, 119-194.
- Kim, Cheolheon 김철헌 (1958), *Donggukjeongun Choseonggo*, (東國正韻 初聲考, 『국어국문학』 19, A Study on the Initials of Donggukjeongun, 『*Korean Language and Literature*』 19, Society of Korean Language and Literature Studies), 107-132.
- 김철헌 (1959), *Donggukjeongun Unmogo*, (東國正韻 韻母考, 『국어국문학』 19, A Study on the Finals of Donggukjeongun, 『*Korean Language and Literature*』 21, Society of Korean Language and Literature Studies), 1-132.
- Kim-Renaud, Young-Key ed. (1997), *The Korean Alphabet*, Honolulu: University of Hawaii Press.
- Karlgren, Bernard (1963), *Compendium of Phonetics in Ancient and Archaic Chinese*, Göteborg: Elanders Boktryckeri Aktiebolag (이돈주 역, 『중국 음운학의 이해』, 서울: 일지사).
- Kono, Rokuro 河野六郎 (1968), *Chosen Kanjionno Kenkyo* (『朝鮮漢字音の研究』, *A Study on Sino-Korean*, Tokyo, Tenrijiposha).
- Kwon, In Han 권인한 (1997), *Hanchaeumeui Byeonhwa* (한자음의 변화, 『國語史研究』) Changes in Sino-Korean Readings, Society of Korean Language History, *Studies in the History of Korean Language*, Seoul: Taehaksa, 283-344.
- 권인한 (2009a), *Jungse Hanguk Hanjaeumhun Jipseong*, (『중세한국한

- 자음훈집성』개정판, *Dictionary of Readings and Teachings of Sino-Korean of Middle Korean*, revised edition, Seoul: J&C)
- _____권인한 (2009b), *Jungse Hanguk Hanjaeumeui Bunseokjeok Yeonku* (『중세한국한자음의 분석적 연구』 개정판, *A Critical Study on Sino-Korean in Middle Korean*, revised edition, Seoul: J&C).
- Lee, Dong Lim 이동림 (1967), *Donggukjeongun Yeonku: Yeonkupyon* (『東國正韻研究』研究篇, *Studies in Donggukjeongun*, Dongguk University).
- Lee, Ki-Moon 이기문 (1961/1998), *Gukeosa Gaeseol* (『국어사개설』, *Introduction to the History of Korean Language*, Seoul: Taehaksa).
- Lee, Ki-Moon & Ramsey, Robert (2010), *A History of the Korean Language*, Cambridge ; New York : Cambridge University Press.
- Lee, Xinkui 李新魁 (1983), *Hanyudengyunxue* (『漢語等韻學』, *A study in Rhyme Grades of Chinese Phonology*, Beijing: Zhonghuashuju).
- Pulleyblank, E.G. (1984), *Middle Chinese: A Study in Historical Phonology*, Vancouver: University of British Columbia.
- Shin, A Sa 申雅莎 (2006) *Hanhanyun Yanjiu*(『韓漢音研究』, *A Study on Sino-Korean*, PhD. Disseration, Beijing University).
- _____申雅莎 (2007) *Jungse Hangukeo'e Banyeongdoen Jungkohapkuho Gochal*(중세한국어에 반영된 중고합구호 고찰, *A Study on Closed Mouth of Middle Chinese Reflected in Middle Korean*, 『*Journal Of Chinese Language & Literature*』 23, Society of Chinese Language and Literature)195-229.
- Song, Zhaoxiang 宋兆祥 (2008), *Zhongshangu Hanhanyu Yanjiu* (『中上古漢韓語研究』, *A Study on Old and Middle Chinese with Comparison of Korean*, PhD. Dissertation, University of Huazhong Science and Technology).
- Wang, Li 王力 (1970), *Hanyu shigao* (『漢語史稿』, *A study in the History of Chinese Language*, Taipei: Taishunshuju).
- _____ (1995), *Wangli Yuyanxue Cidian* (『王力語言學詞典』, Wangli's Dictionary of Linguistics, Jinan: Shandong Jaoyuchubanshe).
- Yu, Chang Kyun 유창균 (1966), *Donggukjeongun Yeonku: Yeonkupyon* (『東國正韻研究』: 研究篇, *Studies in Donggukjeongun*, Seoul: Hyeongseol Chulpansa)

Discussion: Open and Closed Mouth in Dongguk jeong'un style Sino-Korean

ITO, Takayoshi

Seoul National University, KOREA

This paper is meaningful in that it analyzes various types of Chinese and Sino-Korean sounds in an inductive way and points out the importance of how open and closed mouth is one of main principles on Donggukjeongun.

My questions are as follows:

1. In chapter 3, the author identifies pì-hé (關闔) in Hunminjeongeum Herye (訓民正音解例) as kāi-hé (開合). However, in the pì-hé relation, the counter sounds of ‘ㅏ, ㅑ’ (pì) are ‘ㅓ, ㅕ’ (hé) respectively. The difference between pì and hé should be considered as a phonological feature of a single segment, which contains roundedness, height, and backness. In the kāi-hé relation, on the other hand, the counter sounds of ‘ㅏ, ㅑ’ (kāi) are ‘ㅓ, ㅕ’ (hé) respectively, as showed in chapter 4. It should be considered that kāi-hé indicates whether the syllable contains the semi-vowel /w/ or not. Here, I am curious as to why the author deals with these two relations identically, even though such a difference exists.

2. In chapter 1 and 4, the author points out that the main principles of Donggukjeongun-style Sino-Korean do not contain the principle about kāi-hé (開合). Actually, kāi-hé is not the only feature

that is not described as the main principle. For instance, vernacular Sino-Korean sounds contain a confusion between the coda /j/ and no coda, which is fully corrected in Donggukjeongun-style readings. 街 belongs to Xiè shè (蟹攝), which has /j/ as a coda, but its vernacular Sino-Korean sound is ka (가), which has no /j/. On the contrary, 箇 belongs to Guǒ shè (果攝), which has no coda, but its vernacular Sino-Korean sound is kaj (개), which has /j/. The Donggukjeongun-style sounds of 街 and 箇 are kaj (강) and ka (강), whose codas are identical to the Chinese ones. In addition, adding ㄹ (ㄹ) to Xiào shè (效攝) and Liú shè (流攝) is not described as the main principle, either. My question is whether the reasons of these three exclusions are correlated or not.

3. In chapter 4 and 5, the author describes that the characters with lip sound (脣音) initials do not have a closed mouth medial in Donggukjeongun-style readings as well as in the vernacular one. However, it seems that the situation of Zhēn shè (臻攝) conflicts with this description. For instance, the Donggukjeongun-style sounds of 勃, 不, 物 are pol? (뽳), pul? (뽳), mul? (뽳) rather than the expected sounds of pal? (뽳), pil? (뽳), mil? (뽳), whose main vowels are identical to the vernacular Sino-Korean sounds pal (뽳), pil (뽳), mil (뽳). I would like to ask what the reason for this exception is.