Obstruent voicing, aspiration, and tone

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INTRODUCTION

**CF0:** F0 of vowels is higher following voiceless stops

- Extensively investigated in languages with 2-way contrasts (Lehiste and Peterson 1961, Kingston and Diehl 1994, Hanson 2009 etc.)
- What about languages with 3-way contrasts (which tend to be tonal)?
- Previous studies on tonal languages are inconsistent, e.g.:

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<tr>
<td>Thai</td>
<td>11 (6 F)</td>
<td>F0 @ vowel onset</td>
<td>C &gt; C\text{h}</td>
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<td>Erickson</td>
<td>2 (M)</td>
<td>F0 @ “onset”</td>
<td>C &gt; C\text{h}</td>
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<td>Shimizu</td>
<td>7 (all F)</td>
<td>F0 @ 1st vocal cycle</td>
<td>C &gt; C\text{h}</td>
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<td>Lai et al.</td>
<td>10 (5 F)</td>
<td>F0 @ 10% incr.</td>
<td>C &gt; C\text{h}</td>
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<td>Cantonese</td>
<td>16 (8 F)</td>
<td>F0 @ 1st cycle + 10 ms</td>
<td>C &gt; C\text{h}</td>
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**Khmer**

(Austroasiatic)
14 speakers (5 F)
Non-tonal
5 tones (F0)

**Thai**

(Kra-Dai)
12 speakers (6 F)
Non-tonal
6 tones (F0 + VQ)

**Vietnamese**

(Austroasiatic)
14 speakers (6 F)
Non-tonal
6 tones (F0 + VQ)

- Single set of materials across all three languages
- Sonorants as reference level
- Isolation + carrier contexts
- Compare F0 with GAMs (Wood, 2006)

MATERIALS & METHODS

**Khmer**

13-16 July 2016

**Thai**

LabPhon 15
Cornell University

**Questions**

1. Do both C and C\text{h} actually raise CF0?
2. Is attenuation the same in different tonal contexts?

RESULTS

**DISCUSSION**

- Further evidence that CF0 not related to VOT: language/speaker-specific function of how/whether active devoicing is implemented (Kingston & Diehl, 1994; Hanson, 2009; Dmitrieva et al., 2015; etc)
- Tone qua tone tends to come from finals. CF0 primarily involved in conditioning **tonal splits.** If CF0 is actively suppressed, this is mysterious
- Alternative: with fewer tones, timing of laryngeal gestures determining tonal pitch targets may be less precise/more flexible, but with CF0 still prominent (cf. Lai et al., 2009)
- Aerodynamic component? (Kohler, 1985; Xu & Xu, 2003)

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<tr>
<th>Khmer, isolation condition</th>
<th>Thai, high-falling</th>
<th>Vietnamese, isolation, high-level tone</th>
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CONCLUSIONS

1. C\text{h} always raises CF0, implying active devoicing
2. C sometimes raises CF0 (speaker/language-dependent)
3. There is no evidence of C > C\text{h} for any speakers
4. CF0 is not universally attenuated in tone languages: language, context, and tone may all play a role

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References: available upon request