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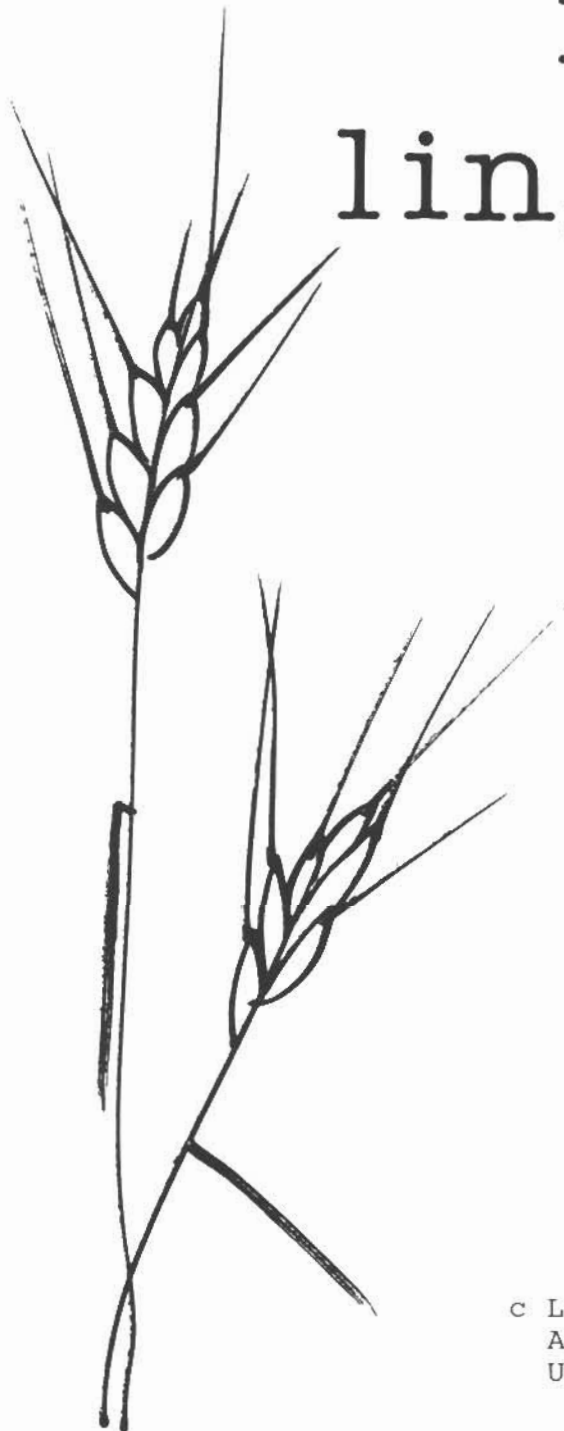
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Volume 13, 1988

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DIPHTHONGIZATION, SYLLABLE STRUCTURE,
AND THE FEATURE [high] IN HMU

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Abstract: Examination of syllable structure in the Hmongic language, Hmu, leads us to posit two rules with the following properties: (1) vowel assimilation to a following consonant, (2) vowel assimilation to a preceding consonant, and (3) assimilation with respect to the feature [high]. In general, our analysis leads us to conclude that the SPE feature [high] is useful for describing the functions of both vowels and consonants in the process of Hmu diphthongization. There are, however, several unanswered questions about [high], especially in its interaction with [round] and [back].^{1,2}

Description of the Language

Hmu (also called Qiandong Miao, Southeastern Guizhou Miao, Eastern Miao, Miao du Sud-est, Kanao, Pho, Hei Miao, Black Miao, and Black Hmong) belongs to the Hmongic (Miao) branch of the Hmong-Mien (Miao-Yao) language family of southern China and mainland Southeast Asia. The Hmong language, spoken by many refugees in the United States, is about as closely related to Hmu as English is to German. Hmong and Hmu are etymologically the same word (Purnell 1970: Appendix, p. 129; Wang 1979: 27, 129).

Hmu is one of the two official languages of the Southeast Guizhou Miao-Dong Autonomous District in Guizhou Province in southwestern China and spills over into adjacent parts of Guangxi and Hunan. In addition, Hmu speech islands are reported from southwestern Guizhou and from Laos (Esguirol 1931; Miao Language Team 1962; Purnell 1970; Haudricourt 1971; Lemoine 1972). The Miao Language Team (1962) says that there are approximately 900,000 speakers of Hmu. The number is probably greater now.

Our analysis refers to the dialect of Hmu spoken in the town of Yanghao in the Southeast Guizhou Miao-Dong Autonomous District and is based entirely on data presented in Wang (1979).³ Yanghao belongs to the Northern dialect of Hmu. Hmu standard orthography (Guizhou Minzu Chubanshe 1958) is based primarily on Yanghao but with some compromises in the direction of other dialects so that it lacks certain consonants found in Yanghao.

Hmu is close to being a canonical monosyllabic language: most words are one syllable long, there is little or no affixation, and syllable boundaries are clearly marked. Moreover, the range of syllable structures is quite limited, all syllables being CV, CVV, or CVC⁴, as in the following examples⁵ (page numbers refer to Wang 1979):

[pi³³] 'we' (23, 130), [pɛ³⁵] 'full' (23, 174), [pə⁵⁵] 'to repay a debt or obligation' (25, 159), [pə³³] 'thigh' (23, 141), [pu³³] 'to know' (23, 160), [tɔ³³] 'deep' (51, 150), [tei¹³] 'which' (61, 167), [təu⁴⁴] 'tree' (10, 66, 191), [mhen³³] 'flea' (27, 176), [pan³⁵] 'to shoot' (23, 177), [pon⁴⁴] 'air' (24, 287).

A syllable onset⁶ can consist of any consonant, and a syllable peak can consist of any vowel or diphthong, but certain vowels and diphthongs are in complementary distribution depending on the preceding consonant. This complementarity is the topic of this paper and we will return to it for a fuller discussion in a moment. Syllable codas are extremely restricted: only [ŋ] and [ŋ̃] are allowed; they are in complementary distribution ([ŋ] after front vowels, [ŋ̃] after back vowels), and they occur only after mid and low vowels. Such restrictions on syllable codas are typical of Hmongic languages (see Purnell 1970; Wang 1979), and, in fact, a limited inventory of codas is an East and Southeast Asian areal phenomenon, although the severity of the limitation differs from one language group to another, the Hmongic languages being near the most restricted end of the range.

The Yanghao dialect of Hmu has the following consonants:

Labial Apical Prepalatal Velar Uvular Glottal

CONSTRUENTS

Stops (vl)

| | | | | | | |
|-------------|----|----|-----|----|----|---|
| Unaspirated | p | t | tɕ | k | q | ʔ |
| aspirated | ph | th | tɕh | kh | qh | |

Affricates (vl)

| | | |
|-------------|-----|-----|
| unaspirated | ts | tɕ |
| aspirated | tsh | tɕh |

Fricatives

| | | | | | |
|----------------|----|----|----|----|---|
| vl unaspirated | f | s | ɕ | | h |
| vl aspirated | fh | sh | ɕh | xh | |
| voiced | v | z | ʐ | ɣ | |

Labial Apical Prepalatal Velar Uvular Glottal

SONORANTS

Lateral

| | | | |
|----------|--|------------------------------|------------------------------|
| vl unasp | | $\frac{1}{\text{e}}$ | $\frac{1}{\text{e}}$ |
| vl asp | | $\frac{1}{\text{e}}\text{h}$ | $\frac{1}{\text{e}}\text{h}$ |
| voiced | | l | le |

Nasal

| | | | | |
|--------------|------------------------------|------------------------------|------------------------------|------------------------------|
| vd unasp | m | n | $\frac{1}{\text{e}}$ | ŋ |
| vl aspirated | $\frac{1}{\text{e}}\text{h}$ | $\frac{1}{\text{e}}\text{h}$ | $\frac{1}{\text{e}}\text{h}$ | $\frac{1}{\text{e}}\text{h}$ |

A striking feature of this system is that stops, affricates, fricatives, laterals, and nasals all have contrasting aspirated and unaspirated series. Although we have not ourselves had the opportunity to hear Hmu, Wang's description is quite clear on this point, and such a pervasive use of contrastive aspiration does not surprise us, for it is quite common in Hmongic and other East and Southeast Asian languages to find aspiration and other state-of-the-glottis parameters (murmur, creak, co-articulated glottal closure, etc.) playing an important role.

Manner of articulation is not relevant to our topic. For the Hmu point of articulation contrasts we propose the following SPE features:

| | Labials | Apicals | Prepalatals | Velars | Uvulars | Glottals |
|-------------|---------|---------|-------------|--------|---------|----------|
| vocalic | - | - | - | - | - | - |
| consonantal | + | + | + | + | + | - |
| anterior | + | + | - | - | - | - |
| coronal | - | + | + | - | - | - |
| high | +/- | - | + | + | - | - |
| low | - | - | - | + | + | - |
| back | - | - | - | + | + | - |

Although we suspect that glottals might be better characterized as [+consonantal] we have followed SPE (p. 307) in writing them as [-consonantal] since this does not affect the problem under discussion. Our specifying labials as [+/-high], however, requires comment. The effect which labials have on following vowels in Hmu suggests that

before high vowels they may be pronounced with an anticipatory raising of the body of the tongue and should therefore be characterized as [+high] before high vowels and as [-high] elsewhere.

In open syllables Hmu has six vowels as follows:

| | front unrounded | back or central unrounded | back rounded |
|------|-----------------|---------------------------|--------------|
| high | i | | u |
| mid | | ə | |
| low | ɛ | a | ɔ |

After apicals, uvulars, and [h], the non-low vowels [i] and [ə] are replaced by the corresponding mid-to-high diphthongs [ei] and [əw]. For example, [tei] occurs but not *[ti], e.g., [tei¹³] 'which' (Wang 1979: 61, 167) and [təw] but not *[tə], e.g., [təw⁴⁴] 'tree' (Wang 1979: 10, 66, 191).

The glottal stop behaves like [h] in its effect on [ə]: there is [ʔəw] but not *[ʔə] (Wang 1979: 10-11). But the glottal stop does not cause [i] to diphthongize: we get [ʔi], e.g., [ʔi³³] 'one' (Wang 1979: 120, 123) but not *[ʔei]. We hope that as more information on Hmu becomes available, an explanation for the behavior of the glottal stop will emerge. For the present we will set the glottal stop aside as an unsolved problem. Henceforth, we will use the term "glottal" to refer only to [h].

With final nasals we have only three vowels:

| | front unround | back unround | back round |
|-----|---------------|--------------|------------|
| mid | en | | oŋ |
| low | | an | |

We posit the following underlying vowel system:

| | i | ɛ | ɯ | a | u | ɔ |
|-------|---|---|---|---|---|---|
| high | + | - | + | - | + | - |
| back | - | - | + | + | + | + |
| round | - | - | - | - | + | + |

Three surface realization rules are necessary to go from these underlying representations to the surface phonetics.

(1) Although Wang does not discuss this explicitly for the Yanghao dialect of Hmu, it is normally the case in languages of East and Southeast Asia that vowels in open syllables, unless otherwise

noted are long. We can assume this to be true in Hmu. In order to account for the diphthongal realizations of [i] and [ə] we will write long vowels as geminates: [ii], [uu], etc. Then diphthongization can be described simply as a lowering of the first segment.

(2) Underlying /u/ is realized phonetically as a mid vowel which Wang writes [ə]. On the basis of what we know about languages from this part of the world, we suspect that this vowel is back of central and could also be written [ɤ] (cf. Henderson 1975). Similarly, we suspect that the diphthong which Wang writes [əu] could also be written [ɤu]. In the related dialects with which one of us (Strecker) has worked (White Hmong and Green Hmong of Thailand and Laos) this diphthong is [ɤu]. Such a diphthong, by the way, also occurs in certain Tai dialects (Gedney 1972) and, outside of Asia, in the type of English spoken in and around Cincinnati, Ohio, e.g., in *smoke* [smɔk] (Lasher 1981). On the other hand, Wang says explicitly that [a] in open syllables is a low central vowel (before [ŋ] we have back [ɑ]).

We do not know why underlying /u/ should lower to [ə] or while /i/ and /u/ remain high, but the same change happens in certain Tai dialects spoken in the same general area (Gedney 1972).

(3) There are only three vowels before the nasal codas. We will treat these syllables as CVN, and posit the underlying vowels as /i/, /u/, and /a/. We then need two low-level rules of phonetic detail:

- (a) /i/ and /u/ become mid before nasals:
- (b) the nasal coda is alveolar after [e] and velar after [o] and [a]:

[+nasal] → [α back] / [α back] _____

The three vowels occurring before nasals are phonetically different from any of the vowels in open syllables. With which vowels should they be identified? The low back vowel [ɑ] is presumably to be identified with the low central vowel [a] of open syllables, but what about [e] and [o]? Are [en] and [on] underlyingly /iN/ and /uN/ with a rule which lowers high vowels to mid before nasals, or are they underlyingly /ɛN/ and /ɔN/ with a rule which raises low vowels to mid before nasals? If the latter were the case, we would expect this rule to apply also to [an], raising it to *[ɔn]. This does not occur, so we adopt the former solution: /iN/ and /uN/. This is a satisfactory solution in any case because we shall see in the next section that Hmu also has another rule which lowers high vowels to mid.

The Hmu Diphthongization Rule

We have already seen that after apicals, uvulars, and glottals,

the high unrounded vowels, which we can now write as /ii/ and /uu/, lower the first segment. The diphthongization of /uu/ is described explicitly by Wang (pp. 10-11) and the diphthongization of /ii/ can be seen in Wang's copious lexical data in which what he writes as [i] and [ei] are in clear complementary distribution. To account for this lowering, we write the following rule:

$$(1) \begin{bmatrix} +\text{high} \\ -\text{round} \\ +\text{vocalic} \end{bmatrix} \rightarrow [-\text{high}] / \begin{bmatrix} -\text{high} \\ -\text{vocalic} \end{bmatrix} \text{ — } \begin{bmatrix} +\text{high} \\ -\text{round} \\ +\text{vocalic} \end{bmatrix}$$

Labials do not trigger diphthongization. Therefore, we hypothesize that before high vowels, labials are pronounced with an anticipatory raising of the tongue, so that they are [+high].

The Hmu Raising Rule

Examination of Wang's lexical data reveals a second complementarity which we have not yet discussed. The high front vowel [i] occurs after prepalatals and velars but not after apicals and uvulars, whereas the low front vowel [ɛ] has the reverse distribution. Both vowels occur after labials. Examples include (page numbers refer to Wang 1979):

| | |
|---|---------------------------------------|
| [i] | [ɛ] |
| [pi ³³] 'we' (23, 130) | [pɛ ³⁵] 'full' (23, 174) |
| [ti ⁴⁴] 'to wear bracelets' (71, 155) | [tɛ ³³] 'son' (51, 173) |
| [ki ³³] 'horn' (101, 174) | [qɛ ³³] 'star' (103, 174) |

No examples of either [i] or [ɛ] after [h] occur in Wang's material.

We account for this complementarity by positing the following rule:

$$(2) \begin{bmatrix} -\text{high} \\ -\text{back} \\ +\text{vocalic} \end{bmatrix} \rightarrow [+high] / \begin{bmatrix} +\text{high} \\ -\text{vocalic} \end{bmatrix} \text{ — } \text{ — } \text{ — }$$

This rule in its present form seems to claim that some examples of [i] are underlyingly /ɛɛ/, whereas others, presumably, are underlyingly /ii/. We have no evidence for such a claim, and are only attempting to state a constraint on possible Hmu syllables. Perhaps one of our readers can suggest a better formalization. Another problem is that this rule raises the whole peak (/ɛɛ/ → /ii/), whereas our diphthongization rule only lowers the first segment. Why should this be, and what is the most economical way to formalize it?

Since both [i] and [ɛ] occur after labials we need to

hypothesize that labials have an anticipatory raising of the tongue before [i] and can therefore be characterized as [+high] in that position, whereas before [ɛ] they are [-high]. In other words, whereas with non-labials, the height of the consonant conditions the height of the vowel, with labials it is the other way round, and labials in Hmu are underlyingly unspecified for height. Although all examples of [i] after [+high] consonants could, if we wished, be derived from underlying /ɛɛ/, we must set up an underlying /ii/ vs. /ɛɛ/ contrast to account for the [ei] vs. [ɛ] contrast after [-high] consonants.

Some readers may wonder why we do not set up an underlying contrast between [+high] and [-high] labials. We could then write

$$\begin{array}{l} /pj\epsilon\epsilon/ \longrightarrow [pi] \\ /p\epsilon\epsilon/ \longrightarrow [p\epsilon] \end{array}$$

and so forth. But such an underlying contrast between high and non-high labials would have a very defective distribution compared to other height contrasts. For example, the [+high] prepalatals and velars contrast with the [-high] apicals and uvulars before /ii/ and /aaw/, but only [+high] labials occur in this position (page numbers refer to Wang 1979):

| | [+high] | | [-high] |
|-----------------------|---|----------------------|--|
| /pjii ³³ / | [pi ³³] 'we' (23, 130) | */pii/ | *[pei] |
| /tii ⁴⁴ / | [ti ⁴⁴] 'to wear bracelets' (71, 155) | /tii ¹³ / | [tei ¹³] 'which' (51, 167) |
| /ki ³³ / | [ki ³³] 'horn' (101, 174) | /qii ³³ / | [qei ³³] 'chicken' (108, 135) |
| /pjɯɯ ⁵⁵ / | [pə ⁵⁵] 'to repay' (25, 159) | */pɯɯ/ | *[pəw] |
| /tɯɯ ⁵⁵ / | [tə ⁵⁵] 'a step' (72, 151) | /tɯɯ ⁴⁴ / | [təw ⁴⁴] 'tree' (10, 66, 191) |
| /kɯɯ ³¹ / | [kə ³¹] 'back' (111, 158) | /qɯɯ ³³ / | [qəw ³³] 'crop of a bird' (11, 108, 190) |

Again, prepalatals and velars contrast with apicals and uvulars before /aa/ but only one set of labials, presumably -high, occurs in this position:

| | [+high] | | [-high] |
|----------------------|--|----------------------|---|
| */pjaa/ | *[pja] | /paa ³³ / | [pa ³³] 'thigh' (23, 141) |
| /naa ¹³ / | [na ¹³] 'to rest on something' (80, 128) | /naa ¹³ / | [na ¹³] 'to lay (eggs)' (68, 133) |

/kaa³³/ [ka³³] 'to fry'
(101, 122)

/qaa⁴⁴/ [qa⁴⁴] 'to crow'
(109, 146)

In other words, [+high] and [-high] labials are in complementary distribution, whereas for other consonants height is contrastive. Therefore, we regard Hmu labials as underlyingly unspecified for height and assimilating in height to the following vowel. Thus we treat [pi] as underlying /pii/, with the height spreading from the vowel to the labial, and [pɛ] as underlying /pɛɛ/. [ti] could be underlyingly either /tii/ or /tɛɛ/: we have no evidence for deciding. * [tɛ] is blocked by rule (2) which would change any underlying /tɛɛ/ to [ti].

We have shown that the SPE feature [high] is a valid and useful feature for describing both vowels and consonants, but we have also raised some questions about this feature. Why is it that only [-round] vowels are subject to the diphthongization rule, and only [-back] vowels are subject to the raising rule? Is there some sort of connection among the features [round], [back], and [high]? Notice also that we have posited two rules, operating from opposite ends of the syllable, that change a high vowel to a mid vowel: the lowering rule before nasal codas and the diphthongization rule. Is there some way to combine these two rules into a broader generalization about Hmu syllable structure?

NOTES

1 An earlier version of this paper was translated by Xiang Rizheng and published in Chinese in Minzu Yuwen (August 1987): 34-40.

2 Strecker would like to thank Wáng Fūshì for his help and encouragement in the study of Hmongic languages. The errors are our own. We would also like to thank Brenda Johns for encouragement, comments, and suggestions.

3 Wang (1979) is a historical-comparative study and includes only Yanghao words which have cognates in other Hmongic dialects. It is possible that some of the sequences of segments which do not occur in Wang's material do occur in Chinese loanwords in other non-inherited vocabulary. If so, then our analysis would apply to the native component of Yanghao phonology only (c.f., Pike and Fries 1949).

4 Wang treats syllable initial glottal stops as predictable so that he analyzes a syllable like [ʔɛ⁴⁴] 'to do' as having the

underlying form / ϵ^{44} / (V). But since glottal stop sometimes has the same effect on the following vowel as does [h] and other consonants, we will treat it as a consonant, hence / $ʔ\epsilon^{44}$ / (CV).

5 Following Wang, we use IPA for vowels and consonants. Hmu also has eight tones, here transcribed with superscript numbers. In the Yanghao dialect they are: mid level [33], high level [55], high rising [35], low level [11], mid-high level [44], low rising [13], high falling [53], low falling [31]. The low level and low rising tones are accompanied by a murmured release ("voiced aspiration") of the initial consonant so that, for example, [m ϵ^{13}] 'face' would in a more narrow transcription be written [m ϵ^{13}]. Tones play no part in the problem discussed in this paper.

6 For discussion of the terms "onset," "peak," and "coda" see Sloat, Taylor, and Hoard (1978).

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