The Phonetic Inventory of Iu-Mien

Daniel Bruhn
UC Berkeley Independent Study

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1 Introduction

1.1 Background

Iu-Mien[1] is a language of the Hmong-Mien (formerly *Miao-Yao*) family spoken by the Iu-Mien people, the largest ethnic group within the Yao nationality (PRC classification) (Hattaway, 2003, p. 221). The Iu-Mien people live mainly in southeast China and the highlands of Vietnam, Laos, and Thailand. A significant number from Laos, however, have resettled in the United States, most notably in Seattle, Portland, and various cities of California (Crystal, 1992).

As is the case with literature on the Hmong people group, there seems to be a good deal of confusion (or at least the potential for confusion) in Iu-Mien terminology. The Chinese word *Yao* is an official PRC term for one of the 56 recognized ethnic groups in China. The Yao nationality consists of speakers of several different languages, including those from the Tai-Kadai language family, the Hmongic branch of the Hmong-Mien family, and the Mienic branch of the Hmong-Mien family (Hmong-Mien Languages, 2007). In addition, until another name for the Miao-Yao language family was adopted by Western scholars, *Yao* also referred to a specific branch within the Miao-Yao family. This branch is now known as the *Mienic* branch of the Hmong-Mien family, and includes Kim-Mun and Iu-Mien (the largest group within the branch), among others (Gordon, 2005). It is not uncommon, therefore, to encounter literature in which the Iu-Mien people are referred to as *Yao*, since they constitute the largest group within both the PRC Yao nationality and the (formerly) Yao branch of the Miao-Yao language family. The most accurate term, however, still remains *Iu-Mien*.

1.2 Consultant(s)

Soumeng 'Sou' Lee, my main consultant, is a 27-year old Iu-Mien speaker and a resident of San Pablo, California. He was born in Namtha (in northern Laos) in 1980, but his family escaped across the Mekong River to Thailand in 1982, where they lived in refugee camps for 5 years. In 1986 they moved to the San Francisco Bay Area, where Sou (then 6 years old) was enrolled in elementary school and first learned English. At home he currently employs a mixture of Iu-Mien and English in conversation with his family. Sou's exposure to other languages has involved learning some Thai while in the refugee camp (which he has mostly forgotten) and taking Spanish language classes while in high school.

While interviewing Sou, I had the opportunity to conduct elicitation with a few other members of his family for comparison, and so I present their relevant biographical information: Sou's grandmother, Meychiang, was born in Laos in 1919 and came to the U.S. with the family in 1986. She uses Iu-Mien exclusively, having never learned English.[2] His father, Xengmeng, was born in Laos in 1949. Sou's older brother, Lou, was 12 years old when the family moved to the U.S., while his younger sister, Lio, was 3 years old:

[1] Also known as *Iu-Mien**h***. (The 'h' indicates a mid falling tone in the Unified Script.)

[2] Meychiang suffers from nearly complete hearing loss, making elicitation difficult, and thus I have only a few recordings of her speech.

Table 1: Ages of Lee family members upon entry into English-saturated environment

Name	Age upon entry into US (years)
Meychiang	67
Xengmeng	37
Lou	12
Sou	6
Lio	3

1.3 Preliminary Notes on Iu-Mien

Iu-Mien belongs to the same language family as White & Green Hmong (Hmong-Mien), and hence shares many of its significant features: a largely monosyllabic lexicon, several tone contrasts, a paucity of allophonic variation, and absence of syntactic inflection. Iu-Mien differs from Hmong, however, in its larger inventory of monophthongs, diphthongs, & triphthongs, smaller inventory of consonants, and allowance of syllable codas.

As is the case with Hmong, the uniform phonotactic environments in Iu-Mien lend themselves to a quasi-phonetic orthography. The *Iu-Mien Unified Script*, based on the Pinyin system for Chinese, was developed in 1984 (Panh, 2002) and represents each word as onset-consonant + vowel + (coda-consonant) + tone-marker. (Historically, Iu-Mien has been written with Chinese characters.) My consultants, however, had never studied the Unified Script and thus possessed only a spoken knowledge of Iu-Mien. In addition, their pronunciations occasionally differed from those indicated by the orthography in my Iu-Mien dictionary (Panh, 2002), which may indicate a dialect difference between the Lee family and the dictionary editor.

1.4 Intra-family Variation & Research Focus

I also observed significant variation *within* the Lee family, and one of a predictable nature: the older members exhibited more tonal and segmental contrasts, while the younger members (including Sou, my main consultant) appeared to have merged certain phonemes and tones, resulting in homophony. For example, Sou's father (Xengmeng) and older brother (Lou) produce the Iu-Mien verb 'to drink' (*hopv* in the Unified Script) as [hop˥˧] and the verb 'to cough' (*hnopv*) as [n̥op˥˧]. Sou and his younger sister (Lio), however, produce [hop˥˧] for both words, indicating a possible merger of /h̥/ and /n̥/ in their inventories. In addition, each member of younger generation I recorded tended to substitute certain Iu-Mien sounds with their approximated English equivalents, while Xengmeng maintained clearly non-English phonemes. For example, Sou and his siblings pronounce the word for 'dustpan' (*jei*) as [ʧɛɪ˦], while their father produces [ʨɛɪ˦].

Given the family members' different stages in language acquisition upon their arrival in the U.S., these phenomena are not unexpected. They did, however, present a dilemma for this researcher: I was faced with the choice of attempting to capture 'authentic' Iu-Mien as spoken by Sou's father or continuing to document the Anglicized Iu-Mien spoken by Sou. In the end I decided to strike a balance between the two, maintaining my original focus on Sou's language, but comparing the data with Xengmeng's pronunciations whenever possible. What resulted was an interesting glimpse at the extent to which a language can be altered in the transmission from one generation to the next.

2 Consonants

Iu-Mien allows for consonants in both onset and coda position but restricts the coda consonants to a small subset (6 members) of the onset consonants.

2.1 Onsets

2.1.1 Stops and Affricates

Iu-Mien onset stops and affricates fall into three series: prevoiced, voiceless unaspirated, and voiceless aspirated, as diagrammed in the following tables[3] (*IMUS* = Iu-Mien Unified Script):

Table 2: Stops & Affricates

	Prevoiced		**Voiceless Unaspirated**		**Voiceless Aspirated**	
	IMUS	IPA	IMUS	IPA	IMUS	IPA
bilabial	*mb*	b	*b*	p	*p*	p^h
dental/alveolar	*nd*	d	*d*	t̪	*t*	t^h
	nz	d͡z	*z*	ts	*c*	ts^h
post-alveolar	*nj*	d͡ʒ	*j*	t͡ʃ	*q*	$t͡ʃ^h$
velar	*nq*	g	*g*	k	*k*	k^h

Table 3: Stop & Affricate Examples

Segment		**Example**			**CD**
IMUS	IPA	IMUS	IPA	gloss	**Track #**
mb	b	*mbuo*	buə˧	'we'	1.01
b	p	*buo*	puə˧	'three'	1.02
p	p^h	*puotv*	$p^{hw}ɜt^{˥˧}$	'to sweep'	1.03
nd	d	*ndaix*	daɪ˨	'to fly'	1.04
d	t̪	*daux*	t̪aʊ˨	'to annoy'	1.05
t	t^h	*tauv*	t^haʊ˥˧	'to breathe'	1.06
nz	d͡z	*nzangv*	d͡zɐŋ˥˧	'boat'	1.07
z	ts	*zaang*	tsaŋ˧	'to steam'	1.08
c	ts^h	*caaux*	ts^haʊ˨	'troublesome'	1.09
nj	d͡ʒ	*njang*	d͡ʒɐŋ˧	'clear'	1.10
j	t͡ʃ	*jaan*	t͡ʃan˧	'vein'	1.11
q	$t͡ʃ^h$	*qaa*	$t͡ʃ^h$a˧	'shrimp'	1.12
nq	g	*nqenx*	gɛn˨	'to divide'	1.13
g	k	*gen*	kɛn˧	'bedroom'	1.14
k	k^h	*ken*	k^hɛn˧	'to lead by hand'	1.15

[3] Unless otherwise noted, all transcriptions are based on Sou's pronunciation.

Family Variation

Comparing these segments with those produced by Sou's father yields an interesting disparity with regards to one of the ostensible affricate series:

Table 4: Sou (postalveolar) / Xengmeng (alveolo-palatal)

	Segment		**Example**			**CD**
	IMUS	IPA	IMUS	IPA	gloss	**Track #**
Sou	*nj*	ʤ	*njang*	ʤɐŋ˧	'clear'	1.16
Xengmeng		ʥ		ʥɐŋ˧		1.17
Sou	*j*	ʧ	*jaan*	ʧan˧	'vein'	1.18
Xengmeng		ʨ		ʨan˧		1.19
Sou	*q*	ʧʰ	*qaa*	ʧʰa˧	'shrimp'	1.20
Xengmeng		ʨʰ		ʨʰa˧		1.21

Where Sou has a series of postalveolar affricates, his father produces alveolo-palatal affricates, which I take to be the original Iu-Mien segments. Sou's substitution of postalveolar affricates is likely due to his introduction to English at a young age.

2.1.2 Nasals

Iu-Mien has both voiced and voiceless onset nasals, as illustrated in the following table:

Table 5: Onset Nasals

	Segment		**Example**			**CD**
	IMUS	IPA	IMUS	IPA	gloss	**Track #**
Voiced	*m*	m	*maa*	ma˧	'mother'	1.22
	n	n	*naaic*	naːɪ˩	'to ask'	1.23
	ny	ɲ	*nyaanh*	ɲan˩	'money'	1.24
	ng	ŋ	*ngaatc*	ŋat˥˩	'to bite, gnaw'	1.25
Voiceless	*hm*	m̥	*hmei*	m̥ɛɪ˧	'oil'	1.26
	hny	ɲ̊	*hnyangx*	ɲ̊ɐŋ˨	'year'	1.27

Family Variation

Once again, intra-family differences arise: Where Sou's father exhibits voiceless variants of the nasals *n* [n] and *ng* [ŋ], Sou tends to produce [h] for both:

Table 6: Sou [h] / Xengmeng (voiceless nasals)

	Segment		**Example**			**CD**
	IMUS	IPA	IMUS	IPA	gloss	**Track #**
Sou	*hn*	h	*hnoi*	hoɪ˧	'day'	1.28
Xengmeng		n̥		n̥oɪ˧		1.29
Sou	*hng*	h	*da'hngatv*	t̪ɐ˧ˈhat˥˥	'to nod off'	1.30
Xengmeng		ŋ̊	(contraction)	t̪ɐ˧ˈŋ̊ɐt˥˥		1.31

The distribution of *hn* [n̥] within the Lee family is particularly interesting:

1. Xengmeng, the father, consistently produces [n̥] where expected (*hn* in the IMUS orthography):

Table 7: Xengmeng *hn*

IMUS	IPA	gloss	CD Track #
hnoi	n̥oɪ˥	'day'	1.29
a'hnoi (contraction)	ɐˈn̥oɪ˥	'yesterday'	1.32
hnamv	n̥ɐm˥	'love'	1.33

2. Lou, the eldest son, produces [n̥] in some words spelled with *hn*, but [h] in others:

Table 8: Lou *hn*

IMUS	IPA	gloss	CD Track #
hnopv	n̥op˧˥	'to cough'	1.34
a'hnoi (contraction)	ɐɻˈhoɪ˥	'yesterday'	1.35

3. Sou uses [h] almost exclusively for *hn*, with the exception of *hniev* 'heavy' (see table below). When confronted with the existence of the [n̥] pronunciation, however, he corrects himself:

Table 9: Sou *hn*

	IMUS	IPA	gloss	CD Track #
[n̥]	*hniev*	n̥iə˥	'heavy'	1.36
[h]	*hnopv*	hop˧˥	'to cough'	1.37
	hnoi	hoɪ˥	'day'	1.38
	hnamv	ham˥	'love'	1.39
	hnomv	hom˥	'to smell'	1.40
"corrected" [n̥]	*hnopv*	n̥op˧˥	'to cough'	1.41

4. Lio, Sou's younger sister, uses [h] exclusively for *hn*.[4] When confronted with her father's [n̥] pronunciation, she had to listen carefully multiple times before trying to imitate this segment.[5]

Table 10: Lio *hn*

IMUS	IPA	gloss	CD Track #
hniev	hiə˥	'heavy'	1.42
hnopv	hop˥	'to cough'	1.43
hnam	ham˧	'damp'	1.44
hnamv	ham˥	'love'	1.45
hnomv	hom˥	'to smell'	1.46

The nature of this distribution correlates with the individuals' ages at entry into the U.S. (Table 1): Lio, learning English at the same time as Iu-Mien, likely perceived and classified [n̥] as the similar phoneme /h/, which exists in both English and Iu-Mien. Sou and Lou, having mostly learned Iu-Mien before entering an English-based environment, may have undertaken some sort of phonemic reanalysis due to pressure from English and retained /n̥/ as [n̥] in some words, while reclassifying it with /h/ in others. Finally, although Xengmeng most likely learned English before entering the U.S., he speaks it as an L2 learner and there is no evidence that English has affected his Iu-Mien inventory.

[4] There is tentative evidence that Lio actually uses a nasalized version of [h] (which might be written as IPA h̃) for *hn*, but further study is required before committing to this.

[5] I say "trying to imitate," because it was evident from Lio's reaction of amusement and light-hearted mimicry that [n̥] is not a segment in her inventory.

Phonetic Nature of Voiceless Nasals

The phonetic nature of these segments is such that it is actually somewhat misleading to label them as true "voiceless nasals." A better description might be "nasally-preaspirated nasals" – that is, a sound similar to the common English "hmm." This phonetic character is clearly evident in the word for 'fifth,' which is simply written as *hmz* in IMUS (*z* being a tone marker). A spectrogram of Sou's pronunciation is shown below, in which a soft (nasal) preaspiration and subsequent voiced nasal are evident:

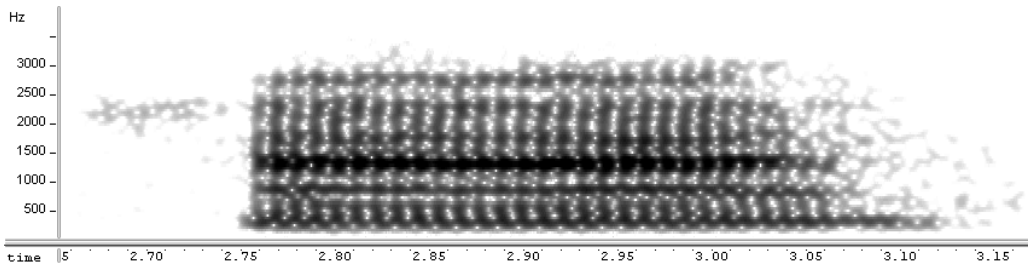

Figure 1: Spectrogram of *hmz* 'fifth'; CD Track 1.47

A better IPA transcription of the IMUS segment *hm* might therefore be [m̃ʰ]. However, this is cumbersome and confusing, and given that other linguists have chosen to remain with the voiceless diacritic for such segments,[6] I will continue to use [m̥].

2.1.3 Other Consonants

Table 11 illustrates the final set of onset consonants in Iu-Mien:

Table 11: Other Onset Consonants

		Segment		**Example**			**CD**
		IMUS	IPA	IMUS	IPA	gloss	**Track #**
voiceless fricatives	glottal	*h*	h	*houx*	həu˩	'pants'	1.48
	labiodental	*f*	f	*faix*	fai˩	'small'	1.49
	alveolar	*s*	s	*sai*	sai˥	'to fasten (belt)'	1.50
voiced approximants	lateral alveolar	*l*	l	*lai*	lai˥	'vegetable'	1.51
	labial-velar	*w*	w	*waaz*	wa˩	'to paint'	1.52
	palatal	*y*	j	*youh*	jəu˨	'gasoline'	1.53
voiceless stop	glottal		ʔ	*meih auv*	mɛi˥ ʔau˧˥	'your wife'	1.54

(Although there is no IMUS symbol for the glottal stop onset, it appears in utterances with words written as vowel-initial.)

[6] See <http://www.phonetics.ucla.edu/vowels/chapter12/burmese.html>, where Ladefoged transcribes Burmese "voiceless nasals."

Family Variation

Xengmeng again exhibits distinctions in his phonetic inventory where his children have merged segments. He produces a voiceless lateral fricative [ɬ] corresponding to the IMUS *hl*, while Lou and Sou simply use [h]:

Table 12: Xengmeng [ɬ] / Lou & Sou [h]

IMUS	**IPA**			**gloss**	**CD Track #'s**
	Xengmeng	Lou	Sou		
hlan	ɬɐn˧	hɐn˧	hɐn˧	'liver'	1.55, 1.56, 1.57
hlauv	ɬaʊ˥˩	haʊ˥˩	haʊ˥˩	'bamboo'	1.58, 1.59, 1.60
hlaax	ɬa˨˩	ha˨˩	ha˨˩	'moon/month'	1.61, 1.62, 1.63
hlaang	ɬaŋ˧	haŋ˧	haŋ˧	'rope, string'	1.64, 1.65, 1.66

2.2 Codas

The last set of consonants in Iu-Mien are the six types that appear in syllable codas. These are shown in the following table with examples:

Table 13: Coda Consonants

Segment		**Example**			**CD Track #**
IMUS	IPA	IMUS	IPA	gloss	
t	t˺	*bitv*	pit˺˥˩	'to spit'	1.67
p	p˺	*aapv*	ap˺˥˩	'duck'	1.68
m	m	*im*	im˧	'bitter'	1.69
n	n	*in*	in˧	'opium'	1.70
ng	ŋ	*zing*	tsɪŋ˧	'eye'	1.71
q	ʔ	*fuqv*	fuʔ˥˩	'to spray'	1.72

3 Vowels

Iu-Mien boasts a complex vowel inventory of monophthongs, diphthongs, and triphthongs, all of which are represented in the IMUS orthography (unambiguously, for the most part).

3.1 Monophthongs

Figure 2 presents impressionistic IPA transcriptions of the 10 Iu-Mien monophthongs and the same chart with the symbols in IMUS:

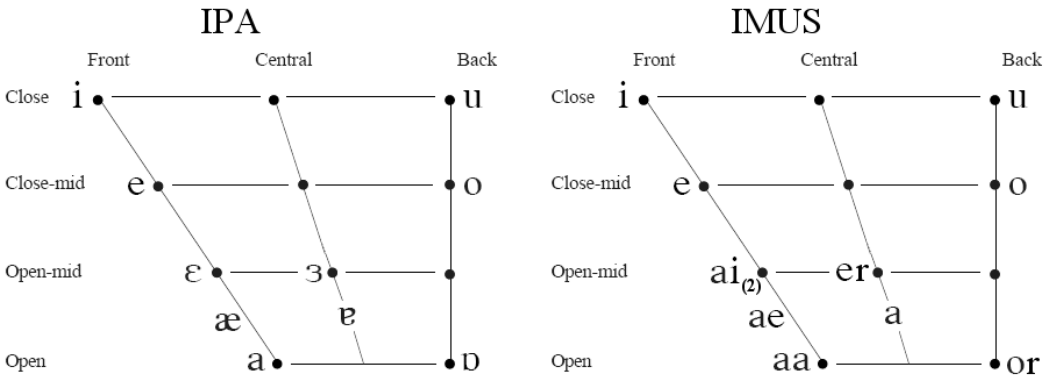

Figure 2: Iu-Mien Monophthongs
(*ai* most often represents the diphthong [aɪ] but also appears in a few words as [ɛ])

Examples of words with these monophthongs are shown in the following table with their formant measurements,[7] while Figure 3 provides vowel plots generated in Project R based on these measurements:

Table 14: Monophthong Examples & Formant Measurements

Monophthong		**Example**			**F1**		**F2**		**F3***		**CD**
IMUS	IPA	IMUS	IPA	gloss	Hz	Bark	Hz	Bark	Hz	Bark	**Track #**
i	i	*i*	iꟾ	'two'	283	2.85	2440	14.34			1.73
u	u	*uv*	uꟾ	'gestures'	364	3.67	729	6.74			1.74
e	e	*heh*	heꟾ	'shoe'	415	4.15	2298	13.94	2815	15.28	1.75
o	o	*hlo*	hoꟾ	'big'	445	4.43	678	6.36			1.76
ai_2	ɛ	*njaiz*	ȸɛꟾ	'soggy'	536	5.23	2015	13.06			1.77
er	ɜ	*sern*	sɜnꟾ	(a raw meat dish)	617	5.89	1559	11.35	2136	13.45	1.78
ae	æ	*dae*	t̲æꟾ	'dad, father'	549	5.34	1718	11.99	2587	14.72	1.79
a	ɐ	*japv*	ʧɐpˀꟾ	'to cut w/ scissors'	627	5.97	1355	10.43	1993	12.99	1.80
aa	a	*hlaax*	haꟾ	'moon / month'	759	6.95	1225	9.78			1.81
or	ɒ	*forv*	fɒˀꟾ	'to lock'	587	5.65	891	7.85			1.82

(* where measurable)

[7] All formant measurements in this paper were conducted with LPC analysis of spectral slices in WaveSurfer.

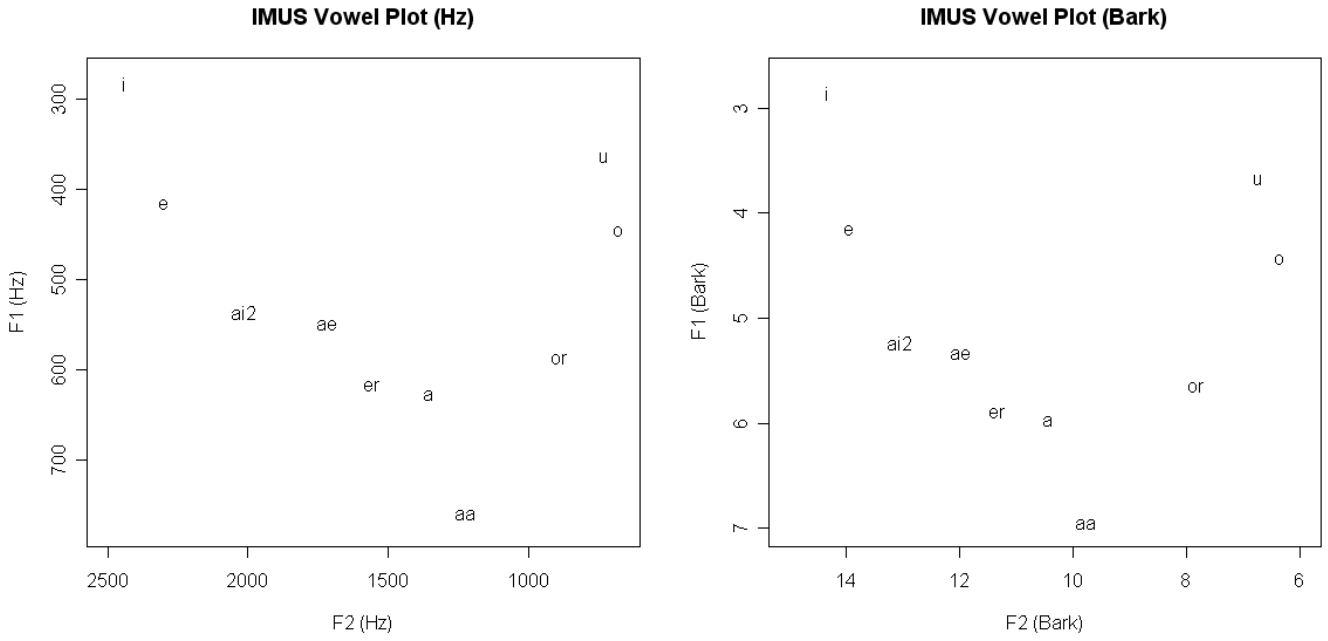

Figure 3: Monophthong Formant Plots

Observations & Family Variation

It should be noted that the above monophthong pronunciations are not fixed, and a phonological analysis would be possible in which the vowels represented by the IMUS symbols were treated as phonemes, rather than phonetically-precise segments. Such a task is beyond the scope of this paper, however, and I will merely give some specific observations regarding certain monophthongs:

a [ɐ] **&** ***aa*** [a]

The issue of the IMUS monophthongs *a* and *aa* is a complicated one that warrants further study. These segments are contrastive, as evidenced by the words *fatv* 'near' and *faatv* 'magic / to scatter.' This contrast is manifested as a duration distinction in Xengmeng's speech, *aa* being longer than *a* by 92 ms. In Sou's pronunciations, *aa* is longer by only 48 ms and is retracted by 132 Hz from *a*:

Table 15: *f**a**tv* vs. *f**aa**tv* / Xengmeng vs. Sou

	IMUS	**F1 (Hz)**	**△F1**	**F2**	**△F2**	**vowel duration (ms)**	**△L**	**CD Track #**
Xengmeng	*f**a**tv*	789	61	1387	31	102	**92**	1.83
	*f**aa**tv*	850		1356		194		1.84
Sou	*f**a**tv*	749	31	1488	**132**	120	**48**	1.85
	*f**aa**tv*	718		1356		168		1.86

In another pseudo-minimal pair, however, the distinctions in Sou's speech are nearly negligible:

Table 16: *f**aa**nx* vs. *d**a**nx*

IMUS	**IPA**	**gloss**	**F1 (Hz)**	**△F1**	**F2**	**△F2**	**vowel dur. (ms)**	**△L**	**CD Track #**
*d**a**nx*	t̪anˀ	'sting'	779	**0**	1296	**31**	183	**27**	1.87
*f**aa**nx*	fanˀ	'umbrella'	779		1265		210		1.88

There also exist words in which he produces *aa* with shorter durations than some of the above examples of *a*:

Table 17: Instances of short *aa*

IMUS	IPA	gloss	vowel duration (ms)	CD Track #
*g**aa**tv*	kat˥˥	'to cut'	137	1.89
*b**aa**tc*	pat˥˩	'to charge, fine'	130	1.90
***aa**pv*	ap˥˥	'duck'	110	1.91

Finally, in two pronunciations of the following minimal pair, the duration differences between *yangh* and *yaangh* fluctuate greatly. (To avoid problems involved in determining a "boundary" between the word-initial glide [j] and the following vowel, the whole word duration was measured for comparison.)

Table 18: *yangh* vs. *yaangh*

IMUS	IPA	gloss	word duration (ms)		CD Track #
			1st utterance	2nd utterance	
yaangh (ix ndoih)	jaŋ˩	'potato'	281	340	1.92
yangh	jaŋ˩	'yellow'	363	336	1.93

Given the illustrated tendencies of Sou's *a* and *aa* to "stray into each other's phonetic territory," there is good reason to believe that *a* and *aa* are not totally contrastive in his inventory. A contributing factor to this quasi-merger may be the general lack of minimal pairs in Iu-Mien involving *a* and *aa*. After a survey of my Iu-Mien dictionary and multiple sessions with Sou's family, I discovered only *fatv* 'near' vs. *faatv* 'magic/to scatter,' *yangh* 'yellow' vs. *yaangh ix doix* 'potato,' and *janx* 'non-Mien person' vs. *jaanx* 'immature chicken' (a term that Sou didn't know). One reason for this lack of contrastive minimal pairs may be the fact that *a* does not occur in open syllables and thus has a distribution that overlaps only partially with that of *aa*, which appears in both open and closed syllables. Whatever the reason for this scarcity, Iu-Mien's large monophthong, diphthong, & triphthong inventory makes the number of *a/aa* minimal pairs a statistical drop in the lexical bucket.

ae [æ] **& ai₂** [ɛ]

The IMUS segments *ae* and *ai₂* present an interesting pair.[8] They are acoustically and perceptually very similar, separated by only a slight advancement distinction, with *ae* being further back (F2 lower by ~300 Hz). This is illustrated in the following table, which summarizes average formant measurements for *ae* and *ai₂* found in open syllables in Sou's Iu-Mien:

Table 19: Open-syllable *ae* vs. *ai₂* Average Formant Measurements

IMUS	F1 (Hz)	F2 (Hz)
ae	555	1751
ai_2	564	2057

Unfortunately, ai_2 only occurs in a small subset of the lexicon (I found 7 words), all of which are open syllables, so it is not possible to compare the behavior of *ae* and *ai₂* in other environments.

[8] It is intriguing that the Iu-Mien Unified Script makes no orthographic provision for this open-syllable [ɛ] vowel, which occurs in certain words spelled with IMUS *ai* (normally pronounced as [aɪ]): *jai* 'chicken,' *jaic* 'skinny,' *jaiv* 'to untie,' *jaix* 'penis,' *njaih* 'deer,' *njaiz* 'soggy,' & *nyaiv* 'embarrassed.' It is very possible that IMUS was based on an Iu-Mien dialect that produces these words with [aɪ], and that the Lee family speaks a different variety.

e [e]

Another observation of family variation is that Sou produces IMUS *e* as [ɛ] in syllables closed by nasals, while his father maintains [e]:

Table 20: Sou [ɛ] / Xengmeng [e]

	IMUS	**IPA**	**gloss**	**CD Track #**
Sou	*nqenx*	gɛn˩	'to divide'	1.94
	gen	kɛn˥	'bedroom'	1.95
	ken	kʰɛn˥	'to lead by hand'	1.96
	hemx	hɛm˩	'to scold'	1.97
Xengmeng	*nqen*	gen˥	'to chop w/ knife'	1.98
	gen	ken˥	'bedroom'	1.99
	ken	kʰen˥	'to lead by hand'	2.01

It is difficult to tie Sou's phonetic behavior here to influence from English, however, as one would expect his [e] to be raised to the diphthong [eɪ]. The source of this alternation therefore remains a puzzle.

er [ɜ]

The vowel represented by IMUS *er* is very rare: I found only 6 words in my dictionary containing *er* (all in syllables closed by *n*), of which Sou knew only *sern* [sɜn˥] (the name of a raw meat dish).

3.2 Diphthongs

Iu-Mien (as spoken by Sou) has the following system of diphthongs that appear only in open syllables, listed in Table 21 with examples and measurements, and plotted on the vowel quadrilateral in Figure 4:

Table 21: Diphthong Examples & Measurements

Diphthong			**Example**			**on- & offglide**		**diph. dur.**	**CD**
Figure 4 #	IMUS	IPA	IMUS	IPA	gloss	F1 (Hz)	F2 (Hz)	(ms)	**Track #**
1	*ai*	aɪ	*lai*	laɪ˥	'vegetable'	849	1559	243	2.02
						417	2255		
2	*aai*	aːɪ	*laai*	laːɪ˥	'last, final'	710	1183	326	2.03
						515	1949	(△D=83)	
3	*au*	aʊ	*auv*	aʊ˥	'wife'	849	1308	249	2.04
						598	821		
4	*aau*	aːʊ	*aauv*	aːʊ˥	'to break w/ both hands'	765	1420	351	2.05
						570	932	(△D=102)	
5	*ei*	ɛɪ	*hmei*	m̥ɛɪ˥	'oil'	543	1963	330	2.06
						362	2353		
6	*oi*	oɪ	*koi*	kʰoɪ˥	'to open'	487	793	356	2.07
						445	2018		
7	*ou*	əu	*goux*	kəu˩	'to take care'	570	1239	341	2.08
						334	724		
8	*eu*	ɛo	*heuc*	hɛo˩˧	'to call, yell'	445	1865	404	2.09
						417	793		

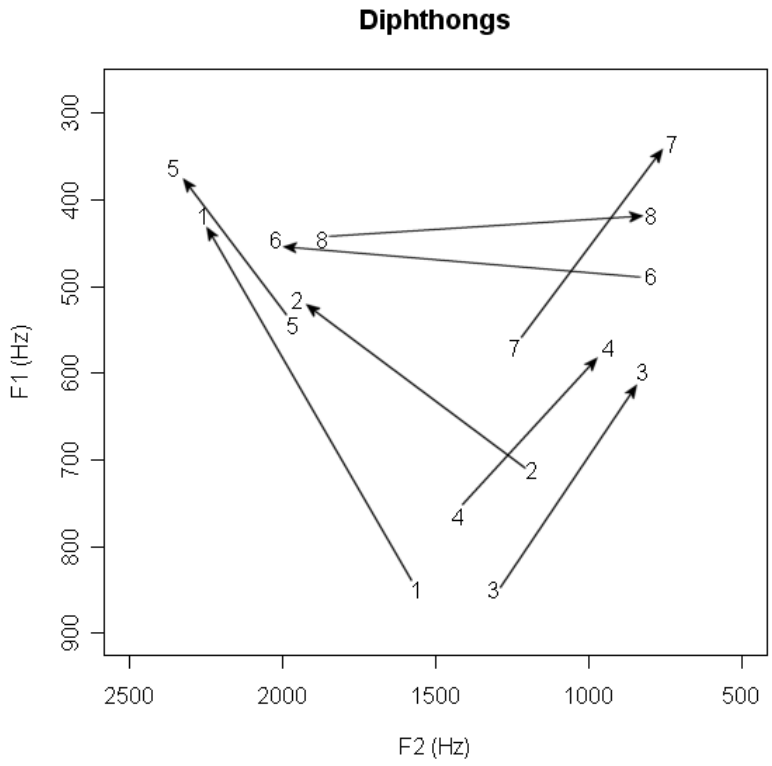

Figure 4: Iu-Mien Diphthongs (see Table 21 for key)

Observations & Family Variation

ei [ɛɪ]

In reality, Sou's pronunciation of the segment represented by IMUS *ei* oscillates between the diphthong [ɛɪ] and a monophthong approximating [e]. This can be seen when comparing his production of the two words *ei* [eɬ] 'to follow' and *hmei* [m̥ɛɪɬ] 'oil,' whose spectrograms are shown in the following figures:

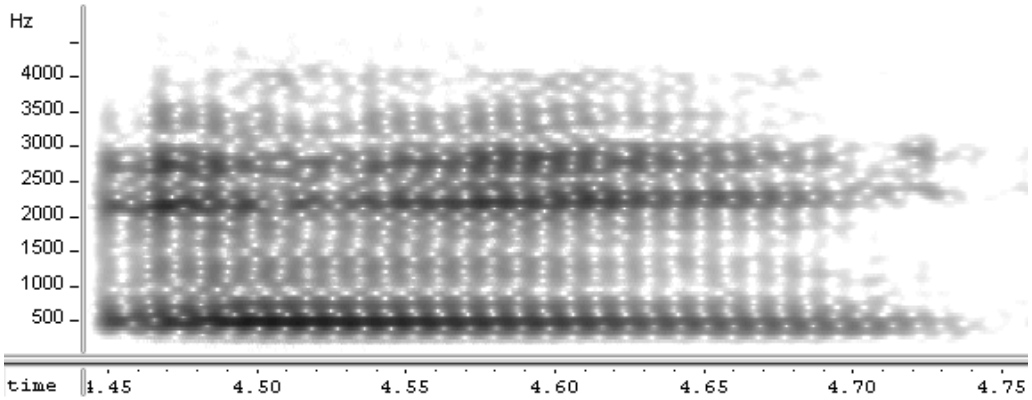

Figure 5: Spectrogram of *ei* 'to follow' with [e] ; CD Track 2.10

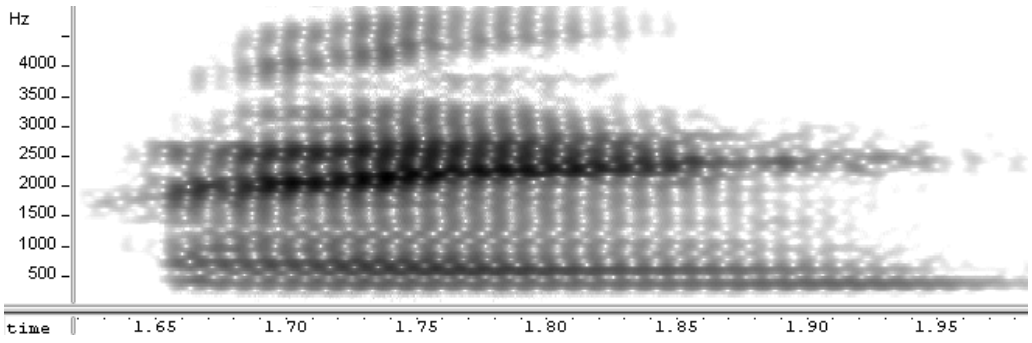

Figure 6: Spectrogram of *hmei* 'oil' with [ɛɪ] ; CD Track 2.06

In Figure 5, F1 and F2 show very little movement, indicating a monophthong. In Figure 6, however, F1 decreases and F2 increases, consistent with diphthongal movement of [ɛ] toward [ɪ]. This variation seems to be a generation-specific phenomenon: Lou, Sou's older brother, also exhibits [e] and [ɛɪ] alternation in his pronunciations, while Xengmeng produces a more consistent [ɛɪ] diphthong.

Contrastive Diphthong Length

As was shown in Table 21, Sou exhibits a length (and slight quality) contrast between the IMUS diphthongs *ai* (243 ms) and *aai* (326 ms). His father's length contrast is even more striking, producing the *ai* of *lai* 'vegetable' for 284 ms and the *aai* of *laai* 'last, final' for 442 ms.

The issue of *au* vs. *aau*, however, is more complex. Table 21 showed that Sou produces the words *auv* [aʊ˥] 'wife' and *aauv* [aːʊ˥] 'to break with both hands' with a duration difference of 102 ms and a very slight quality contrast. In another pair of words, however, these contrasts are practically neutralized:

Table 22: *caux* vs. *caaux*

Example			**on- & offglide**		**vowel duration**	**CD**
IMUS	IPA	gloss	F1 (Hz)	F2 (Hz)	(ms)	**Track #**
caux	tsʰaʊ˩	'to be with'	759	1202	336	2.11
			481	734		
caaux	tsʰaʊ˩	'troublesome'	759	1265	372	2.12
			468	734	(△D=36)	

Xengmeng's phonological behavior behavior with regards to *au* vs. *aau* is also puzzling. The following table presents measurements based on his production of the same two minimal pairs: *caux* vs. *caaux* and *auv* vs. *aauv*:

Table 23: *au* vs. *aau* (Xengmeng)

Example			**on- & offglide**		**vowel duration**	**CD**
IMUS	IPA	gloss	F1 (Hz)	F2 (Hz)	(ms)	**Track #**
caux	tsʰaʊ˩	'to be with'	721	1177	287	2.13
			645	886		
caaux	tsʰaːʊ˩	'troublesome'	822	1341	405	2.14
			670	924	(△D=118)	
auv	aʊ˥	'wife'	721	1379	348	2.15
			670	936		
aauv	aʊ˥	'to break	734	1493	332	2.16
		w/ both hands'	670	1012	(△D=–16)	

While a significant contrast (both in quality and duration) exists between *caux* and *caaux*, *auv* and *aauv* are almost the same utterance, with *aauv* even being shorter than *auv* by 16 ms. When I asked Xengmeng about this similarity,

he stated that 'wife' and 'to break with both hands' were the same word, and that context was needed to differentiate the two. There is clearly room for further research on phonological length contrast in Iu-Mien and how it is represented in the orthography and acquired by successive generations.

3.3 I/U-onglides

The final element in the Iu-Mien vowel system is a pattern of *i*- and *u*-ongliding that can occur with most of the aforementioned monophthongs and diphthongs, forming additional diphthongs and even triphthongs, respectively. Table 24 lists the monophthongs and diphthongs with their *i*/*u*-onglided variants, and Tables 25 & 26 present examples:

Table 24: *I*/*U*-ongliding ('unatt.' = unattested, '?' = unrecorded)

Monophthongs		**i-onglided**			**u-onglided**		
IMUS	IPA	IMUS	IPA		IMUS	IPA	
			open *σ*	closed *σ*		open *σ*	closed *σ*
a	ɐ	*ia*	unatt.	^{j}ɐ	*ua*	unatt.	^{w}ɐ
aa	a	*iaa*	ia		*uaa*	^{w}a	?
ae	æ	unatt.			*uae*	unatt.	^{w}æ
e	e	*ie*	iə	iə/iɛ	*ue*	unatt.	^{w}ɛ
i	i	unatt.			*ui*	ui	?
o	o	*io*	unatt.	^{j}o	*uo*	uə	^{w}ɜ
u	u	*iu*	^{j}u	?	unatt.		
or	ɒ	*ior*	?	^{j}ɒ	unatt.		
ai$_2$	ɛ	*iai*	^{j}ɛ	unatt.	unatt.		
er	ɜ	unatt.			unatt.		
Diphthongs							
ai	aɪ	unatt.			*uai*	^{w}aɪ	unatt.
aai	aːɪ	(*iaai*)*			*uaai*	^{w}aːɪ	unatt.
au	aʊ	*iau*	^{j}aʊ	unatt.	unatt.		
aau	aːʊ	*iaau*	^{j}aːʊ	unatt.	unatt.		
ei	ɛɪ	*iei*	^{j}ɛɪ	unatt.	*uei*	^{w}ɛɪ	unatt.
oi	oɪ	unatt.			unatt.		
ou	əu	*iou*	iəu/^{j}əu	unatt.	unatt.		
eu	ɛo	unatt.			unatt.		

(* attested in dictionary but unknown to Sou)

Table 25: *I*-ongliding Examples

i-onglided			**Example**			**CD**
IMUS	σ	IPA	IMUS	IPA	gloss	**Track #**
ia	closed	ʲɐ	*biangh*	pʲɐŋ˩	‘flower’	2.17
iaa	open	ia	*biaa*	pia˧	‘five’	2.18
	closed	ia	*siaam*	siam˧	‘moustache’	2.19
ie	open	iə	*yie*	jiə˧	‘I’	2.20
	closed	iɛ	*hietc*	hiɛt˥˩	‘eight’	2.21
io	closed	ʲo	*biopv*	pʲop˥˧	‘to bury’	2.22
iu	open	ʲu	*fiuv*	fʲu˥˧	‘to whistle’	2.23
ior	closed	ʲɒ	*mbiorngz*	bʲɒŋ˨	‘cobweb’	2.24
iai	open	ʲɛ	*mbiaic*	bʲɛ˩	‘bamboo shoot’	2.25
iau	open	ʲaʊ	*mbiauh*	bʲaʊ˩	‘unmilled rice’	2.26
iaau	open	ʲaːʊ	*mbiaauz*	bʲaːʊ˨	‘foam bubbles’	2.27
iei	open	ʲɛɪ	*biei*	pʲɛɪ˧	‘four’	2.28
iou	open	ʲəu	*biouv*	pʲəu˥˧	‘fruit’	2.29

Table 26: *U*-ongliding Examples

u-onglided			**Example**			**CD**
IMUS	σ	IPA	IMUS	IPA	gloss	**Track #**
ua	closed	ʷɐ	*buatc*	pʷɐt˥˩	‘to see’	2.30
uaa	open	ʷaː	*guaa*	kʷaː˧	‘cucumber’	2.31
uae	closed	ʷæ	*huaeqv*	hʷæʔ˥˧	‘to whack through jungle’	2.32
ue	closed	ʷɛ	*guetv*	kʷɛt˥˧	‘to scrape w/ spoon’	2.33
ui	closed	ui	*sui*	sui˧	‘sour’	2.34
uo	open	uə	*buo*	puə˧	‘three’	2.35
	closed	ʷɜ	*cuotv*	tsʰʷɜt˥˧	‘exit’	2.36
uai	open	ʷaɪ	*guai*	kʷaɪ˧	‘clever, intelligent’	2.37
uaai	open	ʷaːɪ	*nguaaic*	ŋʷaːɪ˩	‘topmost’	2.38
uei	open	ʷɛɪ	*gueix*	kʷɛɪ˨	‘to dig’	2.39

4 Tone

Iu-Mien words bear contrastive tone, indicated in IMUS by a final tone marker. The following table summarizes the lexical tone contrasts and gives examples, whose spectrograms and pitch traces are shown in Figure 7:

Table 27: Lexical Tone Contrasts

	Tone		**Example**			**CD**
	IMUS	IPA	IMUS	IPA	gloss	**Track #**
high (rising)	*-v*	˥˧ (45) or ˧ (4)	*jaiv*	ʧɛ˥˧	‘to untie’	2.40
mid, falling	*-h*	˩ (31)	*njaih*	ȸɛ˩	‘deer’	2.41
mid	-	˧ (3)	*jai*	ʧɛ˧	‘chicken’	2.42
low (falling)	*-c*	˩ (21) or ˨ (2)	*jaic*	ʧɛ˩	‘skinny’	2.43
low, rising	*-x*	˨ (23)	*jaix*	ʧɛ˨	‘penis’	2.44
	-z		*njaiz*	ȸɛ˨	‘soggy’	2.45

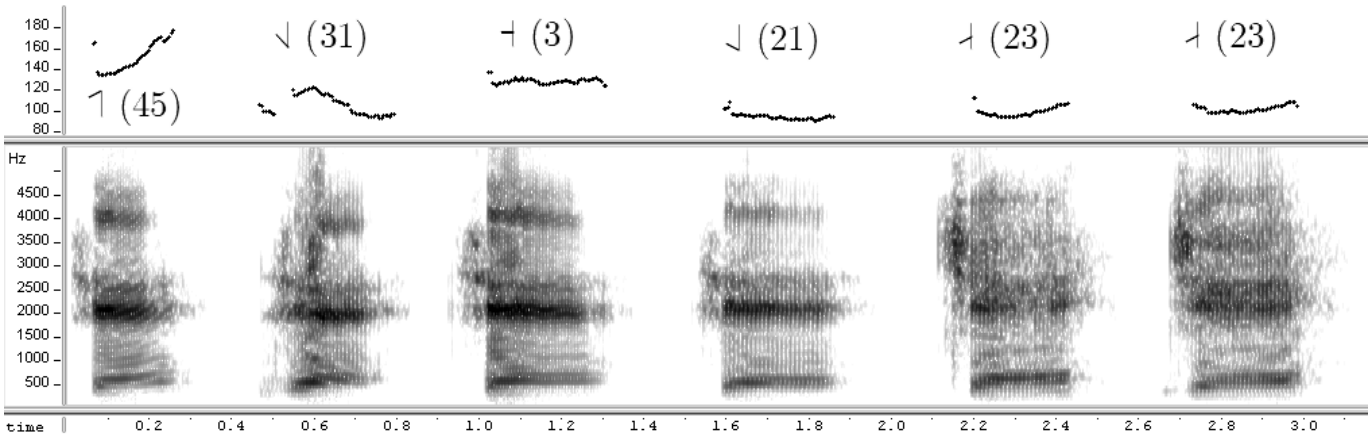

Figure 7: Spectrograms and pitch traces of IMUS *jaiv, njaih, jai, jaic, jaix,* & *njaiz* ; CD Track 2.46

Family Variation

As noted above, Sou produces the *-x* and *-z* tones with the same pitch contour (as do his younger sister and older brother). Xengmeng, however, preserves a distinction between these tones, producing *-x* as ˧ (23) and *-z* as ˧˥ (232). This is illustrated in the following spectrograms and pitch traces of Sou's and Xengmeng's productions of *gox* [ko˧] 'old, elderly' and *hoz* [ho˧]/[ho˧˥] 'thick':

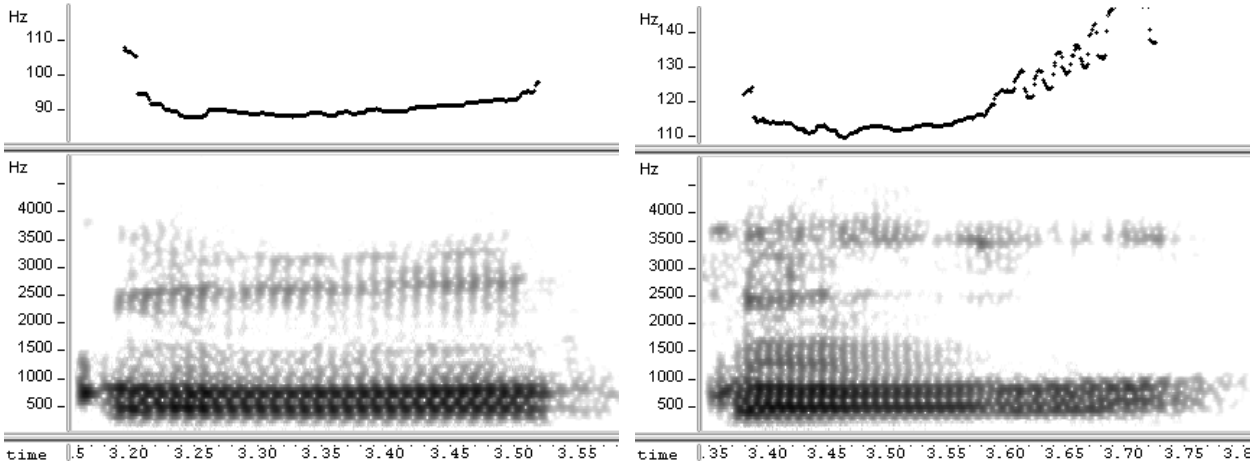

Figure 8: *gox* (Left: Sou; Right: Xengmeng) ; CD Tracks 2.47 & 2.48

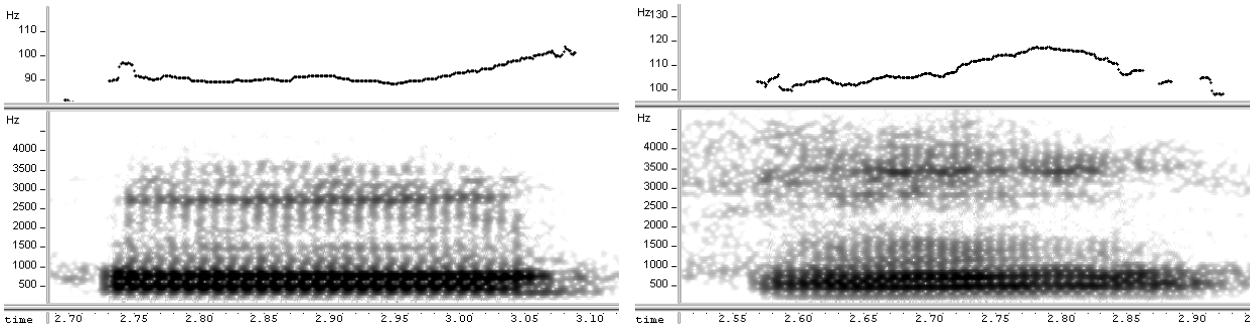

Figure 9: *hoz* (Left: Sou; Right: Xengmeng) ; CD Tracks 2.49 & 2.50

As Figures 8 & 9show, Xengmeng (in addition to producing a more prominent *-x* tone than Sou) maintains a contrast between *-x* and *-z*, which Sou has merged. This distinct *-z* tone is also evident in the speech of Sou's grandmother, Meychiang, as shown below:

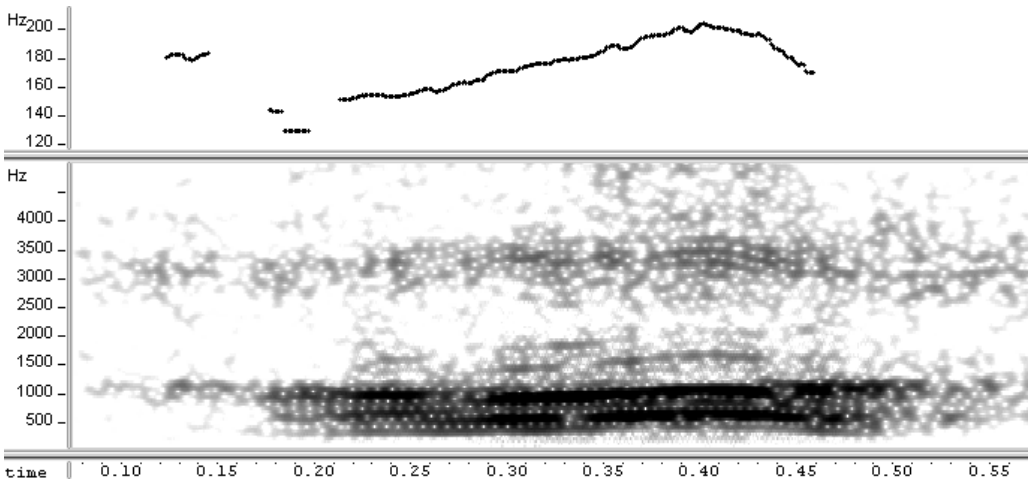

Figure 10: Spectrogram and pitch trace of *hoz* as uttered by Meychiang ; CD Track 2.51

The merger of these two tone contours in the younger generation is not surprising, considering their similarity: both begin with a low rise, which the *-z* tone finishes with a short, slight fall. In addition, words with *-z* are much less frequent in the Iu-Mien lexicon than those with *-x*: In my research, I found 29 words marked with tone *-z* but 62 with *-x*. It is possible that the combination of these factors led to a classification of *-z* as *-x* in the perception of Sou and his siblings.

5 Conclusion

Iu-Mien is a phonetically complex language, in a way that defied my predictions: Having previously worked on Green Hmong (Mong Leng), also a member of the Hmong-Mien language family, with its 47 consonants and 13 vowels, I expected Iu-Mien to have a similar inventory and was not expecting a system of 39 vowels but only 31 consonants. Iu-Mien also exhibits special question intonation despite its reliance on lexical tone contrasts: *Meih mv maaih jai* 'you-not-have-chicken' translates as the declarative "You don't have a chicken" with normal intonation (CD Track 2.52). However, when produced with a different intonation contour (CD Track 2.53), the same sequence means "Do you have a chicken?" (lit. "Do you not have a chicken?"). Finally, there is a prevalence of contraction in Iu-Mien, as in the utterance *ga'nyorc* [kɐˈɲɒ˩] 'spider' (CD Track 2.54), which is a contraction of *gaeng-nyorc* 'insect-spider.' In-depth descriptions of these intriguing phenomena, however, will unfortunately have to be left for a future paper.

This analysis of Iu-Mien as spoken by 27-year old Sou has revealed some ways in which language transmission from one generation to the next can be altered: substitution of dominant language segments, collapsing of distinctions, and introduction of alternations (which may or may not be phonologically conditioned). Further research may help to clarify the roles of English and possibly the Iu-Mien lexicon itself in effecting this process of language change.

Acknowledgments

My deepest thanks to the Lee family, and especially to Sou for his patience, good humour, food, and friendship. As an example of his long-suffering, I should note that he once endured an elicitation session of over 100 tokens with graciousness, and I am deeply indebted to him for the wealth of data he provided that allowed me to complete this research.

References

Crystal, E. (1992). Iu-Mien: Highland Southeast Asian community and culture in California context. In J. Lewis (Ed.), *Minority cultures of Laos: Kammu, Lua', Lahu, Hmong, and Mien* (pp. 327-401). Rancho Cordova, California: Southeast Asia Community Resource Center.

Gordon, R. G., Jr. (Ed.). (2005). *Ethnologue: Languages of the World* (15th ed.). Dallas, Texas: SIL International. Online version: http://www.ethnologue.com/.

Hattaway, P. (2003). *Operation China: Introducing all the people of China.* Pasadena, CA: William Carey Library Publishers. Relevant excerpt available online: http://www.asiaharvest.org/pages/profiles/china/chinaPeoples/I/IuMien.pdf

Hmong-Mien languages. (2007). In *Britannica Concise Encyclopedia.* Retrieved August 26, 2007, from Encyclopædia Britannica Online: http://www.britannica.com/ebc/article-259788

Panh, S. (Ed.). (2002). *English-Mienh and Mienh-English dictionary.* Victoria, British Columbia: Trafford Publishing.