

# Pitch Variation in Umuahia Igbo: Impacts of preceding velar stops on low tone /à/

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# Umuahia Igbo

- Language Family: Niger-Congo
- Spoken primarily in Abia, Nigeria
- 27,000,000 speakers across all dialects of Igbo

# Tonal Phonology

- Contrastive pitch: register tone, high and low (Ikekeonwu, 1991)
  - /é.ká/ (high)
  - /é.kà/ (low)
  - /é.kà/ (falling?)
- Down stepping (Pulleyblank, 1986; Welmers, 1974)

# Vowel Pitch

- /a/
  - [+ - ATR]
  - Central
- Low mid vowel is proven to have the lowest pitch of vowels in Igbo (Nkamigbo, 2012; Nkamigbo & Eme, 2016)

# Umuahia Igbo Phonology

- Nasal and vocalic syllables
  - /ń.kà/
  - /é.kà/
- Secondary articulatory features
  - Labialization
  - Palatalization
  - Aspiration

# Palatalization and Labialization

- Separate phonemes or secondary articulation?
  - Palatalization associated with right to left tone agreement (Welmers, 1977)
  - /w/ devoices when it's a secondary articulation of /k/, likely preventing lowering of the tone (Welmers, 1977)
  - **If** the labial doesn't devoice, it would likely lower the pitch as in the voiced /g/.

# Question and Hypothesis

## Question?

- What is the effect of voicing/ VOT on pitch?

## Hypothesis:

- $/.k^{w(h)}à/ > /.kà/ > /.gà/$

# Methodology: Stimuli

- UCLA Phonetic Archive (2007)
- Recorded November 30, 1976
- Female Umuahia Igbo speaker
- Isolated tokens

.ka	.k <sup>w</sup> à	.k <sup>wh</sup> à	.gà
[é.kà]	[é.k <sup>w</sup> à]	[é.k <sup>wh</sup> à]	[é.gà]
[ɲ.kà]	[ɲ.k <sup>w</sup> à]	[ɲ.k <sup>wh</sup> à]	[ɲ.gà]

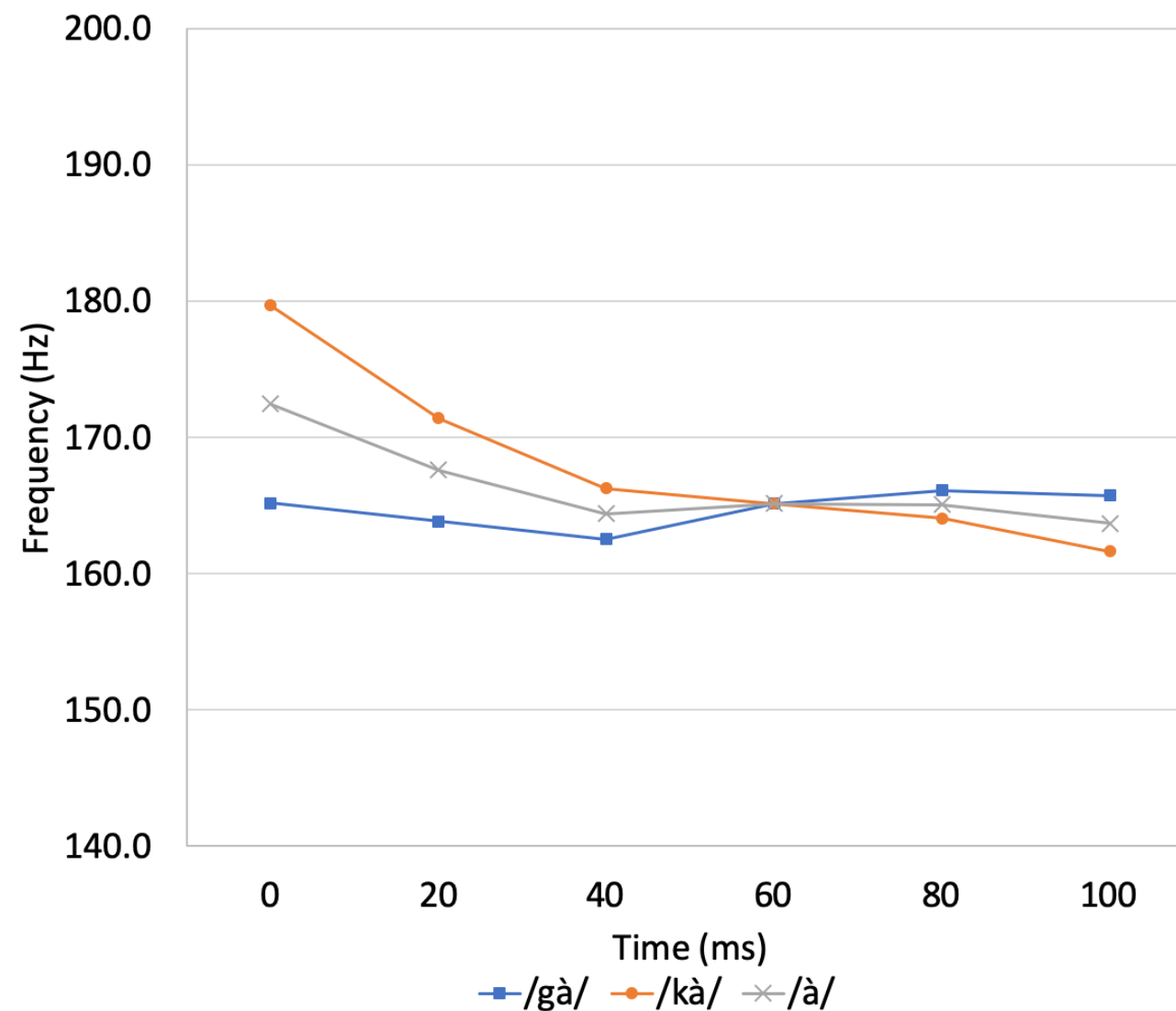


# Methodology: Procedure

- Segment vowel tokens in Praat (Boersma & Weenink, 2019)
- Run script to print pitch values by 20ms intervals

# Results

near identical values for  
average and  $/k^{w(h)}/$



# Observation

Question:

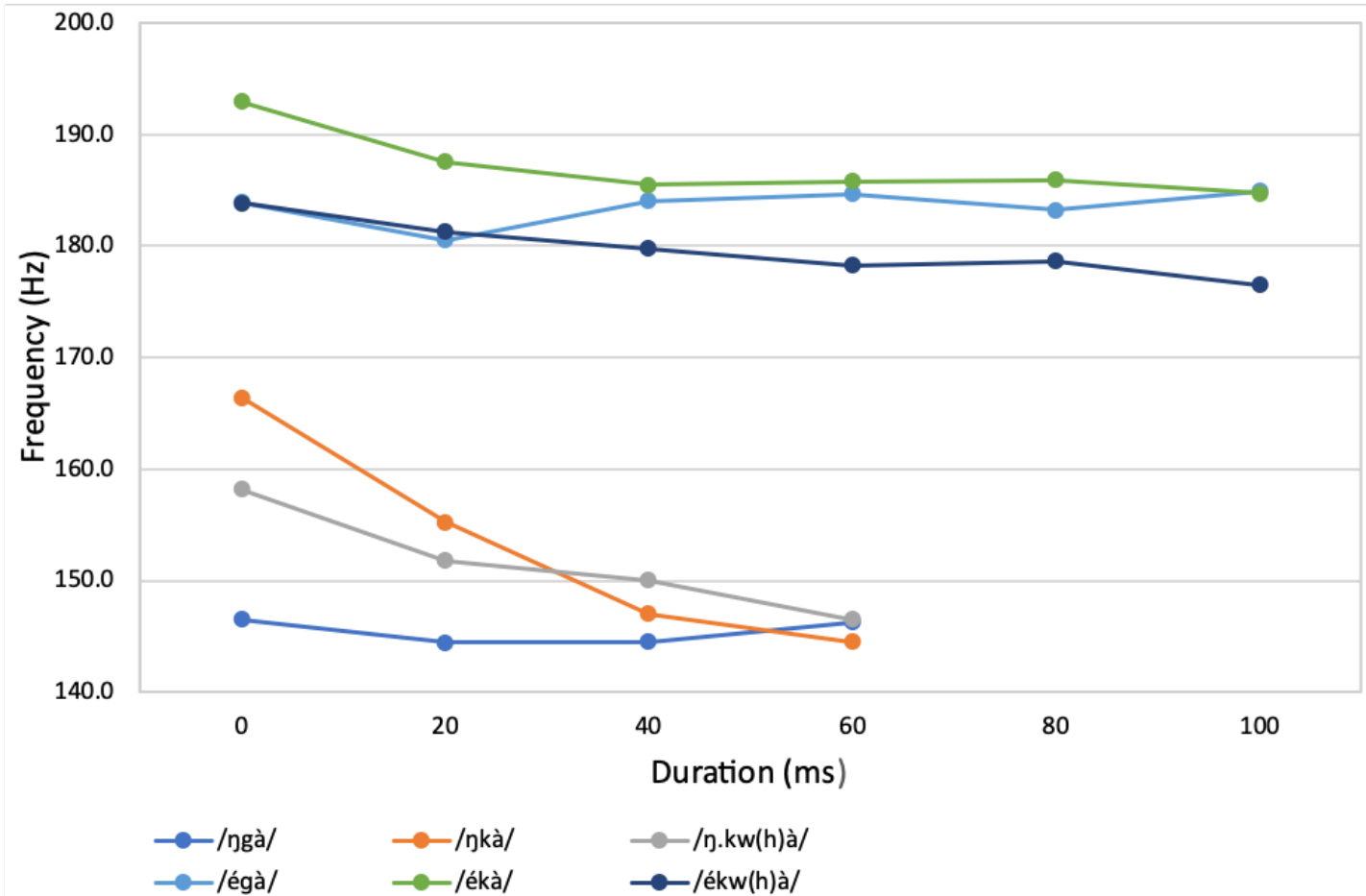
- What is the impact of vowel/nasal prefix?

Observation:

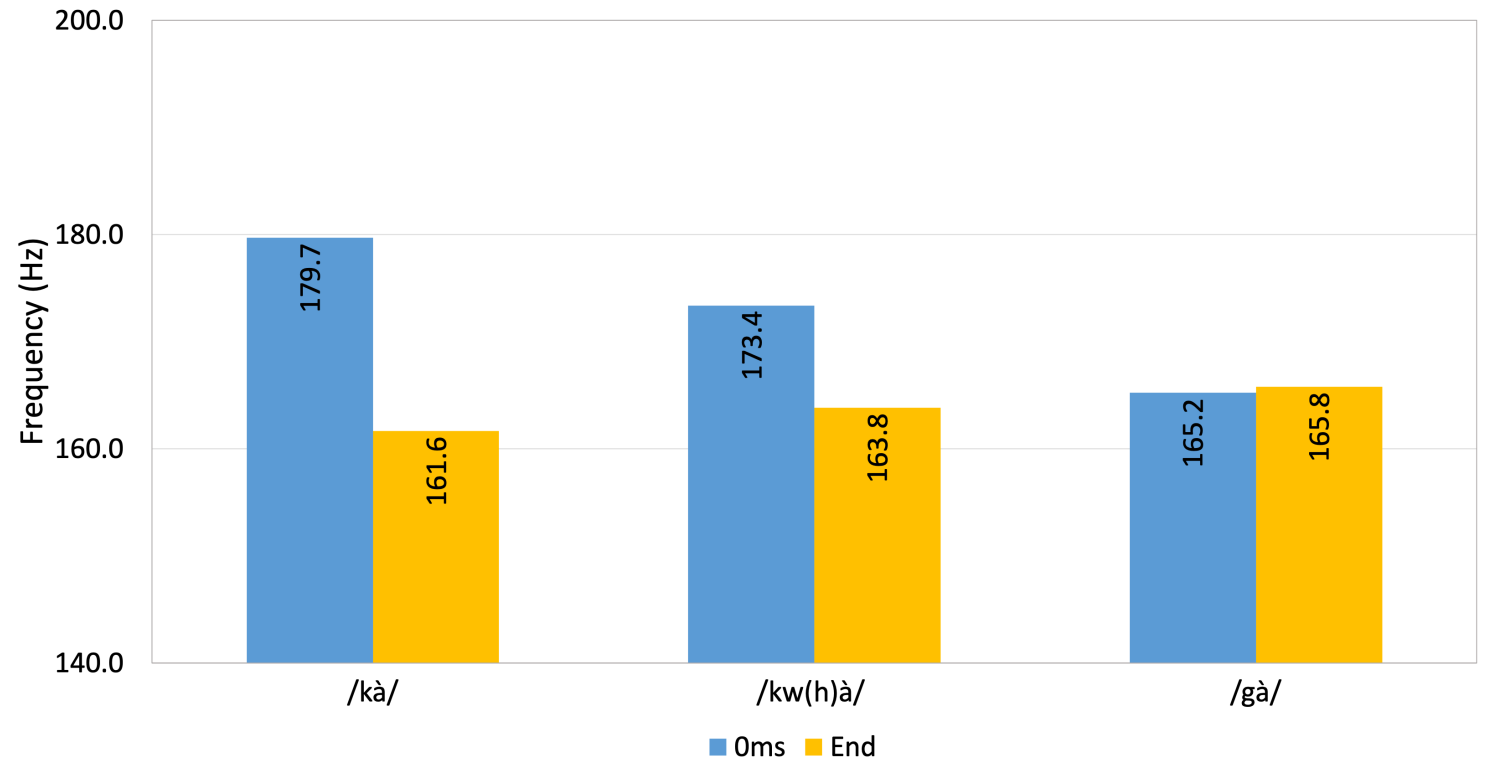
- /é.k/ > /é.k<sup>w(h)</sup>/ > /é.g/ > /ń.k/ > /ń.k<sup>w(h)</sup>/ > /ṇ.g/

# Results:

$/\acute{e}.k/ > / \acute{e}.k^{w(h)}/ > / \acute{e}.g/ >$   
 $/\grave{h}.k/ > / \grave{h}.k^{w(h)}/ > / \grave{h}.g/$



# Results: Pitch Difference from vowel onset to offset



# Discussion

- Noticeable difference in pitch perception following syllabic nasals and V-shaped syllables
- Results challenge previous claims:
  - Overall, pitch decline is imperceptible (Hombert, 1977)
  - Negligible difference in pitch across voicing types
- Tonogenesis: follows previous literature (Kingston, 2011)
  - Thank you to the anonymous reviewer of my abstract!

# Future Research

More tokens

- Conversational speech

Other languages:

- SiSwati
- Ewe

Articulatory phonetic study:

- Laryngoscopy/Ultrasound

# References

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