Generational Differences in Phonation and Tone in Kuy

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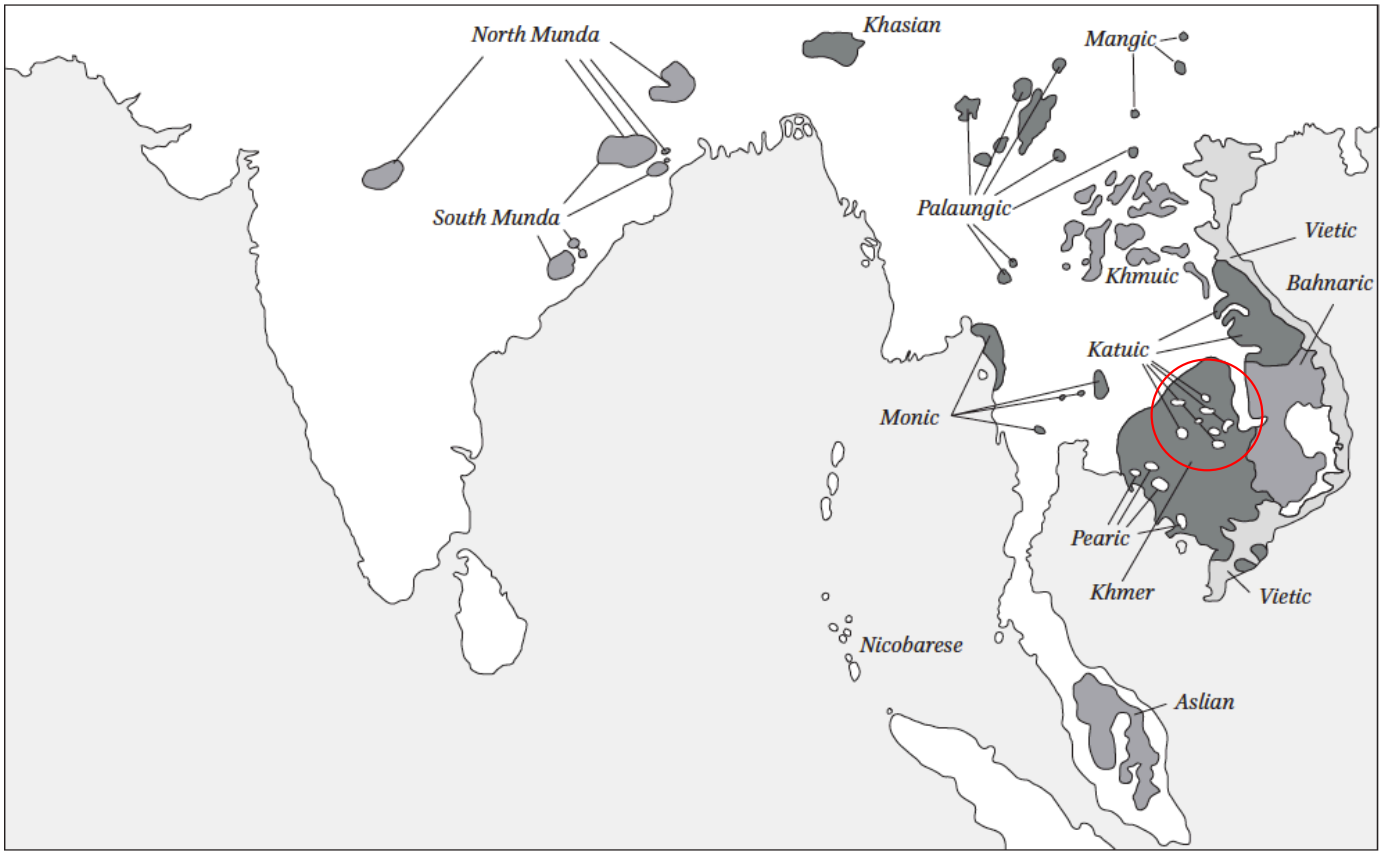
Where Kuy is spoken



Map from Jenny and Sidwell (2014, 144)

Kuy in Tambon Tum, Sisaket province, Thailand

- Approximately 400,000 speakers all together (Premsrirat, 2006)
- In Tum, primarily spoken in:
  - Ban Khi Nak (20)
  - Ban Rong Ra (6)
  - Ban Khi Nak Noi (7) (has a significant Khmer minority)
- Most attend Ban Khi Nak school through first half of secondary school
- Most old speakers attended elementary school at Ban Khi Nak for 4 years

Kuy Vitality

- Most people above 20 have some command
- Many speakers multilingual
  - Of 33 speakers, all report speaking Thai and Lao
  - 10 report speaking no Khmer and of those, 5 report not understanding
- Many older people report using Thai with their grandchildren
  - 6/16 speakers in their 20s say they speak Thai “very fluently”
  - Only 1/17 speakers in their 60s say they speak Thai “very fluently”

Factors leading to change and endangerment

- Parents say teachers would say their children were โง่เหมือนควาย [ŋô: mɨ̆ən kʰwa:j] ‘dumb as a water buffalo’ if they responded to teachers in Kuy
- Many young people leave the village for college or work
  - 7/17 old speakers have never left home
  - Only 1/16 young speakers has never left home

Register in Kuy

- Modal vs. breathy voice
  - tiː ‘old’
  - t̤iː ‘tall’
- Breathy voice generally characterized by
  - Greater open quotient (proportion of glottal cycle for which glottis is open)
  - Greater spectral tilt (loss of energy at higher harmonics)
  - More aperiodic noise
- But voice quality distinctions lead to a bundle of side effects (Kirby and Brunelle, 2017)
  - Lowered f0 can lead to a low tone
  - Lowered F1 can lead to vowel raising or diphthongization (Wayland and Jongman, 2002)

Motivations for change

- Social: greater integration into Thai society
  - Recent rapid modernization & centralization of Thailand
  - Better transportation—younger people more likely to move
  - Increased media access and schoolteachers from other provinces—greater exposure to Thai
- Linguistic: other parts of phonology nearing Thai/Lao
  - Loss of prenasalization: nc^{h}u:n ~ c^{h}u:n 'to send'
  - Merger between final /l/ and /r/: pi:r ~ pi:l 'flower'
  - These mergers lead to fewer onset/coda distinctions
- If breathiness also weakened by contact with Thai, there may be pressure for f0 difference to be enhanced
- Sukgasame (2003); Abramson et al. (2004) report incipient tonogenesis in other Ku(a)y dialects of Thailand

Hypotheses

1. Kuy speakers who show social cues suggesting greater integration into Thai society or more use of Thai (or Lao) will show a greater f0 difference and smaller difference in acoustic correlates of breathiness
2. Speakers who have a weak distinction between modal and breathy voice via acoustic correlates of voice quality will be more likely to have a greater distinction via f0 difference

Production study

- Kuy speakers asked to embed target words in a carrier sentence roughly translating to “I say the word [target] for them to hear”
- Recorded on C544-L headset microphone
- Carried out task on tablet screen in temple computer room or guest room

Participants

- 75 participants in total aged 20 to 70 (none from 40–49)
- So far, those in their 20s (“young”) and 60s (“old”) have been analyzed

	Female	Male
Young	8	8
Old	8	9

Stimuli

- Targets and distractors
  - Young: 14 minimal pairs & 1 minimal triplet
  - Old: 12 minimal pairs (due to prenasalization)
  - 19 distractor words
- Every word shows up 5 times (290 tokens in total)
- Minimal pair token representation

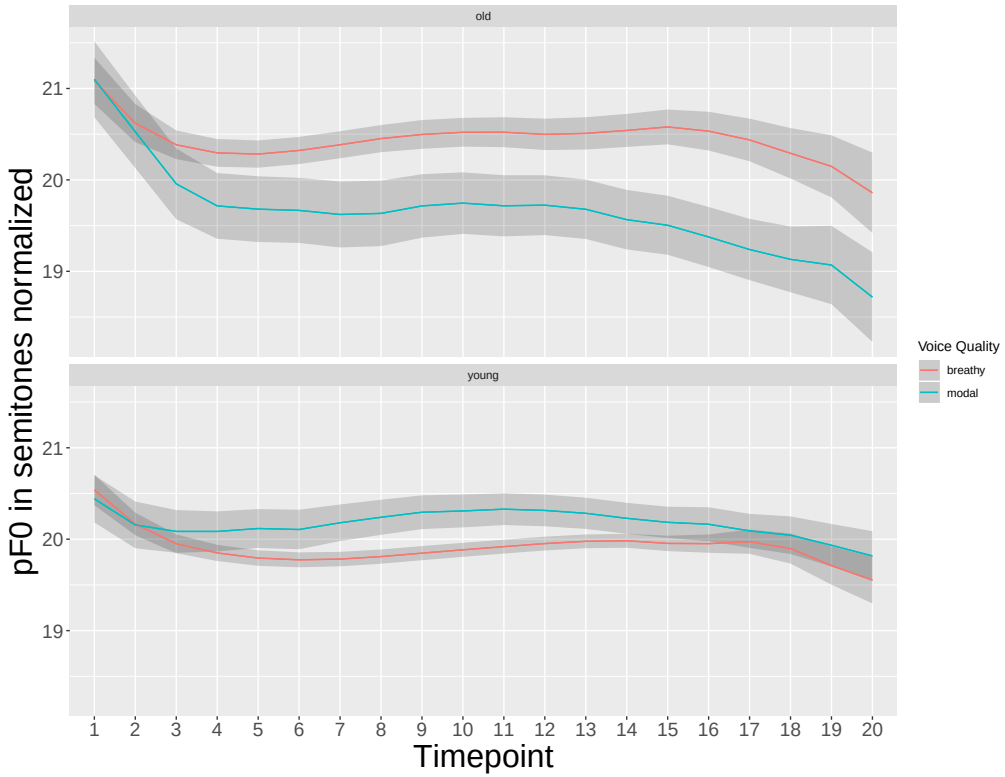
	Minimum	Maximum	Mean
Young	63	139	102.13
Old	41	75	57.76

Measures

- Files aligned with Montreal Forced Aligner (McAuliffe et al., 2017), measurements taken with VoiceSauce (Shue et al., 2011)
- Each measure averaged at each of 20 bins across the vowel, corrected for resonances (Hanson, 1995; Iseli et al., 2007)) and normalized by speaker
- Voice quality with expected higher value is checked off

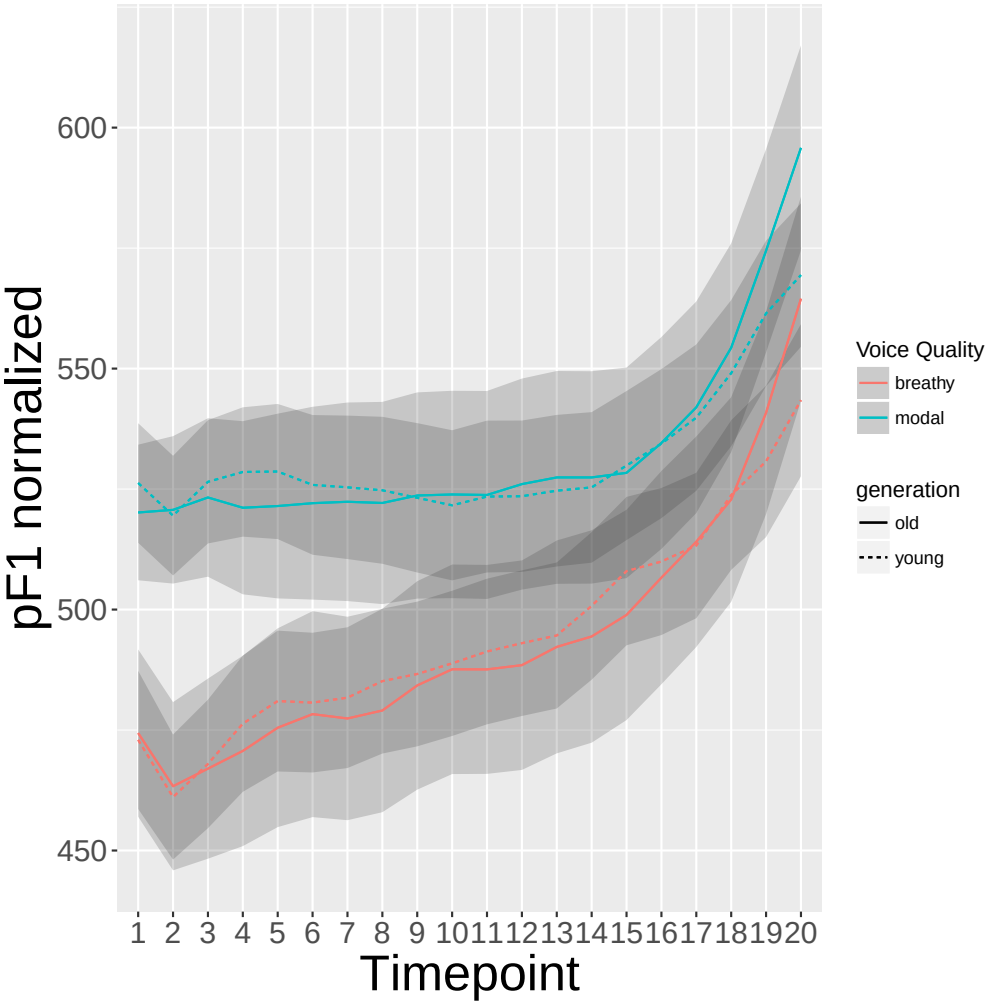
	Modal	Breathy
f0 (in semitones)	✓	
F1	✓	
H1*-H2* (open quotient)		✓
H1*-A3* (spectral tilt)		✓
CPP (periodicity)	✓	

Generational f0 differences



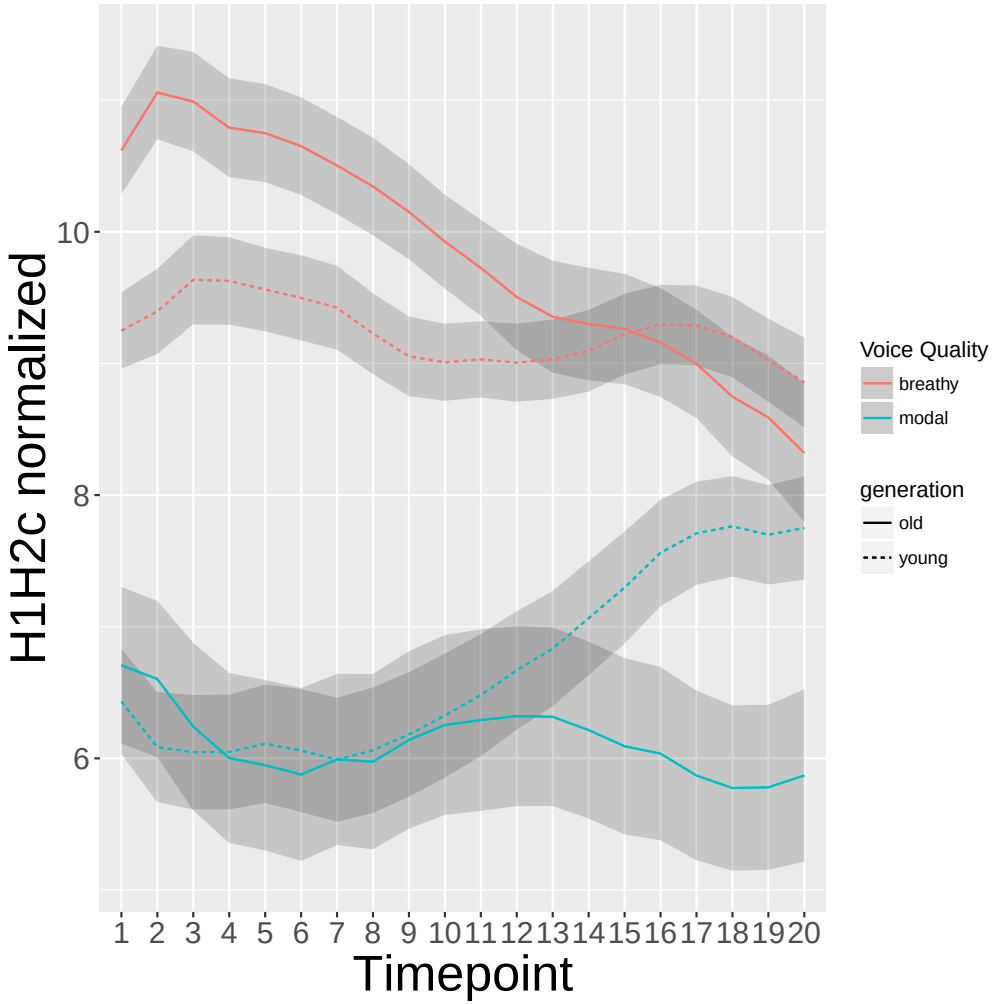
- Younger speakers on average have a significantly higher f0 trajectory throughout the mid-section for modal vowels
- Strangely, old speakers on average have a significantly higher f0 trajectory for breathy voice for most of the vowel

Generational F1 differences



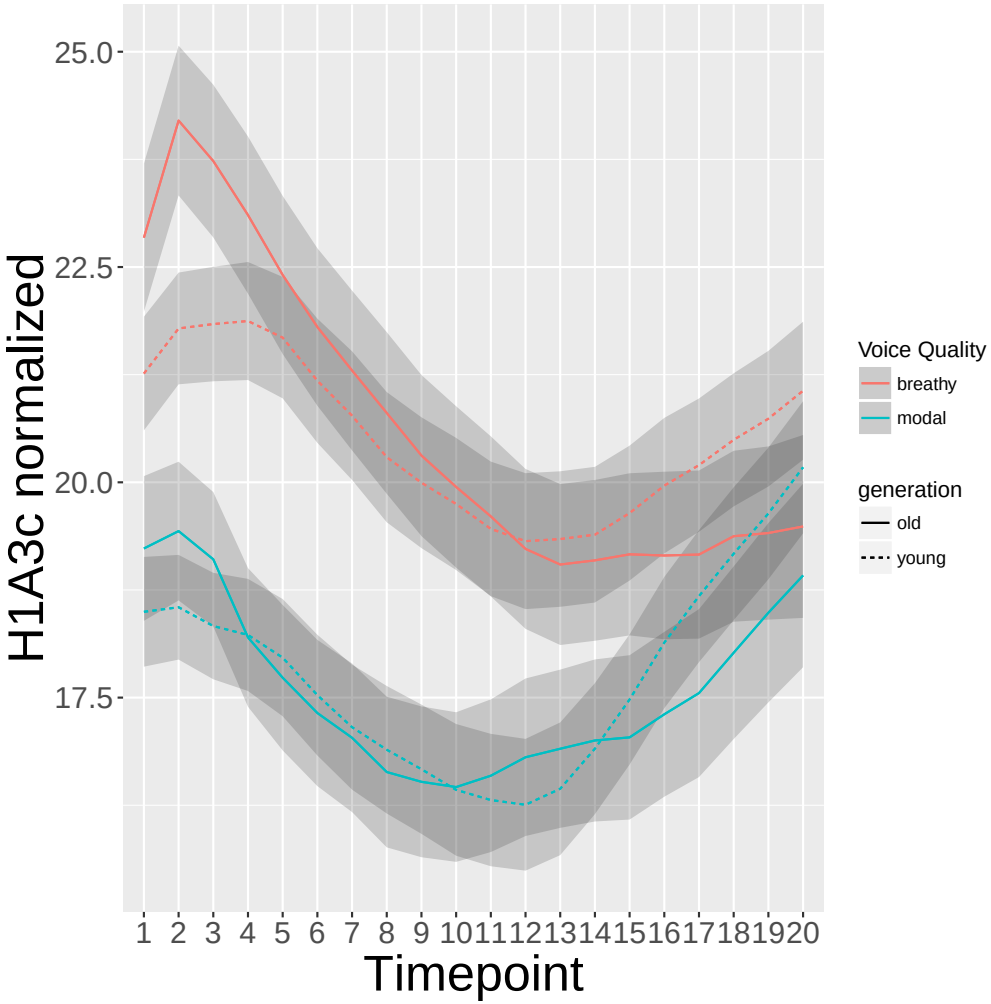
- There is no generational difference
- Breathy vowels have significantly lower F1 than modal ones

Generational H1*-H2* differences



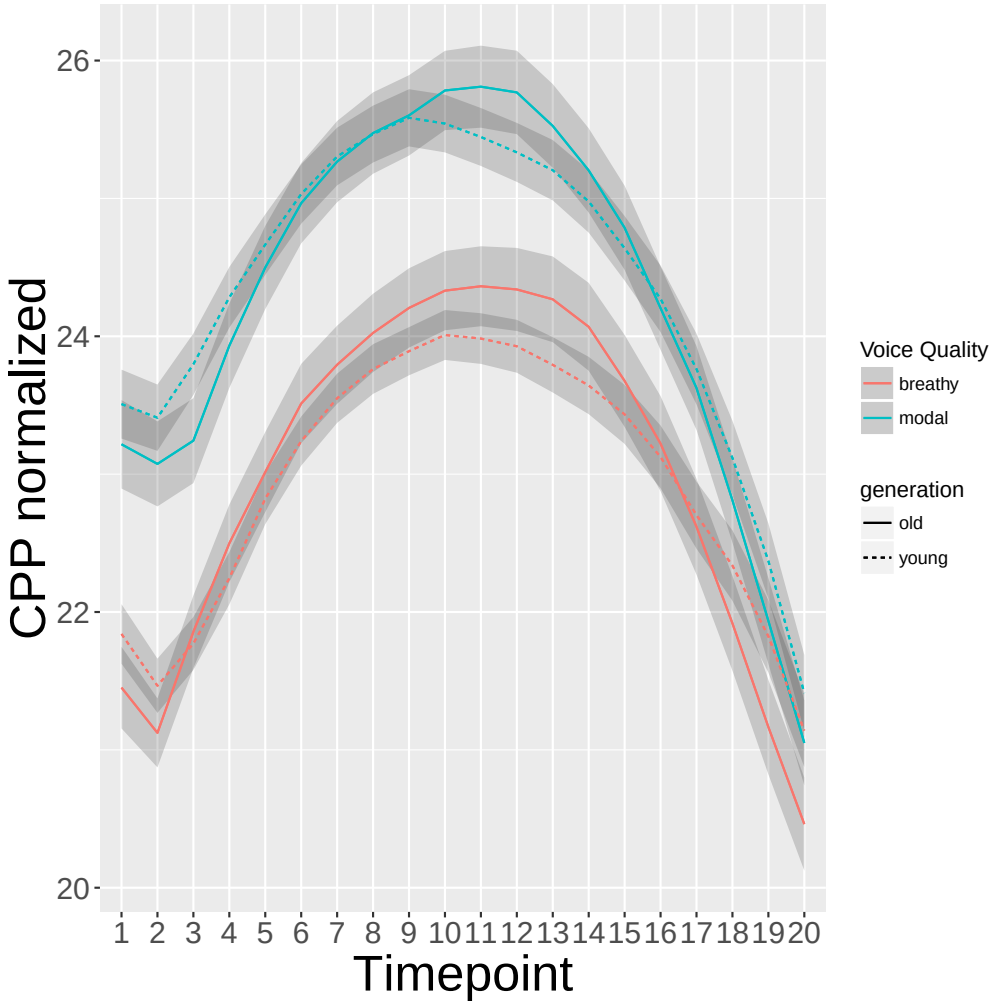
- On average, speakers have a very clear distinction between modal and breathy voice
- Difference is smaller for younger speakers
  - First half of breathy vowels more modal than old speakers
  - Second half of modal vowel more breathy than old speakers

Generational H1*-A3* differences



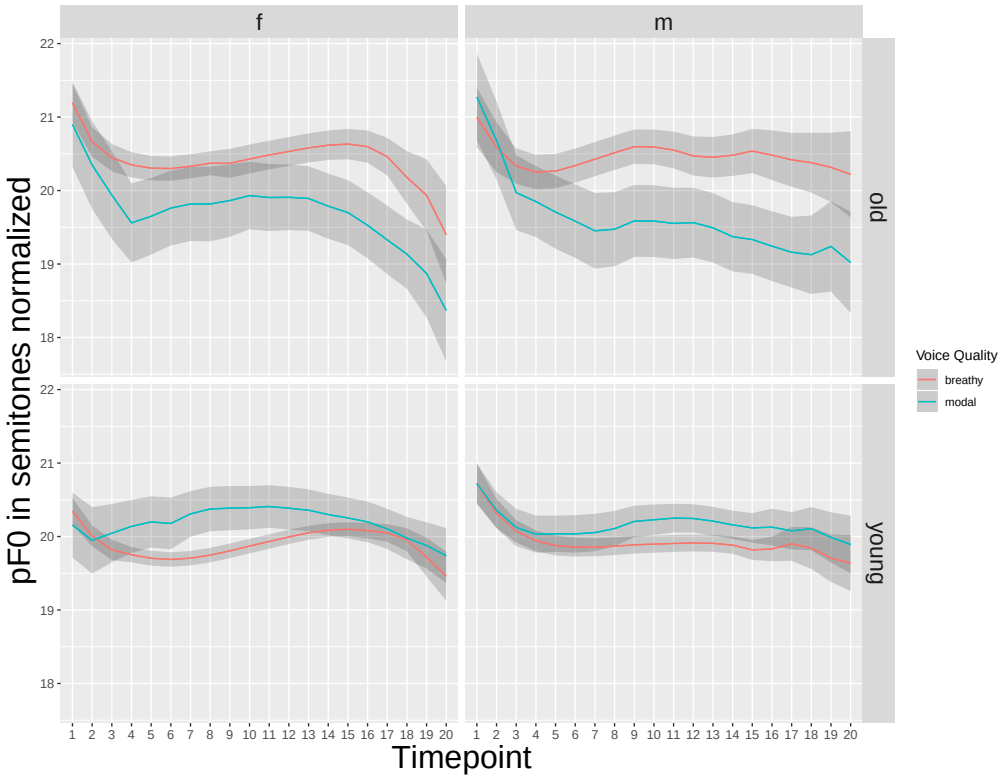
- Younger speakers have lower values for breathy voice than old speakers, but only for the first quarter of the vowel
- Other differences insignificant

Generational CPP differences



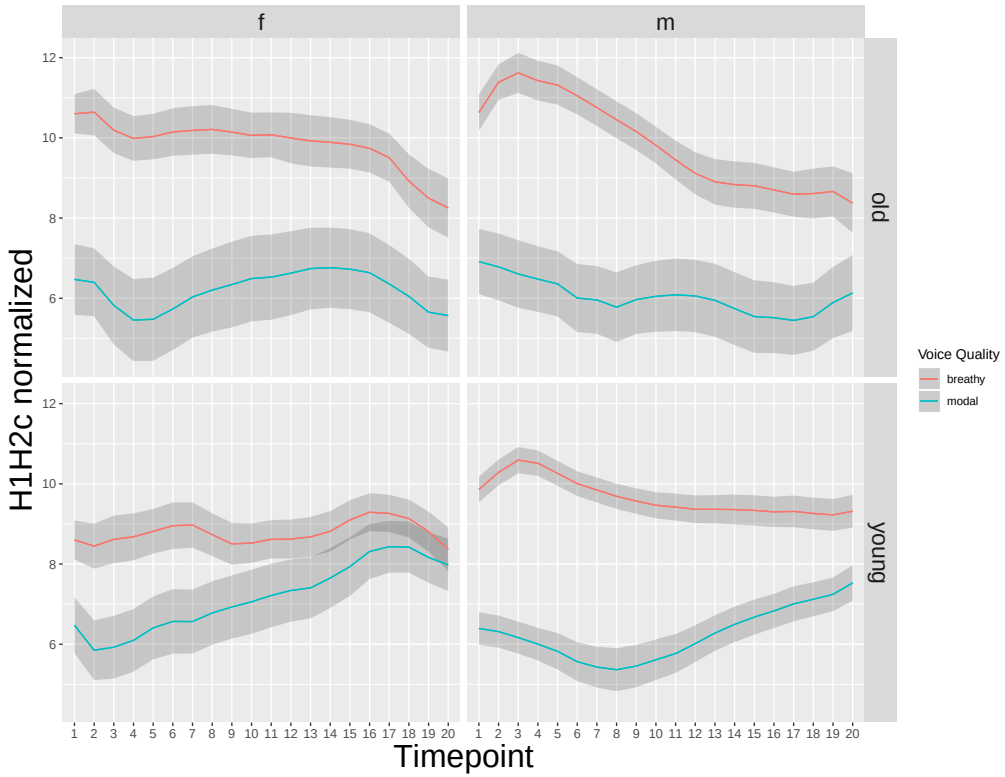
- No significant difference generationally

f0 crossed by gender and generation



- Older males and females have similar trajectories though females have sharper drop at the end
- Younger females have a greater difference than younger males

H1*-H2* crossed by gender and generation



- Older males and females have similar trajectories
- Males have a steeper drop than females for breathy vowels
- Young speakers' modal vowels gradually become breathier over the vowel, starting earlier in females
- Young female speakers have the smallest difference between the voices

Generational summary

- F1 and CPP patterns do not differ by generation
- H1*-A3* differences marginally reduced for young speakers only in the first fifth of the vowel
- H1*-H2* & f0 differences significantly differ by generation
  - H1*-H2* differences reduced for younger speakers
  - f0 differences are reversed between older and younger speakers
  - Older speakers unexpectedly have higher breathy f0 trajectories
- Young females appear to be leading the tonogenetic change; young males slightly lag behind

Social factors explored

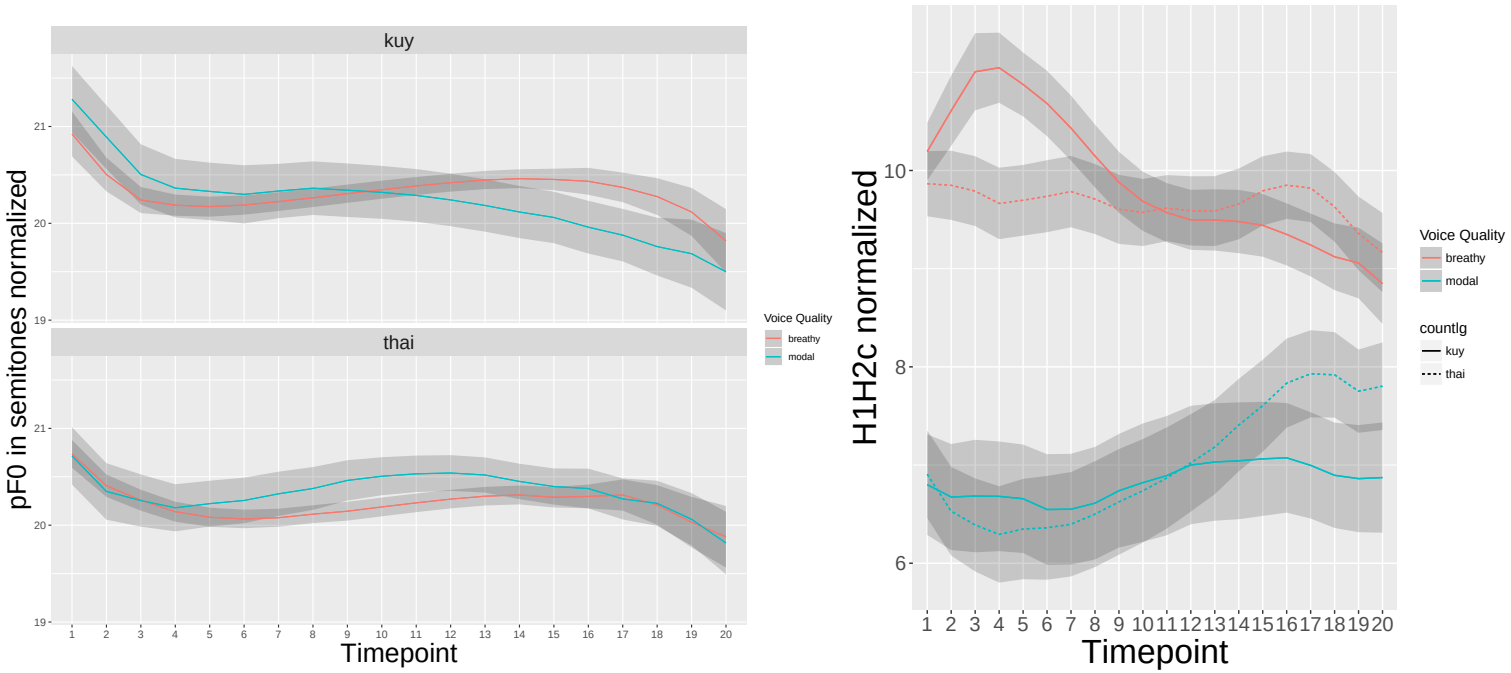
1. **Count language:** language speaker reports counting in
2. **Away long?** if yes, speaker away from home for 4 or more years
3. **Most used language with friends**
4. **Most used language with family**
5. **Best spoken language**
6. **Best understood language**
7. **Group most strongly identified with**

Social factor counts

	Kuy	Thai/Lao	Tie
Count lg	13	17	3
Friend lg	20	12	1
Family lg	26	4	3
Speak best	14	3	16
Understand best	10	10	13
Strongest ID	24	3	6

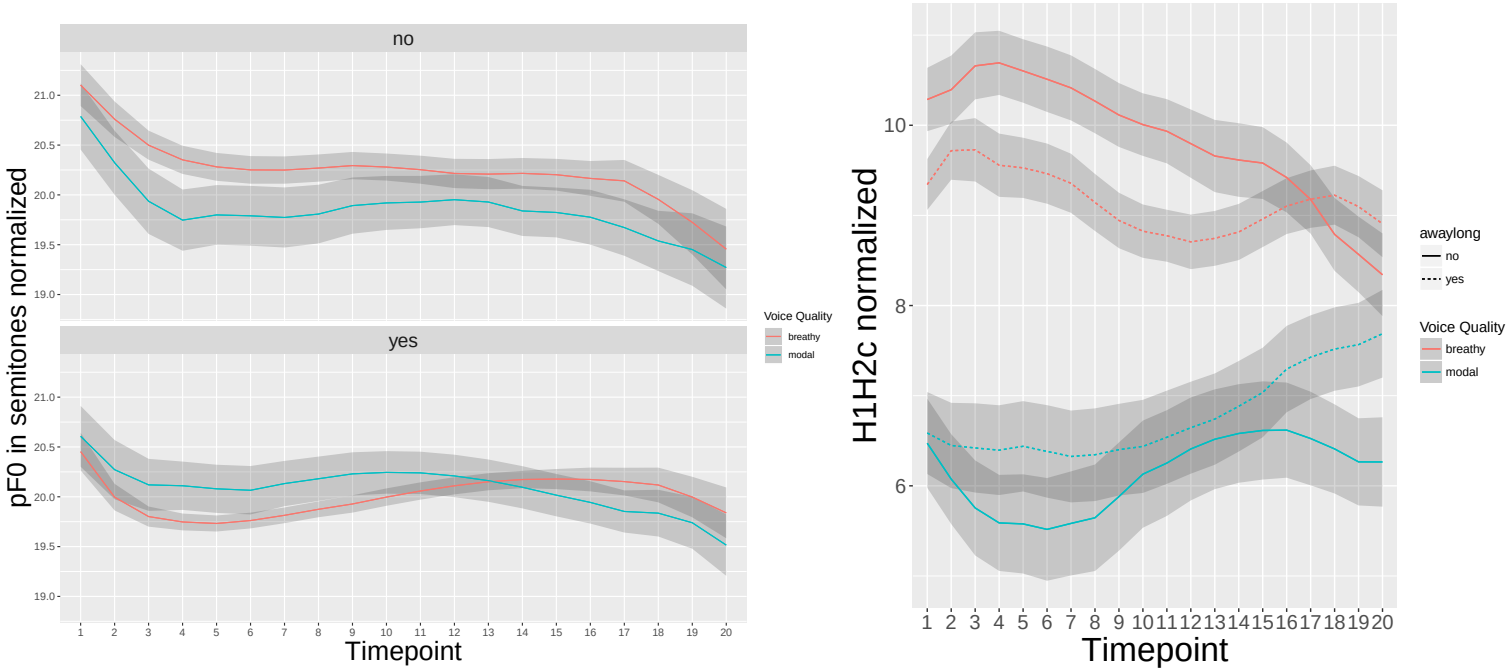
- 17 speakers spent 4 or years away; 16 speakers spent 3 or fewer
- We will focus on the factors that have relatively balanced representation (ignoring ties)

Count language: f0 vs. H1*-H2*



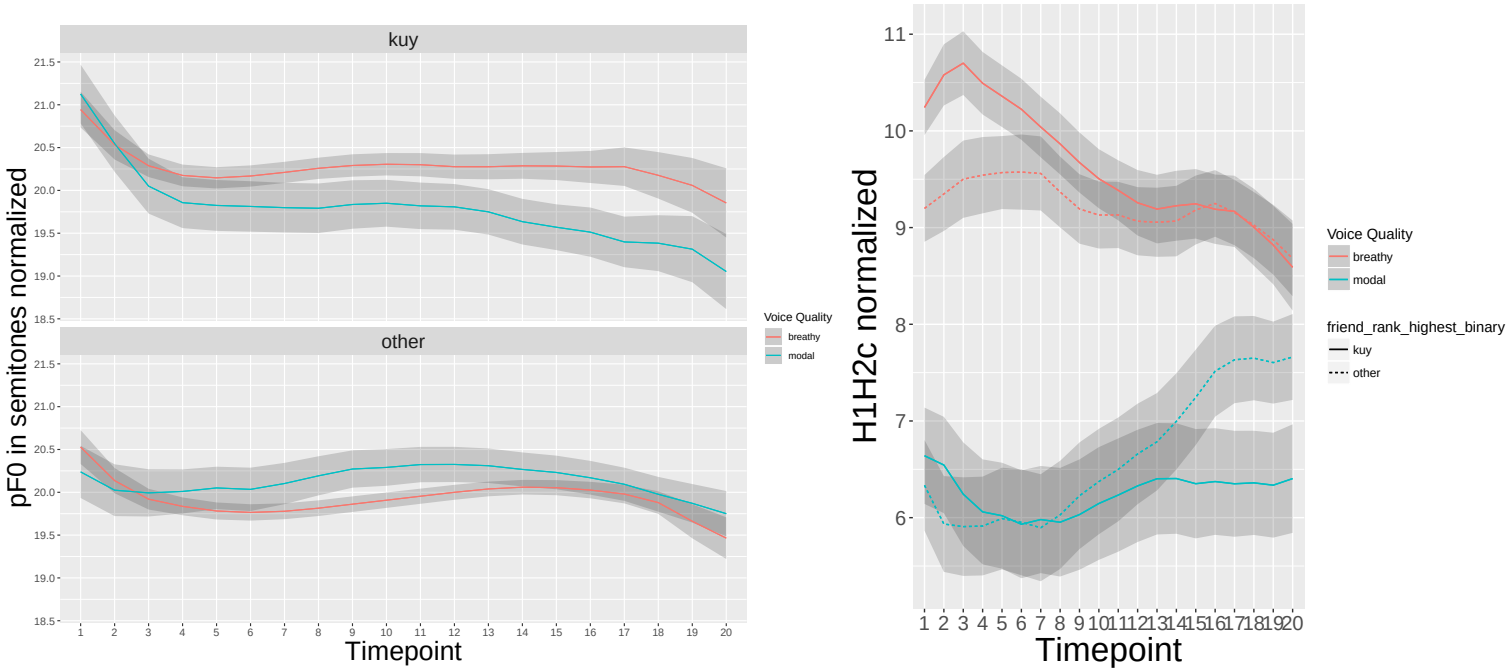
- Thai counters appear to have significantly higher modal f0 trajectories overall than Kuy counters
- Thai counters have a slightly smaller H1*-H2* difference

Away long? f0 vs. H1*-H2*



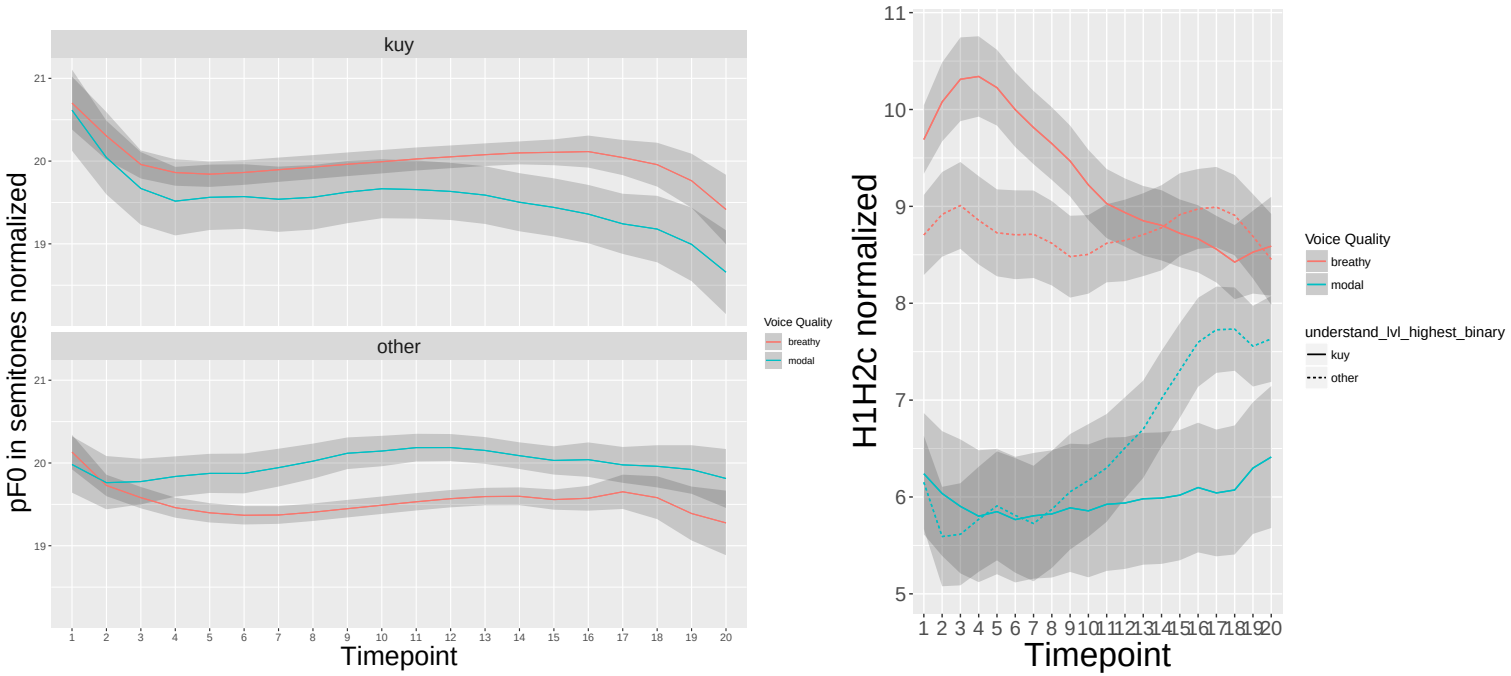
- Those away long have a higher f0 for first half of modal vowels
- Those away long have significantly less breathy breathy vowels

Most used language with friends: f0 vs. H1*-H2*



- Those who use Thai/Lao most often with friends have higher modal vowels
- Breathy vowels less breathy for them in first half; modal vowels more breathy in latter half

Best understood language: f0 vs. H1*-H2*

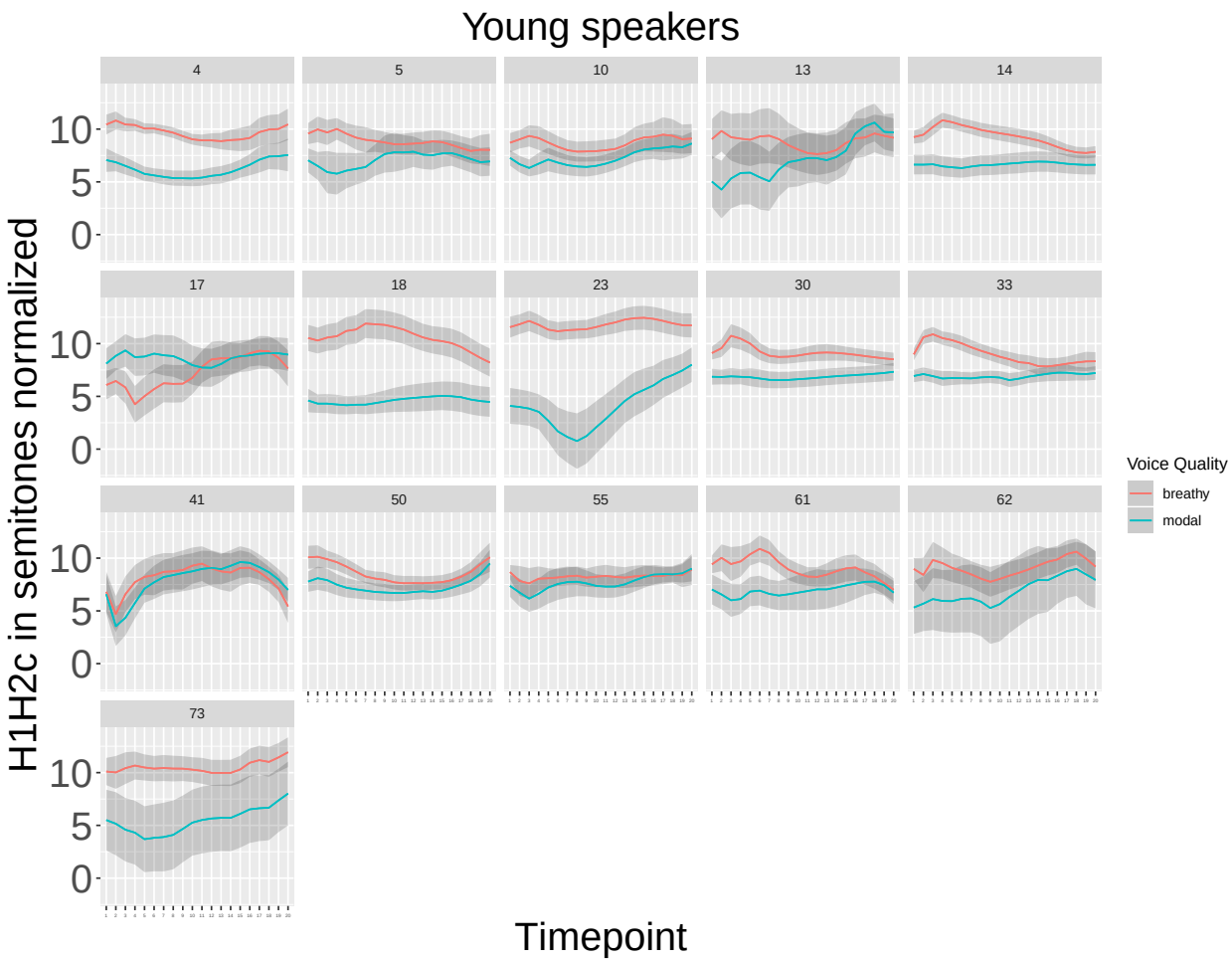


- Those who understand Thai/Lao best have much higher modal vowels
- Breathy vowels less breathy in first half; modal vowels more breathy in latter half

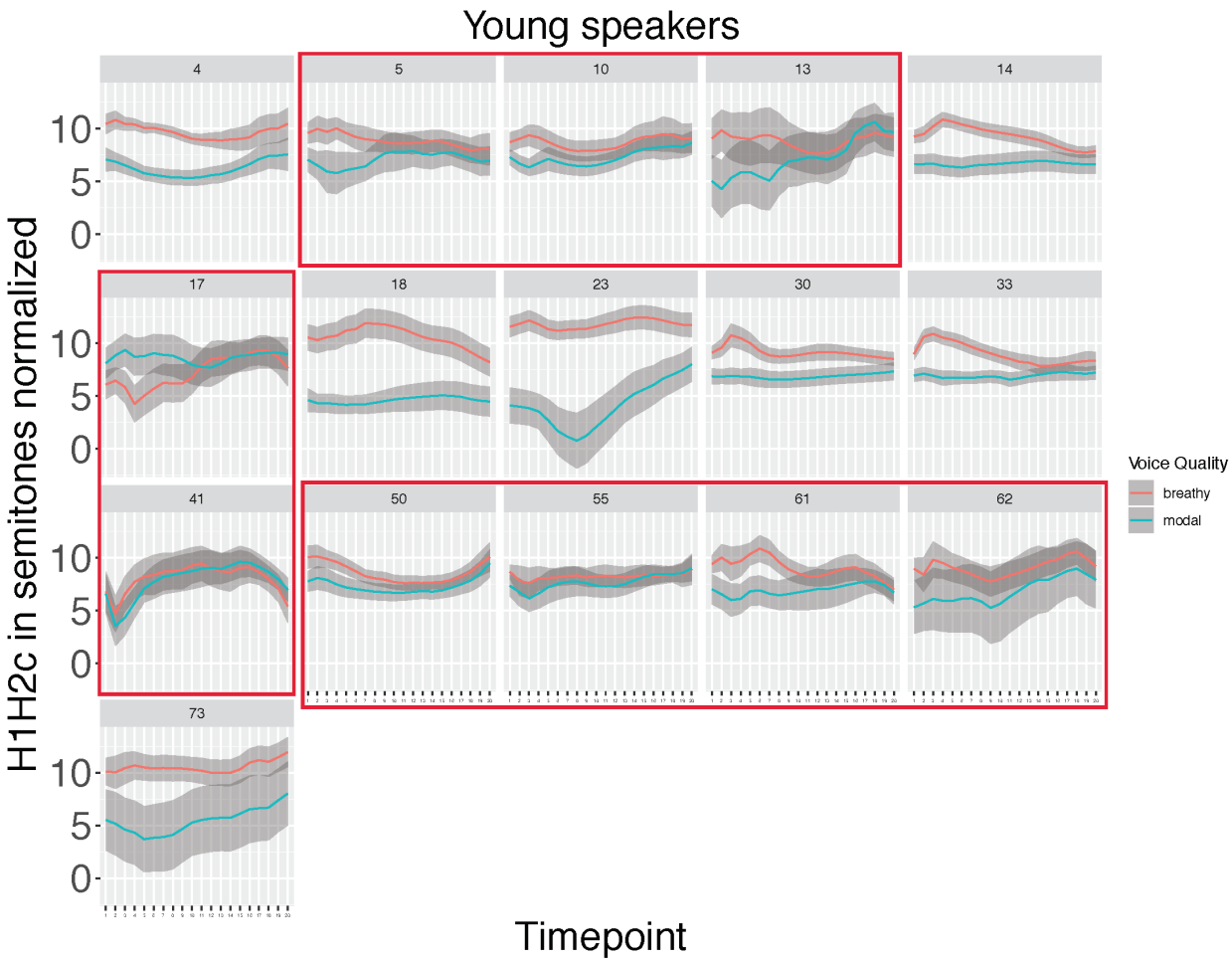
Summary of social factors

- Social factors that are related to more integration into Thai society or greater use of Thai correspond to a larger positive f0 difference between modal and breathy vowels and a smaller difference in H1*-H2*
  - Being away long
  - Counting in Thai
  - Speaking to friends in Thai/Lao
  - Ranking oneself as understanding Thai/Lao better than Kuy
- Many of these factors covary, so we must tease apart

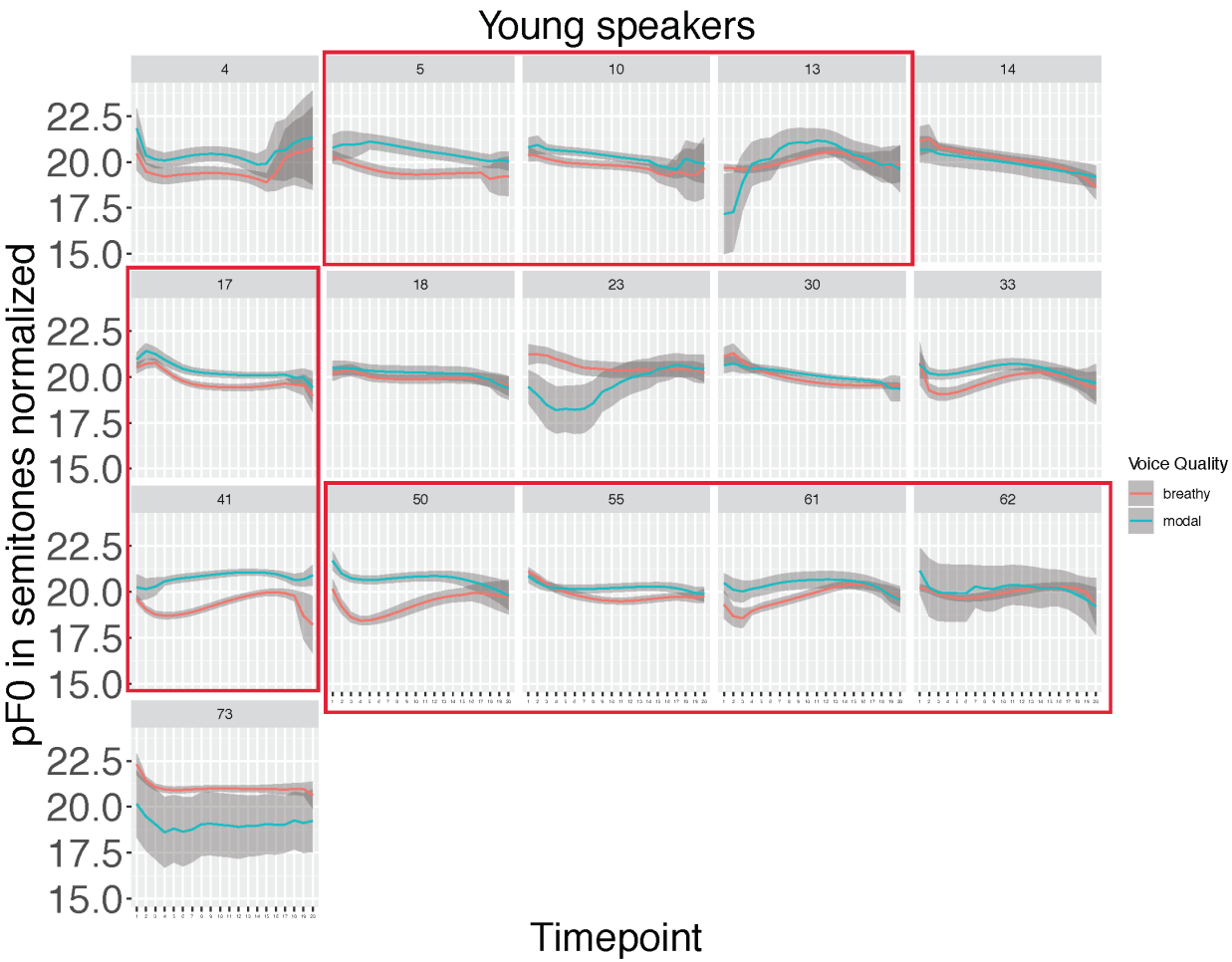
Individual Differences: H1*-H2* young



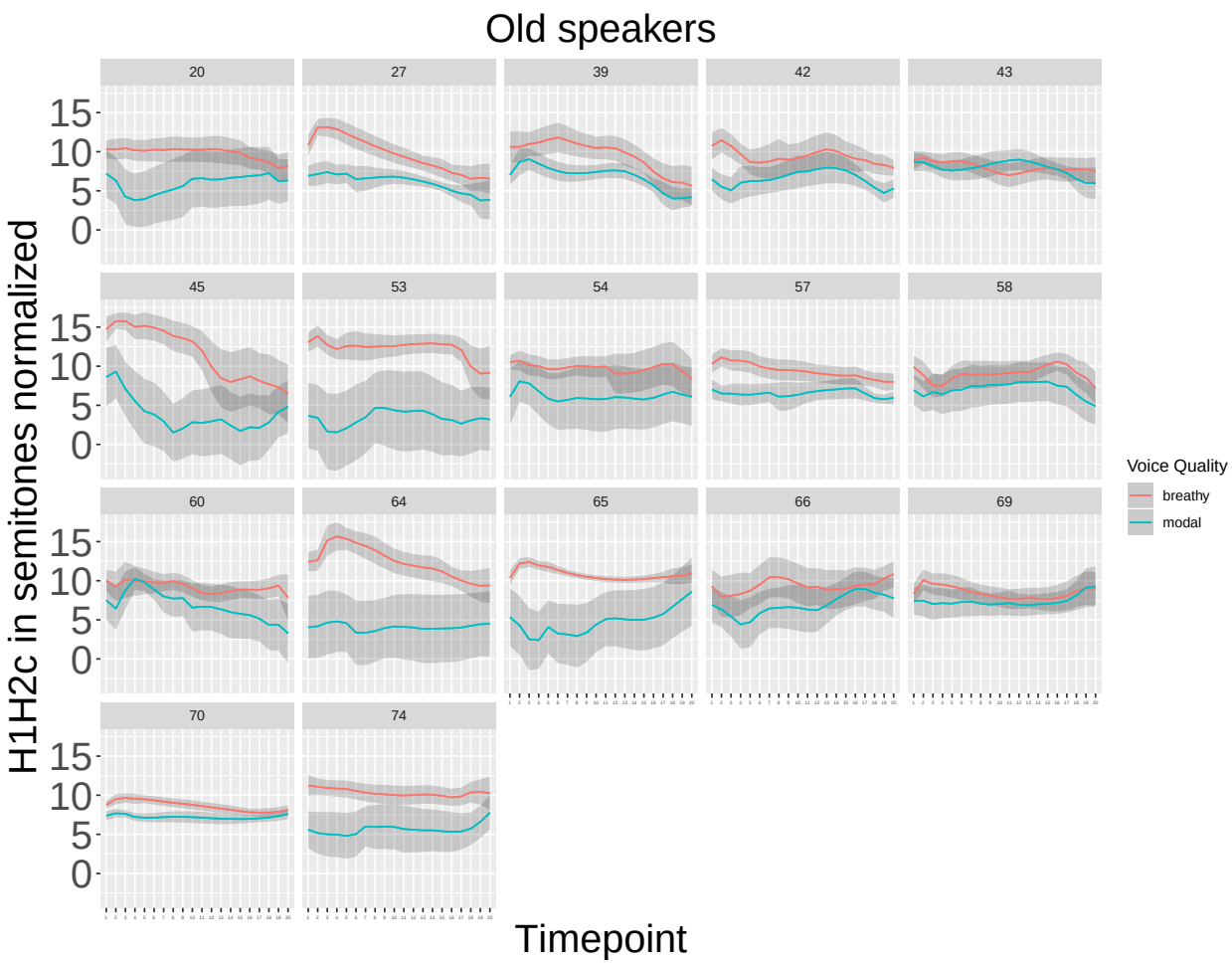
Individual Differences: H1*-H2* young



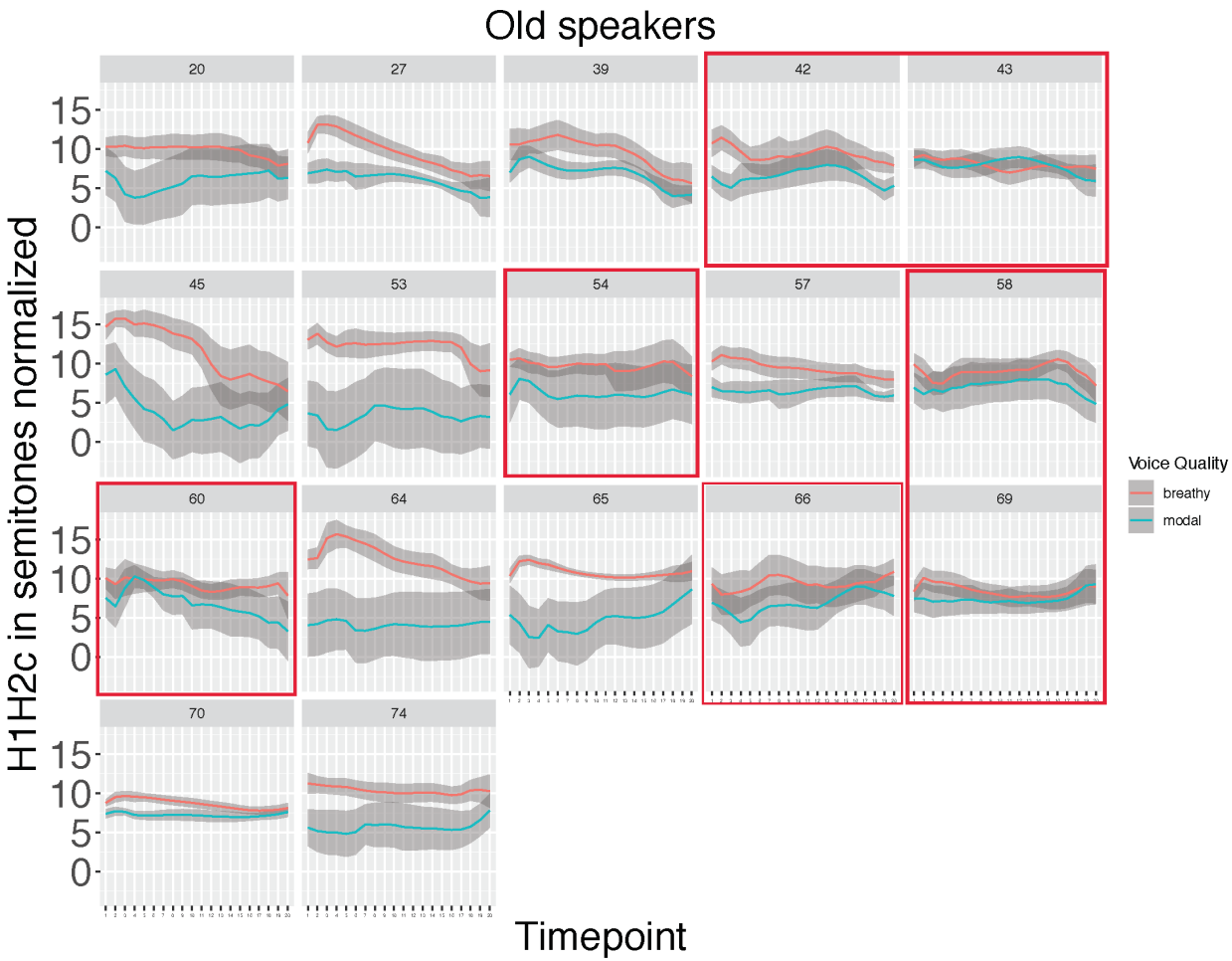
Individual Differences: f0 young



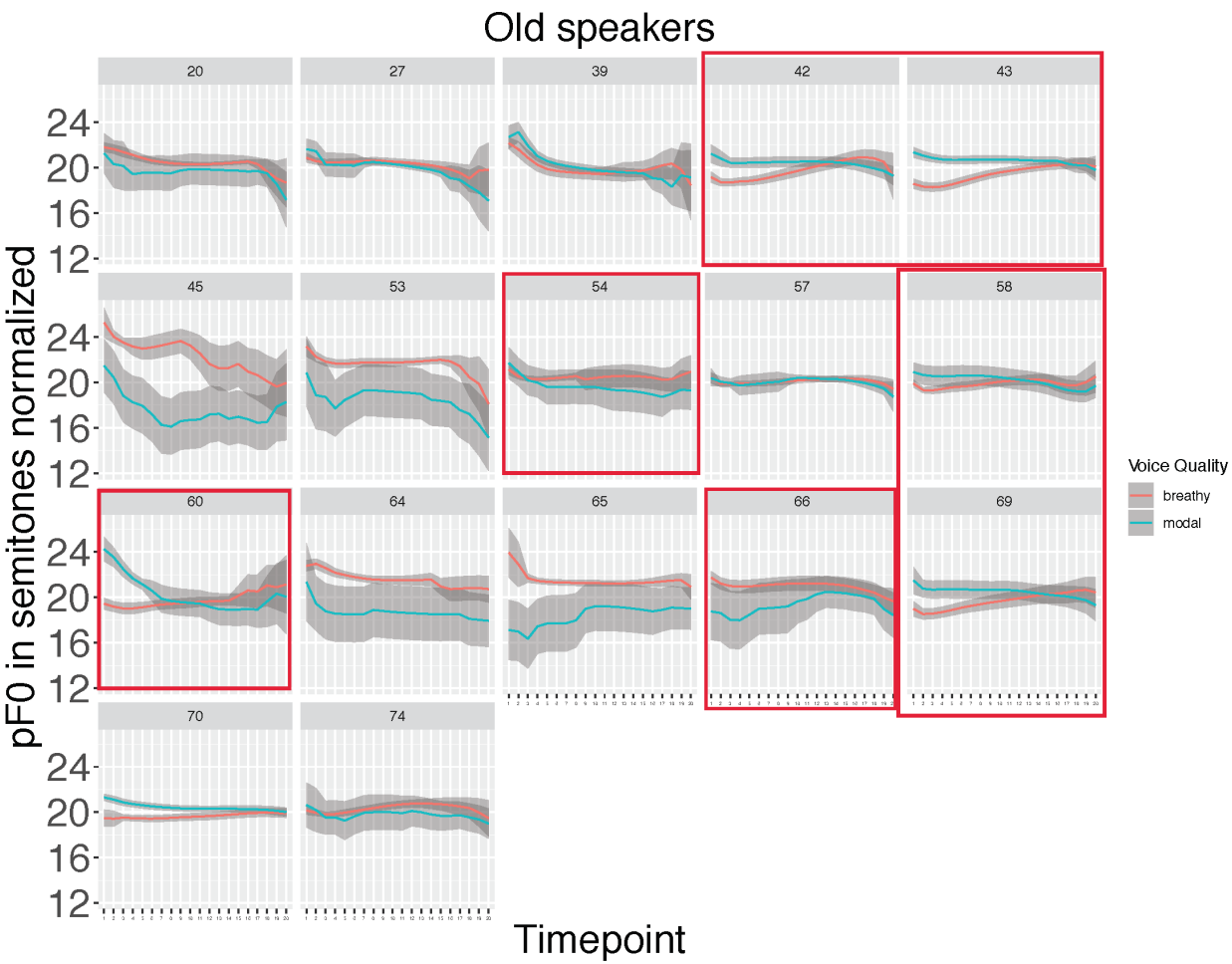
Individual Differences: H1*-H2* old



Individual Differences: H1*-H2* old



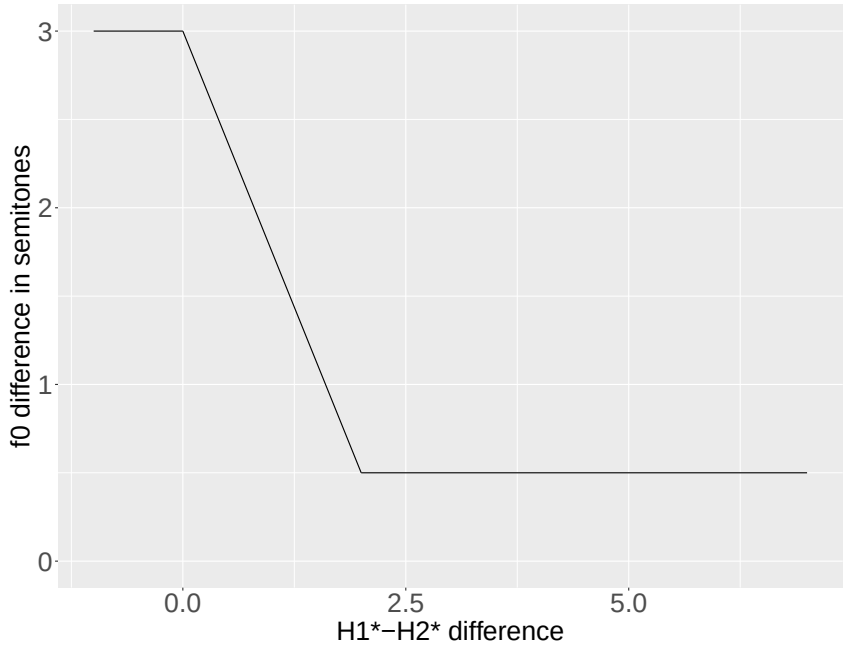
Individual Differences: f0 old



Correlation between f0 and H1*-H2* differences

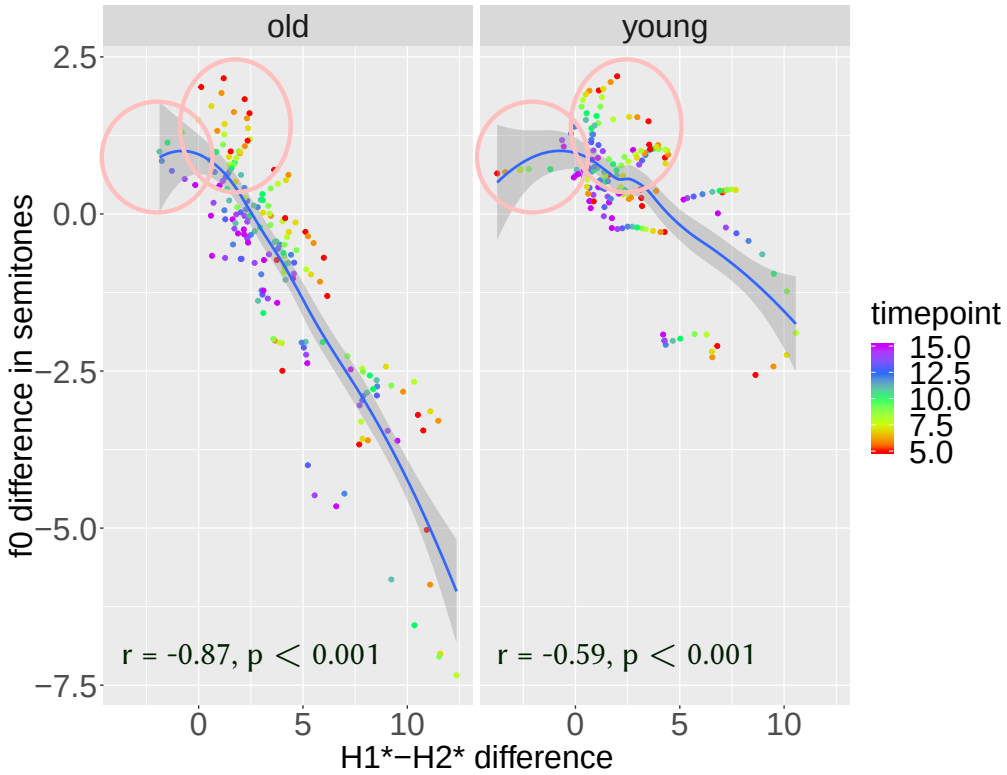
- Looked at timepoints 5 through 15 per speaker
- Subtracted breathy f0 means from modal ones
- Subtracted modal H1*-H2* means from breathy ones
- Plotted scatterplot of each f0 difference, H1*-H2* difference pair

Expected correlation between f0 and H1*-H2*



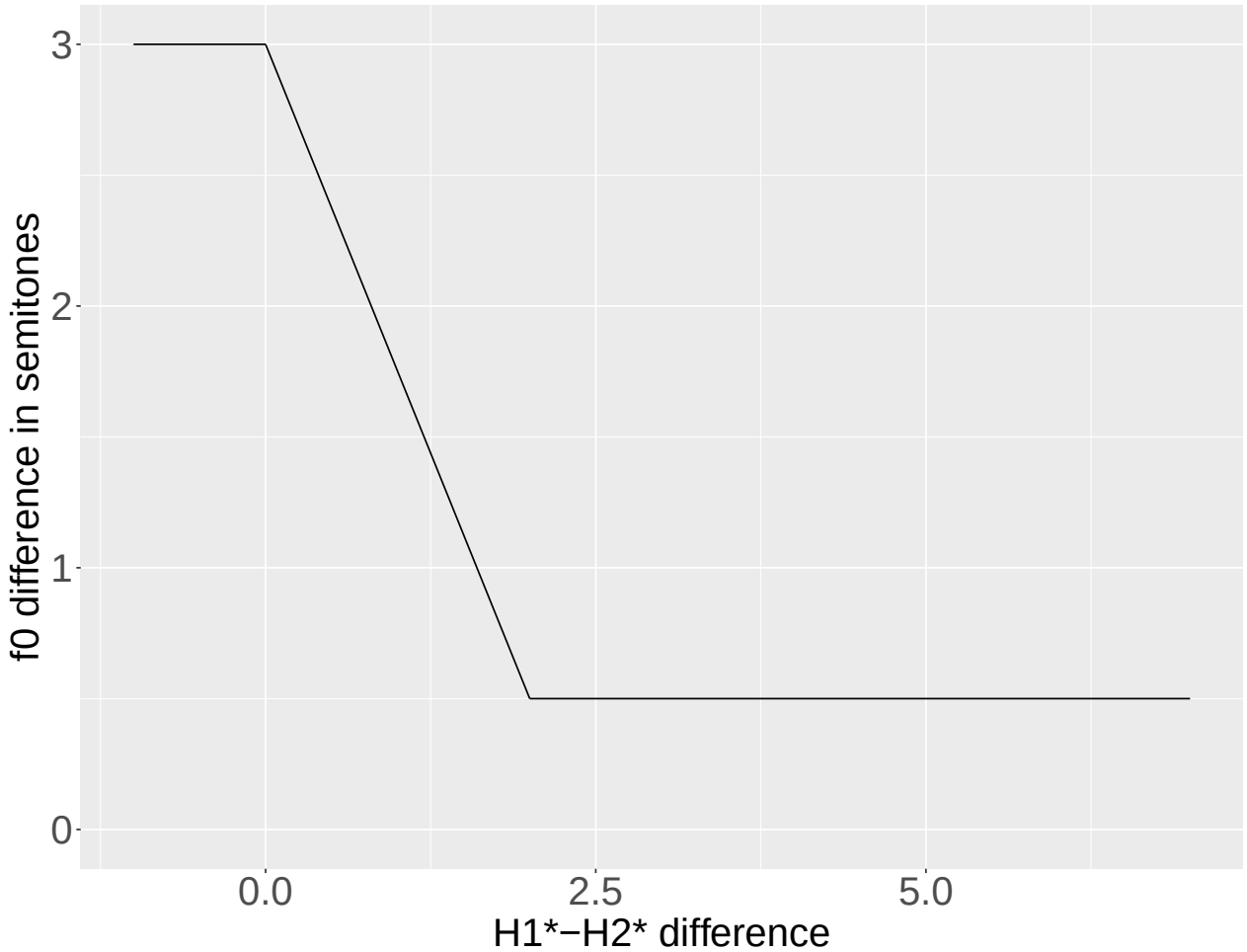
- As H1*-H2* difference is high, f0 difference should be just slightly positive
- As H1*-H2* difference approaches 0, we should expect a rise in f0 difference to compensate

Correlation between f0 and H1*-H2*



- In 0 to negative H1*-H2* diff range, f0 diff consistently positive
- f0 difference is quite positive as H1*-H2* diff approaches 0, *especially for earlier timepoints*
- Younger speakers have a much more restricted range

Expected correlation between f0 and H1*-H2*



Summarized Observations

- Breathiness is still perserved in many younger speakers, but weakening—f0 difference strengthening, with young females leading change
- Speakers who exhibit greater usage of Thai or integration into Thai society are more likely to have weakened breathy cues and stronger f0 cues
- Negative correlation between H1*-H2* difference & f0 difference (strangely extending further than expected)

Conclusions

- Incipient tonogenesis described for other Ku(a)y varieties appears to be happening in Tambon Tum
- Cluster of social factors related to transphonologization from register to tone related to greater exposure to and use of Thai/Lao
- While Kuy has been in contact with Thai and Lao for a long time, bilingualism on rise recently, suggesting that it is mechanism by which tonal contrast can be imposed on non-tonal system, particularly on register system with cues concomitant with pitch changes
- Change is further pressurized by other contrast losses

ขอบคุณ กร่อุบนะ
[kʰàpkʰun krą̈apna?]
Thanks everyone!

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