The effect of lexical stress on the phonetic realization of voicing contrast in Tagalog:
Native and Heritage Comparison

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**Effect of Lexical Stress on VOT**
- Long-lag VOT \([p \, ^{t} \, k]\): Stress lengthens VOT
- Short-lag VOT \([p \, t \, k]\) or \([b \, d \, g]\): No consistent effect
- Lead VOT \([b \, d \, g]\): Stress lengthens prevoicing

**Heritage speakers**
- Heritage speakers are bilingual speakers who grew up hearing a minority language within the home and are also dominant in the majority language of the wider community (Polinsky, 2011).
- Previous studies on VOT of Heritage languages
  - Comparable to the monolingual norm (Knightly et al. 2003, Chang et al. 2011, etc.)
  - Assimilation to the dominant language stops over generations (Hrycyna et al. 2011)

**Goals of the study**
- Examine the VOT of Heritage Tagalog speakers in Toronto
- Effect of stress on VOT under language contact
  - If and how do the two languages of the Heritage speakers differ from each other?
  - If and how do the two languages of the Heritage speakers differ from their monolingual comparisons?

**Methods**
- Speakers
  - Heritage Tagalog speakers (5M, 5F)
  - Monolingual comparisons: English (5M, 5F), Tagalog (5M, 5F)
- Speech materials (English and Tagalog)
  - Bisyllabic words with initial stops \([p \, t \, k \, b \, d \, g]\)
  - Initial stress ("stressed") vs. final stress ("unstressed")
  - 3 repetitions in isolation x 6 stops x 2 stress positions
- Acoustic measurements: VOT, (f0, vowel duration)
- Statistical analyses: mixed effects models
- VOT ~ stress * group + (stress | speaker) + (1 | stop)
- Voiceless stops: VOT as continuous variable
- Voiced stops: VOT as binary variable (prevoicing or not)

**Tagalog**
- "Prevoicing" type
  - Short-lag VOT \([p \, t \, k]\) vs. Lead VOT \([b \, d \, g]\)
  - Stress is signalled by pitch and/or duration (Schachter & Otanes, 1972)
- "Aspirating" type
  - Long-lag VOT \([p \, ^{t} \, k] \, h\) vs. Short-lag or Lead VOT \([b \, d \, g] \sim [b \, d \, g]\)
  - Stress is signalled by pitch, duration, intensity (Ladefoged, 2003)

**Tagalog**
- Stress has no effect on VOT
- English by Heritage speakers:
  - More prevoicing than monolinguals
  - Stress tends to reduce prevoicing (but, n.s.)
- English by Heritage speakers:
  - Almost no prevoicing
  - No discernible effect of stress
- English Monolingual:
  - Long-lag VOT
  - Stress lengthens prevoicing (but, n.s.)
  - Stress tends to increase prevoicing (but, n.s.)

**Prevoiced aspirates ("mixed")**
- A number of prevoiced stop tokens are produced with both prevoicing and aspiration, or the prevoicing tapered off well before the stop release. (cf. Van Alphen and Smits 2004, Caverlé 2014)
- Greater proportion of "mixed" tokens are produced by Heritage Speakers.

**Summary**
- Overall VOT: The two languages of heritage speakers mirror the patterns in the monolingual norms.
- Voiced stops: Heritage speakers produce more prevoiced voiced stops for Tagalog than for English.
- Voiceless stops: Heritage speakers produce English voiceless stops with long-lag VOTs and Tagalog voiced stops with short-lag VOTs.
- Stress effect: The heritage production does not mirror the subtle effect of lexical stress on VOT in the monolingual norms.
- Voiced stops: an "emergent" trend that is not attested in either English or Tagalog norms.
- Voiceless stops: no stress effect, unlike monolinguals
- "Mixed" pre-voicing: Heritage speakers show a greater proportion of voiced stops as a "mixed" token.

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