# The Phonetic Inventory of Mong Leng

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## 1 Introduction

### 1.1 Background

Mong Leng is a language of the Hmong-Mien (Miao-Yao) family spoken by a subset of the Hmong people group mainly located in the highlands of Laos, Thailand, and Vietnam (Center for Applied Linguistics, 2004, p. 2). A significant population of resettled Hmong expatriates also exists in the United States, with the largest concentrations in California, Minnesota, Wisconsin, North Carolina, and Michigan (CAL, 2004, p. 29). At the time of the 2000 U.S. Census, there were reportedly over 186,000 ethnic Hmong living in America, with 22,456 in the city of Fresno alone (Pfeifer, 2005, pp. 5-6). Current (2005) estimates of the total number of Hmong in the world hover around 4.5 million (Lemoine, 2005a, p. 7).

An explanation of terms is important: The Hmong people are part of the larger Miao nationality, which includes other, non-Hmong groups (A Hmao, Mhu, Kho Xiong, etc.) (Lemoine, 2005b, p. 240). Since the Chinese term *Miao* (and the corresponding Vietnamese *Meo*) are considered offensive by some Hmong, there is a movement to refer to all Miao as *Hmong* (Tapp, 2004, p. 18). Hence the recasting of the Miao-Yao family as *Hmong-Mien*, which has contributed to much of the confusion in the literature on the Hmong (Lemoine, 2005a, p. 7).

Among the Hmong of Southeast Asia, two main groups are the White Hmong and the Green Hmong,[1] whose respective names also refer to the dialects of Hmong they speak. In the Romanized Popular Alphabet (RPA), an orthography system developed for the Hmong language by Western missionaries in the 1950s, "White Hmong" is *Hmoob Dawb*, often Anglicized as "Hmong Daw" or "Hmong Der." The issue of the Green Hmong dialect is a bit more complicated: The RPA *Hmoob Ntsuab* can be translated as "Green/Blue Hmong," and is Anglicized as "Hmong Njua." Unlike White Hmong, however, the Green Hmong dialect does not contain the voiceless bilabial nasal [m̥] in its inventory, which is represented by "hm" in the RPA orthography. Thus, "Green Hmong" is often written as *Moob Ntsuab* (Anglicized "Mong Njua"), which more accurately represents the actual pronunciation. However, some speakers of Green Hmong consider *Ntsuab* derogatory[2] and prefer the RPA term *Moob Leeg* (Anglicized "Mong Leng"). In keeping with the style of David Mortensen, I will use the term "Mong Leng" throughout the paper to refer to this dialect. White Hmong and Mong Leng are often described as mutually intelligible (CAL, 2004, p. 41), but it is interesting to note that White Hmong speakers are reported to have more difficulty with Mong Leng comprehension than Mong Leng speakers have with White Hmong (John Vang, personal communication, September 17, 2006; Hmong Cultural Center).

Details on their language ability are sketchy, but it is likely the case that the Hmong in Southeast Asia speak both a specific dialect of Hmong and the national language of the country, be it Lao, Thai, or Vietnamese. According to my consultant, it is not uncommon for Hmong children in Southeast Asia to learn the Hmong language at home and the national language in school, as was the case with his father, who speaks both Mong Leng and Lao. With regards to the Hmong in America (including individuals who are part Hmong), the 2000 U.S. Census revealed that 4.6% of the Hmong population 5 years and older are monolingual English speakers. Of the Hmong individuals 5 years and older who live in households where an Asian or Pacific Island language is primarily used, 39% speak English "very well," 33.4% speak English "well," 20.5% "not well," and 7.1% "not at all" (U.S. Census Bureau).

[1] These names were derived from cultural differences in female clothing; hence the names for other groups, such as "Striped Hmong" and "Black Hmong" (Lyman, 1979, p. 3).

[2] Dr. Mortensen: "This seems to be related to White Hmong accusations of cannibalism. It's complicated" (personal communication, September 24, 2006).

### 1.2 Consultant

John Vang, my language consultant, is a 24-year old Mong Leng speaker and a resident of Alameda, CA. His mother and father are from Laos and resettled in Kansas City, KS, where John was born in 1982. When he was 4 months old, his family moved to Fresno, CA, where his parents still live today. John had a wide range of linguistic exposure while growing up: His parents have always exclusively spoken Mong Leng with him, although his father taught him some Lao when he was of elementary school age. He started learning English in kindergarten, and continues to speak a mixture of English and Mong Leng with his siblings, although he is accused by other Mong Leng speakers of having "English-accented Mong."

In addition, John gained conversational ability in White Hmong, since many of his friends in Fresno were White Hmong and he attended a church where this dialect was used exclusively. He also studied Spanish for 3 years in high school and retains a marginal level of comprehension. While an undergraduate student at UC-Berkeley, he took Linguistics 100, and thus was able to help me identify the articulatory features of Mong Leng phones.

### 1.3 Important Notes on Mong Leng

Mong Leng is a largely monosyllabic language, possessing an impressive inventory of consonants (47) and tone/phonation type contrasts (7). Each syllable consists of an onset and a rime, where the onset is a consonant or consonant cluster, and the rime is a vowel or diphthong (with [ŋ] following nasalized vowels) produced with a specific tone/phonation type.

There is an evident lack of allophonic variation in Mong Leng, as prenasalization, aspiration, and nasalization are used contrastively, and the rigid syllabic structure results in uniform phonotactic environments. This lends itself to a relatively straightforward orthography: The phonologically-based RPA expresses each syllable as consonant/consonant cluster + vowel/diphthong + tone/phonation marker. (Nasalized vowels are indicated by doubling the vowel symbol.) The only segments for which the RPA has no symbols are the glottal stop (the onset for syllables written as vowel-initial) and [ŋ] (which exhibits free variation in syllables with nasalized vowels).

## 2 Vowels

### 2.1 Simple Vowels

Mong Leng has a system of 6 simple vowels, as shown in the following chart made with classical transcription:

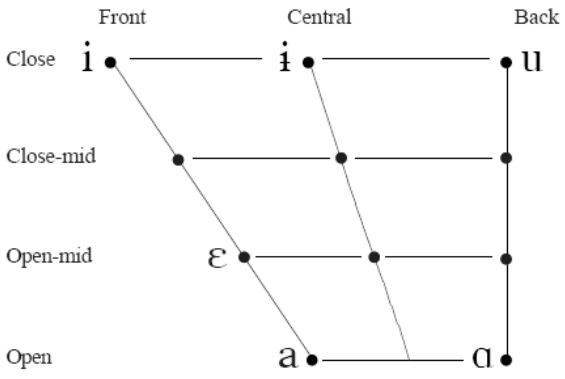


Figure 1: Simple Vowels (classical transcription)

Table 1 lists these vowels with example words:

Table 1: Simple Vowels

| **Vowel** | | **Example Word** | | | **CD** |
|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | **Track #** |
| i | i | tsib | tʃi˥ | *five* | 1.1 |
| | | tij | ti˩ | *older brother* | 1.2 |
| w | ɨ | twb | tɨ˥ | *up against* | 1.3 |
| | | kwv | kɨ˧ | *younger brother* | 1.4 |
| u | u | kuv | ku˧ | *I / me / my* | 1.5 |
| | | us | ʔu˦ | *duck* | 1.6 |
| e | ɛ | mej | mɛ˩ | *you / your* (pl.) | 1.7 |
| | | peb | pɛ˥ | *we / us / our* | 1.8 |
| a | a | tab | ta˥ | *dress* | 1.9 |
| | | tsaj | tʃa˩ | *animal* | 1.10 |
| o | ɑ | pob | pɑ˥ | *ball* | 1.11 |
| | | koj | kɑ˩ | *you / your* (sg.) | 1.12 |

Despite the fact that the vowel in the word for "ball" (*pob*) is written as *o* in the RPA, there is no lip rounding, and the vowel is the IPA [ɑ].

The following series of spectrograms is taken from words produced with the same tone contour (˥), and the formant measurements from the middle of each vowel are summarized in Table 2:[3]

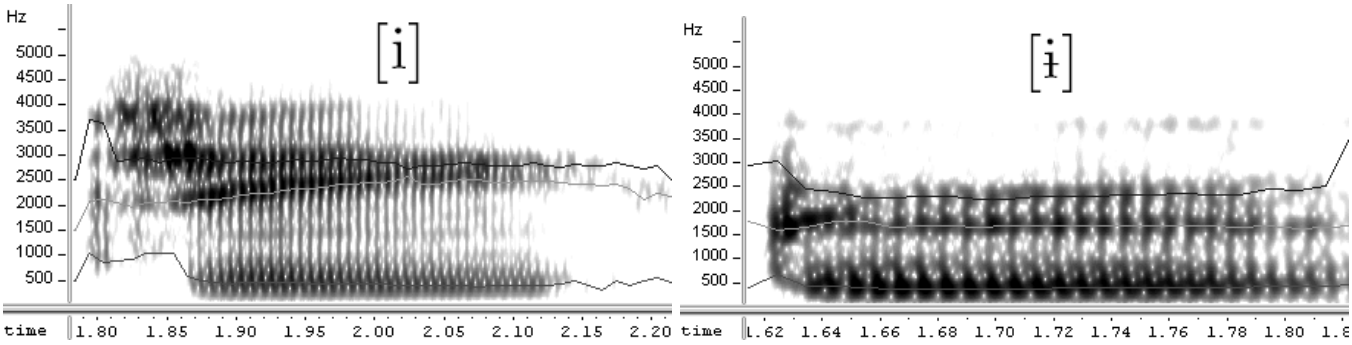


Figure 2: Spectrograms of RPA *tsib* (L) and *twb* (R)

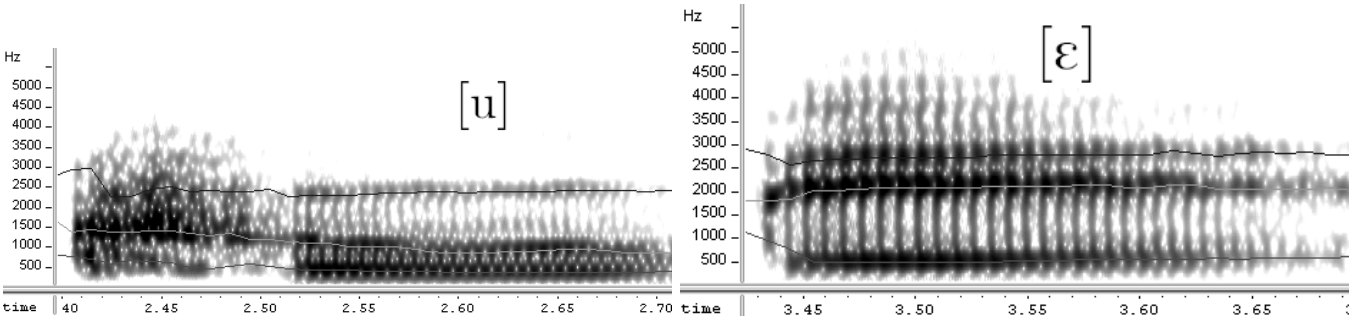


Figure 3: Spectrograms of RPA *khub* (L) and *peb* (R)

[3]I kept track of F3 as well, for kicks.

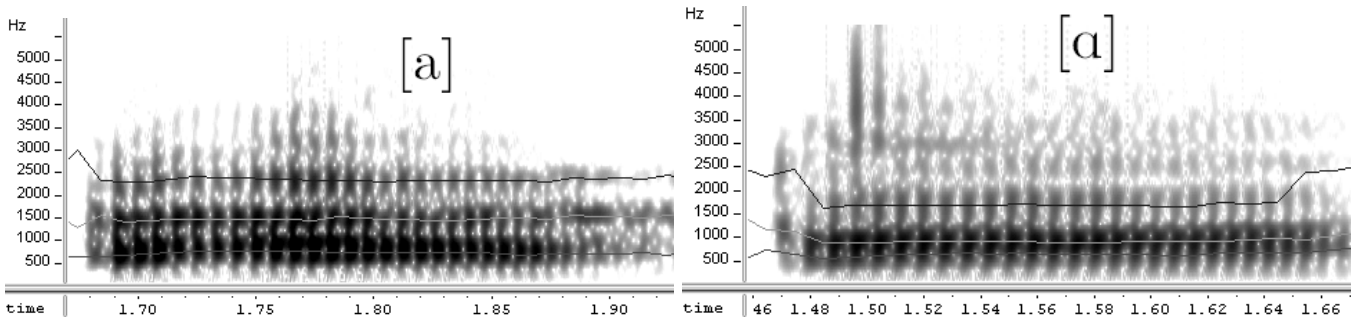


Figure 4: Spectrograms of RPA *tab* (L) and *pob* (R)

Table 2: Vowel Formant Measurements

| **Vowel** | | **Example Word** | | | **F1** | | **F2** | | **F3** | | **CD** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | Hz | Bark | Hz | Bark | Hz | Bark | **Track #** |
| i | i | tsib | tʃiˀ | *five* | 320 | 3.23 | 2484 | 14.46 | 2888 | 15.44 | 1.13 |
| w | ɨ | twb | tɨˀ | *up against* | 348 | 3.51 | 1646 | 11.71 | 2316 | 13.99 | 1.14 |
| u | u | khub | $k^hu$ˀ | *pair* | 348 | 3.51 | 907 | 7.95 | 2400 | 14.23 | 1.15 |
| e | ɛ | peb | pɛˀ | *we / us / our* | 530 | 5.18 | 2149 | 13.49 | 2791 | 15.22 | 1.16 |
| a | a | tab | taˀ | *dress* | 744 | 6.85 | 1434 | 10.8 | 2284 | 13.9 | 1.17 |
| o | ɑ | pob | pɑˀ | *ball* | 697 | 6.5 | 921 | 8.04 | 1688 | 11.88 | 1.18 |

Plotting these formant values in the F1 vs. F2 vowel space yields the following plots for Hz and Bark:

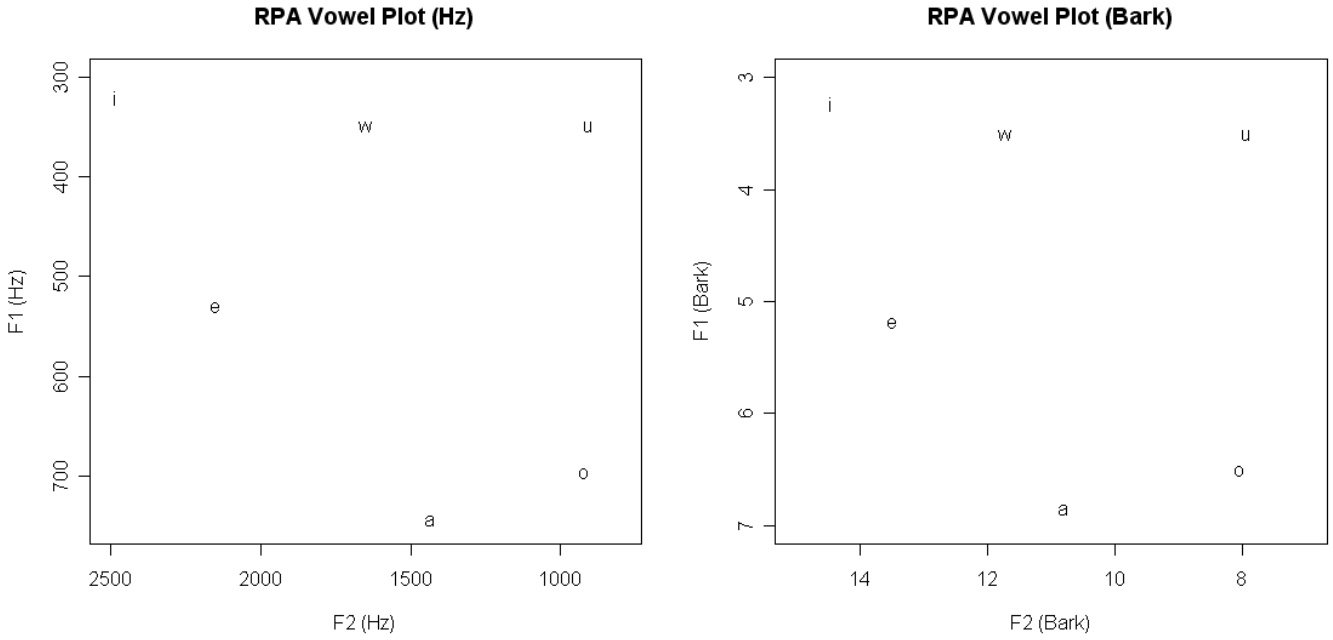


Figure 5: Simple vowel plots

## 2.2 Diphthongs

Mong Leng has four diphthongs, summarized in the following table:

Table 3: Diphthongs

| **Diphthong** | | **Example Word** | | | **CD** |
|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | **Track #** |
| ai | aɪ | qai | qaɪ˥ | *egg* | 1.19 |
| | | ntaiv | ⁿtaɪ˧ | *ladder* | 1.20 |
| au | aʊ | plaub | plaʊ˥ | *four* | 1.21 |
| | | raus | ɽaʊ˦ | *to immerse* | 1.22 |
| aw | aɨ | tawb | taɨ˥ | *basket* | 1.23 |
| | | xyaw | çaɨ˦ | *to mix* | 1.24 |
| ua | ɔᵊ / ɔᴧ | ua | ʔɔᵊ˦ | *to do, make* | 1.25 |
| | | puab | pɔᵊ˥ | *they / them / their* | 1.26 |

The RPA *ua* diphthong is especially interesting because its formant movement is extremely minimal:

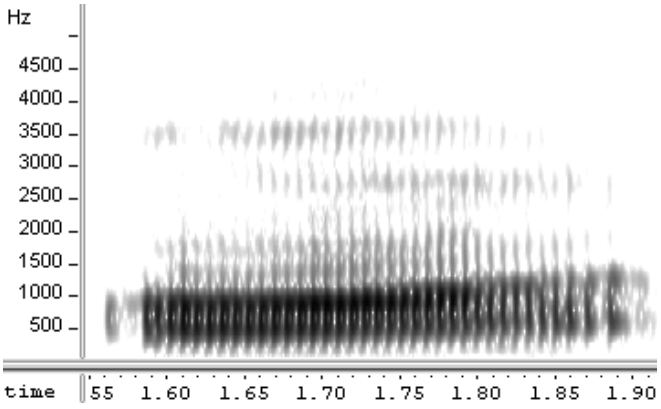


Figure 6: RPA *ua* diphthong in isolation

As shown in the spectrogram, the only significant change is a slight rise in F2. It is therefore my theory that the only articulator movement in *ua* is an unrounding of the lips, yielding a shift from [ɔ] to [ʌ]. To prove this hypothesis, however, I would need to perform an articulator-tracking experiment and verify that the tongue does not move.

## 2.3 Nasalized Vowels

Finally, Mong Leng contains the following nasalized vowels:

Table 4: Nasalized Vowels

| **Vowel** | | **Example Word** | | | **CD** |
|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | **Track #** |
| aa | ã ~ ãŋ | xaav | sã˧ | *to think* | 1.27 |
| | | maa | mãŋ˥ | *coyote* | 1.28 |
| oo | ɔ̃ ~ ɔ̃ŋ | kooj | kɔ̃ŋ˩ | *grasshopper* | 1.29 |
| | | koob | kɔ̃ŋ˥ | *needle* | 1.30 |
| ee | ẽ ~ ẽŋ | pleev | plẽŋ˧ | *to smear* | 1.31 |
| | | qeeb | qẽŋ˥ | *slowly* | 1.32 |

It should be noted that these three vowels constitute a separate system and are not simply a nasalized subset of the simple vowels, especially given the fact that lip rounding occurs in the nasalized RPA *oo* [õ ~ õŋ] but not in RPA *o* [ɑ].

# 3 Consonants

Unlike its relatively simple vowel system, Mong Leng has 47 consonants, not including clusters:

Table 5: Mong Leng Consonant Quantities

| | |
|---|---|
| Stops | 25 |
| Fricatives | 8 |
| Affricates | 8 |
| Nasals | 4 |
| Approximants | 2 |
| | **47** |

This consonant system makes use of 5 distinctive features:[4]

Table 6: Mong Leng Consonant Contrasts

| | | |
|---|---|---|
| **Voicing** | voiced / voiceless | only applicable to fricatives |
| **Place of Articulation** | bilabial / labiodental / dental / alveolar / postalveolar / retroflex / palatal / velar / uvular / glottal | |
| **Manner of Articulation** | stop / nasal / fricative / lateral fricative / approximant / lateral approximant / affricate | |
| **Aspiration** | aspirated / unaspirated | only applicable to contrastive stops & affricates |
| **Prenasalization** | prenasalized / non-prenasalized | |

The only coda in Mong Leng is [ŋ], which occurs after nasalized vowels, so all consonants with the exception of [ŋ] may appear syllable-initially.

## 3.1 Stops

With the exception of the glottal stop, each stop in Mong Leng has four variants, which are all separate phonemes:

Table 7: Stops

| | Non-prenasalized | | | | Prenasalized | | | |
|---|---|---|---|---|---|---|---|---|
| | Unaspirated | | Aspirated | | Unaspirated | | Aspirated | |
| | RPA | IPA | RPA | IPA | RPA | IPA | RPA | IPA |
| bilabial | p | p | ph | $p^h$ | np | $^n p$ | nph | $^n p^h$ |
| dental | t | t | th | $t^h$ | nt | $^n t$ | nth | $^n t^h$ |
| retroflex | r | ʈ | rh | $ʈ^h$ | nr | $^n ʈ$ | nrh | $^n ʈ^h$ |
| palatal | c | c | ch | $c^h$ | nc | $^n c$ | nch | $^n c^h$ |
| velar | k | k | kh | $k^h$ | nk | $^n k$ | nkh | $^n k^h$ |
| uvular | q | q | qh | $q^h$ | nq | $^n q$ | nqh | $^n q^h$ |
| glottal | | ʔ | | | | | | |

[4] According to Mortensen (2004), Mong Leng does not make contrastive use of the alveolar ridge (p. 2). However, when asked to start producing a Mong [n] and describe the location of his tongue tip, my consultant stated that it was "on that ridge behind the teeth," and thus I include *alveolar* in the places of articulation.

The following table provides examples of all 25 stops:[5]

Table 8: Stop Tokens

| **Stop** | | **Example** | | | **CD** |
|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | **Track #** |
| p | p | puab | pɔ$^{ə}$˥ | *they / them / their* | 1.33 |
| ph | p$^{h}$ | phom | p$^{h}$ɑ̰˨ | *gun* | 1.34 |
| np | $^{n}$p | npuab | $^{n}$pɔ$^{ə}$˥ | *next to, beside* | 1.35 |
| nph | $^{n}$p$^{h}$ | nphaav | $^{n}$p$^{h}$ã˩ | *to brush against* | 1.36 |
| t | t | toob | tɔ̃ŋ˥ | *gourd* | 1.37 |
| th | t$^{h}$ | thoob | t$^{h}$ɔ̃ŋ˥ | *bucket* | 1.38 |
| nt | $^{n}$t | ntuj | $^{n}$tu˨ | *heavens* | 1.39 |
| nth | $^{n}$t$^{h}$ | nthuav | $^{n}$t$^{h}$ɔ$^{ə}$˩ | *to unfold* | 1.40 |
| r | ʈ | raus | ʈaʊ˧ | *to immerse* | 1.41 |
| rh | ʈ$^{h}$ | rhu | ʈ$^{h}$u˥ | *to take out* | 1.42 |
| nr | $^{n}$ʈ | nraag | $^{n}$ʈa̤ŋ˧ | *at (behind)* | 1.43 |
| nrh | $^{n}$ʈ$^{h}$ | nrhav | $^{n}$ʈ$^{h}$a˩ | *to look for* | 1.44 |
| c | c | caab | cãŋ˥ | *worm* | 1.45 |
| ch | c$^{h}$ | choj | c$^{h}$ɑ˨ | *bridge* | 1.46 |
| nc | $^{n}$c | nceb | $^{n}$cɛ˥ | *mushroom* | 1.47 |
| nch | $^{n}$c$^{h}$ | nchu | $^{n}$c$^{h}$u˧ | *to smoke* | 1.48 |
| k | k | koj | kɑ˨ | *you / your* (sg.) | 1.49 |
| kh | k$^{h}$ | khub | k$^{h}$u˥ | *pair* | 1.50 |
| nk | $^{n}$k | nkoj | $^{n}$kɑ˨ | *ship* | 1.51 |
| nkh | $^{n}$k$^{h}$ | nkhaus | $^{n}$k$^{h}$aʊ˧ | *bent / crooked* | 1.52 |
| q | q | qeeb | qẽŋ˥ | *slowly* | 1.53 |
| qh | q$^{h}$ | qhov | q$^{h}$ɑ˩ | *hole* | 1.54 |
| nq | $^{n}$q | nqaj | $^{n}$qa˨ | *meat* | 1.55 |
| qh | $^{n}$q$^{h}$ | nqhes | $^{n}$q$^{h}$ɛ˧ | *to thirst* | 1.56 |
| | ʔ | ib tug us | ʔi˥ tṳ˧ ʔu˧ | *one duck* | 1.57 |

Note that [ʈ] (RPA *r*) is not quite a "canonical" retroflex stop, as it sounds extremely similar to an English alveolar [t]. Lacking the necessary equipment to track my consultant's tongue in realtime, I asked him to produce the sentence [ku˩ ʈɑ̤˧ ʈɑ̤˧] (RPA *kuv rog rog*; "I am fat;" CD Track 1.58)[6] as I listened for the characteristic r-coloring manifested on vowels preceding retroflex stops. However, nothing of the sort was heard. The exact nature of RPA *r* therefore remains mostly a mystery, and I label it as a retroflex stop because, according to the literature, the same symbol in White Hmong corresponds to a retroflex stop (Mortensen & Her, 2004, p. 7).

[5]Caveat: It is extremely difficult to locate minimal pairs for 25 stops, and thus this table is not sufficient to actually *prove* the contrastiveness of each stop presented.

[6]No subject's feelings were harmed in the production of this sentence.

## 3.2 Other Consonants

The eight fricatives of Mong Leng are the only segments that make use of the voiced/voiceless distinction:

Table 9: Fricatives & Tokens

| | | **Fricative** | | **Example** | | | **CD** |
|---|---|---|---|---|---|---|---|
| | | RPA | IPA | RPA | IPA | gloss | **Track #** |
| labiodental | voiceless | f | f | faaj | fãŋ˥ | *Fang* (a surname) | 1.59 |
| | voiced | v | v | vaaj | vãŋ˥ | *Vang* (a surname) | 1.60 |
| dental | voiceless | x | s | xaav | sã˧ | *to think* | 1.61 |
| alveolar | voiceless lateral fricative | hl | ɬ | hli | ɬi˥ | *moon* | 1.62 |
| postalveolar | voiceless | s | ʃ | sai | ʃaɪ˥ | *rapid / soon* | 1.63 |
| | voiced | z | ʒ | zoo | ʒɔ̃˥ | *well* | 1.64 |
| palatal | voiceless | xy | ç | xyaw | çaɨ˥ | *to mix* | 1.65 |
| glottal | voiceless | h | h | hab | ha˧ | *and* | 1.66 |

Note that [s] (RPA *x*) is dental, not alveolar. This labeling is supported by Mortensen (2004, p. 3) and was corroborated by asking my consultant to describe his tongue location for RPA *x*. In addition, [ʃ] (RPA *s*) involves no lip rounding in Mong Leng (unlike English).

As with the stops, the affricates each have four contrastive variants, yielding a total of eight:

Table 10: Affricates

| | Non-prenasalized | | | | Prenasalized | | | |
|---|---|---|---|---|---|---|---|---|
| | Unaspirated | | Aspirated | | Unaspirated | | Aspirated | |
| | RPA | IPA | RPA | IPA | RPA | IPA | RPA | IPA |
| dental + dental | tx | ts | txh | $ts^h$ | ntx | $^nts$ | ntxh | $^nts^h$ |
| dental + postalveolar | ts | tʃ | tsh | $tʃ^h$ | nts | $^ntʃ$ | ntsh | $^ntʃ^h$ |

Table 11: Affricate Tokens

| **Affricate** | | **Example** | | | **CD** |
|---|---|---|---|---|---|
| RPA | IPA | RPA | IPA | gloss | **Track #** |
| tx | ts | txab | tsa˧ | *scissors* | 1.67 |
| txh | $ts^h$ | txhub | $ts^hu˧$ | *to sneeze* | 1.68 |
| ntx | $^nts$ | ntxaib | $^ntsaɪ˧$ | *twins* | 1.69 |
| ntxh | $^nts^h$ | ntxhais | $^nts^haɪ˦$ | *daughter* | 1.70 |
| ts | tʃ | tsaj | tʃa˥ | *animal* | 1.71 |
| tsh | $tʃ^h$ | tshais | $tʃ^haɪ˦$ | *breakfast* | 1.72 |
| nts | $^ntʃ$ | ntsuab | $^ntʃɔ^ə˧$ | *green* | 1.73 |
| ntsh | $^ntʃ^h$ | ntshaav | $^ntʃ^hãŋ˨$ | *blood* | 1.74 |

Each of the four nasals appears syllable-initially with the exception of the velar nasal [ŋ], which is an optional[7] coda on syllables with nasalized vowels:

Table 12: Nasals & Tokens

| | **Nasal** | | **Example** | | | **CD** |
|---|---|---|---|---|---|---|
| | RPA | IPA | RPA | IPA | gloss | **Track #** |
| bilabial | m | m | moov | mɔ̃ŋˊ | *powder* | 1.75 |
| alveolar | n | n | nam | na̰ˬ | *mom* | 1.76 |
| palatal | ny | ɲ | nyaj | ɲaˬ | *probably* | 1.77 |
| velar | | ŋ | qeeb | qẽŋˀ | *slowly* | 1.78 |

The final consonants are the two approximants:

Table 13: Approximants & Tokens

| | **Approximant** | | **Example** | | | **CD** |
|---|---|---|---|---|---|---|
| | RPA | IPA | RPA | IPA | gloss | **Track #** |
| voiced palatal approximant | y | j | yuav | jɔᵊˊ | *to buy* | 1.79 |
| voiced alveolar lateral approximant | l | l | luj | luˬ | *large* | 1.80 |

## 3.3 Consonant Clusters

The only consonant clusters are eight combinations of certain stops and laterals, or [m] and a lateral:

Table 14: Consonant Clusters

| | | | **Cluster** | | **Example** | | | **CD** |
|---|---|---|---|---|---|---|---|---|
| | | | RPA | IPA | RPA | IPA | gloss | **Track #** |
| voiceless bilabial stop + lateral | non-prenasalized | unasp. | pl | pl | plaub | plaʊˀ | *four* | 1.81 |
| | | asp. | plh | pl̥ʰ | plhaub | pl̥ʰaʊˀ | *hard shell* | 1.82 |
| | prenasalized | unasp. | npl | ⁿpl | nplej | ⁿplɛˬ | *rice* | 1.83 |
| | | asp. | nplh | ⁿpl̥ʰ | nplhaib | ⁿpl̥ʰaɪˀ | *ring* | 1.84 |
| voiceless dental / velar stop + lateral | non-prenasalized | unasp. | dl / kl | tl ~ kl | klais | tlaɪˤ | *bear* | 1.85 |
| | | asp. | dlh / klh | tl̥ʰ ~ kl̥ʰ | dlha | tl̥ʰaˤ | *to run/jump* | 1.86 |
| | prenasalized | unasp. | ndl / nkl | ⁿtl ~ ⁿkl | nklais | ⁿtlaɪˤ | *to break off* | 1.87 |
| | | asp. | ndlh / nklh | ⁿtl̥ʰ ~ ⁿkl̥ʰ | **unattested** | | | |
| bilabial nasal + lateral | | | ml | ml | mluav | mlɔᵊˊ | *dent* | 1.88 |

Note that the linear IPA transcription for aspirated clusters does not fully depict the actual quality of these segments, in which [l] exists mostly in the aspiration noise.

Both Mortensen (2004) and Lyman (1974) describe the RPA *dl / kl* cluster as alternating between [tl] and [kl] in free variation (p. 3; p. 35). However, I am more inclined to believe that this segment involves some unique combination of both, given my consultant's description of his tongue position ("touching the gums above the teeth all around"), and that slight muscular adjustments, perhaps phonologically conditioned, result in slightly different burst patterns, perceived as [tl] and [kl]. No doubt some palatography experiments would be useful here.

The lack of a [ⁿtl̥ʰ] ~ [ⁿkl̥ʰ] cluster in Mong Leng is extremely intriguing. My consultant was unable to recall any words that begin with RPA *ndlh* or *nklh*, and Lyman notes that "[d]uring three years of field-work, words having this phoneme were not encountered" (1974, p. 258). The English-Mong-English Dictionary (Xiong, Xiong, & Xiong, 2002), however, lists *ndlh* as a Mong consonant cluster (p. viii), though it fails to provide any words in the Mong-English section containing this phoneme.

[7] As far as I can tell, the velar nasal is in free variation, but more research is needed to determine if there might be phonological, historical, or speaker-specific constraints on such variation.

## 3.4 Prenasalized Stops

### 3.4.1 Prevoiced/Prenasalized

Of all the 47 consonants of Mong Leng, I found the prenasalized stops to be the most fascinating. Consider the spectrogram for [ⁿplɛꓶ] (RPA *nplej*; "rice") shown in Figure 7:

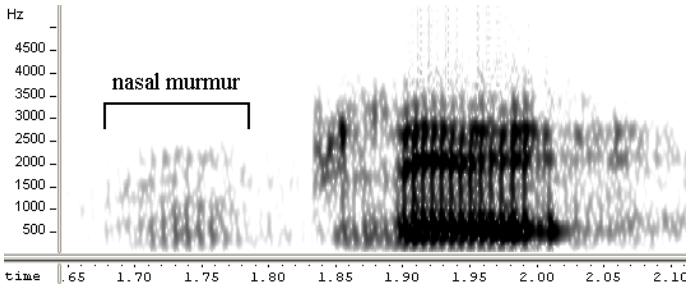


Figure 7: RPA *nplej*; CD Track 1.89

It is tempting to treat the initial low frequency sound as prevoicing instead of the nasal murmur of prenasalization, and indeed, some modified versions of the RPA use *b* in place of *np* ("xfwayne," 2004). This is a fallacious interpretation, however, for the following reasons:

1. Prenasalization shows up in running speech as a full-blown nasal consonant. For example, the words *tug* (a type of article called a *classifier*) and *npua* ("pig") are [tuꓶ] and [ⁿpɔᵊꓶ] in isolation, while the phrase *tug npua* is [tu̯ꓶmpɔᵊꓶ]:

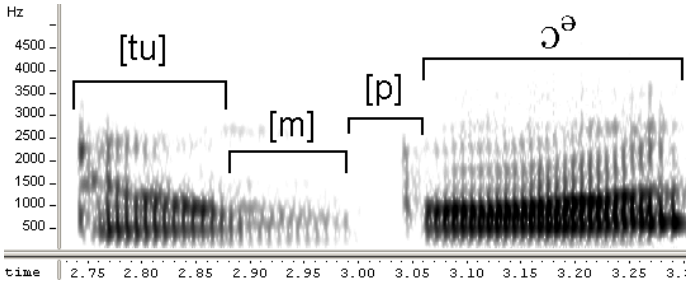


Figure 8: RPA *tug npua* showing nasal consonant [m]; CD Track 1.90

2. Notice also that prenasalization can appear before aspirated consonants. If the initial murmur were due to prevoicing, one would expect voicing to continue after the stop release and through aspiration , yielding a voiced aspirate. However, this is not the case, as illustrated in the spectrogram for [ⁿtʰɔᵊˀ] (RPA *nthuav*; "to unfold"):

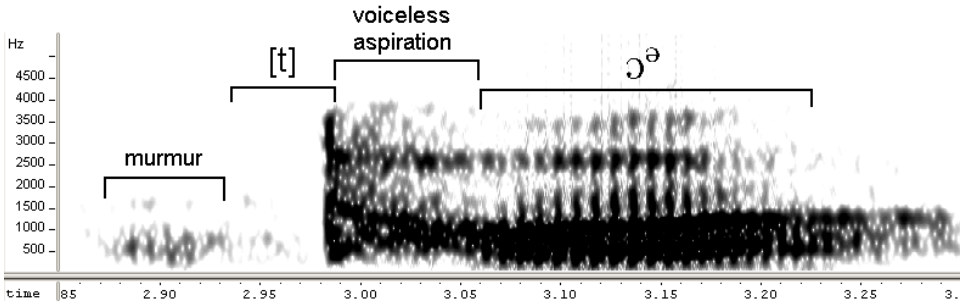


Figure 9: RPA *nthuav* showing voiceless aspiration; CD Track 1.91

The low frequency murmur ceases before the stop release and the aspiration is voiceless: If prenasalization were actually prevoicing, RPA *nth* would be a "prevoiced voiceless aspirated stop," which is physically possible but very unlikely.[8]

3. The prenasalization murmur simply does not match the frequency pattern of a prevoicing murmur, as demonstrated in the following two spectrograms, which show my consultant producing [ⁿp] (RPA *np*, taken from *nplej*) and myself[9] producing a prevoiced [b] (CD Track 1.92):

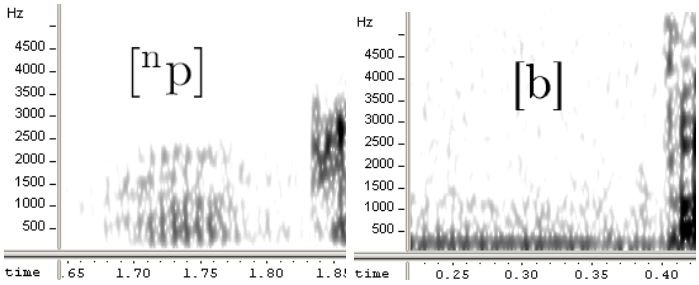


Figure 10: John's RPA *np* (L) and my IPA prevoiced [b] (R)

4. Finally, the initial murmur was verified to be nasal by asking my consultant to block the nostrils with his thumbs and produce [pɔᵊˀ] (RPA *puab*; "they/them/their;" CD Track 1.93) and [ⁿpɔᵊˀ] (RPA *npuab*; "next to, beside;" CD Track 1.94). He remarked that he felt "pressure building up" on his thumbs for *npuab*, verifying the open state of the velopharyngeal port.

[8] Update: After examining some spectrograms, it appears that the White Hmong sound represented by RPA *dh* might be exactly this anomalous sound: a prevoiced voiceless aspirated (alveolar) stop!

[9] The reason I did not use my consultant's English prevoiced [b] is explained in section 3.4.3.

### 3.4.2 Alternative Transcription

Prenasalization yields different a nasal murmur pattern for each stop, corresponding to the place of articulation:

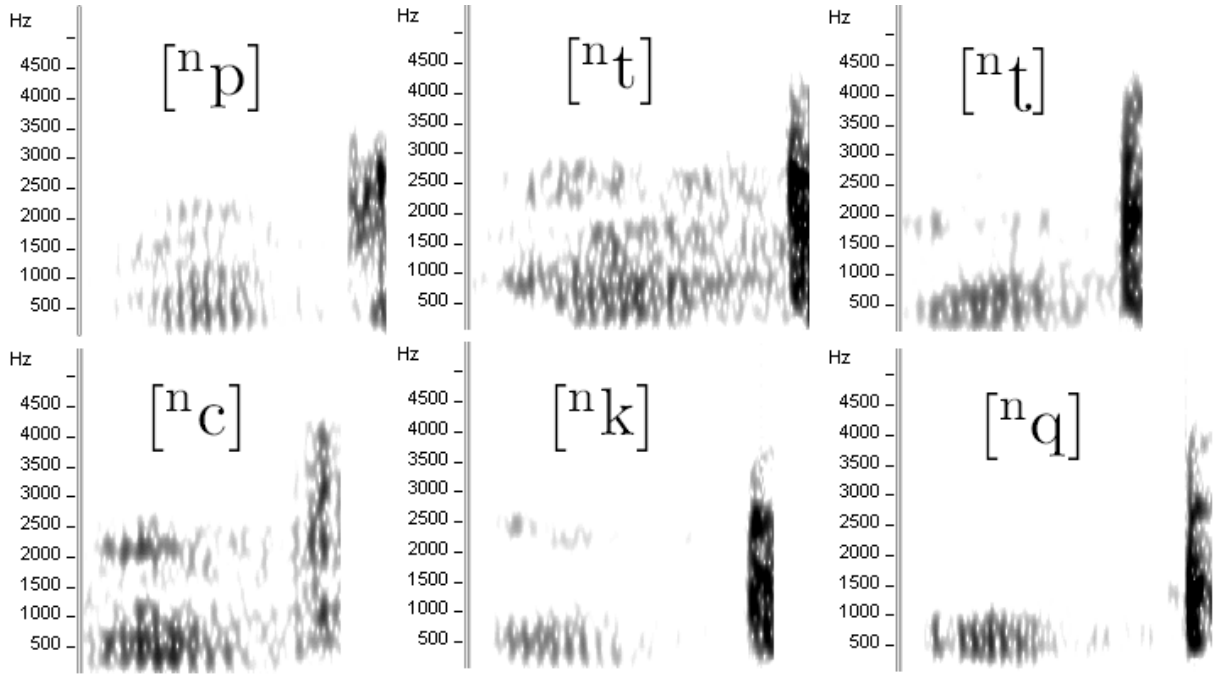


Figure 11: Spectrograms of different Mong Leng prenasalizations

One might therefore choose to represent prenasalization with an alternative transcription system that designates the place of articulation for each nasal:

Table 15: Alternative prenasalization transcription

| RPA | IPA | Alternative IPA |
|---|---|---|
| np | ⁿp | mp |
| nt | ⁿt | nt |
| nr | ⁿt̠ | nt̠ |
| nc | ⁿc | ɲc |
| nk | ⁿk | ŋk |
| nq | ⁿq | ɴq |

Indeed, in his dictionary (1974) and grammar (1979) of Mong Leng, Thomas Lyman uses a similar system. Unfortunately, this method of transcription obscures the fact that each of these segments is one consonant, not a cluster of a nasal + stop/affricate.

### 3.4.3 Possible Influence on English Production

While analyzing spectrograms of my consultant's speech, I noticed an interesting phenomenon: Prenasalization seems to take the place of prevoicing in his production of English voiced stops.[10] For instance, consider the following spectrograms for John's production of the English words *bee, don't,* and *give*:

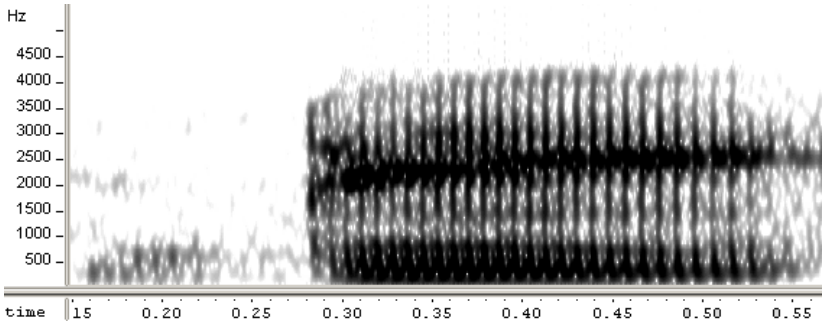


Figure 12: Spectrogram of English *bee*; CD Track 1.95

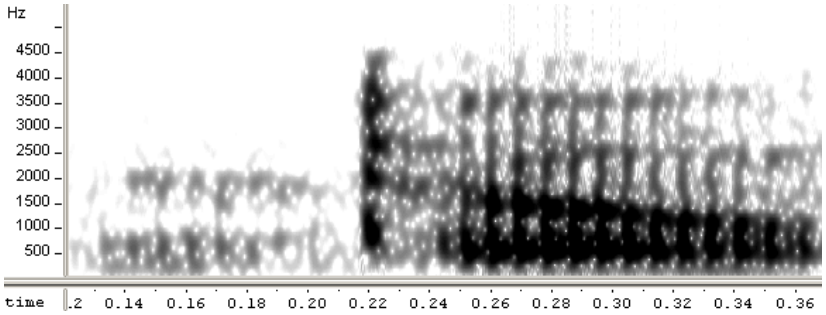


Figure 13: Spectrogram of English *don't*; CD Track 1.96

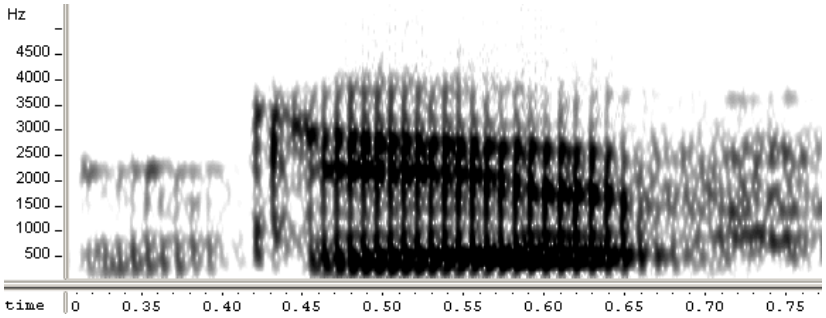


Figure 14: Spectrogram of English *give*; CD Track 1.97

The murmurs preceding the stop closures contain too many frequency components to be instances of simple prevoicing, which should look like the voicing bar in Figure 10. This is especially evident in the [g] stop closure of *give*, whose averaged FFT is shown in the following figure:

[10] As a side issue, it should be noted that he alternates between prevoicing and short lag VOT in producing voiced stops.

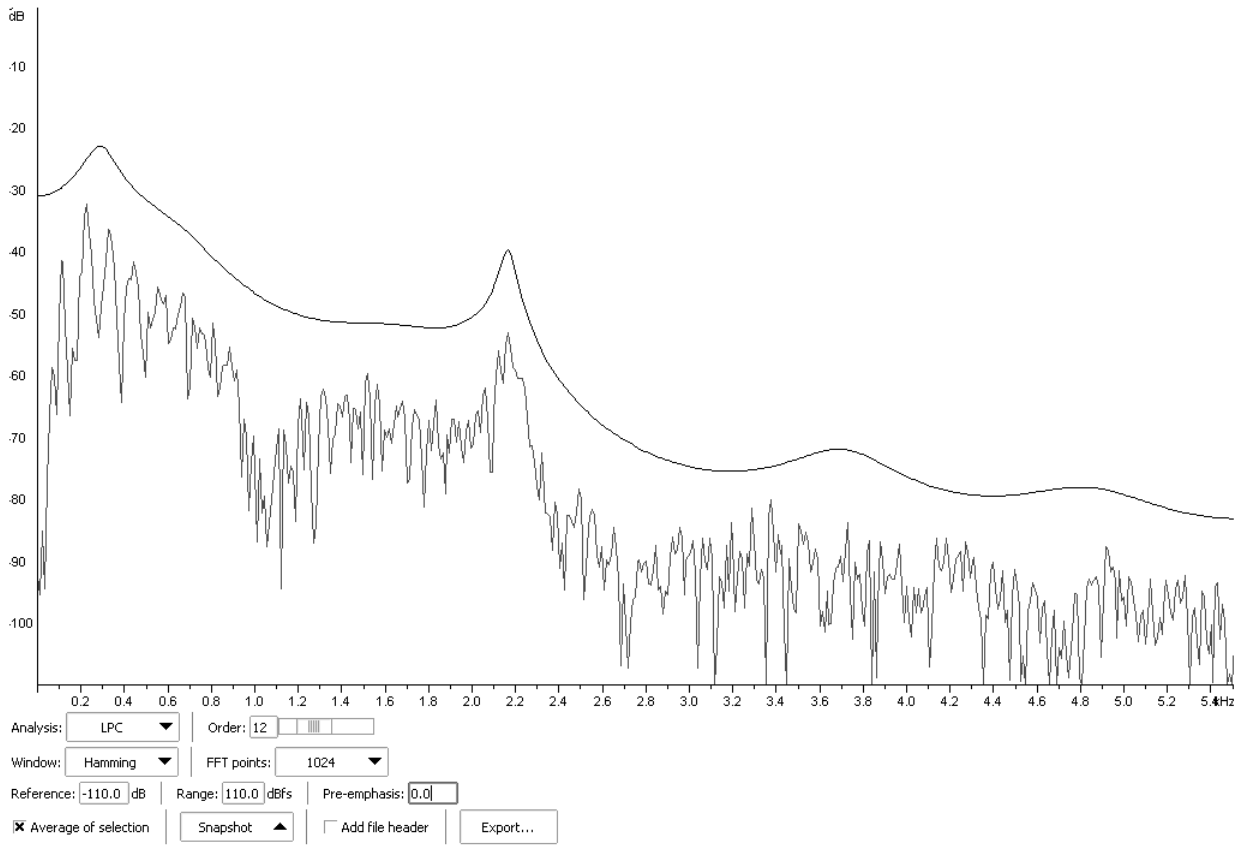


Figure 15: FFT of [g] closure noise (averaged)

Since my consultant learned Mong Leng before English, it is quite possible that he substitutes prenasalization for prevoicing in English, although he is certainly a native speaker of both languages.

# 4 Prosody

## 4.1 Isolation

### 4.1.1 Tone/Phonation Type Contrasts

The following table summarizes the lexical tone/phonation type contrasts in Mong Leng:[11]

Table 16: Tone/Phonation Type Contrasts

| | **Tone / Phonation** | | **Example** | | | **CD** |
|---|---|---|---|---|---|---|
| | RPA | IPA | RPA | IPA | gloss | **Track #** |
| high, rising | -b | ˥˧ (45) | ntub | ⁿtu˥˧ | *wet* | 1.98 |
| high, falling, tense | -j | ˥˩ (52) | ntuj | ⁿtu˥˩ | *sky/heavens* | 1.99 |
| low, rising | -v | ˩˧ (24) | ntuv | ⁿtu˩˧ | *to fell (a tree)* | 2.1 |
| mid | - | ˧ (44) | ntu | ⁿtu˧ | *to spit* | 2.2 |
| low | -s | ˨ (33) | ntus | ⁿtu˨ | *to weave* | 2.3 |
| low, falling, breathy | -g | ˨̤ (33) | ntug | ⁿtṳ˨ | *edge* | 2.4 |
| low, falling, creaky | -m | ˨̰˩ (31) | ntum | ⁿtṵ˩ | *tight* | 2.5 |

[11] The literature on White Hmong/Mong Leng also mentions the RPA *-d* tone, a variation of the *-m* tone that shows up in certain morphological environments and is produced as ˩˧ (213) (Yang, 2004, p. 182; Mortensen, 2004, p. 4). My consultant, however, stated that for him the *-d* tone is the same as the *-v* tone, and my recordings of his speech corroborate this fact.

The spectrograms and pitch plots in Figure 16 illustrate the tone and tone contour contrasts:

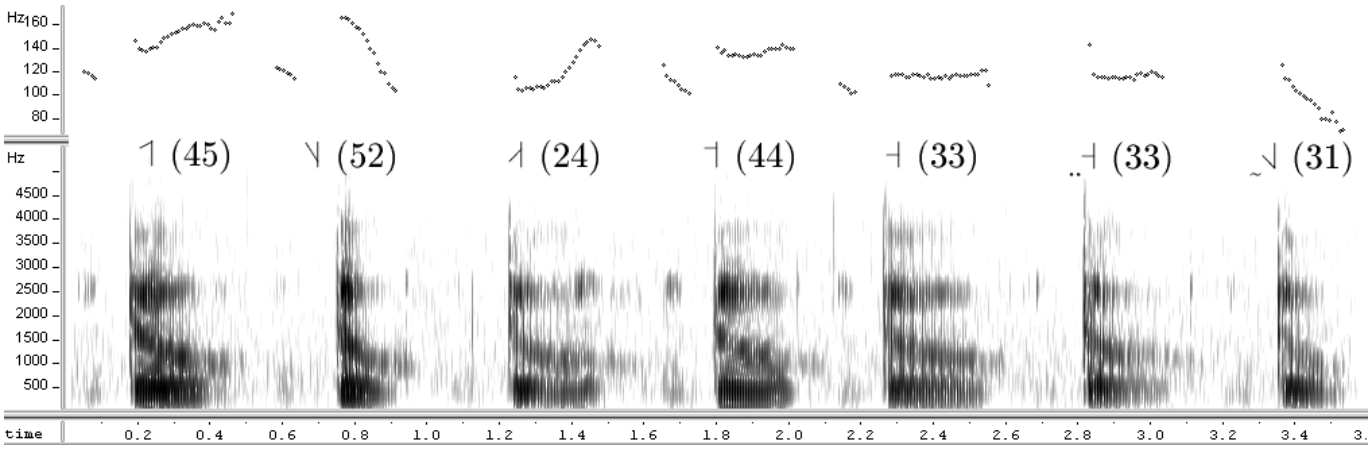


Figure 16: Spectrograms and pitch plots of RPA *ntub, ntuj, ntuv, ntu, ntus, ntug, ntum* (displaying spliced version of CD Track 2.6)

The following waveforms and spectrograms illustrate the differences among modal (RPA *ntus*), tense (*ntuj*), breathy (*ntug*), and creaky (*ntum*) voice and all show a 117 ms slice of each token:

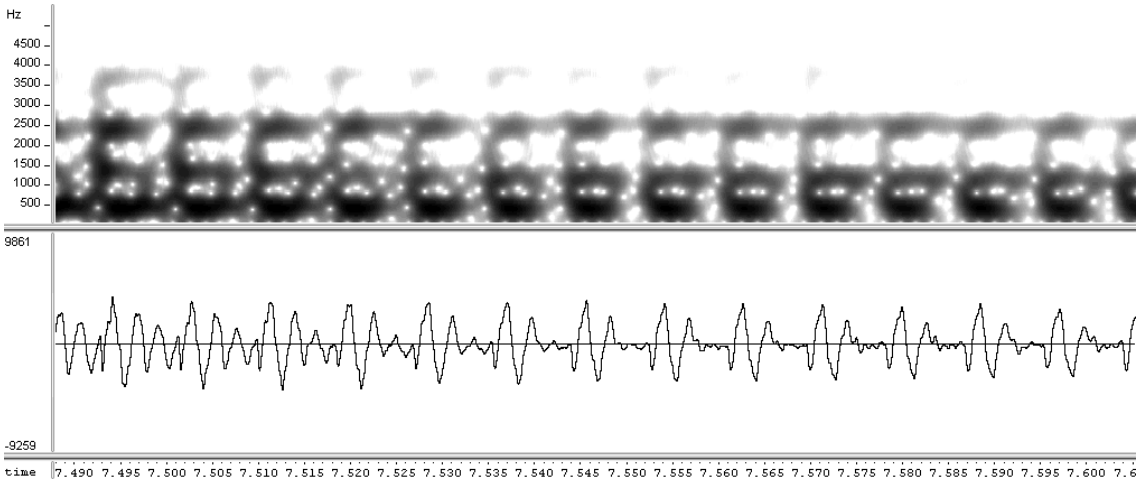


Figure 17: Modal voice (RPA *ntus*)

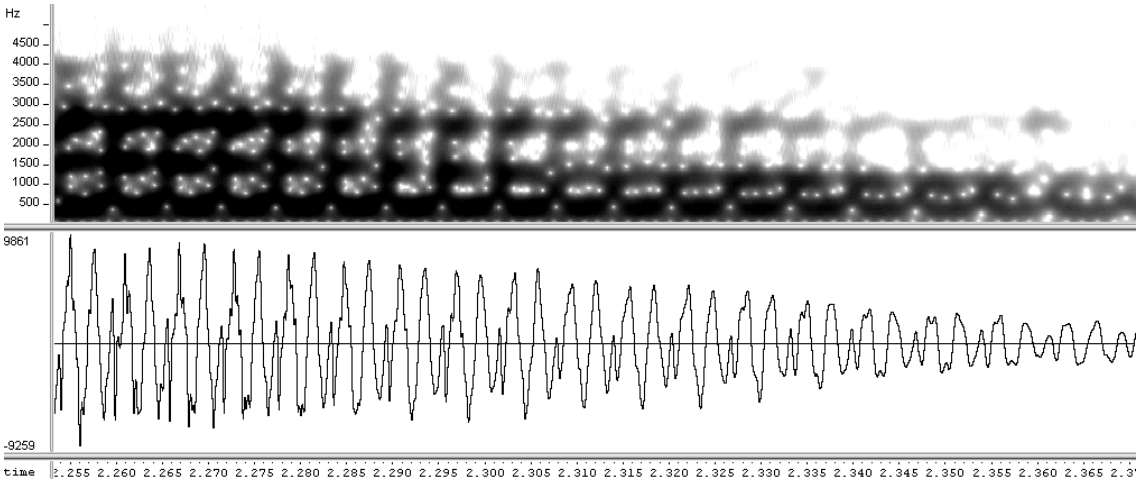


Figure 18: Tense voice (RPA *ntuj*)

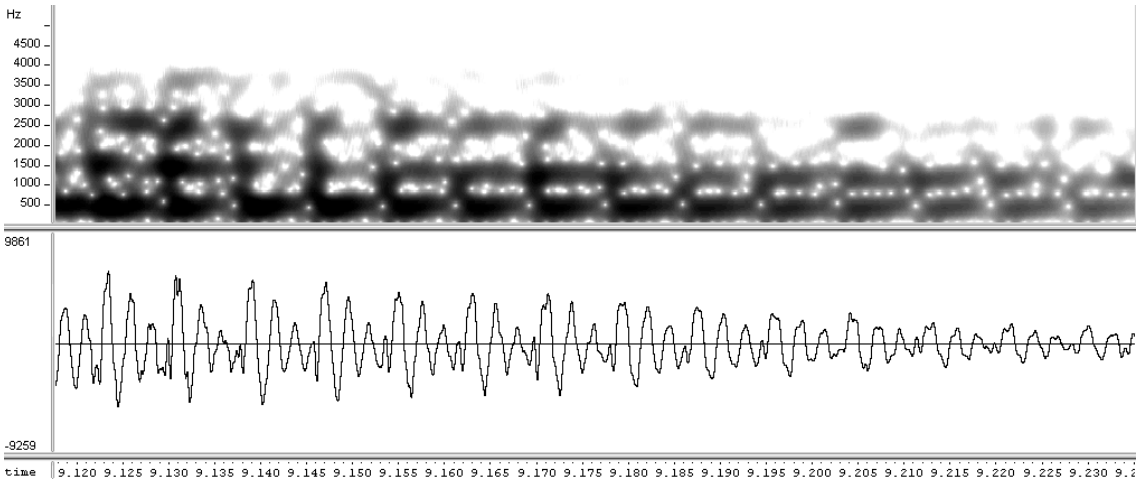


Figure 19: Breathy voice (RPA *ntug*)

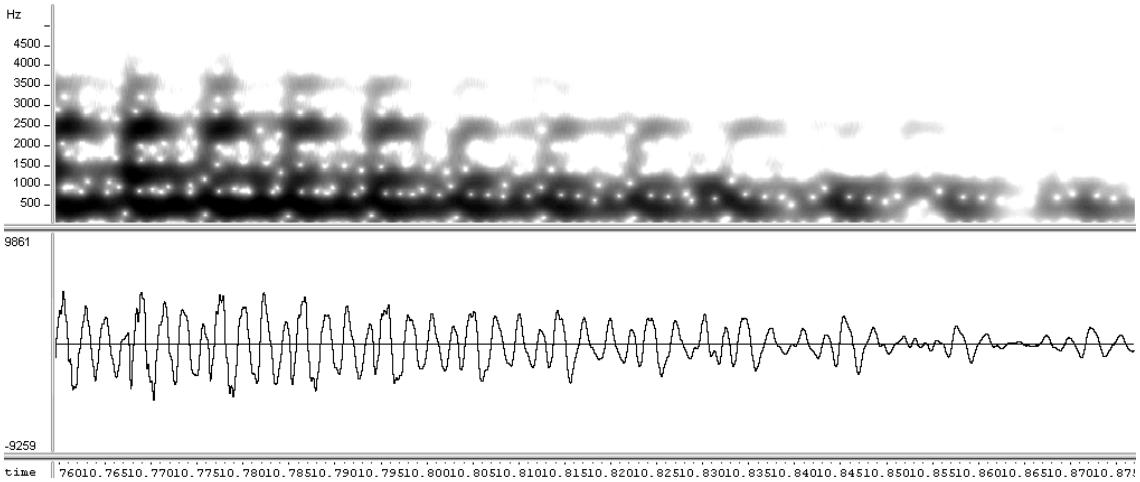


Figure 20: Creaky voice (RPA *ntum*)

### 4.1.2 Other Suprasegmental Features

Given that Mong Leng has a largely monosyllabic lexicon, other word-internal suprasegmental features are hard to come by. There was no word-internal stress contrast for the few polysyllabic words we encountered, nor was there any evidence of stressed words in running speech. After making this observation myself, I asked my consultant for his insight on stress in Mong Leng, and he revealed that Mong Leng (and White Hmong) speakers "stress" a word by lengthening the vowel, which makes sense given Mong Leng's lack of a phonological length contrast. This phenomenon is manifested in running speech, which is covered in the next section.

## 4.2 Running Speech

### 4.2.1 Tone Sandhi

While Mong Leng phonation types are preserved in running speech, the tone contours exhibit interesting, though not totally unpredictable, behavior. An analysis of spoken phrases and passages yielded the following observations:

1. The initial pitch for the high, rising RPA *-b* tone contour (IPA ˥˧ 45) is significantly affected by the immediately preceding tone.
2. The initial pitch of the high, falling, tense, RPA *-j* tone contour (IPA ˥˩ 52) is also affected by the immediately preceding tone, sometimes changing *-j* to a rising-falling tone contour.
3. If a syllable begins with a nasal or prenasalized consonant, the final pitch of the immediately preceding syllable "bleeds over" into the nasal/prenasalized consonant.
4. The low, rising RPA *-v* tone (IPA ˩˧ 24) is most often expressed in running speech as ˧ (22) or ˩˧ (23).

The spectrogram and transcription in Figure 21 are of an excerpt from John 1:1-3 (CD Track 2.7), originally taken from a White Hmong translation of the Bible (Hmong Baptist Fellowship, 2004) and translated into Mong Leng by my consultant, and illustrate the above observations:

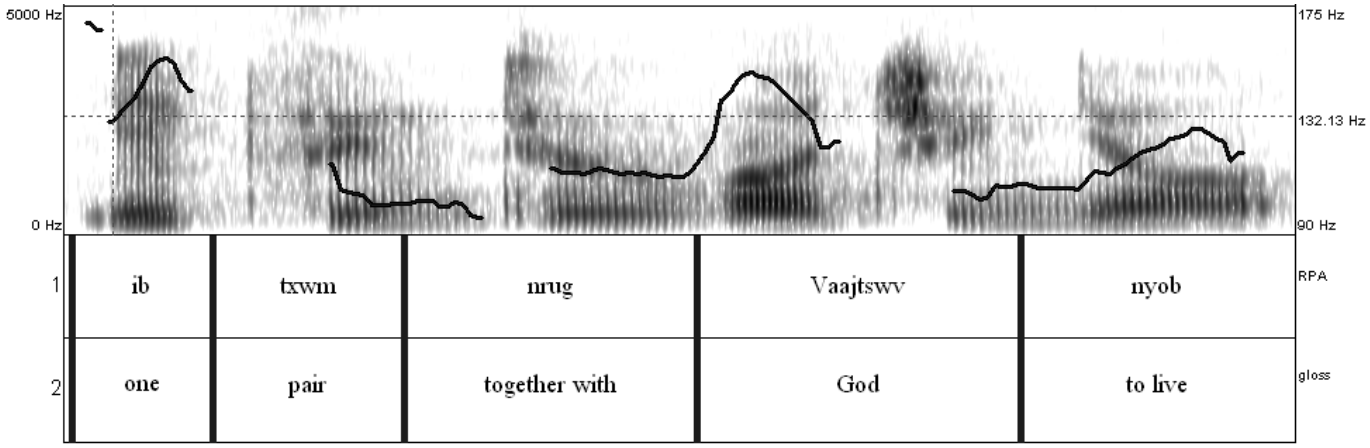


Figure 21: Spectrogram and transcription of RPA *ib txwm nrug Vaajtswv nyob* (CD Track 2.8)

My consultant had just taken a breath before he began this phrase, so the high rising tone contour of RPA *ib* (IPA [i˥]) is as expected. Notice that it begins to fall in anticipation of the low falling *-m* tone contour of *txwm* [tsi̯˨], which itself extends to the initial nasal consonant of *nrug* [ⁿt̪u̯˧] (as noted in observation 3). The vowel of *nrug is* low-toned and breathy, as expected, and the pitch rises at the beginning of *Vaajtswv* [vãn˨˩tʃi̯˩˧][12] to reach the starting pitch for the high falling *-j* tone contour. This results in a rising-falling contour (observation 2) on the first syllable of *Vaajtswv*, which could be transcribed as [vãn˩˥] (353).

[12]Note that the optional nasal consonant following [ã] here assimilates to the POA of [tʃ] and is therefore [n].

The -*v* tone contour of *Vaajtswv* is an example of observation 4: It is expressed as a steady 22 tone (˧), and also extends onto the initial nasal consonant of *nyob* [ɲɑ˥] (observation 3). Finally, *nyob* demonstrates observation 1, as the high rising -*b* tone contour starts with the level 2 pitch of the preceding syllable and rises. Hence, it barely even reaches the level 4 starting pitch of *ib*, and would be better transcribed as [ɲɑ˦] (24).

### 4.2.2 Vowel Lengthening

Although my consultant typically does not utilize semantic vowel-lengthening in his Mong speech, he demonstrated the concept to me by producing the following sentence, with the transcription shown in Table 17 and spectrogram in Figure 22:

Table 17: Transcription of vowel-lengthened sentence (CD Track 2.9)

| **RPA** | nwg | muab | pov | dleb | dleb | tom | u |
|---|---|---|---|---|---|---|---|
| **IPA** | n̈˧ | mɔᵊ˥ | pɑ˦ | tlɛ˥ | tlɛː˥ | tɑ̃˨ | ʔu˧ |
| **gloss** | *he* | *take* | *throw* | *far* | *far* | *over there* | |
| **translation** | "He throws it very far over there." | | | | | | |

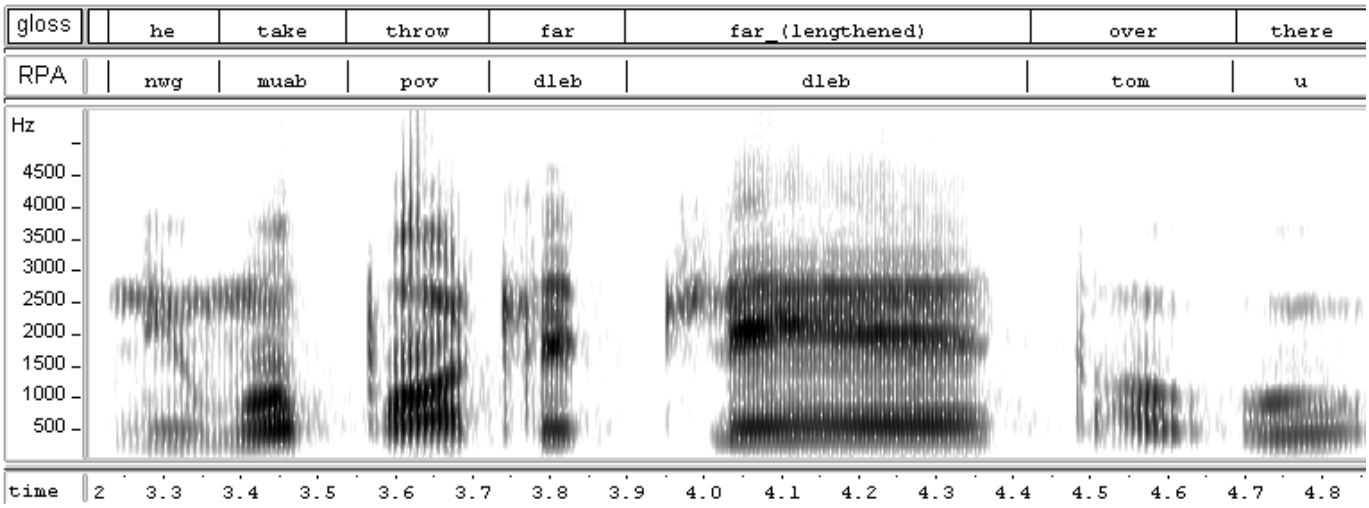


Figure 22: Vowel-lengthened sentence (CD Track 2.9)

A lengthened vowel in the reduplicated adjective indicates a semantic sense of "greater degree," yielding *very far*.

### 4.2.3 Question Intonation (or lack thereof)

Mong Leng preserves its lexical tone contrasts in polar interrogatives by utilizing the word [pɔᵊ˧] (RPA *puas*), which appears before the verb to form a question:[13]

Table 18: Transcription of polar interrogative (CD Track 2.10)

| **RPA** | koj | puas | nyob | zoo |
|---|---|---|---|---|
| **IPA** | kɑ˩ | pɔᵊ˧ | ɲɑ˥ | ʒɔ̃ŋ˥ |
| **gloss** | *you* (sg.) | question-marker | *live* | *well* |
| **translation** | "Are you doing well?" | | | |

[13]My consultant also noted that *puas* can be uttered at the end of a sentence to convey sarcasm.

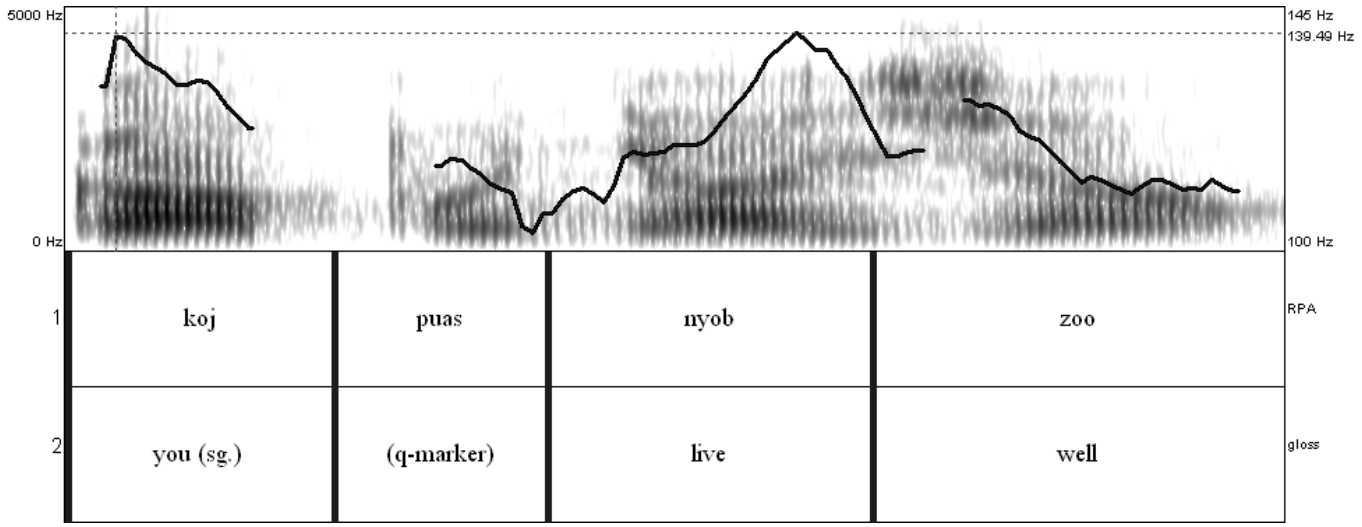


Figure 23: Polar interrogative (CD Track 2.10)

Note that in Figure 23 the tones and tone contours are not altered by the question status of the utterance.

# 5 Conclusion

Mong Leng is a phonetically and syntactically fascinating language, and provides a superb demonstration of the manner in which complexity is distributed differently for different languages: While the inventory of consonants and tones/phonation types is impressive and may be daunting to an English speaker, underneath it lies a language that is largely monosyllabic and (to the best of my knowledge) completely lacking syntactic inflection. For example, *kuv* [kuˬ] means *I*, *me*, or *my*, and *yog* [jo̤˧] means *to be, am, is,* or *are*. This is a beautiful picture of the complementary-yet-equal nature of human languages: Where one exhibits complexity, the other exhibits simplicity; where one exhibits simplicity, the other exhibits complexity.

**Acknowledgments**

Special thanks to John Vang, my friend and consultant, for allowing me to record his voice and pick his brain, and for putting up with my tone-challenged Anglo ears. I am also indebted to Dr. David Mortensen for providing his expert assistance in clearing up my *Miao/Hmong* and *Mong Njua/Mong Leng* terminology confusion.

# Appendix: White Hmong vs. Mong Leng

Since my consultant speaks both White Hmong and Mong Leng, through the course of our sessions we discovered some systematic phonological differences between the two dialects, which I sketch here:[14]

1. Where White Hmong makes use of a voiceless nasal, Mong Leng uses the voiced nasal:

| | **White Hmong** | | **Mong Leng** | | **CD** |
|---|---|---|---|---|---|
| gloss | RPA | IPA | RPA | IPA | **Track #s** |
| *spear* | hmuv | m̥u˧ | muv | mu˧ | 2.11, 2.12 |
| *(H)mong* | Hmoob | m̥ɔ̃ŋ˥ | Moob | mɔ̃ŋ˥ | 2.13, 2.14 |

2. White Hmong pronunciation of RPA *e* is closest to IPA [e], while Mong Leng pronunciation is closest to [ɛ]:

| **gloss** | **RPA** | **White Hmong IPA** | **Mong Leng IPA** | **CD Track #s** |
|---|---|---|---|---|
| *we* | peb | pe˥ | pɛ˥ | 2.15, 2.16 |
| *together* | ua ke | ɔ$^{ə}$˥ ke˥ | ɔ$^{ə}$˥ kɛ˥ | 2.17, 2.18 |

3. White Hmong syllables containing either of the diphthongs *ia* [ia] and *ai* [aɪ] tend to be expressed with *a* [a] in Mong Leng:

| | **White Hmong** | | **Mong Leng** | | **CD** |
|---|---|---|---|---|---|
| gloss | RPA | IPA | RPA | IPA | **Track #s** |
| *mother* | niam | nia̰˨ | nam | na̰˨ | 2.19, 2.20 |
| *to seek / look for* | nrhiav | $^{n}$t̰$^{h}$ia˧ | nrhav | $^{n}$t̰$^{h}$a˧ | 2.21, 2.22 |
| *skirt, dress* | tiab | tia˥ | tab | ta˥ | 2.23, 2.24 |
| *chicken* | tus qaib | tu˦ qaɪ˥ | (tug) qab | qa˥ | 2.25, 2.26 |
| *meat* | nqaij | $^{n}$qaɪ˨ | nqaj | $^{n}$qa˨ | 2.27, 2.28 |

4. Many White Hmong syllables containing the vowel *a* [a] are produced in Mong Leng with *aa* [ã ~ ãŋ]:

| | **White Hmong** | | **Mong Leng** | | **CD** |
|---|---|---|---|---|---|
| gloss | RPA | IPA | RPA | IPA | **Track #s** |
| *stomach* | lub plab | lu˥ pla˥ | (lub) plaab | plãŋ˥ | 2.29, 2.30 |
| *flute* | lub raj | lu˥ ta˨ | (lub) raaj | t̰ãŋ˨ | 2.31, 2.32 |
| *insect* | tus kab | tu˦ ka˥ | (tug) kaab | kãŋ˥ | 2.33, 2.34 |

5. The White Hmong voiced alevolar stop *d* [d] is expressed in Mong Leng as the consonant cluster *dl / kl* [tl ~ kl]:

| | **White Hmong** | | **Mong Leng** | | **CD** |
|---|---|---|---|---|---|
| gloss | RPA | IPA | RPA | IPA | **Track #s** |
| *black* | dub | du˥ | dlub | tlu˥ | 2.35, 2.36 |
| *far* | deb | de˥ | dleb | tlɛ˥ | 2.37, 23.8 |
| *wide* | dav | da˧ | dlaav | tlãŋ˧ | 2.39, 2.40 |

[14] All White Hmong audio examples downloaded from the *Talking White (Hmoob Dawb) Hmong/English and English/Hmong Dictionary* (St. Paul Public Schools).

6. Some White Hmong syllables with the -*s* tone (33) are phonated as breathy in Mong Leng, and are therefore written with -*g* (33, breathy):

| | **White Hmong** | | **Mong Leng** | | **CD** |
|---|---|---|---|---|---|
| gloss | RPA | IPA | RPA | IPA | **Track #s** |
| *he / she / it / him / her / his / its* | nws | nɨ˧ | nwg | n̤ɨ˧ | 2.41, 2.42 |
| *to go down, descend* | nqes | ⁿqe˧ | nqeg | ⁿq̤ɛ˧ | 2.43, 2.44 |
| *pants, trousers* | lub ris | lu˥ ʈi˧ | (lub) rig | ʈ̤i˧ | 2.45, 2.46 |
| classifier used before persons & things | tus | tu˧ | (tug) | | 2.47 |
| *one duck* | | | ib tug us | ʔi˥ tṳ˧ ʔu˧ | 2.48 |

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