THE ASYMMETRY OF THE MEDIAL GLIDES IN MIDDLE CHINESE

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Abstract

It is taken for granted in Chinese linguistics that the medial glide belongs to the rhyme (or final), and that the glides -i- and -u- exhibit the same behavior—they both belong to the rhyme. Insight into the constituency of the medial glides comes from phonological processes that target sub-syllabic strings. In this paper, I show that the medial glides in Middle Chinese exhibit asymmetric behavior. Specifically, -i- belongs to the rhyme, but -u- does not. Their syllabic position is as follows:

Cu[iVC]

Supportive evidence comes from the fanqie entries recorded in the Qieyun (c. 600A.D.). The same asymmetry is attested in modern Mandarin, especially in the dialects spoken in Shanxi Province. The 'split personality' of the medial glides in Middle Chinese proves remarkably conservative.

Key words: Middle Chinese, medial glide, syllable, Chinese phonology

摘 要

汉语学术界一般认为汉语介音（-i-和-u-）的音韵行为是一致的，它们同属韵母。本文检讨《切韵》的反切实例，认为-i-和-u-的音韵行为是不对称的。具体地说，-i-属于韵母，-u-属于声母。中古汉语音节和介音有关的结构如下所示（C, 辅音；V, 元音）:

Cu[iVC]

在《切韵》里，-i-是三等韵的标志，-u-是合口韵的标志。介音不对称说明等是韵母的特性，而开合口则是声母的特性。

我们还考察了现代山西方言的分音词，发现该方言的介音和中古介音是一致的。从中古到现代的一千多年里，汉语介音的音韵特性没有丝毫改变。

* This paper was originally presented at the Seventh International and Nineteenth National Conferences on Chinese Phonology, organized by the National Chengchi University, Taiwan, in May 2001. It is one of a series of papers I have written on Chinese syllable structure. In revising the paper I benefited from the comments of the anonymous reviewer, and from the discussion I had with Pan Wuyu, whose recent work (Pan 2001) deals with the same topic. I am responsible for errors of fact and interpretation that still remain.
1. INTRODUCTION

In Chinese linguistics, it is commonly assumed that the syllable consists of the initial (C) and the final (F). The final, in turn, consists of the medial glide (G), the nuclear vowel (V), and the coda consonant or off-glide (C), plus tone. We display the segmental structure of the syllable in (1).1

(1) \[C \[ F GVC\]]

In traditional philology, characters are classified along two parameters: division (等) and lip-rounding (开合). There are four divisions of rhymes, which are largely correlated with the tongue position of the main vowel, as exemplified by the xie 蟹 and xian 咸 rhyme categories (Wang 1980:57):2

(2)  I II III IV
    xie 蟹 ai ai ìei iei
    xian 咸 am am ìem iem

As is evident in the data, between Division I and Division IV vowels, the main vowel moves from the low-back position to the high-front position.3 In reconstruction work since Karlgren (1940), rhyme division is represented not only in the main vowel, but also in the medial glide. In Wang’s reconstruction, for example, Division III is represented by i, and Division IV by i. Phonetically Division III i is consonantal, and Division IV i vocalic; but phonemically, they are non-distinct (cf. Chao 1941). There are scholars, notably Lu (1947), Li (1956), Pulleyblank (1962), and Baxter (1992), who postulate -i- for Division III rhymes, and no medial glide for Division IV rhymes. The contrast between Division III and Division IV is encoded in the main vowel only.

Rhymes are further classified into round (he-kou 合口 ‘closed mouth’) and spread (kai-kou 开口 ‘open mouth’). Not all rhymes contrast for the spread-round distinction. Among those that do, the xie rhymes are typical:4

(3)  I II III IV
    xie 蟹, spread ai ai ìei iei
    xie 蟹, round uai wai ìwei iwei

1 The syllable in (1) is a structural interpretation of the relevant traditional philological concepts. Many scholars, among them Karlgren (1940), Wang (1956), Chen (1976), and Ting (1979), adopt the more articulated structure shown in (i).

(i) \[C \[ e G [e VC]\]]

where R stands for the rime, which is to be distinguished from F, the final. As far as reconstruction of historical Chinese phonology is concerned, the difference between (1) and (i) is immaterial. For this reason the two structures are widely accepted as equivalent in general as well as historical Chinese linguistics (cf. Wang 1956). In this paper, the terms ‘final’ and ‘rime’ are used in the structural sense of (i), and the term ‘rime’ in the traditional sense of yun-mu. I will not discuss the position of tone within the Qieyun syllable. The issue is discussed at length in Bao (1995).

2 Xie 蟹 and xian 咸 are traditional names for the rhyme categories (she 摄) in question. Reconstruction of the Qieyun and Guangyun phonology differs from scholar to scholar, more in phonetic symbols than in phonological substance; see Zhou (1984), Wang (1985) and Yu (1985) for a comparison of major reconstruction systems. In this paper, characters are transcribed with the phonetic reconstruction of Wang (1980), in accordance with the traditional classification of Ding (1981). It needs to be acknowledged that any system of reconstruction will serve our purpose equally well.

3 This characterization of division is not true of other rhymes. For example, the rhyme uy is Division I, but oy is Division II, even though the main vowel u is higher than o.

4 I will call rhyme categories with the spread-round distinction ‘paired rhymes’ (kai-he yun 开合韵), and those that do not, ‘singleton rhymes’ (du yun 独韵). Singleton rhymes come in two types: round singleton rhymes contain round main vowels (i.e., [u] in the yu 于摄 rhymes and [un] in the tong 通摄 rhymes), and spread singleton rhymes end in labials -u or -m (i.e. xiao [au] 效摄 and xian [am]咸摄). Clearly the second type of singleton rhyme exhibits the effect of OCP-like restriction on labial co-occurrence. This restriction persists in modern Chinese. Beijing Mandarin, for example, disallows *u…u, and modern Taiwanese disallows *u…u and *u…m (cf. Lin 1989, Chiang 1992).
Wang (1980), following Karlgren (1940), uses -u- for round rhymes of Division I, and -w- for round rhymes of the other three divisions. Obviously, the u/w distinction is non-phonemic (cf. Chao 1941, Li 1956, Pulleyblank 1962, Li 1971). In modern Mandarin, the medial glides are realized as -w- (Divisions I, II; round), -i- (Divisions III, IV; spread) and -y- (Division IV; round), respectively.5

Using the syllable structure in (1), we enumerate the inventory of Qieyun syllables in (4).

(4) a. spread, I, II [C₁ [v VC]]
   b. spread, III  [C₁ [v IVC]]
   spread, IV  [C₁ [v iVC]]
   c. round, I  [C₁ [v uVC]]
   round, II  [C₁ [v wVC]]
   d. round, III  [C₁ [v wVC]]
   round, IV  [C₁ [v wVC]]

The syllable structure in (1) projects an air of symmetry and consistency. The glide that codes division (henceforth, -i-) and the glide that codes lip-rounding (henceforth, -u-) occupy the same medial position within the syllable—as the first segment of the final. The position of the medial glides, however, is not as settled as the typology in (4) would have us believe. In modern Chinese dialects the medial glides are not uniformly part of the final (cf. Chao 1941, Li 1956, Lin 1989, Bao 1990; but see Duanmu 1990, 2001). In Middle Chinese, the language represented in the Qieyun (c. 600 A.D), there is convincing evidence that -i- and -u- exhibit asymmetric phonological behavior that points to different positions within the syllable. This is the core issue we will address in the following pages.

In traditional rhyme dictionaries, division and lip-rounding are considered properties of the rhymes (cf. Wang 1956). Linear order between them is not a meaningful theoretical or empirical issue. In modern reconstruction, which attempts to interpret traditional categories in phonetic and phonological terms, division and lip-rounding are represented by two separate symbols, -i- and -u-. The question of linear order between the two arises. There are three possibilities, listed in (5).

(5) a. -i,u-
   b. -iu-
   c. -ui-

(5a) is unordered. In autosegmental phonology, -i- and -u- can be treated as ‘floating’ sub-segmental features, which are mapped onto the syllable template to yield either (5a) or (5b). For this reason we consider (5a) equivalent to either (5b) or (5c) under a suitable autosegmental analysis of the syllable template and segment-template mapping. Some scholars adopt (5b), which is perhaps due more to convention than to analytical commitment (but see Zhou 1954). Other scholars argue that lip-rounding is a property of the initial, and division a property of the final (Schaank 1897, Pan 2000). That requires (5c). Historical evidence appears to support -ui-. Archaic Chinese rhymes do not contrast for the spread-round distinction, and the Middle Chinese -u- is derived largely from labialized initials in Archaic Chinese (cf. Karlgren 1940, Dong 1944, Pulleyblank 1962, Li 1971, Chang and Chang 1976, Pan 2000).

The contiguous strings in (5b,c) can be given a structural interpretation. Two such interpretations, through different mappings of -i,u- onto the same syllable template, are displayed in (6).

(6) a. -i[u-
   b. -u[i-

For now, I will not give a structural interpretation of ‘[’). Both (6a) and (6b) have been proposed in the literature. Ting (1979) assigns (6a) to Division III/IV round rhymes, with -i- part of the initial, and -u- part of the final. Under this analysis, -u- cannot be a secondary feature of labialization of the initial segment. For scholars who consider -u- a feature of labialization, (6b) is the only possible structure for Division III/IV rounded rhymes.

(6a,b) are syllabic representations of the traditional notions of division and lip-rounding. The difference between them can only be resolved empirically through a careful analysis of linguistic processes that target the final as a constituent. One such process is fanqie, which ‘spells’ the pronunciation of a novel character (i.e. syl-

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5 For this reason I treat the front round glide -y- (-ü- in pinyin) as a sequence of -u- and -i-, and will not discuss round rhymes of Division IV separately from round rhymes of the other three divisions. I thank one reviewer’s comment on this point.
lable) by combining the initial of one syllable with the final of another. Since it divides the syllable at the juncture of the medial glide, fanqie spelling reveals the position of the medial glide within the syllable. In Chinese historical linguistics, fanqie data are primarily used for the reconstruction of segments (i.e. initials and rhymes). In this paper I examine these data to ascertain the structural position of the medial glides. I argue that the fanqie data support (6b), yielding the structure shown in (7).

(7) [Cu[iVC]]

(7) is the structural interpretation of the asymmetric phonology of the medial glides in Middle Chinese: -i- is part of the final; -u- is not.

The rest of the paper is organized as follows. In section 2 I discuss the fanqie entries of the Qieyun fragments. In section 3 I show that the asymmetry of the medial glides is also attested in modern Shanxi dialects. Syllable structure proves to be remarkably conservative for some 1400 years. Section 4 is the conclusion.

2. MEDIAL HARMONY IN FANQIE

Fanqie, literally ‘reverse cut’, is a common philological tool used in dictionaries, rhyme tables, and other documents to specify the pronunciation of a novel character. One specimen of the fanqie spelling follows.

(8) tuŋ = tak + yuŋ

The initial segment of the first syllable t- combines with the non-initial segments of the second syllable, -uy, to ‘spell’ the new syllable tuŋ. The general format of fanqie spelling is (9).

(9) target syllable = initial syllable + final syllable

The fanqie data in the Qieyun, on the basis of which the phonology of Middle Chinese is reconstructed, has been extensively and exhaustively studied, especially Li (1956), Lu (1963), and more recently Pan (2001). According to Lu (1963), the general properties of fanqie are as follows.

(10) a. The target syllable has the same initial segment as the initial syllable.
    b. The target syllable has the same -VC as the final syllable.
    c. The target syllable has the same tone as the final syllable.
    d. If the final syllable contains -i-, the target syllable contains -i-.
    e. If the final syllable contains -u-, the target syllable contains -u-.

We now proceed to examine the fanqie entries (i.e. characters) in the Qieyun. The following examples are typical of Divisions I and II syllables.6

(11) a. ta 1 = tak 4 + ya 1
    ma 2 = mak 4 + ya 2
    b. t’ai 3 = t’u 1 + dhi 3
    mau 3 = mak 4 + pau 3
    c. kap 4 = ku 2 + yap 4
    mat 4 = mak 4 + yat 4
    p’ak 4 = pak 4 + xak 4
    d. ts’u’m 1 = ts’uŋ 1 + yom 1
    tan 2 = ta 1 + yan 2
    p’uŋ 2 = pak 4 + lan 2

6 Unless otherwise stated, the data are collected from Li (1956), Lu (1963) and Ding (1981), and transcribed with the phonetic symbols used in the reconstruction of Wang (1980). The numbers in the data represent tonal categories: 1 for ping ‘even,’ 2 for shang ‘rising,’ 3 for qu ‘departing,’ and 4 for ru ‘entering.’ There is considerable controversy concerning Division IV syllables. Wang (1980) and Li (1956) are in the opposing camps: Wang (1980) reconstructs a medial glide for Division IV syllables, whereas Li (1956) does not. Our discussion does not commit us to a given position on this issue. We will therefore consider the medial glide in Division III syllables only.
The above entries are canonical *fanqie*: the target syllable obtains its initial from the initial syllable, and -VC and tone from the final syllable, cf. (10a,b,c). Since the target and final syllables lack a medial glide, they vacuously satisfy (10d,e).

For our purpose, Division III syllables are crucial. (10d,e) require that the target and final syllables of a *fanqie* entry share the same medial glide. While (10a,b,c) have no exception, there are exceptions to (10d,e). The number, however, is negligible. Out of some 3616 *fanqie* entries that comprise the *Qieyun*, only 41 entries are exceptional (cf. Li 1956, Lu 1963).\(^7\) The exceptions constitute a little more than one percent of the total number of *fanqie* entries. We conclude that the target and final syllables strictly obey (10d,e).

Generalizations (10d,e) impose strong harmonic requirement on the medial glides of the target and final syllables of a *fanqie* entry. Chao (1941) observes that there is an unmistakable tendency for the initial and final syllables to share medial glides, a phenomenon that he calls medial harmony. As we shall see shortly, medial harmony between the initial and final syllables is not as strong as that between the target and final syllables. We will call it weak medial harmony, to be distinguished from (10d,e), which express strong medial harmony.

The two medial glides, -i- and -u-, exhibit distinct harmonic behavior, which, we will argue here, arise from their distinct syllabic position. We first consider -i- harmony. Lu (1963) tabulates the *fanqie* entries in terms of the division of the initial and final syllables. The results are summarized in (12).

(12) Division of initial and final syllables of all *fanqie* entries

<table>
<thead>
<tr>
<th></th>
<th>-I</th>
<th>-II</th>
<th>-III</th>
<th>-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-</td>
<td>799</td>
<td>304</td>
<td>30</td>
<td>233</td>
</tr>
<tr>
<td>II-</td>
<td>5</td>
<td>33</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>74</td>
<td>205</td>
<td>1807</td>
<td>42</td>
</tr>
<tr>
<td>IV-</td>
<td>22</td>
<td>5</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>547</td>
<td>1853</td>
<td>291</td>
</tr>
</tbody>
</table>


The figures in (12) exclude 25 entries with division mismatches between the target and final syllables. From the table, we can make a few observations. First, there is no co-occurrence restriction on the division of the initial and final syllables of a Division I, II or IV entry. For example, I-II entries outnumber II-II entries by a large margin (304 vs. 33), and I-IV entries outnumber all other -IV combinations (233 vs. 58). Second, Division IV behaves like Divisions I and II in its combinatorial possibilities. As we mentioned earlier, Divisions I and II syllables are reconstructed with no medial glide, and Division III syllables with the glide -i- (or other equivalent symbols). These reconstructions are not controversial, and amply supported by the realization of Divisions I, II, and III syllables in modern Chinese dialects. However, the reconstruction of Division IV syllables is a controversial matter. The core of the controversy is how Division IV is represented in phonetic reconstruction. Karlgren (1940), Chao (1941), and Wang (1980) represent it in the medial glide, while Lu (1947), Li (1956), and Shao (1980) represent it in the main vowel. The weak harmonic behavior of Division IV syllables—that between the initial and final syllables—supports the latter reconstruction. Following Lu (1947) and Li (1956), we will group Divisions I, II and IV syllables together.

Third, and more importantly for us, Division III syllables predominantly combine with other Division III syllables. This is the expected result of weak medial harmony (cf. Chao 1941, Pan 2001). It appears that Division III is special in the phonology of Middle Chinese: it obeys medial harmony in *fanqie*, conditions the palatalization of velars, and the subsequent spirantization of labials (cf. Karlgren 1940, Chao 1941, Lu 1947, Li 1956).

Collapsing Divisions I, II, and IV into a single category, denoted by I, we obtain the following table from (12):

(13) Weak medial harmony

<table>
<thead>
<tr>
<th></th>
<th>-I</th>
<th>-III</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-</td>
<td>1417</td>
<td>46</td>
</tr>
<tr>
<td>III</td>
<td>321</td>
<td>1807</td>
</tr>
</tbody>
</table>

Given the near perfect strong medial harmony, that between the target and final syllables, we can group all *Qieyun fanqie* entries into four broad types, enumerated in (14a-d). We add (14e-h) to complete the list.

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\(^7\) The figure includes mismatches of all divisions. That is to say, if the target syllable is Division I, and the final syllable Division II, the *fanqie* entry is considered a mismatch—a violation of (10b). Disharmonious *fanqie* entries in violation of (10d,e) are no more than 25, according to Lu (1963: 354).
Chao (1941) sees weak medial harmony as gradient, rather than absolute. This is evident in (14). The canonical types are (14a,b), which are perfect in both strong and weak versions of medial harmony. (14c,d) obey strong medial harmony, but violate weak medial harmony. (14e,f), which Li (1956) and Lu (1963) consider exceptional, violate both strong and weak medial harmony. (14g,h) are not attested. Together, (14a-h) are all the possible target-initial-final combinations in fangie spelling.

We have seen fangie data of the type (14a). The fangie data of the three types (14b-d) are as follows.

(15) a. Type (14b) l\[i\] = l\[i\] + t\[i\] = l\[i\]
    b. Type (14c) ts\[i\] = ts\[i\] + y\[i\] = ts\[i\]
    c. Type (14d) dz\[i\] = dz\[i\] + s\[i\] = dz\[i\]

The medial harmony patterns that we see in (15) provide unequivocal evidence for the partial structure of the Division III syllable shown in (16):

(16) …[i…]

where … may be null, and [ is a sub-syllabic constituent. The patterns can be readily accounted for with [ interpreted as the nucleus (17a), the rime (17b), or the final (17c).

(17) a. …[N i…]…
    b. …[R i…]…
    c. …[F i…]…

All three structures represent division as a property of the rhymes.

Assigning the structure (16) to the fangie entries in (15) yields the forms in (18):

(18) a. dz\[i\] = dz\[i\] + s\[i\] = dz\[i\]
    b. ts\[i\] = ts\[i\] + k\[i\] = ts\[i\]
    c. l\[i\] = l\[i\] = l\[i\]

These forms clearly demonstrate the process of fangie spelling: the target syllable is formed with the initial of the initial syllable and the final of the final syllable. Since -i- is part of the final, the target syllable inherits -i- from the final syllable—the content of strong -i- harmony (10d).

8 The figure does not include 10 entries of Division II and Division III mismatches that are due to the initial-final phonotactics; see Li (1956: 101). One such example is the form in (i), which is of type (14e):

(i) t\[i\] = t\[i\] + x\[i\] = t\[i\]

In this form, the initial t\[i\] (chang) only combines with Division III rhymes, but m\[i\] is a Division I rhyme. Some of the exceptional fangie entries of the Qieyun are ‘corrected’ in later rhyme dictionaries, see Lu (1963: 351).
The exceptional forms (14e,f) are exemplified below:

(19) a. Type (14e)  
\[ k_i t = k + m_{t} \]  
\[ k_i w = k + t + u \]  
\[ b_l t = b + u + k \]  

b. Type (14f)  
\[ t = t + l \]  
\[ w = w + t + u \]  
\[ b = b + u + k \]  

Both forms violate strict medial harmony between the target and final syllables. They are truly the exceptions that prove the rule.

We now turn to \(-u\)- harmony, which is far more complicated than \(-i\)- harmony. Traditional rhyme table compilers classify rhymes into two groups: those that contrast for spread-round distinction (\(kai-he\) 年 ‘spread-round rhyme’), and those that do not (\(du\) 年 ‘singleton rhyme’). The so-called singleton rhymes may contain vowels that are either spread (the \(xiao\) 效 category) or round (the \(yu\) 遇 category). Round syllables from rhyme categories with the spread-round contrast contain the medial glide \(-u\). Singleton rhymes lack \(-u\), regardless whether their main vowels are round or spread. This distinction is important for \(-u\)- harmony, as we shall see shortly.

According Li (1956), there are five types of fanqie entries involving \(-u\)-. These are shown in (20) (\(u\), syllables containing \(-u\)-; \(d\), syllables from singleton rhymes; \(-\), syllables without \(-u\)-; \(p\), syllable with labial initial).

(20) a. i. \(u = - + u\)  
ii. \(u = d + u\)  

b. i. \(u = u + u\)  
ii. \(u = u + p\)  
iii. \(d = u + d\)  
iv. \(u = u + -\)  

c. \(u = d + -\)  
d. \(- = u + -\)  
e. \(- = - + u\)

Of the five types, Li (1956) and Lu (1963) consider (20c-e) exceptional. Like \(-i\)- harmony, we distinguish strong \(-u\)- harmony between the target and final syllables (cf. (10e)) from the weak \(-u\)- harmony between the initial and final syllables. Clearly, (20c,d,e) violate strong \(-u\)- harmony. Since there are only thirteen entries, they do not affect the validity of (10e) as a requirement of fanqie spelling.

By far (20a) is the most common type, followed by (20b). These two types are exemplified in (21) and (22), respectively:

(21) a. \(tsu = tsa + k\)  
\(t = t + y\)  
\(ku = k + y\)  
\(t = t + u + k\)  

b. \(yiwen = y + w + x\)  
\(xiwen = x + w + m\)  
\(y\)  
\(x\)  
\(x\)  
\(x\)  
\(x\)  

(22) a. \(k = k + g\)  
\(yiwen = y + w + x\)  
\(xiwen = x + w + m\)  
\(y\)  
\(x\)  
\(x\)  
\(x\)  

We now consider the implication of \(-u\)- harmony for the position of \(-u\)- within the syllable. If we interpret the notion ‘initial’ as a segment, rather than a syllabic constituent (i.e. onset), the data in (21) offer compelling evidence that \(-u\)- is independent of the initial. If it were a marker of secondary articulation of the initial segment, i.e. labialization, we would expect it to disappear from the target syllable, which acquires the initial from the initial syllable. The data are compatible with the two structures in (23).
We now turn to the patterns of (20b), exemplified in (22). These patterns may appear to be insignificant, since there are only 70 entries. The 70 entries are not insignificant if examined against the overall distribution of initial syllables. According to Li (1956:94-96), there are some 425 initial syllables used in the fanqie spelling of the Qieyun, representing 36 initials. Among the 425 initial syllables, only 36 syllables, representing 14 initials, contain the medial glide -u-, and many of them are velars, and to a lesser extent, labials. Though small in number, the fanqie types (20b) nevertheless offer reliable evidence concerning the syllabic status of the medial glide -u-. The data in (22a), of type (20b-i), need no comment; they obey both strong and weak medial harmony. (22b), of type (20b-ii), are entries whose final syllables contain labial initials. The phonotactics of labial initials in Middle Chinese is too complex to discuss in detail here; interested readers may wish to consult Karlgen (1940), Chao (1941), Lu (1947, 1963), Li (1956), Ting (1979), Li (1971), Shao (1982), and Pan (2000). It is sufficient for us to note that labial initials are found with round rhymes, especially Division III rhymes, as attested (1940), Chao (1941), Lu (1947, 1963), Li (1956), Ting (1979), Li (1971), Shao (1982), and Pan (2000). It is sufficient for us to note that labial initials are found with round rhymes, especially Division III rhymes, as attested by the yiwnt 4 and xìwun 2 entries of (22b).9 The remaining two entries of (22b), ywng 1 and xw 3, clearly obtain -u- from their respective initial syllables. The target and final syllables of the entries in (22c), of type (20b-iii), belong to singleton rhyme categories—those without the spread-round contrast. Some are round (i.e. xuok 4); some spread (i.e. xam 1). Finally, the entries in (22d), of type (20b-iv), violate strong medial harmony, and the target syllable obtains -u- from the initial syllable.

Based on the data in (22), Li (1956:136) gives the following generalization (see also Pan 2001):

Generalization (24) allows strong -u- harmony to be violated provided that there is -u- in the initial syllable—simultaneous violation of strong and weak -u- harmony. In other words, the medial glide -u- in the target syllable may come from the final syllable or the initial syllable. The role of -u- harmony in fanqie spelling differs sharply from that of -u- harmony, as we have seen earlier.

We now consider type (20c), which Li (1956) considers exceptional. There are only ten entries, all of which violate strong -u- harmony. Three specimens of this type are shown below:

\[
\begin{align*}
\text{(25)} & \quad k'\text{u} \text{n} 3 = k'\text{u} 2 + \text{Ian} 3 \\
& \quad y\text{iwe} 3 = y\text{u} 1 + \text{die} 3 \\
& \quad k\text{wai} 1 = k\text{u} 1 + \text{dai} 1
\end{align*}
\]

In all ten entries, the initial syllable belongs to the singleton rhyme category yu 遇, which is the most frequently used category as initial syllables in the Qieyun (Lu 1963). It may be tempting to treat the yu 遇 syllables, which are round, as containing the medial glide -u-, and analyze these entries along the same line as entries of types (20b-ii,iv), in which the initial syllable contributes -u- to the target syllable. Li (1956) observes that this treat-

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9 Modern Chinese labiodental fricatives are derived from Middle Chinese labial plosives in round, Division III syllables (piwag > faq ‘square’). Labial initials must be allowed to combine with round rhymes of Division III, in violation of OCP, to provide the right conditioning environment. Labial initials combine freely with round and spread singleton rhymes (i.e. pu p with the mo 模 rhyme in the yu 遇 rhyme category; pau p with the hao 豪 rhyme in the xiao 效 rhyme category), but not with round paired rhymes of Divisions I, II, and IV (i.e. puan p with the huan 桓 rhymes in the shan 山 rhyme category), with the exception of the hui 灰 rhymes in the xie 謝 rhyme category, where labials combine with the round rhymes, but not with the spread ones, i.e. puol vs. *pni. When labial-initial syllables are used as the final syllable, we may have surprising results (Li 1956: 134, Lu 1963: 350):

(i) kai 2 = ka 1 + mai 2
   k\text{wai} 2 = k\text{u} 1 + \text{mai} 2
(ii) y\text{e} 4 = y\text{u} 1 + \text{paet} 4
    y\text{waet} 4 = y\text{u} 2 + \text{paet} 4

As the data show, the same labial-initial final syllable is used to ‘spell’ spread and round target syllables. Although such entries are few—Lu (1963) lists only 7 such pairs, they are nevertheless symptomatic of the structural indeterminacy of the medial glide -u-.
ment is untenable, since in all other cases with a \(yu\) 遇 initial syllable, the target syllable does not exhibit -\(u\)-. The entries below belong to Type (14a).

(26)  
\[\begin{align*}
\text{koi 1} &= \text{ku 3 + ŭi 1} \\
\text{don 2} &= \text{du 1 + ŭan 2} \\
\text{sâŋ 3} &= \text{su 1 + laŋ 3} \\
\text{luk 4} &= \text{lu 1 + kak 4}
\end{align*}\]

These entries suggest that round singleton rhymes, such as \(yu\) 遇, do not contribute -\(u\)- to the target syllable, in contrast to round rhymes with spread-round contrast.

From the data in (22) we can conclude that -\(u\)- is not as closely tied to the vowel as -\(i\)- is. In fact, the role of -\(u\)- in fanqie spelling is ambivalent: it is not secondary articulation of the initial, yet it tends to accompany the initial, as demonstrated by the data in (22b). This behavior suggests that -\(u\)- is not part of the same constituent as -\(i\)-, which we capture with the structure (23a).

Unfortunately the fanqie data do not shed light on the precise constituency of -\(u\)-. The structure in (23a) is the substructure of the following possible syllable structures (irrelevant structure is omitted):

(27)  
\[\begin{align*}
a. & \quad \sigma \\
 & \quad R \\
 & \quad C u i V C \\
b. & \quad \sigma \\
 & \quad O R \\
 & \quad C u i V C \\
c. & \quad \sigma \\
 & \quad F R \\
 & \quad C u i V C \\
\end{align*}\]

In moraic theory, -\(i\)- links to a mora, and -\(u\)- directly to the syllable node, as displayed in structure (28).

(28)  
\[\begin{align*}
\sigma \\
\mu \\
\mu \\
i
\end{align*}\]

We take (28) to be equivalent to (23a).

Since the fanqie facts do not differentiate among the three structures (27a,b,c), we will continue to use (23a) to represent the asymmetry of the medial glides in Middle Chinese.

3. **The Medial Glide in Modern Shanxi Dialects**

The language recorded in the *Qieyun* is most likely the language of the educated elite, with the compilers displaying characteristic deference to past rhyme dictionaries (cf. Zhou 1966). Although the precise geographic location of the language is open to debate—the ancient capitals of Changan and Luoyang are among the most likely places, there is general consensus among scholars that it is the predecessor of modern Chinese dialects, especially Mandarin (cf. Zhou 1966, Chen 1976, Ting 1979, Wang 1980, Pang 2000). The phonology of the medial glide in Middle Chinese and modern Mandarin dialects provides interesting support to this position. In this section, we show that the same asymmetry is attested in the so-called *l*-words in the Mandarin dialects spoken in Taiyuan and Datong, two major cities of Shanxi Province, near the ancient capitals mentioned above.
L-words are disyllabic, partially reduplicated words in which the second syllable invariably begins with \( l \), hence the name. Partial reduplication is not a productive word-formation process in modern Mandarin, and the historical origin of L-words is often obscure (see Xu 1981, Zhang 1993). These fossilized lexical items are widespread in Chinese, especially in northern Mandarin dialects. In almost all cases an L-word corresponds to a monosyllabic word of the same meaning, as exemplified below:

\[(29)\] pai 2 = poʔ 4 - lai 2  ‘sway’

Combining \( p \) of the first syllable and \( ai 2 \) of the second yields pai 2. In structure, L-words parallel fanqie entries. The Taiyuan L-words have been discussed quite extensively (Wang 1961, Zhao 1979, Xu 1981). The data cited here are drawn from Zhao (1979).

Zhao (1979) lists eighty-eight L-words, which fall into three major types, shown in (30).

\[(30)\]

<table>
<thead>
<tr>
<th>Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>poʔ lai (&lt; pai) ‘to wag’</td>
</tr>
<tr>
<td></td>
<td>taʔ laŋ (&lt; tŋ) ‘scaffold’</td>
</tr>
<tr>
<td></td>
<td>kaʔ lau (&lt; kau) ‘to stir’</td>
</tr>
<tr>
<td>IIa</td>
<td>tuaʔ luəe (&lt; tuae) ‘to arrange’</td>
</tr>
<tr>
<td></td>
<td>kuaʔ luʔ (&lt; kuaʔ) ‘stick’</td>
</tr>
<tr>
<td></td>
<td>tsʰuaʔ luəe (&lt; tsʰuae) ‘a string of’</td>
</tr>
<tr>
<td></td>
<td>xuaʔ luəe (&lt; xuəe) ‘a place’</td>
</tr>
<tr>
<td>IIb</td>
<td>k’uaʔ lye (&lt; k’ye) ‘circle’</td>
</tr>
<tr>
<td></td>
<td>kuaʔ lye (&lt; kye) ‘to roll into’</td>
</tr>
<tr>
<td>IIc</td>
<td>tuʔ la (&lt; tuʔ) ‘to drop’</td>
</tr>
<tr>
<td></td>
<td>k’uaʔ lai (&lt; k’uai) ‘biscuit’</td>
</tr>
<tr>
<td>III</td>
<td>tsʔ liou (&lt; tiou) ‘to carry’</td>
</tr>
<tr>
<td></td>
<td>kaʔ liau (&lt; kiau) ‘crooked’</td>
</tr>
<tr>
<td></td>
<td>p’äʔ liaʔ (&lt; piaʔ) ‘idiosyncratic’</td>
</tr>
</tbody>
</table>

From the data, we obtain the following two generalizations:

\[(31)\]

a. -i- and -y- do not occur in the first syllable.

b. If -u- occurs in the second syllable, it occurs in the first syllable.

Informally, we derive an L-word from its monosyllabic base syllable through a copy-and-replace strategy: We first copy the base syllable to yield a string of two syllables, and then replace the rime of the first syllable with \( ↔ \) (Replace(R)), and the initial of the second syllable with \( l \) (Replace(l)). This is illustrated in the derivation of Type I L-words, shown below.

\[(32)\]

| Copy base: | taŋ   |
| Replace(R): | taʔ   |
| Replace(l): | -     |

Output: taʔ laŋ

Type I L-words are composed of syllables that do not have a medial glide. The derivation establishes the targets of Replace(R) and Replace(l).

\[\text{10} \] The four types in (30) account for 90% of the L-words listed in Zhao (1979). Zhao (1979) does not provide the monosyllabic counterparts of the L-words that comprise the list. The words given in parentheses are reconstructed from other sources, mainly Wang (1961), Zhao (1979), and He and Wen (1993). The assumption here is that a monosyllabic word contains all the phonetic materials of its L-word counterpart. From our perspective, only three L-words, shown below, are truly exceptional.

\[(i)\]

<table>
<thead>
<tr>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>kuaʔ liou ‘to roll’</td>
</tr>
<tr>
<td>kuaʔ liou ‘goat’</td>
</tr>
<tr>
<td>tsʰuaʔ liou ‘to slide down’</td>
</tr>
</tbody>
</table>

The two syllables do not contain the same medial glide.
In Type IIa -l-words, the medial glide -u- from the base syllable is retained in both syllables, suggesting that neither Replace(R) nor Replace(l) affects -u-. In Type III -l-words, the medial glide -i- is retained in the second syllable, but disappears from the first syllable. The absence of -i- is not due to phonotactically-induced repair, since -iə? is an actual rhyme in Taiyuan (Wang 1961). We attribute it to the effect of Replace(R). The transfer behavior of -i- suggests that -i- is part of the rime, a constituent targeted by Replace(R). The derivations below illustrate.

(33) a. Derivation of Type IIa
   Copy base: ts’u[æ] ts’u[æ]
   Replace(R): ts’u[ə]?
   Replace(l): -
   Output: ts’uə? luæ

b. Derivation of Type III
   Copy base: p’[iə? p’[iə?
   Replace(R): p’[ə? -
   Replace(l): - l[iə?
   Output: p’[ə? lia?

Since -y- is a combination of -u- and -i-, Type IIb can be derived in the same fashion:

(34) Copy base: ku[iə] ku[iə]
   Replace(R): ku[ə? -
   Replace(l): - lu[iə
   Output: kuə? lye

At first glance, Type IIc -l-words appear problematic, since -u- occurs only in the first syllable, but not in the second. This type can be easily understood in consideration of Taiyuan phonotactics: Replace(l) creates luo and luai, which are not possible syllables in Taiyuan. The lack of -u- can be attributed to phonotactic repair:

(35) Copy base: k’u[ai k’u[ai
   Replace(R): k’u[ə?
   Replace(l): - lu[ai
   Phonotactic repair: - l[ai
   Output: k’uə? lai

Under this analysis, Type IIc and Type IIa are equivalent.

Exactly the same medial glide asymmetry is exhibited in the dialect of Datong. Datong -l-words are listed in (36) (Ma and Liang 1986).

(36) a. Type I
   k’əu > k’ə? ləu
   peə > poʔ leə

b. Type IIa
   k’uəɾ > k’uə? ləuə
   kuo > kuo? luo

Type IIb
   teə > kuoʔ lye
   ts’ye > kuoʔ lye

Type IIc
   xua > xuəʔ la
   xuæ > xuəʔ ləe

c. Type III
   ts’iəo > k’əʔ ləəo

The forms in Datong are point-to-point identical to those in Taiyuan. Interestingly, when -i- is deleted from the first syllable, te and ts’ become k and k’, respectively (see 36b,c), Types IIb and III). The palatoalveolars and the velars are in complementary distribution in modern Mandarin dialects, as well as in Middle Chinese.

Given the copy-and-replace analysis, the generalizations stated in (31) follow directly from the syllable structure of (23a). We conclude that the medial glides in Taiyuan and Datong exhibit the same kind of asymmetry as their counterparts in Middle Chinese. It is worth noting that this kind of asymmetry is not attested in Min dialects, as I have shown elsewhere (Bao 2000a,b).
4. CONCLUSION

In the preceding discussion, we have demonstrated the asymmetric phonology of the medial glides in Middle Chinese. The asymmetry is displayed by the patterns of medial harmony summarized in (37) and (38) ($i$: Division III rhymes; $\sim i$, Divisions I, II, IV rhymes; $u$, round rhymes; $\sim u$, spread rhymes, including singleton rhymes; $=$, robust pattern; $\neq$, non-robust or non-existent).

(37) -i- harmony:
   a. $i = i + i$
   b. $i = \sim i + i$
   c. $i \neq i + \sim i$
   d. $i \neq \sim i + \sim i$
   e. $\sim i \neq i + i$
   f. $\sim i \neq \sim i + i$
   g. $\sim i \neq i + \sim i$
   h. $\sim i = \sim i + \sim i$

Medial-harmonic requirement provides ready explanation for the above patterns. Consider -i- harmony first. (37a,b) and (37g,h) are canonical forms of fanqie entries: the former satisfy strong medial harmony, and (37g,h) do so vacuously. By contrast, (37c,d,e,f) violate strong medial harmony; consequently, these forms are ruled out.

The behavior of -i- harmony is expected, if we assume that -i- is part of the constituent that goes into the target syllable, as captured in the structure (23a), repeated below:

(23) a. …u[i…

We now turn to -u- harmony. (38a,b,h) are the canonical forms that satisfy strong -u- harmony. (38d,e,f), which do not occur, violate strong -u- harmony. The crucial patterns are (38c) and (38g)—the attested form (38c) violates strong -u- harmony, but the unattested form (38g) satisfies strong -u- harmony, albeit vacuously. The asymmetry of the medial glides manifests itself in the status of (37c,g) and (38c,g): the target syllable may obtain -i- and -u- from the final syllable, but only -u- from the initial syllable.

In addition, we have shown that (23a) readily accounts for the asymmetric behavior of the medial glides in modern Mandarin dialects of Shanxi. Not surprisingly, it also accounts for patterns of speech error in modern Beijing Mandarin (cf. Moser 1991, Shen 1992, Bao 1996). Although there is no general agreement on structural detail, the continuity in syllable structure since Middle Chinese has been widely assumed in the literature (cf. Chao 1941, Zhou 1954, Chen 1976, Ting 1979, Li 1971, Pan 2000, 2001). Our analysis of the Qieyun sound system and the $l$-words in modern Shanxi lends empirical support in favor of the continuity thesis, especially the continuity between Middle Chinese and modern Mandarin. Nevertheless, it casts serious doubt on the well-articulated structure discussed in footnote 1, repeated below:

(39) [C [$i$ G [$l$, VC]]

The structure fails to capture the asymmetry of the medial glides in Middle Chinese and modern Mandarin.

In discussing the development of syllable structure in the history of Chinese, Ting (1979) cautions that Min should not be grouped together with Middle Chinese, nor with modern Mandarin. Careful analysis of similar syllable-sensitive data in modern Min dialects yields no evidence for the asymmetrical behavior of the medial glides (cf. Li 1985, 1986, Lin 1989, Chan 1990, Chiang 1992, Chung 1997, Bao 2000a,b). Ting’s cautious approach is empirically motivated. Given the fact that the Qieyun system is the predecessor of modern Mandarin, syllable structure proves remarkably conservative in the development of the past fourteen centuries.