

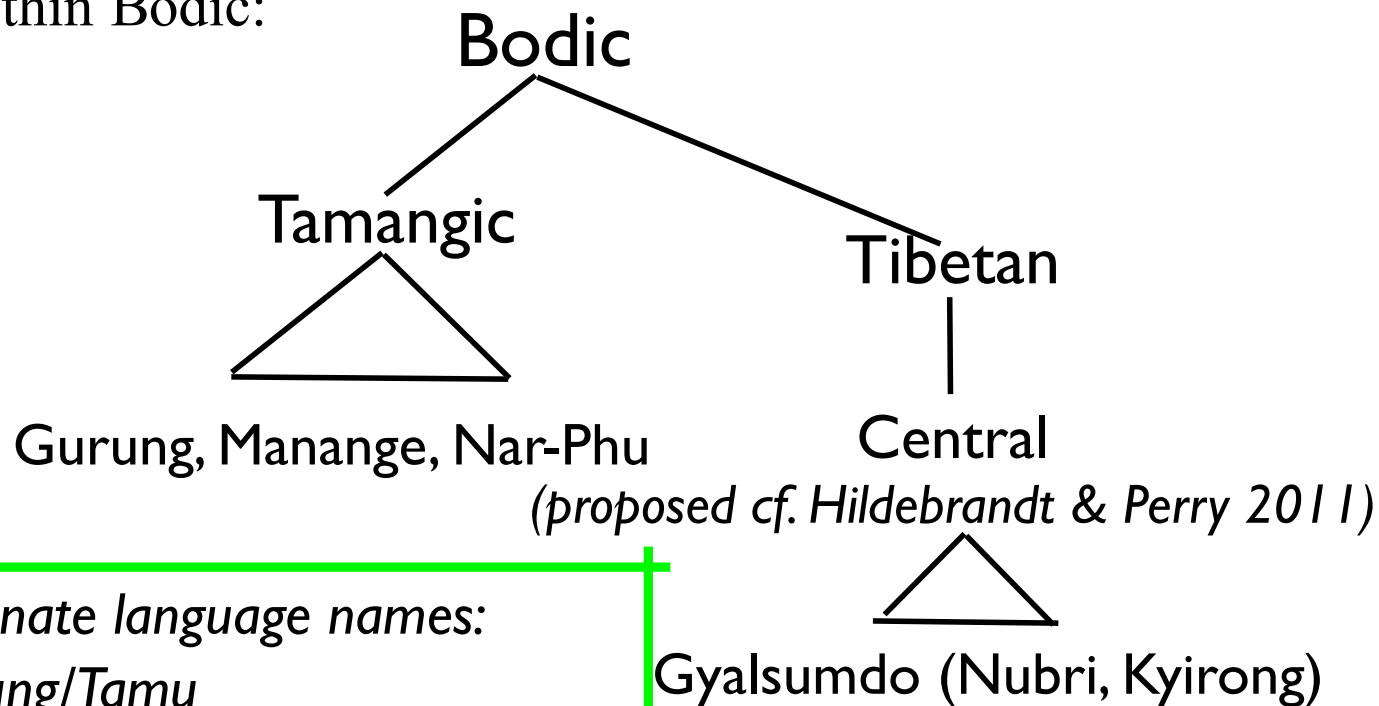
Acoustic & Articulatory Analysis of Tone in Four Languages of Nepal



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The Setting

- Manang is home to four language communities from two sub-groups within Bodic:



Alternate language names:

Gurung/Tamu

Manange/Nyeshangte/Manangke

Gyalsumdo/Pweme/Lama Bhasa

Nar/Chhyprung

Phu/Nartwe

The Setting

- Sociolinguistic, lg. usage and lg. attitude surveys now ongoing parallel to this acoustic/articulatory study of the segmental & suprasegmental systems so far indicate that many Gyalsumdo crossed the Larke Pass from Gorkha District, but there are some familial linkages to Mustang District too
- Also, Manang-Gurungs largely either claim Manang as their long-term ancestral home, or else they narrate ancestral movement (via marriage) from Lamjung to the south

The Setting

- Mazaudon (2005, 2012), Mazaudon & Michaud (2006, 2008): fieldwork, including instrumental-based methods, can shed light on often difficult-to-describe tonal characteristics and possibly reveal evolutionary paths in languages of different genealogical distances
- (And, an overlaying of instrumental investigations alongside the sociolinguistic dimensions can also uncover possible extra-linguistic factors as relevant to unexpected observations)
- This talk represents in some ways both an initial attempt employ these complementary methods within Manang, but also part of an ongoing (15-year!) effort to answer the deceptively simple question: “What is tone?” in these languages

The Setting

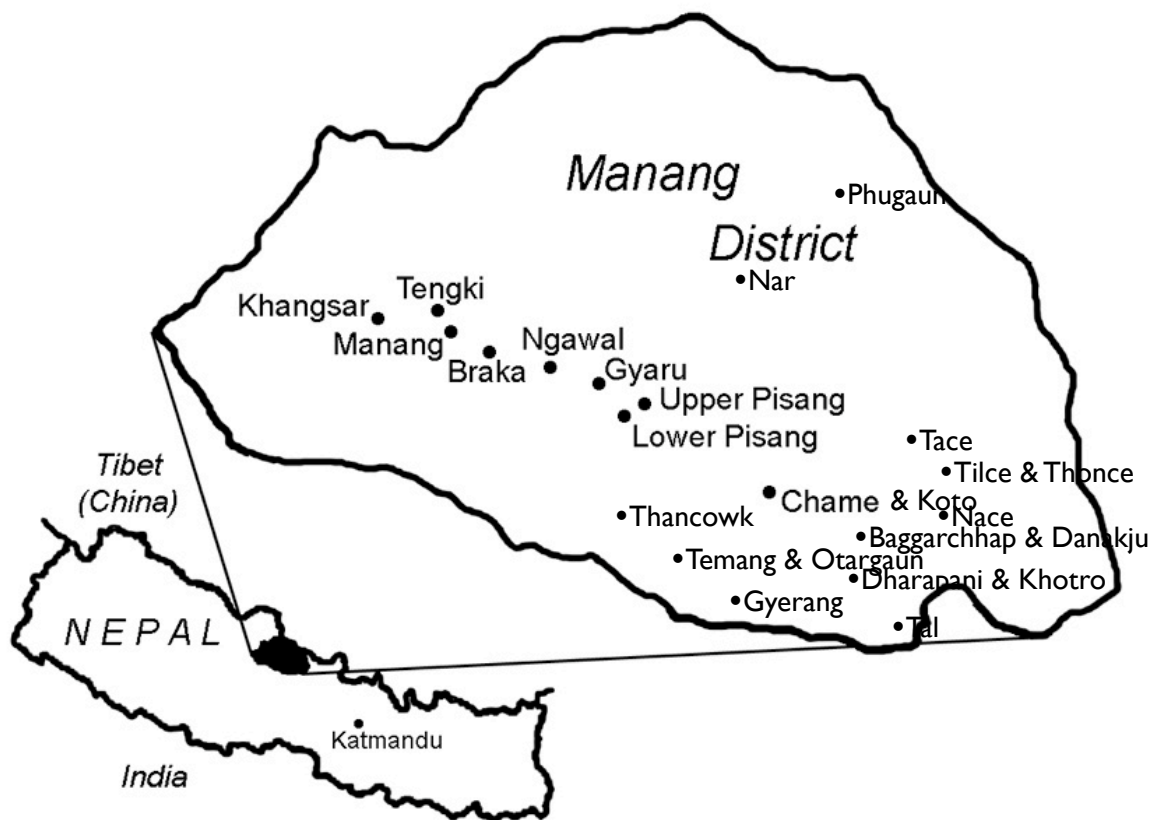
- The migration histories of Tamangic peoples & languages vis-a-vis Gyalsumdo are still somewhat unclear, but Gyalsumdos have lived amongst (primarily) Gurung speakers for may, many generations in lower Manang

- This map gives a basic distribution of M-G and Gyalsumdo in lower Manang (based on surveys in Summer 2012)



<http://www.mananglanguages.org>

Languages of Manang



The Setting

- Nar & Phu spoken to north-east
- Manange spoken in northern & central VDC's
- Manang-Gurung spoken in southern & central VDC's
- Gyalsumdo spoken around Tal, Chame, Baggarchhap, Thonce, Danakju

Tamangic Tonogenesis

		Tamang	Gurung	<u>Thakali</u>	Manange
*HI	/1/	54 ± asp	33 ± asp	54	22 ± asp
	/2/	55 ± asp	54 ± asp	44	44 ± asp
*LOW	/3/	33/22 fi, + asp	11 fi, -asp	11 fi, -asp	52 -asp (only <u>obs</u>)
	/4/	211 fi, + asp, [b]?	12 fi, -asp, [b]?	121 fi, -asp, [b]	42 + asp (only <u>obs</u>)

(fi = breathy/murmur phonation; [b] = possible phonetic voicing effect of onset;

Chao numbering system where 5 = high, 1 = low)

- However: Mazaudon & Michaud (2008, 2006), Hildebrandt (2007), Mazaudon (2005)-- high degrees of idiolectal & dialectal variation, phonetic correlates differently weighted across languages, varied role of F0 in defining the systems

Evolution of Tibetan Tones

WT Initials	Modern Reflexes	e.g. in <u>Kyirong Tib.</u>	e.g. in <u>Nubri</u>
<u>voiced</u>	LOW, voiceless (± <u>asp</u>)	"Mid", unvoiced	<u>low</u> voiced or voiced breathy
<u>pfx</u> + voiced	LOW, voiced/ <u>unasp</u>	"Low", ± voiced, breathy	<u>voiced</u> modal or voiced breathy, or voiceless breathy
<u>voiceless (asp)</u>	(MID-)HIGH, voiceless <u>asp</u>	"High", aspirated	<u>high</u> voiceless <u>asp</u>
<u>pfx</u> + voiceless	HIGH, voiceless <u>unasp</u>	"High"	<u>high</u> voiceless <u>unasp</u>

(adapted from Mazaudon 1977, Huber 2002 for Kyirong, Webster 1992 for Nubri)

- Additionally, WT finals -g, -d, -s, -/ns > modern-system contour tones (with corresponding long vowels in e.g. Kyirong)

Data & Methods

The Bigger Project

- 80-90 words elicited from speakers in each village throughout Manang
- Organized by a range of phonetic, phonological & lexical factors: onset type, word-size, stem vowel quality, comparability across tone models, lex. category
- If village is represented by more than one language, we attempt representation from each lg.

Sub-set for This Talk

- Approximately 40 monosyllabic words (nouns, numerals) of mixed vowel quality and syllable structures

Data & Methods

The Bigger Project

- Even representation of male/female, preferred age range 18-40 years
- In Year 1 of project: 10 Manang-Gurung speakers represented, only 6 Gyalsumdo speakers located so far (we hope to work with others living in Kathmandu)

Sub-set for This Talk

- Four Manang-Gurung (2 m, 2 f)
- Four Gyalsumdo (2 m, 2 f)
- Two Nar (1 m, 1 f)--data gathered in 2010
- 9 Manange (8 f, 1 m)--data gathered in 2001, selected data shown today

Data & Methods

The Bigger Project

- Pitch (5 measurement points, F0), relative vowel intensity (dB), relative vowel/vcd onset jitter (%), obstruent onset V.O.T., vowel duration, vowel spectral tilt (comparison of the amplitude of F0 to H2)
- Electroglottographic Analysis: closed-quotient value (EGG CQ) of all voiced onsets (including sonorants) and initial vowels

Sub-set for This Talk

- M-G: all measurements done
(so far also the only lg. w/serious perception tests conducted)
- Gyal: all measurements done
- Nar: no EGG
- Manange: no EGG, spectral tilt, jitter, or intensity

Data & Methods

- Words were recorded in isolation (three repetitions) & frame-medial or final context (three repetitions)
- Gurung *kwe* ‘bee’ & *la-pΛ* ‘drive.away-NOM’
 - For nouns: toso ηΛ-e kwe mro-e-po [now 1SG-ERG bee see-ASP-NOM] ‘Now I see a bee.’
 - For verbs: toso ηΛ-e la-pΛ tsΛ-ti-po [now 1SG-ERG drive.away-DEONT want-ASP-NOM] ‘Now I want to drive away.’
- Gyalsumdo *ʈo* ‘stone’ & *ʈo* ‘walk/go’
 - For nouns: ηΛ ʈo t^hoŋ-sõ [1SG stone see-TAM/EVID] ‘I saw the stone.’
 - For verbs: ηΛ tantΛ ʈo-ke (re) [1SG now walk/go-TAM/EVID (EVID)] ‘I am walking now/I walk now.’

Three Gurung Tone Models:

Data & Methods

	Kaski Gurung (Glover 1974)	Manange (Hildebrandt 2004)	Tamu (TSS 2004)
Tone 1	“clear, relaxed”	“low, level”	modal (low)
Tone 2	“clear, intense”	“high, level”	modal (high)
Tone 3	“breathy, low”	“very high, falling”	breathy
Tone 4	“breathy, rising”	“mid, falling”	breathy (high)
Justification	authoritative, long-standing reference for Gurung tone	a sister language with which MG people have had long-term, intense contact	a newer account of multiple Gurung dialects w/ large lexicon, but not MG

Tone Models: Lexical Mis-matches

Data & Methods

Word/Gloss	Kaski	Manange	Tamu
<i>ti</i> 'house'	<i>/2/</i>	<i>/4/</i>	<i>/1/</i>
<i>po</i> 'popped corn'	<i>/2/</i>	<i>/4/</i>	<i>/3/</i>
<i>to</i> 'pillar'	<i>/3/</i>	<i>/2/</i>	<i>/4/</i>
<i>kā</i> 'chin'	<i>/2/</i>	<i>/1/</i>	<i>/2/ ~ /3/</i>

Data & Methods

- Tone models for the other languages:
- Gyalsumdo: WT correspondences (keeping an eye to what Kyirong and Nubri display)
- Manange: my prior work based on my own fieldwork, dissertation, grammar and other published information (Mazaudon 1978, Nagano 1984, Hoshi 1986a, b)
- Nar(-Phu): Noonan (2003 and notes) and Mazaudon (1996)

Tone	Chao	Auditory Properties	Onset Consonant Properties
/1/	22	Low & Level	Not Applicable
/2/	44	High & Level	Not Applicable
/3/	52	High & Falling	If initial C is [+obstruent], unaspirated
/4/	42/32	Mid & Falling	If initial C is [+obstruent], aspirated

Manange Tones
(Hildebrandt 2003,
2004, 2005)

TONE NUMBER	PITCH CONTOUR, CHAO SCALE	EXAMPLE
1	53	nâŋ 'reciprocal obligation'
2	44	naŋ 'full'
3	12	nfiŋ 'planted in rows'
4	21 or 31	nfiâŋ 'in'

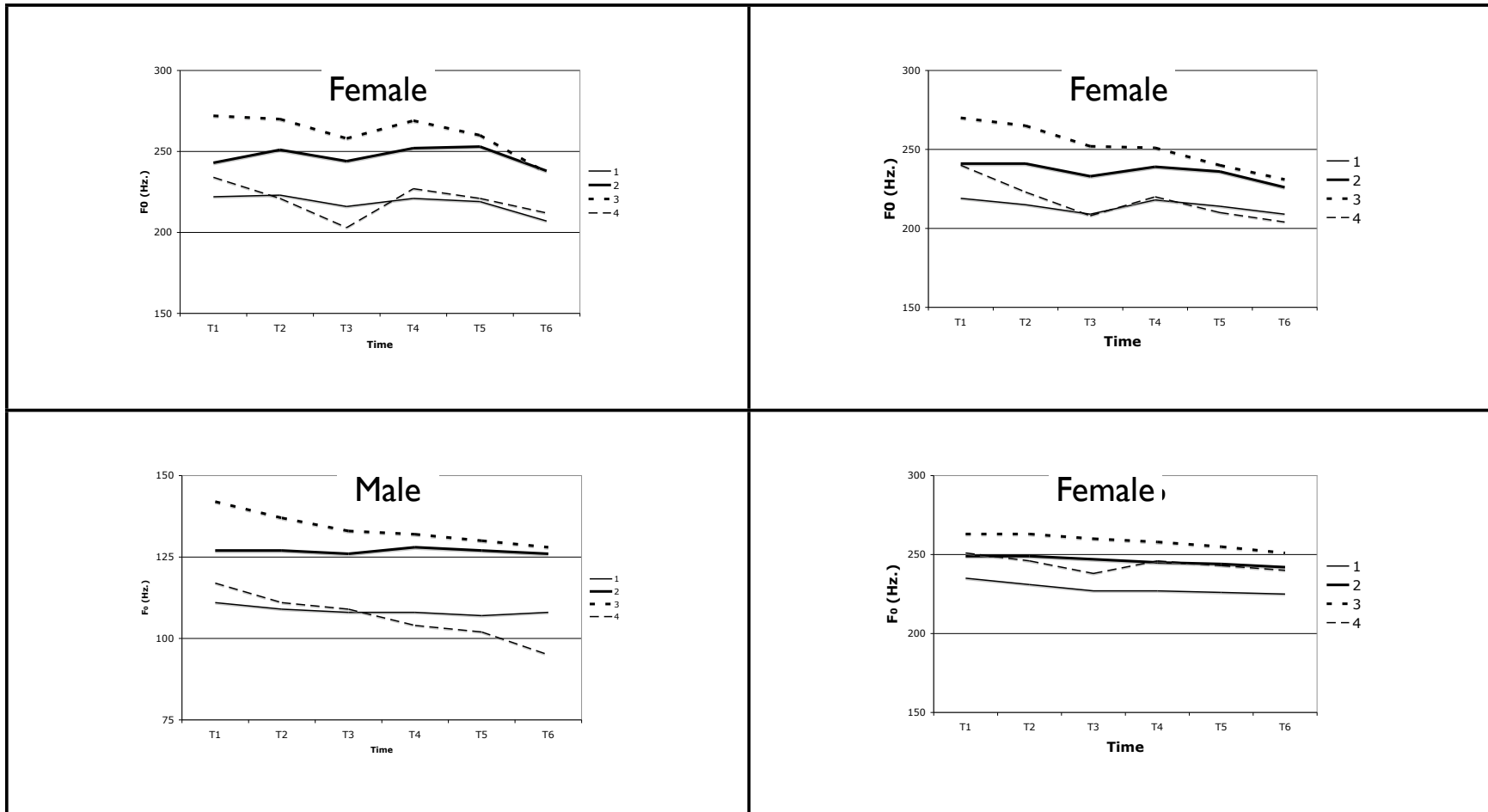
Nar-Phu Tones (Noonan 2003 339)

Observations & Analysis

- What can we look to as modern reflexes, or as features to the tonogenetic developments in these languages?
- Just what kind of variation is possible amongst any generalizations?
 - Pitch-melody (within/across the two registers)
 - Behavior of initial obstruents (VOT)
 - Voicing of vowels with respect to Electroglottographic measurements

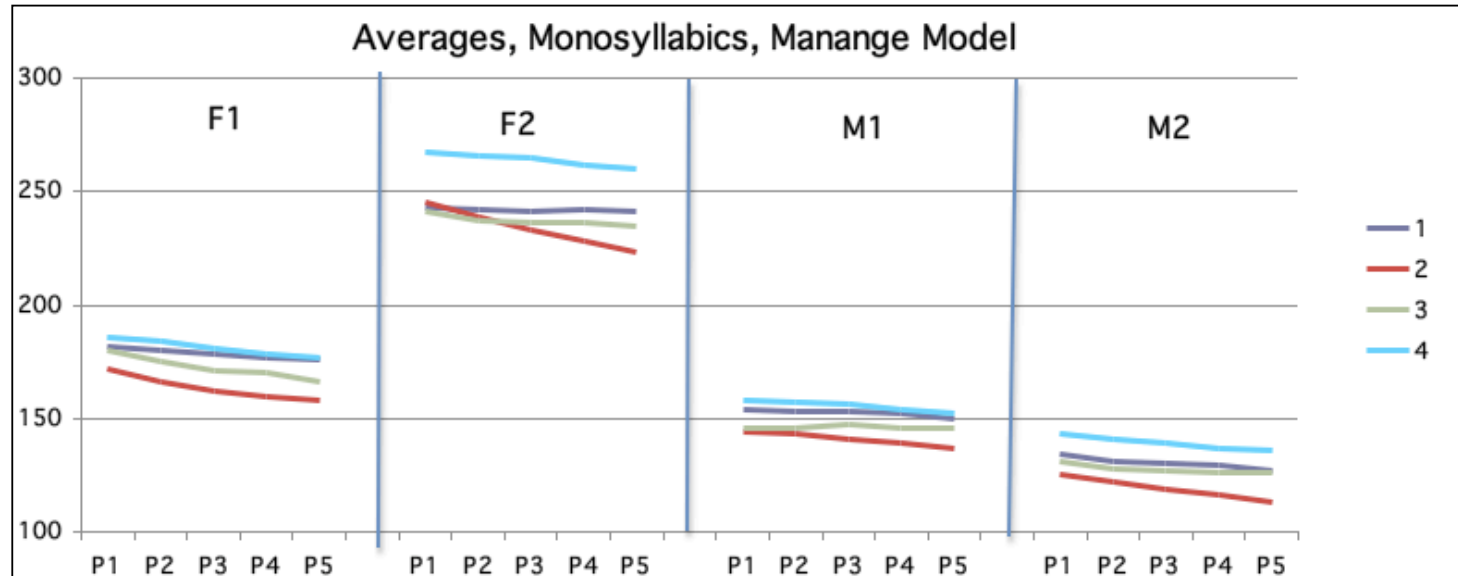
Observations & Analysis

- One place to begin: Pitch-melody within “high” vs. “low” register groupings (Four Manange speakers, 6 measurement points)



Observations & Analysis

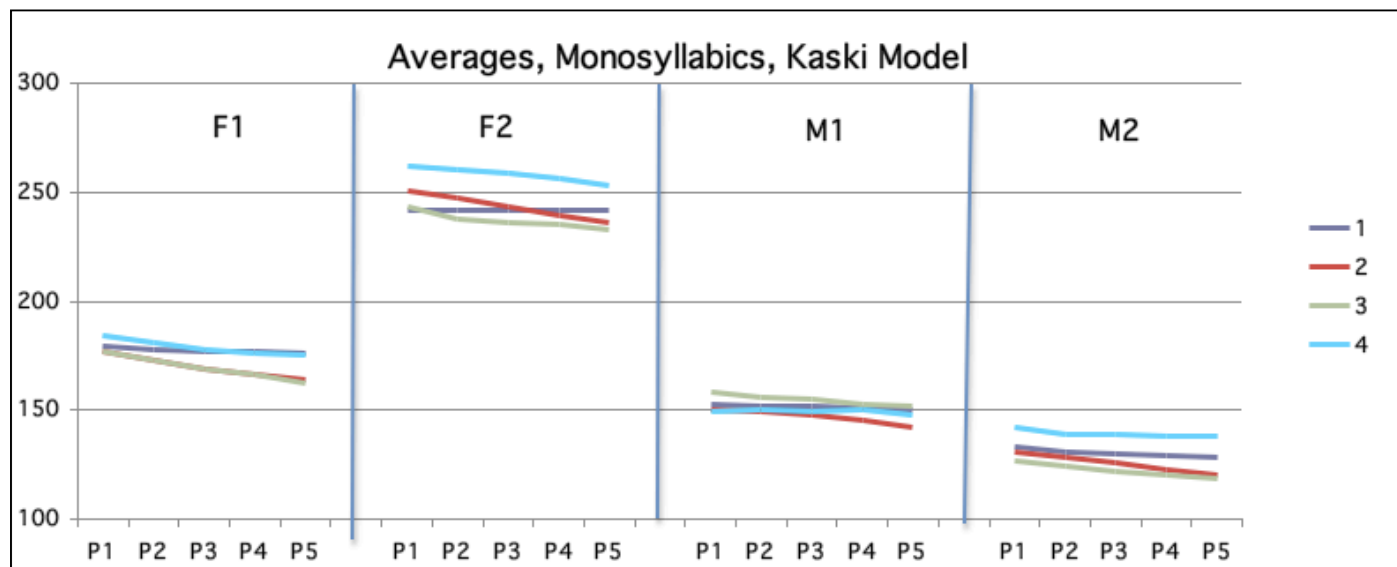
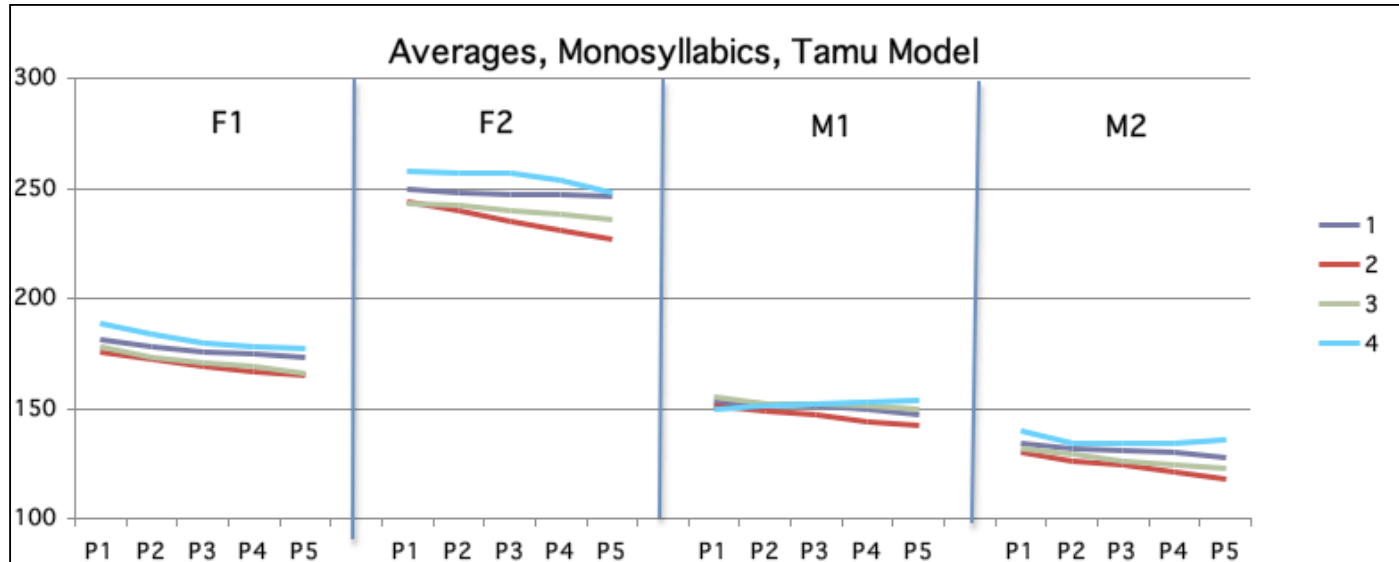
- Pitch-melody: Four Manang-Gurung speakers (5 measurement points)



- Manange (prior slide): four-way separation for most speakers (not male)
- M-G: a high-low separation only emerges when plotted against Manange model for 3 of 4 speakers so far, which seems to be an interesting development for communities in this region

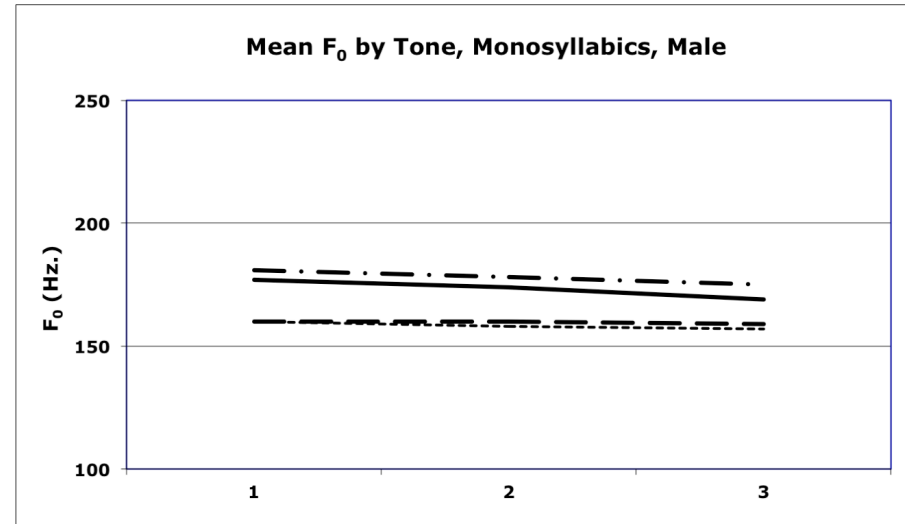
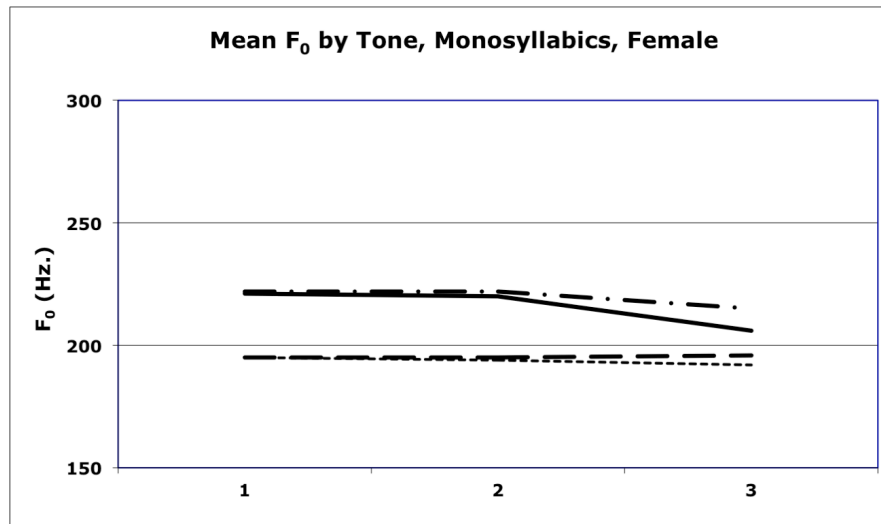
Observations & Analysis

- Pitch-melody: When plotted against the Tamu and Kaski models...



Observations & Analysis

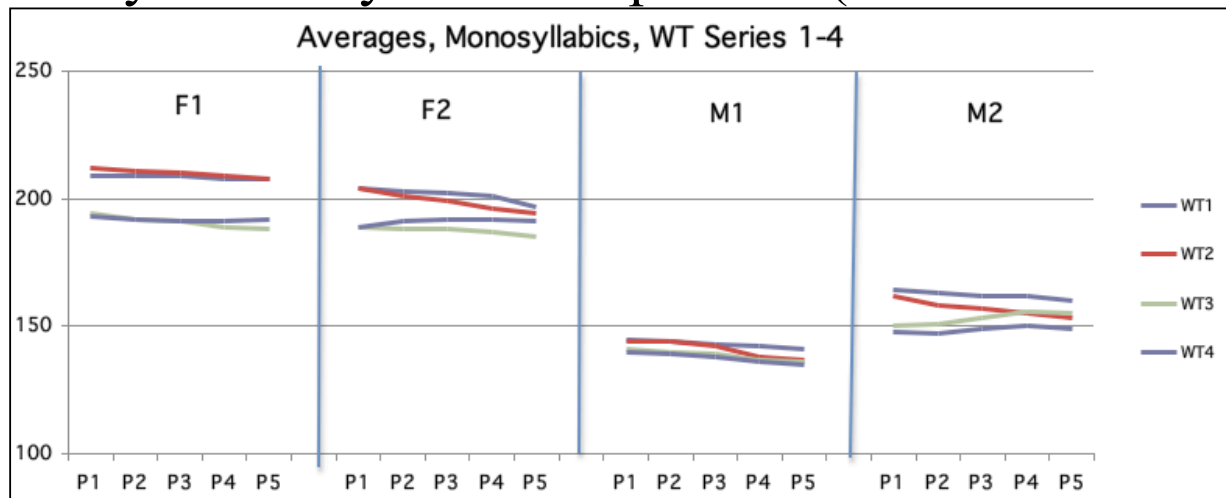
- Pitch-melody: Two Nar-Phu speakers (3 measurement points)



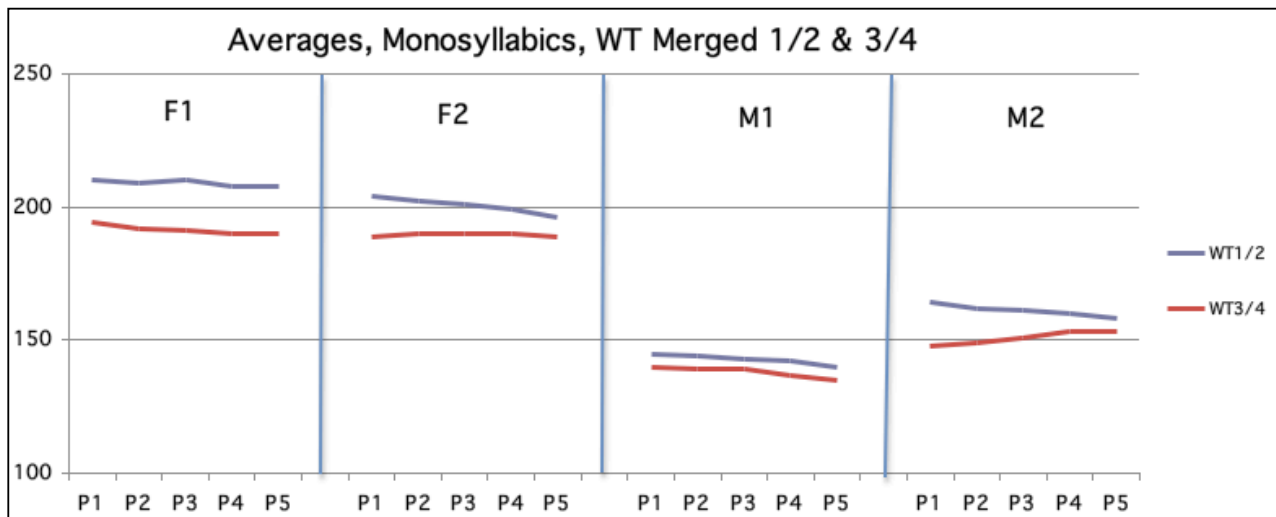
- No clear evidence (yet) for additional melody distinctions within a high-low register

Observations & Analysis

- Pitch-melody: Four Gyalsumdo speakers (5 measurement points)

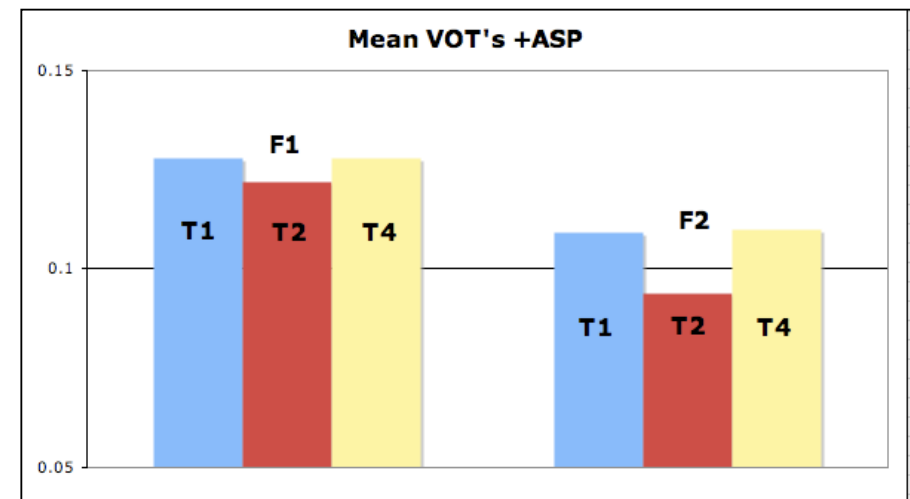
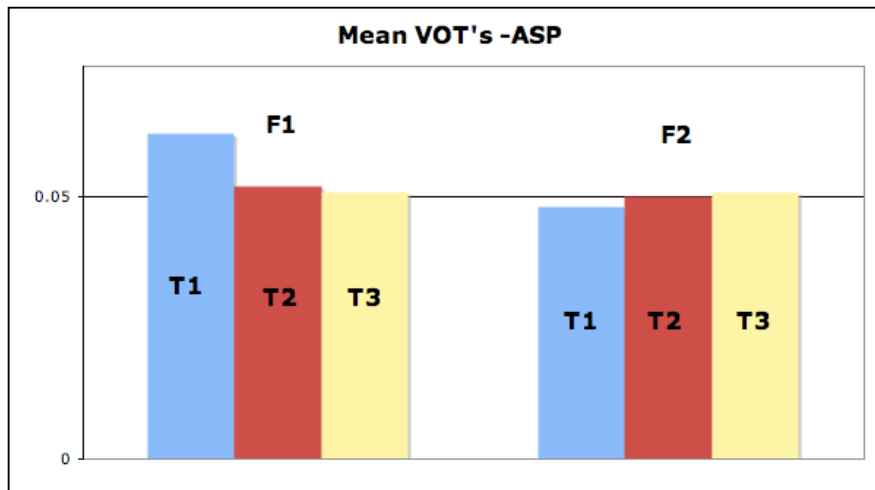


- The four categories are not obvious, but when WT 1/2 and WT 3/4 are merged into a proposed “high” v. “low”, the differences are significant



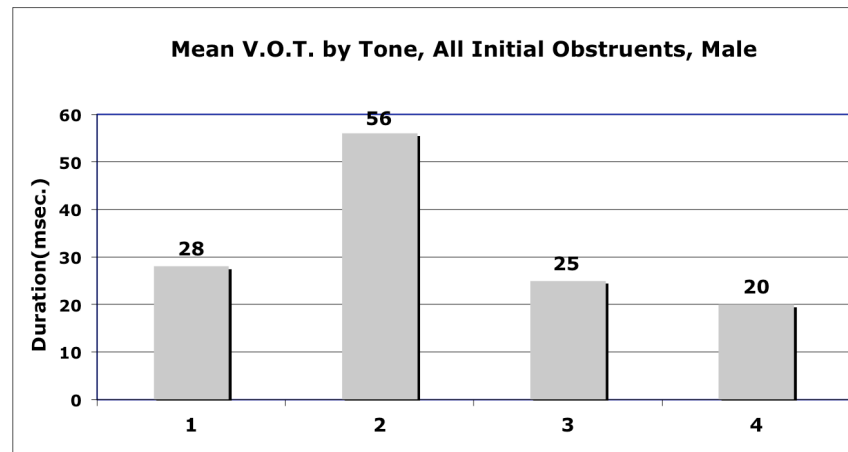
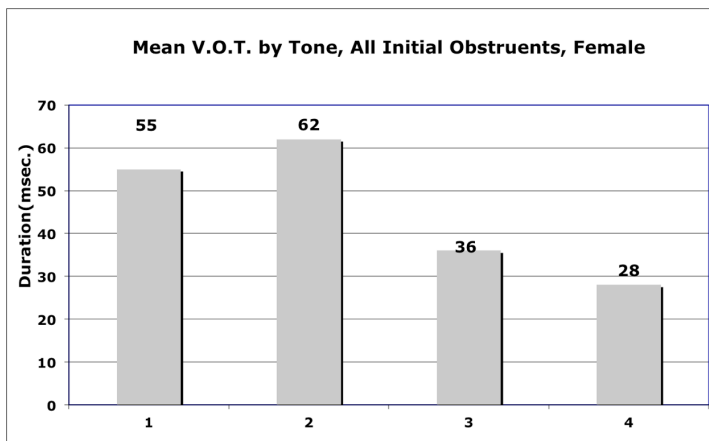
Observations & Analysis

- Another possible cue: Voice Onset Time (VOT) differences on initials in different registers (or tone groupings within the H-L division) may emerge as a reflex of older (obstruent) voicing contrasts (Manange, 2 speakers)

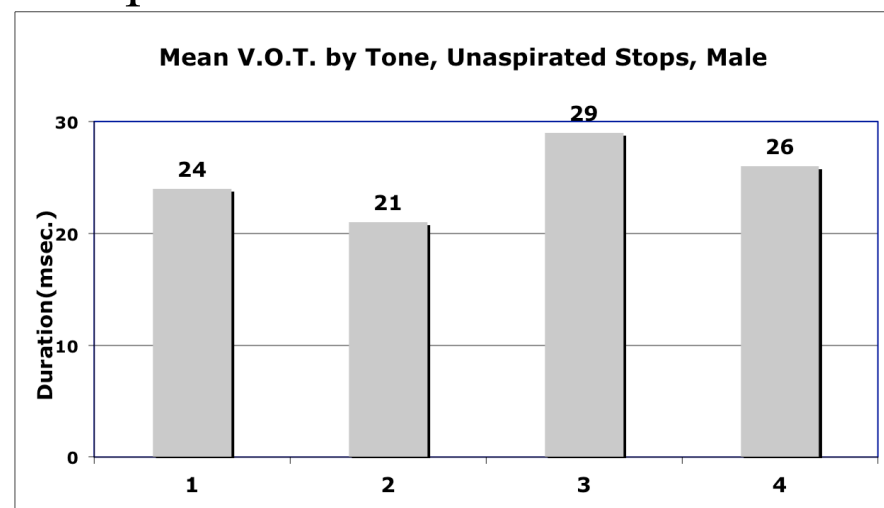
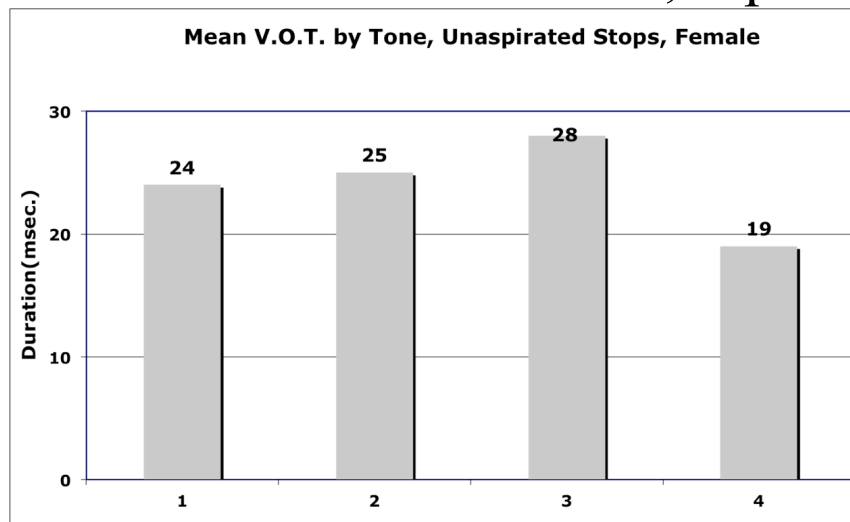


Observations & Analysis

- VOT differences on initials, Nar (2 speakers)

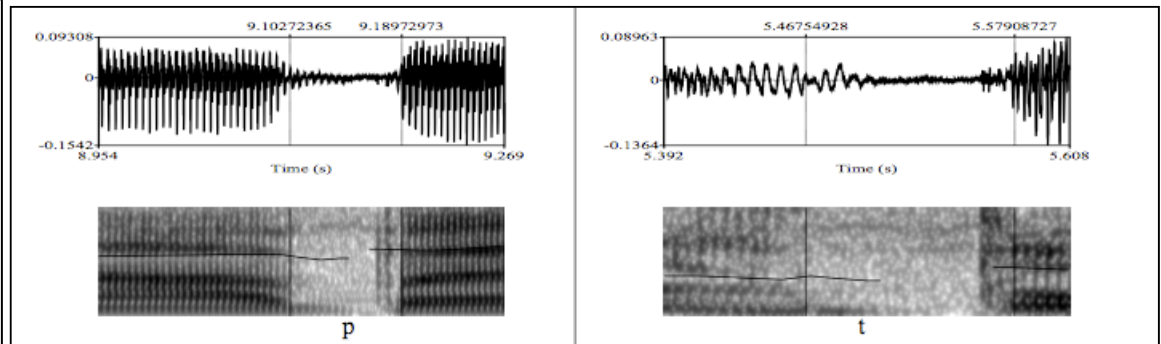
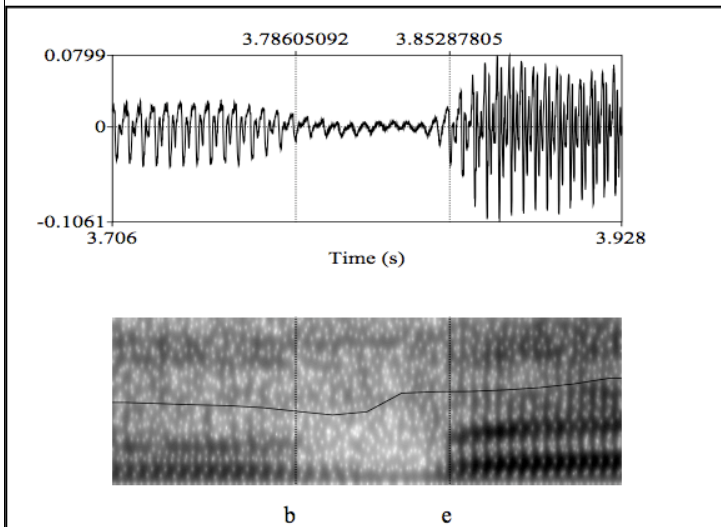
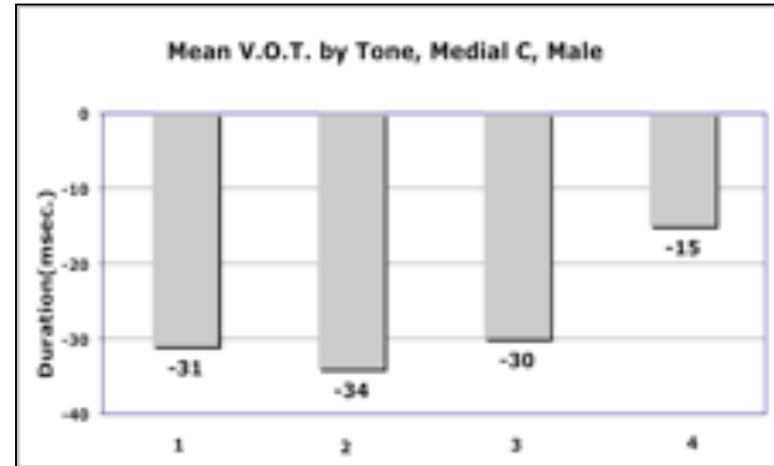
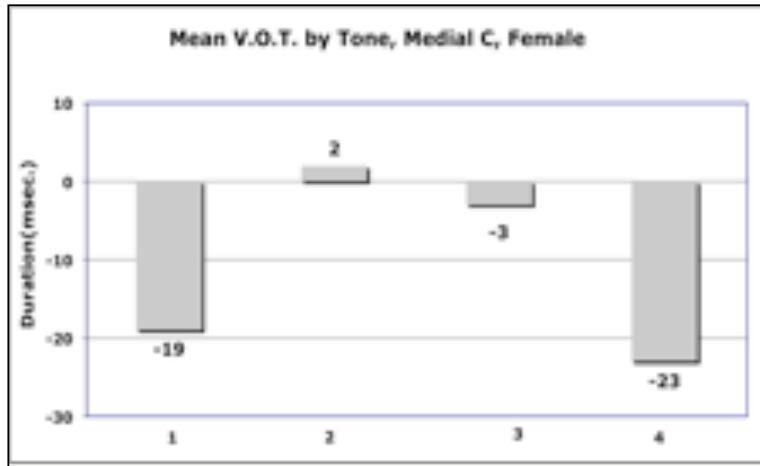


- VOT differences on initials, aspirated stops & affricates removed



Observations & Analysis

- In word-medial position, passive plosive voicing assimilation (V_V) is common, but not entirely regular, and does not align with tone

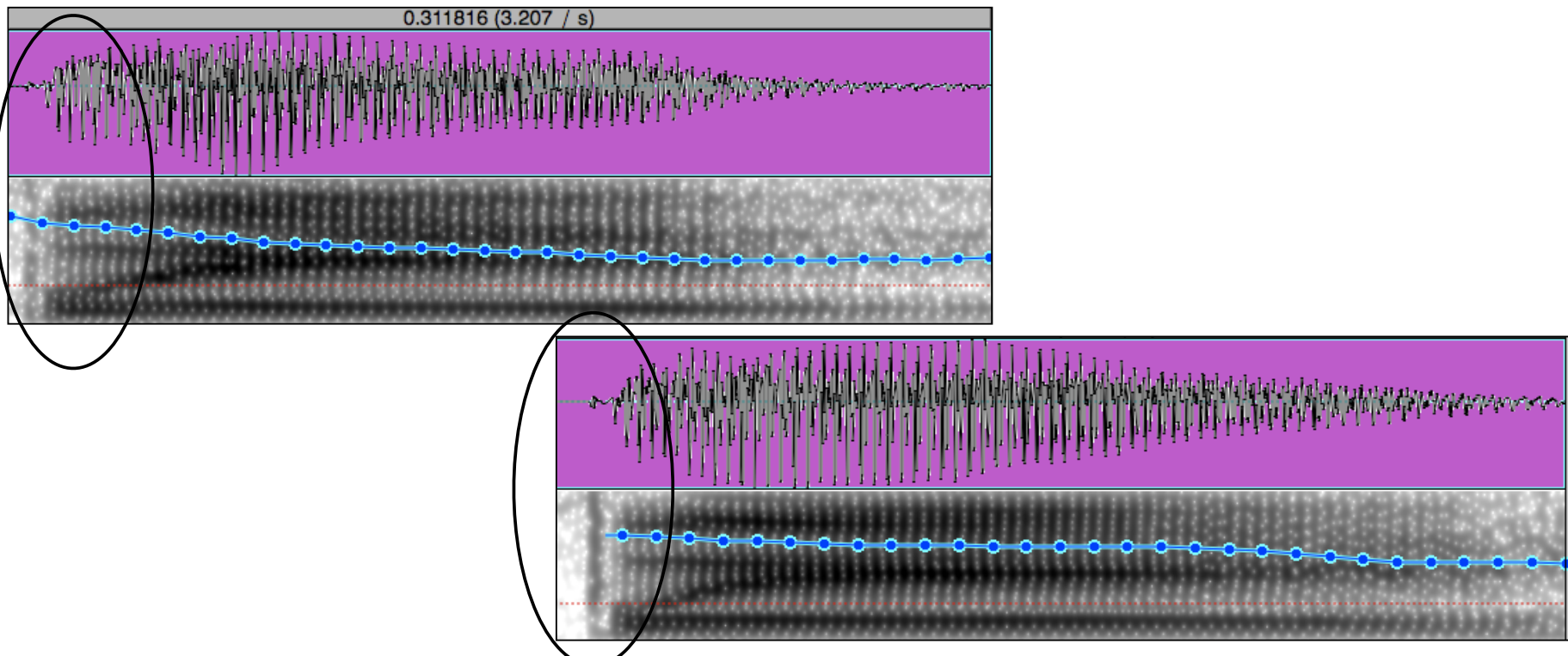


/na-pe/ 'sick-NOM' & /pɦâlto/ 'part of foot'

/tɦû-pe/ 'sew-NOM'

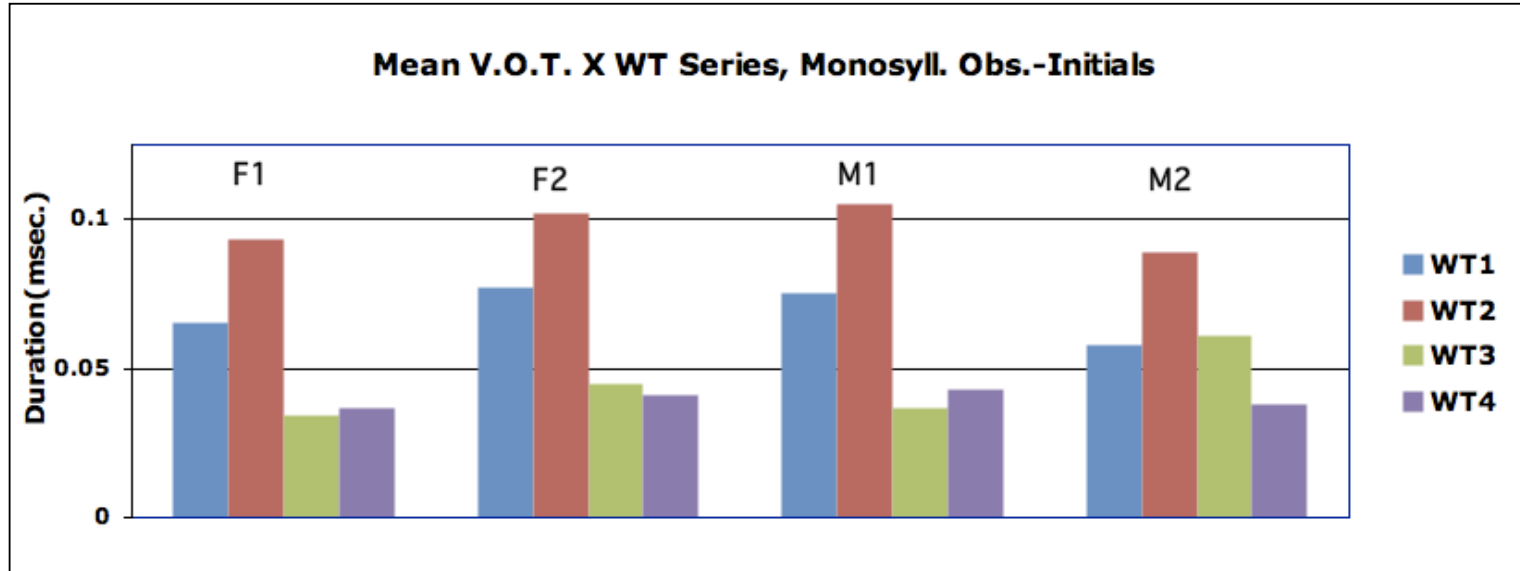
Observations & Analysis

- No measurable VOT differences on initials, Manang-Gurung
- F2 (from Nace village) has 2 words with marginal/weak pre-voicing: /p^we/ ‘iron’ (upper image), /p^we/ ‘wool’ (lower image)
- Caveat: very small word-set, ‘true’ aspiration is rare overall, only with some velar-initial & affricate-initial words; bilabial initials frequently spirantized, otherwise solidly voiceless



Observations & Analysis

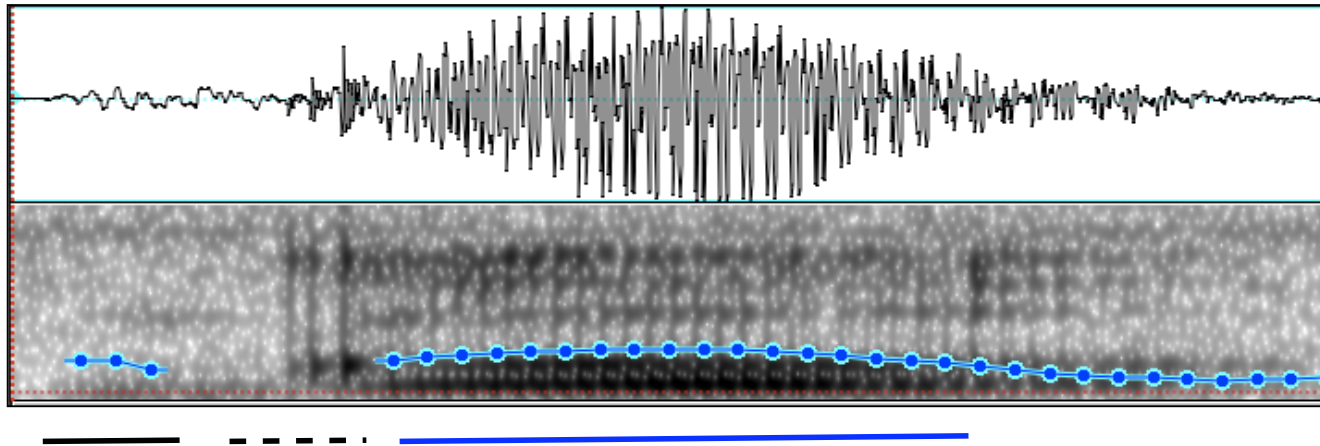
- VOT differences on initials, Gyalsumdo (4 speakers)



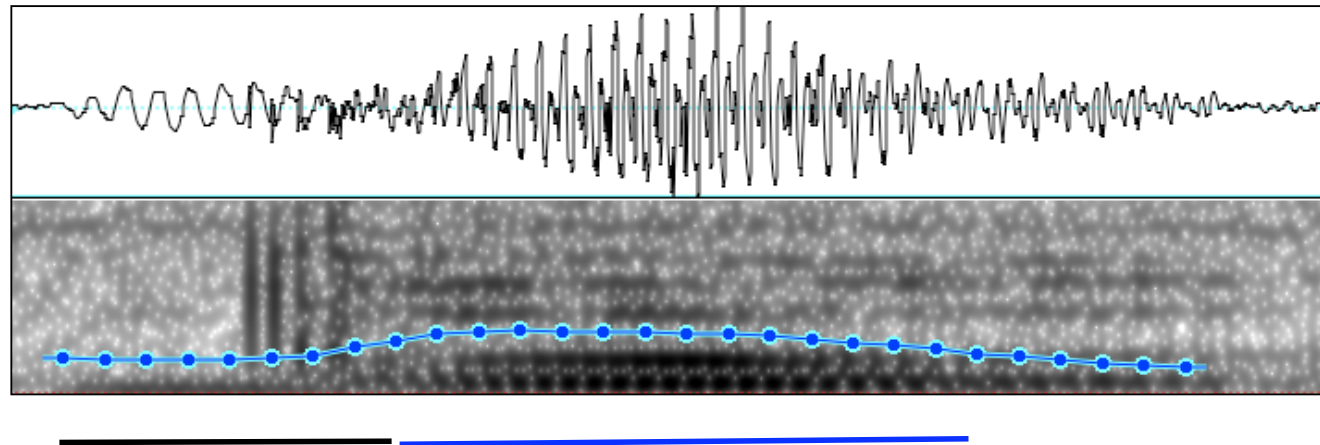
- The male speakers show a strong tendency towards pre-voicing or else breathy onsets with words in WT 3 & WT 4 (those cases are not reflected in these bar-graphs)

Observations & Analysis

- Pre-voicing/Breathy initials, Gyalsumdo:



[g^ho] ‘door’



[bu] ‘insect’

Observations & Analysis

- Electroglottographic cues: Mazaudon and Michaud (2008) observed that the open-quotient (O_q) values were significantly higher, with a dipping then rising pattern through time for the LOW tones vs. HI.
- i.e. for the LOW tones, they observed an overall rise in airflow rate in the nucleus

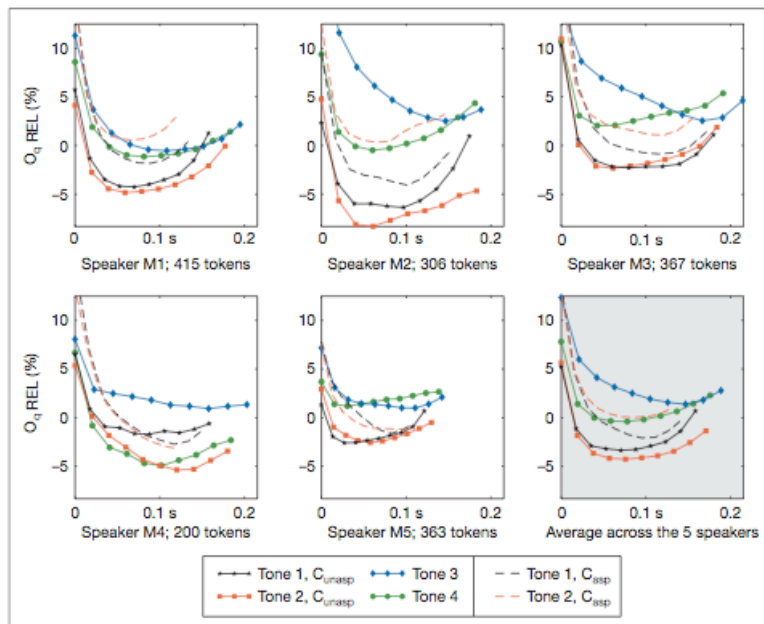
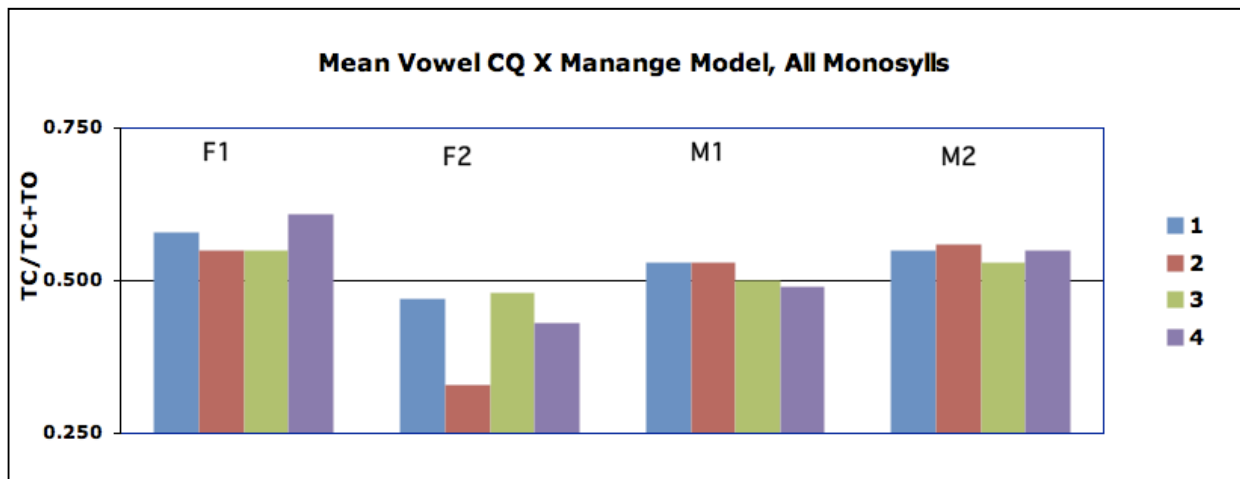
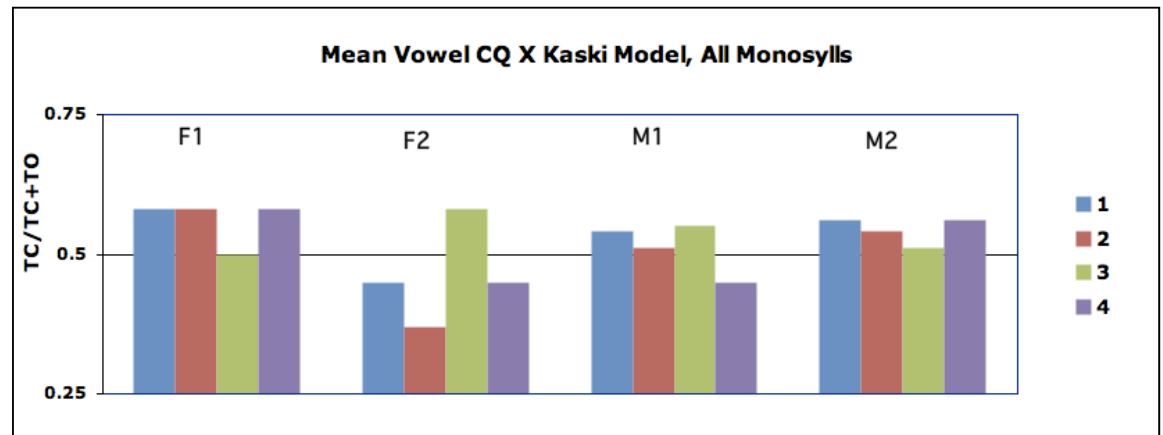


Fig. 4. Averaged curves of O_q (relative to the mean O_q value of each speaker), plotted against average duration. p. 240

- My study: all words recorded through a EG2-PCX2 two-channel EGG assembly (see slide #1)
- I measured Closed Quotient (CQ): difference between time of v.f. closure in relation to total time of voicing cycle; Non-modal predicted to carry lower CQ values than modal, as v.f. closure is shorter in time & opening portion lags for longer
- I took only one measurement point

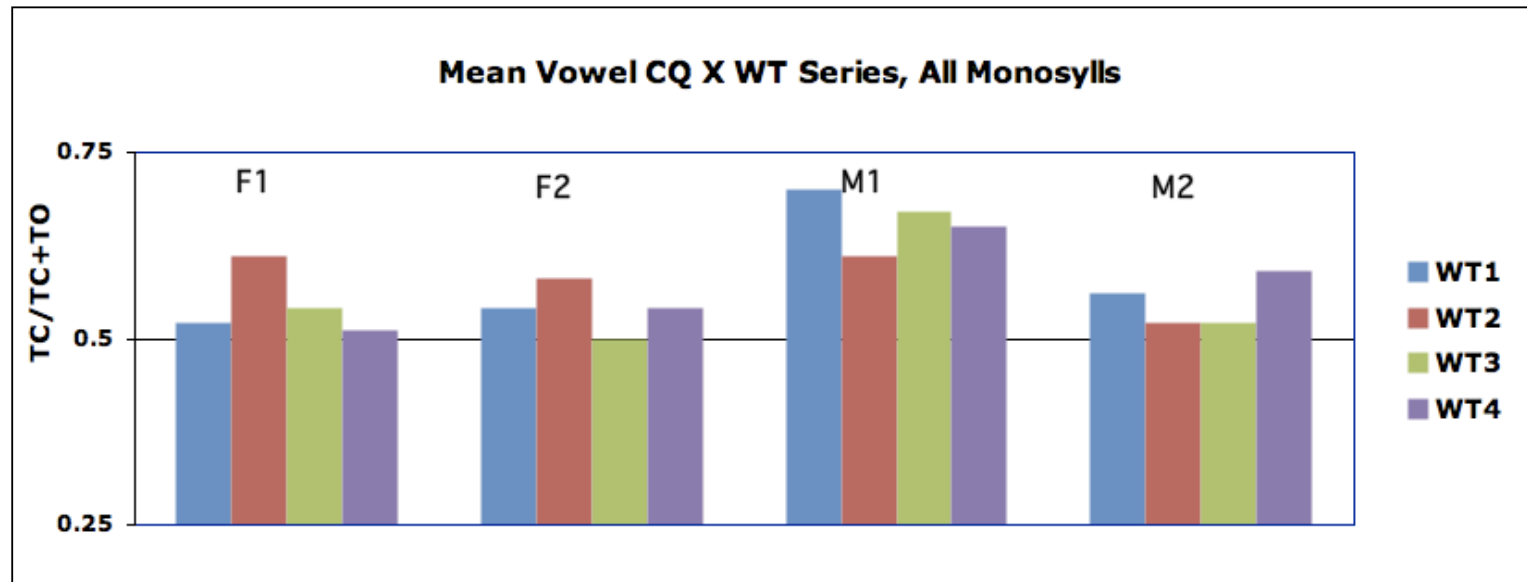
Observations & Analysis

- EGG CQ for Manang-Gurung:
- When either the Kaski or the Manange tone models are considered, a weak correlation between /4/ vowels & lower CQ, but it is not consistent across speakers



Observations & Analysis

- EGG CQ for Gyalsumdo:
- Three of four speakers: initial vowels of WT 3 and/or 4 show lowered CQ values, but this is not always significant



Tamangic Languages of Manang

Summary

Characteristics	Manange	M-G	Nar(-Phu)
pitch-melody	high-low & level-falling/contour	High-Low emerges only when compared to Manange model	High-Low
onset voicing	never voiced, but aspiration split in tones /3/ & /4/	no (real) evidence of voicing, and phonetic aspiration rare overall	lower VOT in low register
other cues			jitter?

Gyalsumdo

Summary

My Proposal	Characterized by
“Hi” (WT 1/2)	Higher F0 (no evidence for contour diffs. yet), \pm asp obs.
“Low” (WT 3/4)	Lower F0, tendency towards obstruent voicing, particularly by males, weak evidence for shorter vocal fold closure for vowels, obstruent aspiration rare

Summary

- What is not showing any consistent patterning so far?
 - Vowel duration
 - Spectral tilt (F0-H2)
 - Vowel Jitter (but female Nar speaker does show some increased jitter on tones /3, 4/)
- What from here?
 - Voicing properties on medial consonants
 - F0 properties manifested across larger units
 - Possibly additional CQ measurements across the nucleus

Final Remarks

- While still quite tentative (with parallel data collections planned for upper Manang in 2013 & 2014), this talk represents a first view to a systematic comparative examination of the phonetic manifestation of tone in these languages
- The situation observed for Manang-Gurung so far is particularly interesting when compared with other varieties elsewhere in Nepal
- What are the consequences of language contact in such close proximity on these systems (and their emergent cues), especially in light of their relative diachronic youthfulness?

Final Remarks

- Gyalsumdo is surrounded by Manang-Gurung, but its system may be appreciated by quite different cues
- I'm particularly interested in the picture that will be painted by additional measurements from other speakers, alongside those of Nar-Phu, as these are the two languages of Manang that that show the greatest sudden interruption in available speakers below the age of 50

*Thank You (full references supplied upon request)
Thanks to Dubi Nanda Dhakal & Oliver Bond for help w/data collection
Thanks to Jillian Lowery & Cassidy Martin for assistance
with data organization & coding
Research supported by NSF 1149639
Thank you to Manang language communities for their participation*