

PRENUCLEAR GLIDES IN CHINESE*

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Introduction

This paper discusses the place for pre-nuclear glides within the internal hierarchical structure of the Chinese syllable. Based on the data drawn from several Chinese dialects, I suggest that pre-nuclear glides in Chinese are not part of the onset, nor are they part of the rime in a strict sense. In order to account for the dialectal differences with respect to the behavior of the pre-nuclear glides in Chinese rhyming patterns and language games, these glides are proposed to be part of the rime projection which dominates the pre-nuclear glide and the syllabic rime.

Before we discuss how to represent Chinese pre-nuclear glides in a hierarchical syllabic structure, I first provide general information about Chinese syllable structure and the traditional Chinese view on the composition of the syllable. (1) shows that the maximal syllable in Chinese is composed of a consonant, a glide, a nuclear vowel, and a coda.

(1) Chinese syllable structure

(C) (G) V (X)

C: cons, G: glide, V: nucleus, X: cons or glide

- | | | | | | | | |
|----|------|------|-------|-------|------|------------------------|--------------|
| a. | /u/ | /i/ | /tu/ | c. | /an/ | /ai/ | /tai/ |
| | [u] | [i] | [tu] | | | [ay] | [tay] |
| b. | /ua/ | /ia/ | /kua/ | /ɕia/ | d. | /ian//iau//tian//tiau/ | |
| | [ua] | [ya] | [kwa] | [ɕya] | | [yan][yaw] | [tyan][tyaw] |

The coda can either be a non-vocalic consonant or a glide. The high vocalic segment may surface as a nuclear vowel (1.a.), or as a glide when it is adjacent to a more sonorant vocalic segment (1.b-d). Since the vowel/glide alternation is totally predictable, it is usually assumed that there is no need to make an underlying distinction between glides and vowels in

Chinese. Following the general practice in the field of Chinese linguistics, I will use vowel symbols for the surface glides in the following presentation except in the discussion of language games, in which case glide symbols are used to avoid confusion.

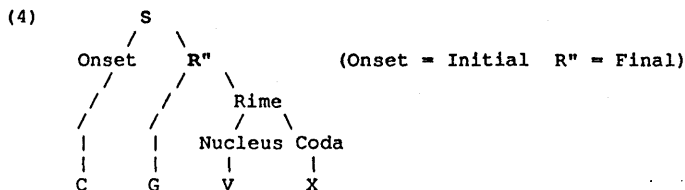
The traditional view of Chinese syllable structure groups the pre-nuclear glide, the nucleus and the coda as a constituent called final. As illustrated in (2), the syllable is divided into two major constituents: initial and final.

(2)	Initial	Final	(Tone is omitted)
	C	G V X	

(3) gives a few examples showing how a syllable is divided into an initial and a final. (3.e.) is an example of the so-called zero initial syllable, i.e., a syllable beginning with a glide.

(3)	a.	b.	c.	d.	e
	tu	tuan	kuai	bei	uei
Initial	t	t	k	b	zero
Final	u	uan	uai	ei	uei
Surface form	[tu]	[tuan]	[kway]	[bey]	[wey]

This view of dividing the syllable into two major constituents dated back to 600 AD, and is still adopted by many Chinese linguists nowadays. When the Chinese syllable is interpreted in terms of the western view of the syllable constituent structure, i.e., the onset/rime dichotomy, the position of pre-nuclear glides as part of the onset or of the rime becomes unclear. In this study, I examine the arguments for either possible position of Chinese pre-nuclear glides, discuss the problems, and propose that these glides are part of the rime projection as shown in (4).

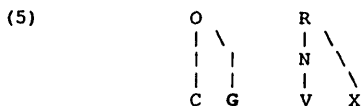


This structure corresponds to the Chinese view of the initial/final dichotomy in that the onset is the initial, and the rime projection is the final. Within this structure, the glide and the rime are dominated by the rime projection, and the rime consists of the nuclear vowel and the coda.

Proposing that the prenuclear glide is a separate entity from the onset suggests that this glide has a closer relationship with the rime. On the other hand, excluding the prenuclear glide from the rime indicates that structurally speaking the main nuclear vowel still maintains a closer tie with the coda. I will demonstrate that these two aspects are supported by the rhyming patterns and language games in various Chinese dialects. Since the onset/rime division of the syllable constituent structure may be considered universal, introducing a new label or node like the rime projection to the syllable hierarchy may not be desirable and certainly needs justification. In the following sections, I begin with a discussion of some problems of the proposals that assign the prenuclear glide either to the onset or to the rime in accounting for the dialectal differences in Chinese rhyming patterns and language games.

Is the prenuclear glide part of the onset?

The structure in (5), with the glide belonging to the onset, is perhaps the most common view of Chinese syllable in terms of onset/rime constituent structure.



The arguments for this position are usually based on that fact that in Mandarin the prenuclear glide is not part of the rime. The major argument for treating Chinese prenuclear glides as part of the onset is that they play no role in the rhyming patterns of Chinese (Chen 1984, Steriade 1988, Duanmu 1990). (6) shows that in Mandarin Chinese, syllables form a rhyming set if their nuclear vowels and postnuclear segments are identical. This computation of identity does not count prenuclear glides, suggesting that these glides are not part of the nuclear or the rime.

(6) Mandarin poetic rhyming: an/tan/uan/ian/guan/dian

The second argument for (5) comes from Mandarin backness and rounding assimilation. In Mandarin the schwa assimilates in backness and rounding with the adjacent vocalic segments (7.a.b.). When the schwa is adjacent to both /i/ and /u/, regressive assimilation is dominant over progressive assimilation, as shown in (7.c.).

(7) Mandarin syllable internal assimilation

- a. əu --> ou əi --> ei
 b. iə --> ie uə --> uo
 c. iəu --> iou uəi --> uei

Therefore, the prenuclear glide in Mandarin should not be part of the nucleus to form a diphthong with the main vowel since the assimilation process indicates that the nucleus and the coda have a closer relationship.

In addition, Duanmu (1990), citing phonetic evidence, and Bao (1990), using game languages, suggest that the tone bearing unit in Chinese is the rime. That is, in Mandarin, the prenuclear glide is not associated with tone.

- (8) Tone
 / \
 C G V X

Bao (1990), in his discussion of Chinese language games, assumes that the prenuclear glide in Mandarin is not part of the nucleus or the rime. (9.a.-c.) are some examples of the formation of one Mandarin secret language. In (9.a) we can see that each syllable is split into two in the secret language. The initial consonant of the original syllable is retained in the first syllable and a new rime is given. In the second syllable, a new consonant is attached to the vowel of the original syllable. Interestingly, when the source syllable contains a prenuclear glide, the glide appears in both syllables in the secret language form, as shown in (9.b.c.).

- (9) Bao 1990: Mandarin secret language
(Fanqie language) (data from Chao 1931)

- a. ma --> may ka taw --> tay kaw
b. swan --> sway kwan
c. Çye --> Çyay kyə --> Çye tÇye
d. (i) Reduplicate the syllable: sw.an sw.an
 (ii) In the first syllable replace
 the rime with [ay]: sw.ay sw.an
 (iii) In the second syllable replace
 the first segment in the
 onset with [k] sw.ay kw.an

Assuming the structure in (5) in which the glide is part of the onset, Bao proposes a derivation like (9.d.). The first step is to reduplicate the syllable. Then in the first syllable, replace the rime with a new rime, and in the second syllable replace the first segment in the onset, i.e., the initial consonant, with a new consonant.

Notice that since this analysis has to specify that the replacement of the second syllable is not the whole onset but simply the first segment of the onset, such an analysis cannot be an argument for assigning the prenuclear glide to the onset. Our proposed syllable structure in (4), in fact, can also derive the correct result within Bao's framework. The derivation is given in (10). If the glide is a separate unit from the onset, as I suggest, we can simply replace the rime with the new rime in the first syllable, and the onset with the new onset in the second syllable.

- (10) (i) Reduplicate the syllable: s.w.an s.w.an
 (ii) In the first syllable replace
 the rime with [ay] s.w.ay s.w.an
 (iii) In the second syllable replace
 the onset with [k] s.w.ay k.w.an

There are some problems in the general arguments for treating the prenuclear glide as an onset element. First, these arguments are based only on the fact that this glide is not part of the nucleus or rime in Mandarin. There is no specific argument to show that the glide has to be an onset element. With the assumption that there are only two major constituents: onset and rime, if the glide is not part of the rime, it follows that it can only be part of the onset. However, if the rime projection is allowed to exist, as will be demonstrated later, then the prenuclear glide does not

have to be syllabified as the onset. Moreover, evidence from dialects other than Mandarin is not considered. In fact, the assumed syllable structure as in (5) cannot be generalized to be the structure of some other dialects.

Consider now the argument based on rhyming. Recall that in Mandarin, pre-nuclear glides do not participate in the rhyming scheme. In Taiwanese folk songs and oral poetics, however, syllables with pre-nuclear glides are in most cases required to rhyme with syllables with the same glides (Chang 1986, Li 1986).

(11) Rhyming in Taiwanese and Kejia (Hakka) folk songs and oral literature

a. Taiwanese iu/iu, io/io, ua/ua, iau/iau, ien/ien
rare: iau/au, iam/am, ia/a

b. *ia/ua

c. Kejia uan/an *uan/ian

Examples in (11.a.) show that there are only a few cases where the pre-nuclear glides are not needed. The important point is that two syllables with different pre-nuclear glides in general cannot be a rhyming pair, as shown in (11.b.). This is in contrast with the Mandarin rhyming pattern in (6), where the pre-nuclear glide plays no role in literary rhyming at all. Kejia is similar to Taiwanese in that syllables with different pre-nuclear glides are not considered a rhyming pair (11.c.). The fact that the identity of the pre-nuclear glide is required in rhyming indicates that the glide and the rime form a rhyming unit in Taiwanese and Kejia.

My proposed structure naturally accounts for the differences in rhyming: The rime projection (R") is involved in the Taiwanese and Kejia rhyming schemes, while in Mandarin only the rime is considered.

(12) Rhyming in Mandarin: R/R
Rhyming in Taiwanese & Kejia: R"/R" or R"/R

If we are to have only one structure for the maximal syllable in all Chinese dialects, my proposed structure can better account for the rhyming differences among dialects.¹ In addition, such a structure poses no problem in accounting for Mandarin backness/rounding assimilation, tonal behavior, and language games since

(15) Mandarin syllable internal assimilation

- | | | |
|----|-------------|-------------|
| a. | əu --> ou | əi --> ei |
| b. | iə --> ie | uə --> uo |
| c. | iəu --> iou | uəi --> uei |

As already mentioned earlier, this assimilation process suggests the closer relationship between the main vowel and the coda, contrary to what (14.a.) may imply. Aside from those arguments discussed in the previous section for excluding Mandarin pre-nuclear glides from the nucleus, the so called rime change process in some Mandarin dialects also indicates that the pre-nuclear glide should not be considered part of the nucleus. (16) gives a few examples from Huojia Mandarin (He 1982, Lin 1989). The fact that pre-nuclear glides clearly do not participate in the rime change process (16.d-h) suggests that the Mandarin pre-nuclear glide should not be part of the nucleus.

(16) Rime change in Huojia Mandarin (Tones are omitted)

- | | | | |
|-----|-------|----------|--------------|
| a. | sa | --> sɔ | 'fool' |
| b. | tan | --> tɛ | 'blanket' |
| c. | tʰaŋ | --> tʰɔ̃ | 'soup' |
| d. | pʰiau | --> pʰiɔ | 'ticket' |
| e. | luə | --> luo | 'mule' |
| f. | kʰüə | --> kʰüo | 'chopsticks' |
| g. | lian | --> liɛ | 'curtain' |
| h.. | çiŋ | --> çiɔ̃ | 'suitcase' |

The next question to be addressed is whether or not there is justification for treating Taiwanese and Kejia pre-nuclear glides as part of the nucleus. Bao's suggestion for structures like (13.b.c) comes from an analysis of Taiwanese secret language. (17) gives three examples showing the formation of Taiwanese secret language. The Taiwanese secret language form also contains two syllables. In this game language, the vowel of the original syllable is retained in the first syllable with /l/ as the new onset, and the onset of the original syllable appears in the second syllable with a new rime /i/. Examples in (17.b-d) show that, unlike what we have seen in Mandarin secret language, pre-nuclear glides do not appear in both derived syllables at the same time in Taiwanese secret language.

- (17) Taiwanese secret language
(Li 1985, Lin 1989, Bao 1990)

a	be	-->	<u>l</u> e	b <i>i</i>	
b.	kway	-->	<u>l</u> way	k <i>i</i>	
c.	t ^h yam	-->	<u>l</u> yam	t ^h <u>i</u> m	--> lyam t ^h in
d.	tsyaw	-->	<u>l</u> yaw	t <i>s</i> i	

In order to account for the differences between Taiwanese and Mandarin secret languages, Bao posits a different syllable structure for Taiwanese. Under Bao's assumption, the glide and the main vowel in Taiwanese form a constituent, i.e. the nucleus. (18) gives the derivations of examples (17.c.d). In (18.a.), the original onset is replaced with a new onset in the first syllable, and in the second syllable the original nucleus, [ya], is replaced with the new nucleus [i]. Since it is the nucleus, not the whole rime, that is replaced, the coda consonant is retained. In (18.b), since both the prenuclear and postnuclear glides are assumed to be part of the nucleus in Bao's model, both glides and the main vowel, as a constituent, are replaced with [i].

- (18) Taiwanese secret language formation (Bao 1990)

- a. (i) Reduplicate the syllable: t^h.ya.m t^h.ya.m
 (ii) In the first syllable
 replace the onset with [l]: l.ya.m t^h.ya.m
 (iii) In the second syllable
 replace the nucleus with [i]: l.ya.m t^h.i.m
 (iv) dissimilation l.ya.m t^h.i.n
- b. (i) Reduplicate the syllable: ts.yaw ts.yaw
 (ii) In the first syllable
 replace the onset with [l] l.yaw ts.yaw
 (iii) In the second syllable
 replace the nucleus with [i] l.yaw ts.i

If we adopt this model to account for Taiwanese secret language formation, my proposed structure may not work elegantly since in my proposal the prenuclear glide does not form a constituent with the main vowel, and the replacement process can not be done only once. However, there is an alternative view on Chinese secret language formation. If we adopt the mode of analysis proposed in Yip 1982, it is not necessary to assume that the prenuclear glide and the main vowel form a syllabic constituent. Based on Yip's model, Taiwanese secret language has the skeletal template CGVX CVC with a preassociated onset in the first syllable, and a

nucleus, and thus is consistent with our proposed structure in which the glide is separate from the nucleus and rime.

Conclusion

The discussion in the previous sections has demonstrated that the prenuclear glide is not part of the nucleus/rime, nor is it part of the onset. Evidence from rhyming patterns and game languages suggests that first, there is a closer relationship between the prenuclear glide and the rime than that between the glide and the onset, at least in dialects like Taiwanese and Kejia;² second, there is a closer relationship between the nuclear vowel and the code than that between the prenuclear glide and the nuclear vowel. Our proposed structure correctly reflects these two aspects. Consequently, the structure with the rime projection not only captures the insight of many Chinese linguists and Chinese speakers' intuition but also helps account for the dialectal differences with respect to syllable structure.

With this proposal, there are two issues to be discussed concerning the structure of syllables beginning with glides and universality of the proposed structure. By proposing a structure with a rime projection, I do not mean to suggest that all prenuclear glides in Chinese are dominated by the rime projection. The main point of the proposal is that in a syllable with an initial non-glide consonant, i.e., CGV or CGVX, prenuclear glides are part of the rime projection. In a syllable that begins with a glide, each dialect may syllabify the prenuclear glide differently. Examples from Mandarin and Taiwanese game languages and Cantonese can illustrate the point. Consider first examples from Mandarin secret language in (21).

(21) Mandarin secret language

- a. swan --> swai kwan
- b. ɕye --> ɕɰay kye (---> ɕye tɕye)
- c. wan --> way k_an
- d. yaŋ --> ɰay kɰaŋ (---> ye tɕyaŋ)

In (21.a.b.) the source syllables are in the form of CGVX, and the prenuclear glides appear in both syllables in the derived forms. In a syllable beginning with a glide the front and back glides behave

differently with respect to secret language formation. (21.c.) shows that the /w/ glide is not retained in the second syllable, which case is different from (21.a) where the glide appears in both syllables in the secret language form. In contrast, the high front glide in (21.d.), like the one in (21.b.), appears in both syllables in the derived form. The asymmetry can be easily accounted for if we assume different structures as in (22) for [wan] and [yang].

- (22) a. O R b. R"
 | /\ / \
 w an / R \
 / / \
 y a ŋ

Since the back glide [w] occupies the onset position of the syllable (22.a.), the new onset [k] totally replaces the old onset [w] in an example like (21.c.). On the other hand, the high front glide is part of the rime projection but not the onset; therefore, there is no clash between the new onset and the front glide, and the newly supplied onset /k/ can be added to derive [kyaŋ] in (21.d.).

In Taiwanese secret language, the onset of the original syllable is always retained in the second syllable (23.a.b.). The fact that the glides [w] and [y] do not appear in the second syllable as shown in (23.c.d.) indicates that in Taiwanese all pre-nuclear glides are not onset elements, and that syllables beginning with [w] and [y] should all have the structure as in (22.b.) in which pre-nuclear glides are part of the rime projection.

- (23) Taiwanese secret language
 a. kway --> lway ki
 b. tsyaw --> lyaw tsi
 c. way --> lway _i
 d. yaw --> lyaw _i

In Cantonese, all pre-nuclear glides may be considered part of the onset since Cantonese is the Chinese dialect in which the maximal syllable contains only three segments. The representation of Cantonese syllable structure is given in (24).

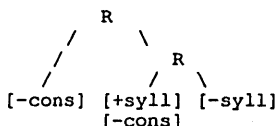
(24) Cantonese maximal syllable	XVX	O	R
			/\
		w	a n
		y	a w
		t	a n

In sum, Mandarin, Taiwanese, and Cantonese, present three different ways to syllabify their prenuclear glides in syllables lacking an initial. In Mandarin, the back glide can be an onset but the front glide cannot. In Taiwanese, all prenuclear glides are part of the rime projection, while in Cantonese, due to the different syllable structure from other Chinese languages, all prenuclear glides are best treated as part of the onset.

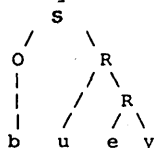
The final issue is whether or not our proposed structure holds only for Chinese. In fact, Harris (1983) posits a similar structure for Spanish syllable based on the phonotactic distribution and the behavior of stress assignment. The structure and one example of Spanish are given in (25).

(25) Spanish (Harris 1983)

a.



b. Example: buey 'ox'



Prenuclear glides may not be universally part of the rime projection (cf. Schane 1987). In fact, we have already shown that in Chinese some prenuclear glides are not assigned to the rime projection under specific circumstances. As far as universality is concerned, I conclude that the place for prenuclear glides within the internal hierarchical syllable structure is determined on a language-specific basis.

NOTES

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¹ Since unlike in Taiwanese and Kejia, there is no evidence to prove that the pre-nuclear glide has to form a rime projection constituent with the rime in Mandarin, the dialectal differences may also be accounted for by positing different syllable structures for Taiwanese and Kejia on the one hand and Mandarin on the other. That is, The syllable structure of Taiwanese and Kejia has a rime projection, while in Mandarin the pre-nuclear glide is part of the onset. However, as I mentioned earlier, there is no strong argument demonstrating that the Mandarin pre-nuclear glide has to be part of the onset, either. Since rime projection appears to be required for at least some dialects, before strong evidence can be found to show otherwise in Mandarin, I assume that all these dialects have the same structure with the pre-nuclear glide as part of the rime projection.

² Hongming Zhang (personal communication) points out that the fact that pre-nuclear glides in Cantonese either occupy the onset, e.g., /wan/, or become the secondary articulation of a velar onset, e.g., /k^wan/, indicates that these glides have a closer relationship with the onset. As we have discussed, the rhyming patterns in Taiwanese and Kejia suggest otherwise. As for Mandarin, there does not seem to be independent evidence for either position. Cantonese is unique among Chinese dialects in that the maximal syllable contains only three segments. The fact that the pre-nuclear glides are syllabified as the onset appears to be a direct consequence of proper syllabification given the syllable structure XVX. Markedness may be involved in the choice of a labialized velar consonant /k^w/ rather than a short diphthong /wa/. At this stage, I would hold my position only for dialects that allow four segments in a syllable. If independent evidence is found to argue that all pre-nuclear glides in Mandarin have to be in the onset, my proposal will then be revised to hold only for dialects like Taiwanese and Kejia. Before more research can be done, I suggest to have one structure as proposed to represent Chinese syllables with four segments.

REFERENCES

- Bao, Zhiming. 1990. Fanqie languages and reduplication. *Linguistic Inquiry* 21.317-350.
 Chang, Yu-hong. 1986. The status of suprasegmentals and other syllabic 'accessories' in Taiwanese riming

- schemes. Paper presented at the Second International Conference on Sinology, Taipei, Taiwan.
- Chao, Yuen Ren. 1931. Fan-qie yu ba zhong. (Eight varieties of secret language based on the principle of fan-qie.) Bulletin of the Institute of History and Philology, Academia Sinica 2.320-354.
- Chen, Matthew. 1984. Abstract symmetry in Chinese verse. Linguistic Inquiry 15.167-71.
- Cheng, Chin-chuan. 1973. A synchronic phonology of Mandarin Chinese. The Hague: Mouton.
- Chung, Raung-fu. 1989. Aspects of Kejia phonology. Urbana: University of Illinois dissertation.
- Duanmu, San. 1990. On the fixed syllable structure of Chinese. Proceedings of the 1989 Western Conference on Linguistics.
- Harris, James. 1983. Syllable structure and stress in Spanish: A nonlinear analysis. Linguistic Inquiry Monograph 8. Cambridge: MIT Press.
- He, Wei. 1982. Huojia Fangyan Yunmu de Fenlei. (Classification of finals in the Huojia dialect) Fangyan 1982.22-36.
- Li, Paul. 1985. A secret language in Taiwanese. Journal of Chinese Linguistics 13.91-121.
- Li, Paul. 1986. Rhyming and phonemic contrast in southern Min. Bulletin of the Institute of History and Philology Academia Sinica 57.439-463.
- Light, Timothy. 1977. The Cantonese final: An exercise in indigenous analysis. Journal of Chinese Linguistics 5.75-102.
- Lin, Yen-Hwei. 1989. Autosegmental treatment of segmental processes in Chinese phonology. Austin: University of Texas dissertation.
- Schane, Sanford A. 1987. The resolution of hiatus. Parasession on Autosegmental and Metrical Phonology, Chicago Linguistic Society 23. 279-290.
- Steriade, Donca. 1988. CV phonology: A generative theory of the syllable by George N. Clements and Samuel Jay Keyser. Language 64.118-129.
- Yip, Moira. 1982. Reduplication and C-V skeleta in Chinese secret languages. Linguistic Inquiry 13.637-661.