Tonogenesis in Khmer: A cross-dialect comparison

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29 May 2013

Tonogenesis: the phonologization of f0

Phonologization: 'The reinterpretation by listeners of a previously intrinsic cue after recession and disappearance of the main cue' (Hombert et al. 1979)

Stage 1	*Stage 2*	*Stage 3*
pá [—]	pá [—]	pá [—]
bá [⁄]	bǎ [⁄]	pà [⁄]
automatic	'extrinsic'	'phonemic'

Figure 1: Tonogenesis via transphonologization of *f*0 (after Hyman, 1976).

Incipient tonogenesis in Phnom Penh Khmer

Careful/reading register

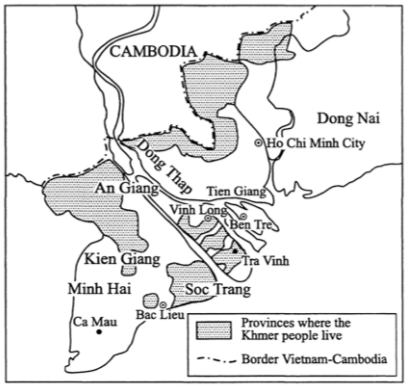
/C/	ក	/kɑː/	'neck'	ក្	/kuː/	'pair'	
/C^h/	ខ	/k^{h}ɑː/	'soup'	ឃ្យ	/k^{h}uː/	'old'	
/Cr/	ក្រ	/krɑː/	'poor'	ក្រូ	/kruː/	'teacher'	

Casual/spoken register

/Cr/	⟶	[k^{h}ŏɑ], [kɔ̤ɑ̤]	[k^{h}ŭː], [kṵː]	

(Noss, 1966; Huffman, 1967; Wayland & Guion, 2005; cf. Filippi & Vicheth, 2009)

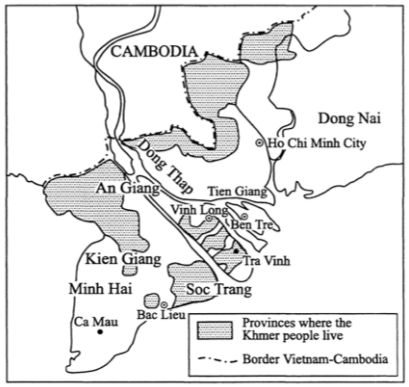
Khmer in Vietnam (*Khmer Krom*)



(Thạch Ngọc Minh, 1999)

- settled in early 17th c.
- ∼ 1,2m (2009 VN census)
- 75% in Sóc Trăng,Trà Vinh, Kiên Giang provinces
- Very little scholarly work on KK, esp. in W. languages

Incipient tonogenesis in Kiên Giang Khmer



(Thạch Ngọc Minh, 1999)

Standard	*KG*	*Gloss*
[krɑː]	[kàː]	‘poor’
[kɑː]	[kɑː]	‘neck’
[khruː]	[kùː]	‘teacher’
[khuː]	[khuː]	‘pair’
[srok]	[sòk]	‘district’
[sok]	[sok]	‘peace’

A cross-dialect field study

- Which acoustic dimensions are employed to signal the /C/ - /C^h/ - /Cr/ contrast in each dialect?
- Are there differences in use/perception of *f*0 in each dialect?
- What might account for the differences (if any) between dialects?

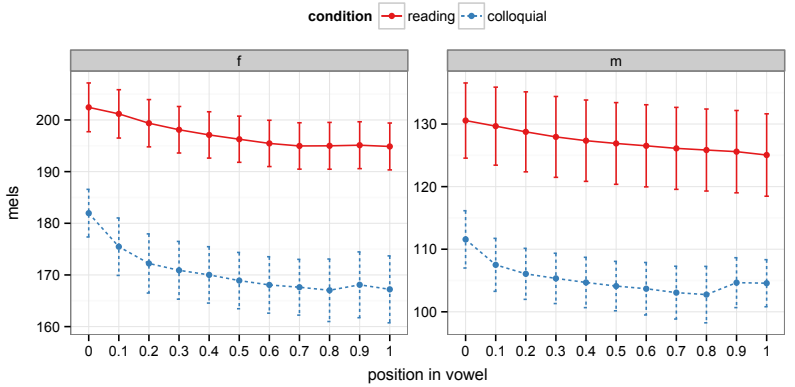
(Kirby, submitted ab, in prep)

Production: Design

- 20 speakers of each dialect
- minimal triplets $\longrightarrow$
- careful & casual conditions
- 3 repetitions/item
- *f*0, VOT, spectral tilt, F1

តា	taː	‘grandfather’
ថា	t^{h}aː	‘to say, tell’
ត្រា	traː	‘seal, stamp’
គូ	kuː	‘pair’
ឃ្លូ	k^{h}uː	‘old’
គ្រូ	kruː	‘teacher’

*f*0 difference by condition: PP



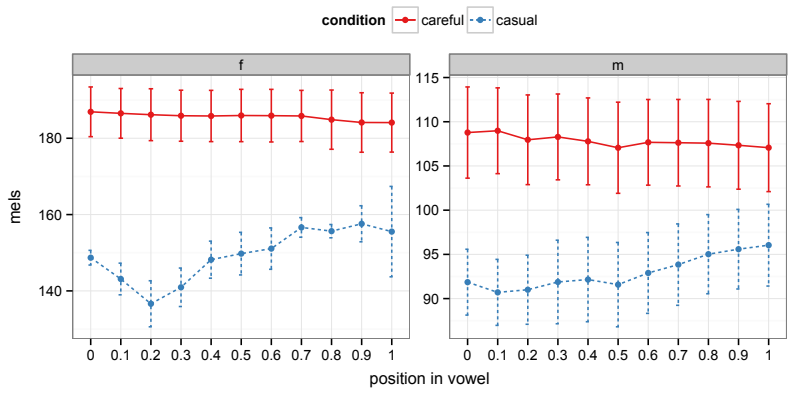
Intercept = 195.14 (4.28)

$\beta_{\text{condition=colloquial}} = -28.94$ (4.44)

Intercept = 126.52 (6.69)

$\beta_{\text{condition=colloquial}} = -24.46$ (5.92)

*f*0 difference by condition: KG



Intercept = 185.06 (8.15)

$\beta_{\text{condition=casual}} = -43.05\ (4.95)$

Intercept = 107.4953 (4.34)

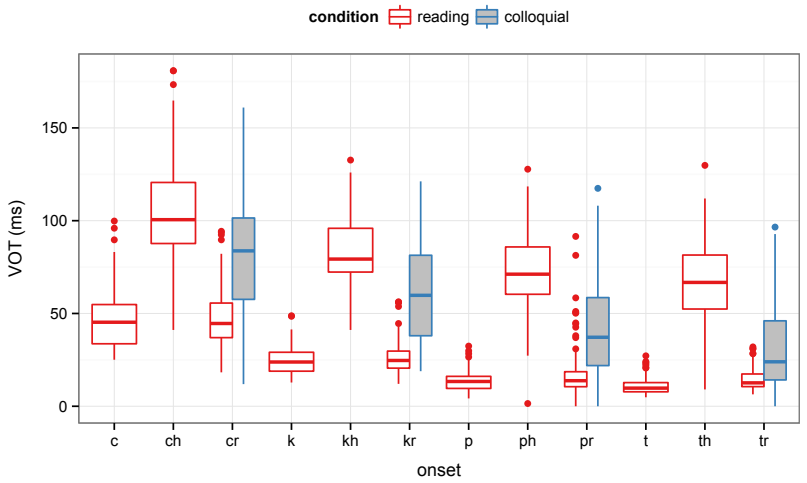
$\beta_{\text{condition=casual}} = -15.12\ (0.95)$

VOT differences: PP

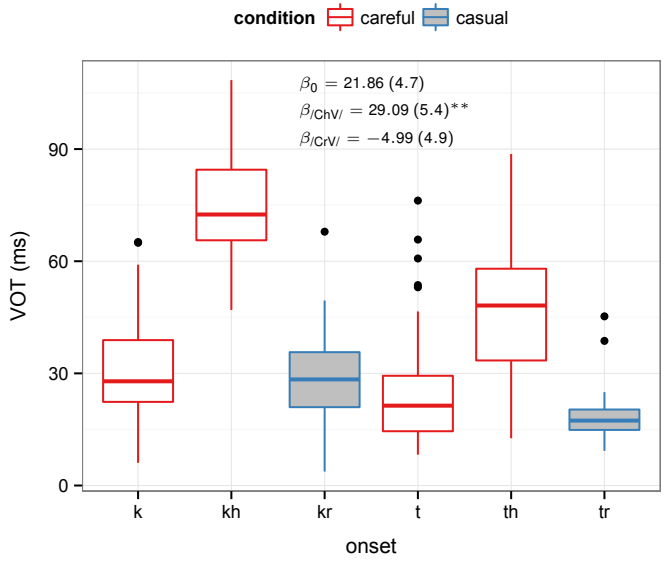
$\beta_0 = 7.81\ (2.37)$

$\beta_{/\text{ChV}/} = 58.11\ (3.38)^{***}$

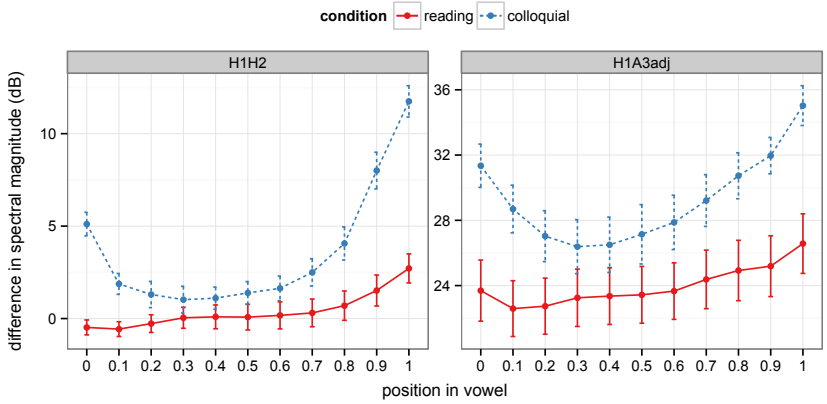
$\beta_{/\text{CrV}/} = 29.51\ (4.94)^{**}$



VOT differences: KG



Breathy voice: PP



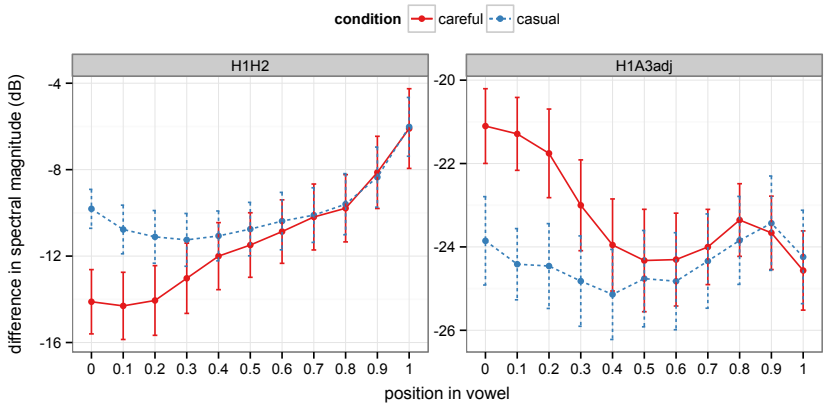
Intercept = -0.24 (0.78)

$\beta_{\text{condition=colloquial}} = 3.62\ (0.85)$

Intercept = 22.64 (1.85)

$\beta_{\text{condition=colloquial}} = 6.47\ (4.8)$

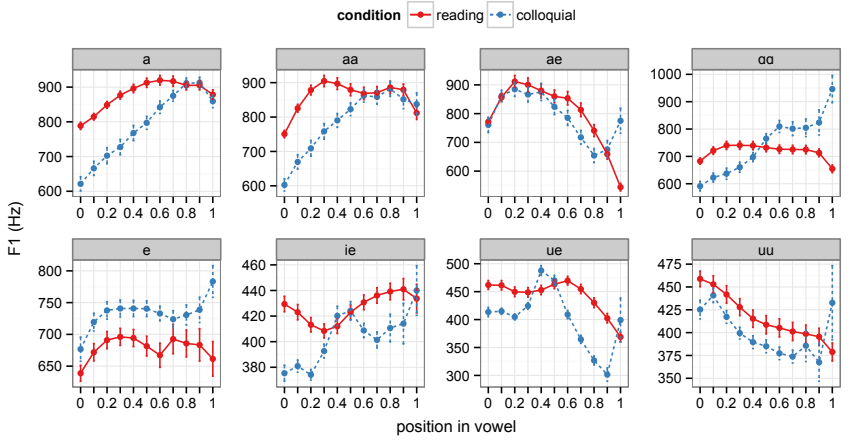
Breathy voice: KG



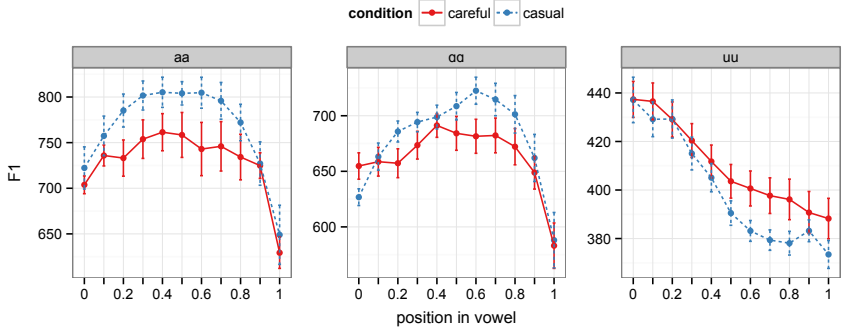
Intercept = -11.92 (2.52)
condition=casual n.s.

Intercept = 19.23 (1.33)
$\beta_{\text{condition=casual}} = -4.16$ (1.08)

F1 differences: PP



F1 differences: KG



No significant effects of `condition` or `t:condition`

Production: Summary

Colloquial /CrV/ > [CV] forms are produced with ...

Phnom Penh	Kiên Giang
intermediate aspiration	/CV/-like aspiration
lowered f0	lowered F0
lowered F1	unchanged F1
breathy voice	modal voice

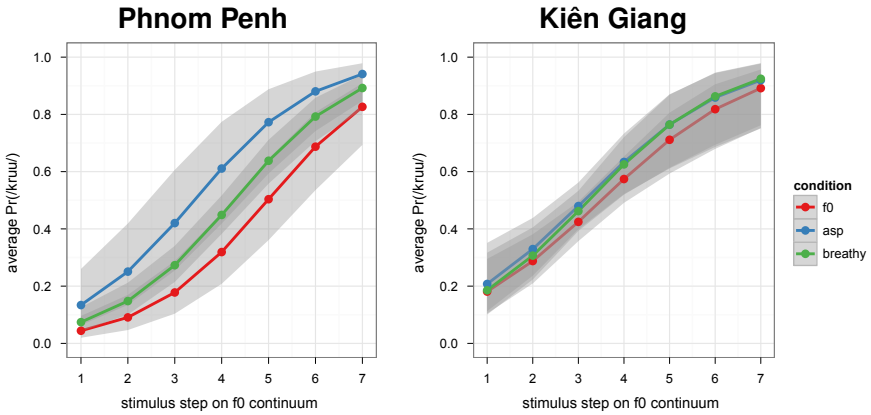
...relative to reading condition forms.

Perception tests

ក្រូ /kruu/ ‘teacher’ កូ /kuu/ ‘pair’

*f*0 drop (Hz):	60	50	40	30	20	10	0
VOT (ms):		10				70	
voice quality:		modal				breathy	

Divergence in perception



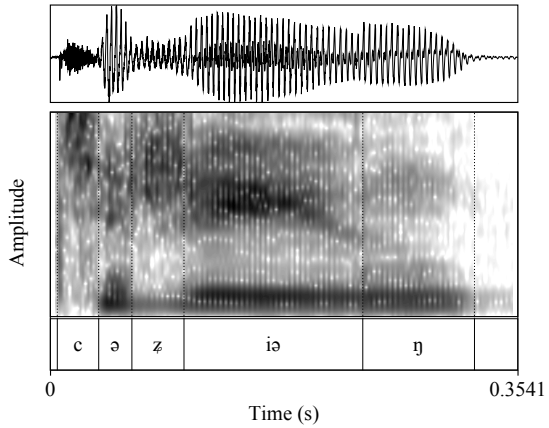
2AFC between /kruu/ and /kuu/ on [kuu ∼ kŭu] (=/kruu/) continuum

Fortition of /r/: a trigger for change

- Insufficient pressure differential across lingual constriction during initiation may result in fortition (e.g. fricativization)

ច្រៀង

/criəŋ/
‘to sing’

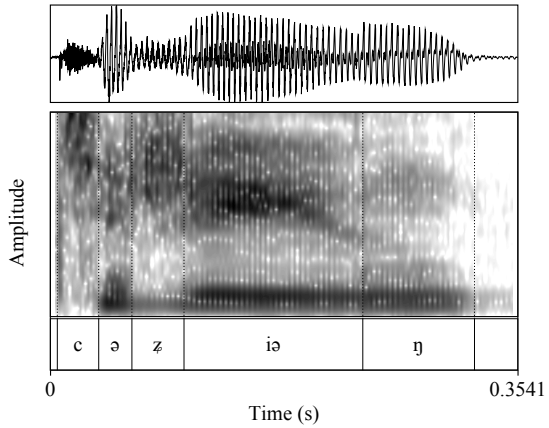


Fortition of /r/: a trigger for change

- May be (mis)perceived as aspiration and/or condition breathy voice, leading to perceptual lowering of *f*0/F1

ច្រៀង

/criəŋ/
‘to sing’



F1 < breathy voice

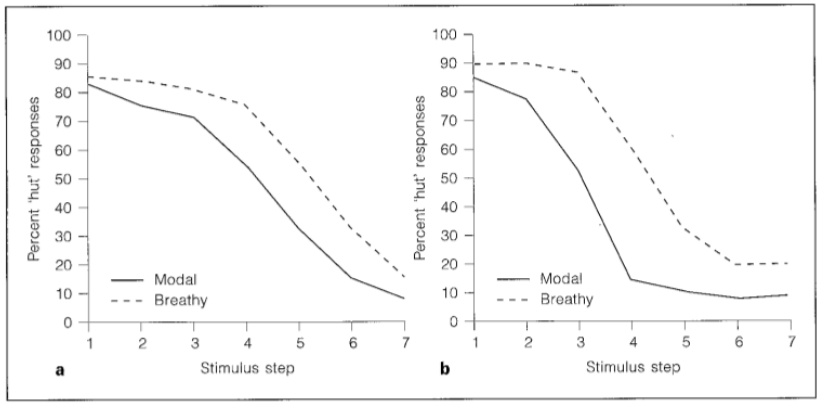


Fig. 8. Identification functions for experiment 3. Stimulus step 1 is the /ʌ/ endpoint of the series and 7 is the /a/ endpoint. **a** 'Male' series. **b** 'Female' series.

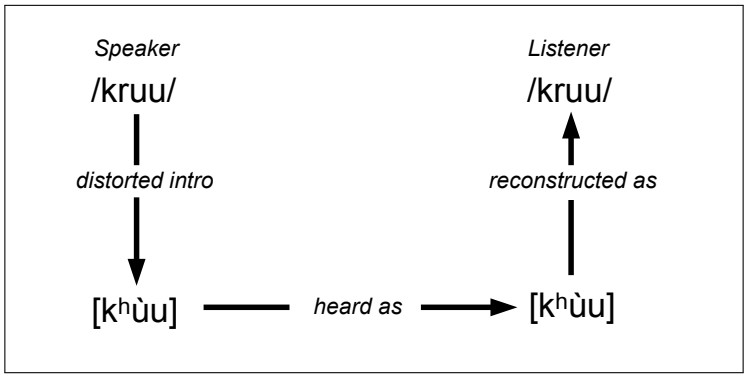
(Lotto *et al.*, 1997; cf. Henderson, 1952; Huffman, 1976; Denning, 1989 etc.)

Tonal restructuring

Proto-language	*/gaa/	*/kaa/
Conservative	/gaa/	/kaa/
Transitional	/k^{h}aa/	/kaa/
Register	/kàa/	/kaa/
Restructured	/kia/	/kaa/
(Tonal)	/kàa/	/káa/

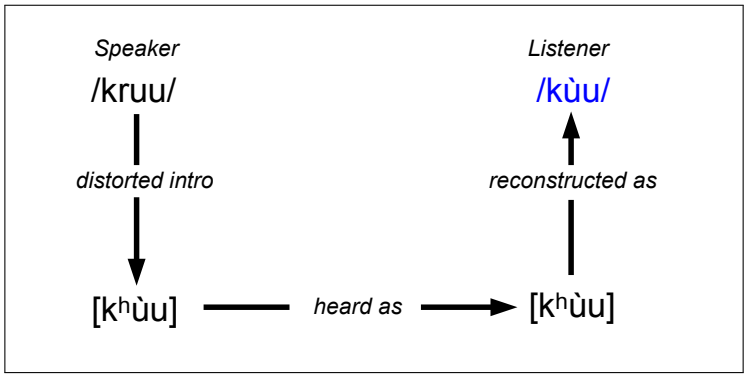
(After Huffman 1985, "Vowel permutations in Austroasiatic languages")

The listener as a source of sound change (Ohala, 1981)



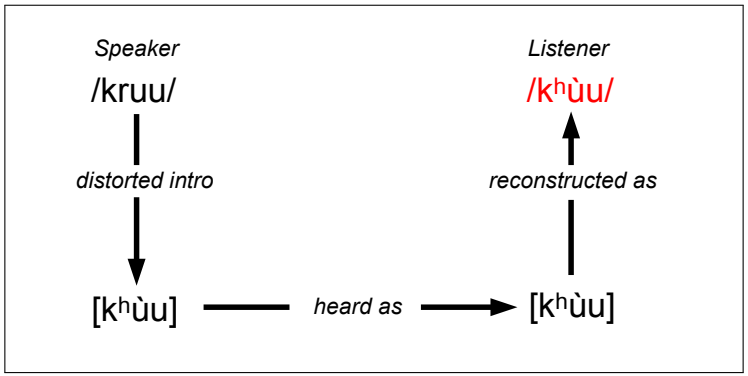
- Listener 'corrects' for coarticulatory effect (Ohala 1981)

The listener as a source of sound change (Ohala, 1981)



- Partial correction of strengthened trills

The listener as a source of sound change (Ohala, 1981)



- Total failure to detect environment causing distortion

Differential compensation for phonetic bias

What could mediate differences in compensation?

- properties of the lexicon (Sonderegger & Yu, 2010)
- variation in cognitive processing style (Stewart & Ota, 2008; Yu, 2010; Yu et al., 2011)
- association of phonetic differences with indexical meaning (e.g. social group differentiation)
- ...

Tonogenesis in Khmer?

- No (at least, not yet)
- Standards; literacy (PP), prestige (KG)
- Divergence in attention to phonetic dimension?
- Follow-on: controlled vs. automatic VOT effect?

Thank you

Acknowledgments
Art Abramson
Susan Guion Anderson
Marc Brunelle
Doug Cooper
Justin Watkins
Alan Yu

Collaborators
Dinh Lu Giang (USSH HCMC)
Sor Sokny (Buddhist Institute, Phnom Penh)

Funding
Council of American Overseas Research Centers
Center for Khmer Studies, Phnom Penh