Structure of Hmong-Mien Languages
Session #3 Tonology

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Session overview

- Tone language types
- White/Green Hmong tones
- Phonation as a phonetic cue in tone identification
- West Hmongic tone sandhi
- Tonally constrained music
- The origin of HM tones
- Other tone topics in sessions to come
  - Tonal morphology (session #4)
  - Autosegmental representation of tone (session #7)
  - Language contact and the spread/realization of tone (session #8)
- Assignment #1 again

The "Asian" and "African" tone language types

"Asian" type	"African" type
3-12 tones	2-3 tones
Tone cues: pitch level, pitch change, phonation type, duration	Primary tone cue: pitch
Unitary level and contour tones	Level tones only (contours analyzed as combinations of levels)
Tone change in particular contexts (tone sandhi) limited; involves replacement rather than spread	Tone spread, bunching, delinking, reattachment, floating, displacement common
Monosyllabic words	Polysyllabic words
Few bound segmental morphemes	Numerous bound segmental morphemes
Tone primarily used for lexical discrimination	Extensive grammatical use of tone

- Why use quotes around "Asian" and "African"?
  - African types in Asia (some Wu dialects of Chinese)
  - Asian types in Africa (some Khoisan and West African isolating languages)

- And tone languages of the Americas can be of either type
  - Athabaskan languages with only 2 tones, while
  - Meso-American languages with enormous inventories (Chatino class going on at the Institute right now)

- Hmong-Mien languages do belong to the classic "Asian" type, however.

Hmong tones

on a 5-point scale: 5 highest, 1 lowest

55	*tob*	deep (+ a spinning top)
52	*toj*	a hill
24	*tov*	to add water
33	*to*	to be pierced
42	*tog*	to sink (+ a block, + half)
22	*tos*	to wait (+ to meet)
21ʔ	*tom*	there (+ to bite)
(213)	*tod*	over there

https://www.youtube.com/watch?v=M2-flB3AwR4

… a footnote on Hmong dialect differences

Lub luv luj luj lug   lawm.   Green Mong
CLF car big big come PFV

Lub tsheb loj loj los   lawm.   White Hmong
CLF car   big big come PFV

Phonation as a phonetic cue in tone identification

Kuang, Jianjing. 2013. The tonal space of contrastive five level tones. *Phonetica* 70: 1-23.

Additionally:

Garellek, Marc, Patricia Keating, Christina M. Esposito, and Jody Kreiman. 2013. Voice quality and tone identification in White Hmong. *Journal of the Acoustical Society of America* 133 (2): 1078-1089.

The famous five level tones of "Black Miao"

Black Miao (Hēi Miáo) is a variety of Hmu (East Hmongic) spoken in eastern Guizhou Province.

The initial fieldwork and description was done in the 1940s by Li Fang Kuei, whose student Julia Kwan wrote an oft-cited Univ. of Washington MA essay on the language in 1966.

A world record that tests the limits of human perception? Perhaps not, as Jianjing Kuang shows.

Problem: the "JND"

- The Just Noticeable Difference for contrastive tones in an inventory is c. 20-30 Hz in speech (but interestingly, smaller differences are not difficult to perceive in non-speech: in music, presumably).

- But the normal pitch range for a male speaker cross-linguistically is c. 100 Hz (Fig. 1). Therefore, Kuang contends that speakers can perceive no more than 3 levels without help.

- Expand acoustic space or add extra dimensions: duration, contour, and/or phonation.

Phonation and tone

- Laryngealization in Black Miao evident in the lowest and in the highest tone in different ways, for different reasons, but both involve the effects of pitch extremes.
  - 55 tone (220 Hz): "longitudinal tension of the vocal folds increases as pitch increases…T55 is produced with a tense (or stiff) phonation."
  - 11 tone (75 Hz): "The high CQ of T11 is likely to be due to vocal fry, caused by the compression in the vocal folds which naturally occurs with low pitches."
- Breathiness, on the other hand, is independent of pitch: see esp. Fig. 8, which shows a strong correlation among all the EGG factors proposed for breathiness, but only weak correlation of those factors with pitch.
- Revisiting the Hmong breathy tone and its differing characterizations by Garellek et al. ("high falling"), by our You Tube instructor Jay Her ("lowest tone"), and by me.

Experiments and results

- Pitch measurements: F_0 trajectories of three mid-tones very similar (22, 33, 44) (Figs 3 & 4)

- Perception test: the greatest confusability between 22 and 44 (judged different only 70% of the time) (Table 3)

- Factoring in acoustic measurements (H1-H2, H1-A1, and electroglottographic measurements of vocal fold contact, speed, etc.), the 33 tone is clearly distinguished from 22 and 44 in tonal space (Figs 9 & 10)

A typology of pitch/phonation relationships (all attested in Southeast Asia)

- Contrastive tones, all in modal voice (Thai)
- Contrastive phonation types ("registers") (Yi, Chong)
- Contrastive tones, some of which are characterized by non-modal voice (most Hmongic, Vietnamese, Burmese)
- Contrastive tones *and* contrastive phonation — independent and cross-cutting systems (A-Hmao breathy consonants with any tone; Jingpho with 3 tones x 2 registers = 6 contrasts)

Andruski & Ratliff 2000

West Hmongic tone sandhi

"Tone sandhi" is a phonological change occurring in tonal languages, in which the tones assigned to individual words or morphemes change based on the pronunciation of adjacent words or morphemes.

White Hmong examples:

de^{52} sia^{24} > de^{52}-sia^{33}

water cooked   water cooked (boiled)

hnu^{55} te^{22} > hnu^{55}-te^{42}

sun hand   sunray

$poŋ^{55}$ de^{52} > $poŋ^{55}$-de^{42}

fall water   drown

Prerequisites for tone change

- West Hmongic tone sandhi now involves a paradigmatic replacement of one tone in the inventory by another tone in the inventory.
- The first word (the trigger) must have either the 55 or 52 tone.
- The second word must have one of the following tones:
  - 52, 22, or 21ʔ (>42)
  - 24 (>33)
  - 33 (>22)
- Pretty senseless, synchronically

In order to understand tone sandhi…

… you need to understand tone categories based on historical origin:

55	A1	<	*open syllable, voiceless initial
52	A2	<	*open syllable, voiced initial
24	B1	<	*-ʔ syllable, voiceless initial
22	B2	<	*-ʔ syllable, voiced initial
33	C1	<	*-h syllable, voiceless initial
42	C2	<	*-h syllable, voiced initial
22	D1	<	*-p, -t, -k syllable, vless initial
21ʔ	D2	<	*-p, -t, -k syllable, vd initial

"upper register" tones < syllables with vless initials:

55	A1	<	*open syllable, voiceless initial
52	A2	<	*open syllable, voiced initial
24	B1	<	*-ʔ syllable, voiceless initial
22	B2	<	*-ʔ syllable, voiced initial
33	C1	<	*-h syllable, voiceless initial
42	C2	<	*-h syllable, voiced initial
22	D1	<	*-p, -t, -k syllable, vless initial
21ʔ	D2	<	*-p, -t, -k syllable, vd initial

"lower register" tones < syllables with voiced initials:

55   A1   < *open syllable, voiceless initial
52   A2   < *open syllable, voiced initial
24   B1   < *-ʔ syllable, voiceless initial
22   B2   < *-ʔ syllable, voiced initial
33   C1   < *-h syllable, voiceless initial
42   C2   < *-h syllable, voiced initial
22   D1   < *-p, -t, -k syllable, vless initial
21ʔ   D2   < *-p, -t, -k syllable, vd initial

Historical interpretation of West Hmongic tone sandhi

	White Hmong	Green Mong	Xuyong	Xianjin	Shimen	Qingyan	Gaopo	Zongdi
A2 > C2	X	X	X	X		X	X	X
B2 > C2	X		X	X		X	X	X
D2 > C2	X	X		X				
B1 > C1	X	X	X	X	X			X
C1 > D1	X	X		X	X			X
	environment A1- or A2- _____				environment A1- _____			

The phonetic values of the tones involved are unimportant; only the historical categories involved are important. When the process was active, presumably the phonetic nature of the syllable types involved were important, however.

Key features of West Hmongic tone sandhi

- The requirements for tone sandhi do not involve phonetic tone values, but rather historical tone categories. It was presumably once a natural phonological process, but is no longer.
- Tone sandhi is more likely to occur in certain lexical categories than others.
- Particular lexical items are more likely to trigger or undergo tone sandhi than others.
- Tone sandhi rarely involves a change in meaning and apart from a few lexicalized compounds is always optional.
- Although it is possible to predict non-occurrence, it is impossible to predict when tone sandhi *will* occur.

Typical constructions

- Numeral-Classifier
  - o^{55}-dai^{42} ntaw^{24} (< dai$^{21\text{ʔ}}$) '2 sheets of paper'

- Reciprocal-Verb (could justify analysis of the reciprocal as a bound morpheme)
  - si^{55}-tua^{22} (< tua^{33}) 'kill each other'

- Noun-Modifier
  - nploŋ^{52}-qhua^{33} (<qhua^{24}) 'dry leaves'

- Noun-Noun
  - te^{55}-chaɯ^{22} (<chaɯ^{33}) 'country' (land-place)

- Verb-Noun
  - ka^{52}-ntu^{42} (< ntu^{52}) 'morning' (be bright-sky)

Tonally constrained music

What happens to musical "tunes" in songs when pitch is already being used to convey lexical contrasts? Is instrumental music the only possible type of music?

Kwv txhiaj

"Hmong secular poetry is organized into stanzas which are memorized, improvised, or spontaneously constructed by the singer using a combination of both techniques. A stanza may contain any number of unrhymed "lines" of non-specific lengths … but four rhymed lines provide the basic framework around which a … stanza must be built …" (Catlin 1982:172)

<u>Initial Motive (long, high note)</u>
Unrhymed line(s)
Rhyming line A   my Bonnie lies over the sea
Unrhymed line(s)
Rhyming Line B   oh, bring back my Bonnie to me
Unrhymed line(s)
Rhyming line A'   my Bonnie lies over the sky
Rhyming line B'   oh, bring back my Bonnie before I die
<u>Concluding signature (glissando to low short note)</u>

Lexical tone and musical pitches
hais kwv txhiaj, lit. 'speak *kwv txhiaj*'

Typical tone/pitch equivalences (Catlin 1982:178):

lexical tone	4-pitch system	5-pitch system
55	4	5
52	1	2
24	4	5
33	3	4
22	2	3
42	2	3
21ʔ	2	1

How many basic pitches does this singer use?

https://www.youtube.com/watch?v=kYFJ_UUpI_c

Don't count "ornamentation" (grace notes, decorative notes) – listen to the notes she holds for a longer period of time.

The origin of HM tones

- All languages in the Sinosphere (Chinese, Vietnamese, Tai-Kadai languages, Hmong-Mien languages) seem to have developed tone in the same way: from loss of final laryngeal consonant contrasts in a first wave, doubled by loss of initial laryngeal consonant contrasts in a second wave. Tone is thus a language contact feature, although which language developed tone first is unknowable.

- The origin of tones in Vietnamese was discovered by André Haudricourt in 1954. This was possible due to the fact that close relatives of Vietnamese (Muong, Thavung, etc.) are atonal—we can see the "before" and "after" within one compact family, Vietic. His account of tonogenesis has served as a model for the study of all other tone languages in the area.

Tonogenesis in White Hmong

	A		B		C		D	
Atonal	CV		CVʔ		CVH		CVC$_{vl}$	
Genesis	CV		CV↗		CV↘		CVC$_{vl}$	
Split	A1 *t- upper	A2 *d- lower	B1 *t- upper	B2 *d- lower	C1 *t- upper	C2 *d- lower	D1 *t- upper	D2 *d- lower
Hmong	tɔ^{55} deep	tɔ^{52} hill	tɔ^{24} mix	tɔ^{22} wait	tɔ^{33} pierced	tɔ^{42} sink	--	tɔ^{21ʔ} there

Tonal categories and phonetic values

- Presumably, when tones were new, the "upper register" tones from originally voiceless initials had a higher pitch than their "lower register" counterparts from originally voiced initials.

- This is true for categories B and C (from -ʔ and –h) to this day: of 70 varieties, 81% of B2 tones are lower than B1 tones and 89% of C2 tones are lower than C1 tones. But for category A (from -ø), this is not the case: in exactly half of the 70 varieties, A2 is lower than A1, but in the other half, A1 is lower than A2. Why?

Phonation-to-tone development

	A	B	C
Stage I	CV	CV?	CVH
Stage II	CV	CV̰ ↗	CV̤ ↘
Stage III	upper: CV	upper: CV̰	upper: CV̤
	lower: CɦV	lower: CɦV̰	lower: CɦV̤
Stage IV	A1: CV	B1: CV	C1: CV
	A2: CV ~ CV̰	B2: CV ~ CV̤ ~ CV̰	C2: CV̤ ~ CV

More evidence

- Residual phonation in modern languages
  - breathiness hierarchy C2 < B2 < A2
  - Mun: creakiness in category B

- Raised vowels in Zongdi categories B2 and C2 (a lax glottis effect)

- Complex contour tones (fall-rise or rise-fall) almost exclusively in categories B1 and B2

To put it another way . . .

HM tone	HM initial	Ancient voice quality		Modern voice quality
A modal	voiceless	A1 modal-modal	>	modal
	voiced	A2 breathy-modal	>	modal (rare: breathy)
B creaky	voiceless	B1 modal-creaky	>	modal
	voiced	B2 breathy-creaky	>	modal or breathy (rare: creaky)
C breathy	voiceless	C1 modal-breathy	>	modal
	voiced	C2 breathy-breathy	>	breathy or modal

Other references

- Andruski, Jean & Martha Ratliff. 2000. Phonation types in production of phonological tone: the case of Green Mong. *Journal of the International Phonetic Association* 30:37–61.

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Assignment #1
(posted on website)

Mo Piu is a West Hmongic language spoken in Nậm Tu Hạ, Nậm Xé commune, Văn Bàn district, Lào Cai Province, Vietnam. The local people report that it is the least numerous of all the local Hmongic groups (Andrew Hsiu, p.c.). Number of speakers: 237 in 2011 (Caelen-Haumont 2012).

You will listen to recordings of a Mo Piu speaker reading a wordlist. The wordlist is posted on the class website (each word is in a separate file). You have to try to figure out how many tones there are in this language and then give a description of each one, using your ears alone.

See the full assignment description posted on the website for instructions (and hints).
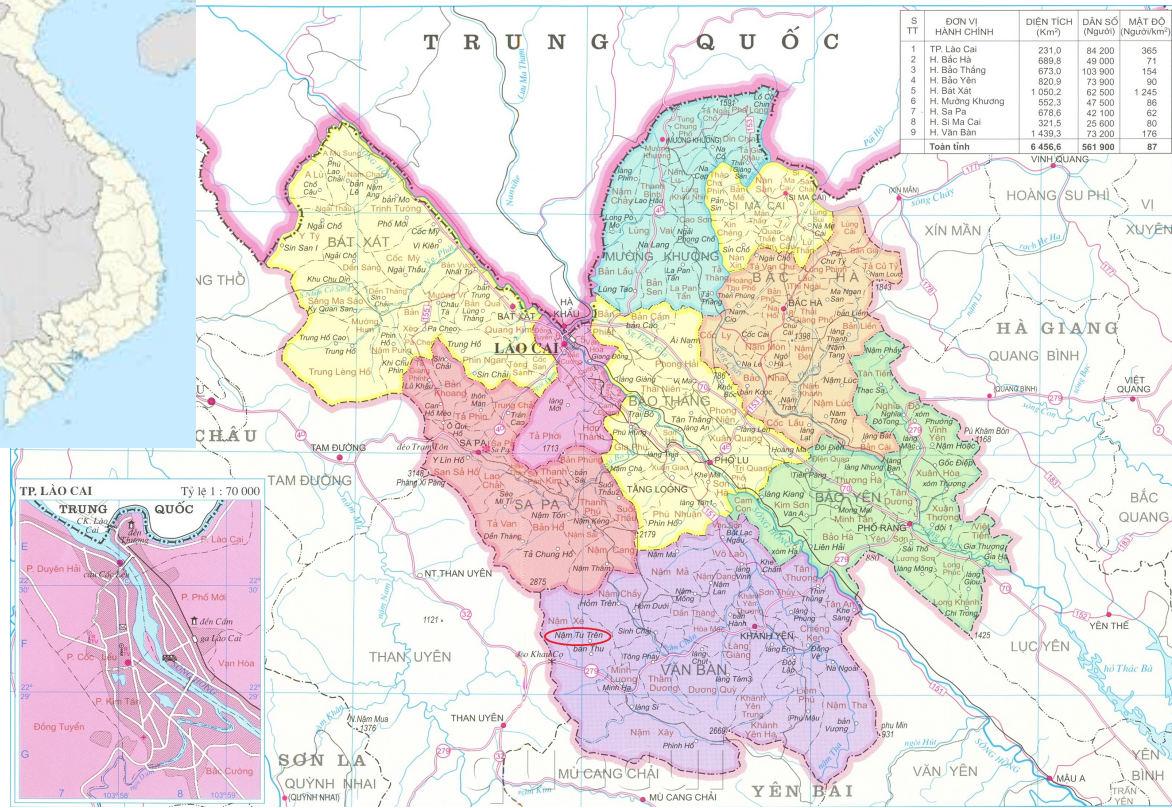
S TT	ĐƠN VỊ HÀNH CHÍNH	DIỆN TÍCH (Km²)	DÂN SỐ (Người)	MẬT ĐỘ (Người/Km²)
1	TP. Lào Cai	231,0	84 200	365
2	H. Bắc Hà	689,8	49 000	71
3	H. Bảo Thắng	673,0	103 900	154
4	H. Bảo Yên	820,9	73 900	90
5	H. Bát Xát	1 050,2	62 500	1 245
6	H. Mường Khương	552,3	47 500	86
7	H. Sa Pa	678,6	42 100	62
8	H. Si Ma Cai	321,5	25 600	80
9	H. Văn Bàn	1 439,3	73 200	176
	Toàn tỉnh	6 456,6	561 900	87

TP. LÀO CAI   Tỷ lệ 1 : 70 000

HOÀNG SU PHÌ
XÍN MẦN
VINH QUANG
HÀ GIANG
QUANG BÌNH
VIỆT QUANG
QUANG BÌNH
BẮC QUANG
LỤC YÊN
YÊN THẾ

BÁT XÁT
MƯỜNG KHƯƠNG
SI MA CAI
BẮC HÀ
LÀO CAI
BẢO THẮNG
SA PA
PHỐ LU
BẢO YÊN
PHỐ RÀNG
KHÁNH YÊN
VĂN BÀN

TAM ĐƯỜNG
THAN UYÊN
NT THAN UYÊN
MÙ CANG CHẢI
QUỲNH NHAI
SƠN LA
YÊN BÁI
VĂN YÊN
YÊN BÌNH
MẬU A