Non-dorsal vowels

Phonetic and phonological evidence from African languages

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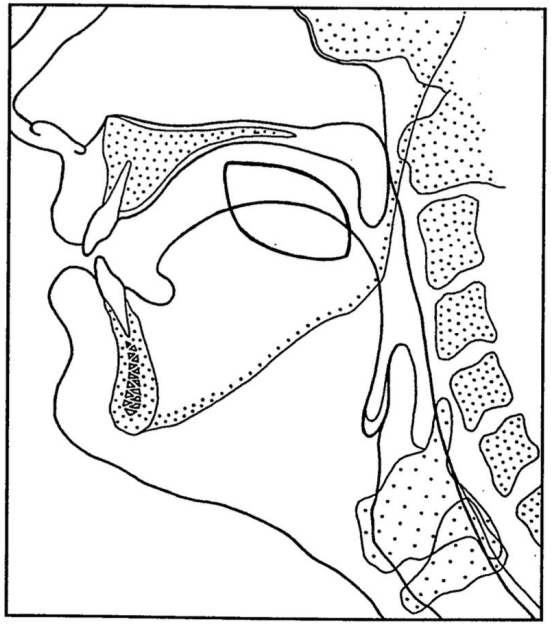
Introduction

Vowels are implicitly dorsal

The space of possible vowels is often defined by, and mapped to, the position of the highest part of the tongue dorsum

- Position of the highest point of the dorsum is viewed as the major determinant of vowel quality Jones 1956, Lindau 1978, Ladefoged & Maddison 1996: 282-292, et seq
- Not without reason: dorsum position does play a major role in setting F1/F2 frequency

Figure 10.3 The tilted oval shape of the vocoid space, within which the highest point of the body of the tongue is placed in the production of vocoids (after Abercrombie 1967: 157)



Laver 1994

But: other possibilities!

Vowels with **non-dorsal articulation** are attested - major constriction target further forward (coronal, labial)

Talk overview:

- Background and distribution; focus on languages of **Cameroon Grassfields**
- Articulatory phonetic data: direct evidence of labial and coronal constrictions
- Phonological characterization: place features obtained from onset C versus inherent place features
- Some phonological processes which non-dorsal vowels participate in (differently from dorsal vowels) - major place interaction

Global distribution

- Nearly every **Chinese** language outside of the Min and Yue families has non-dorsal vowels Zee & Lee 2007
  - n.b. 舌尖元音 and so-called 摩擦化元音 are non-dorsal vowels
- Non-Chinese languages spoken nearby frequently have them as well, possibly as a result of long-running language contact

- Swedish Westerberg 2020
- Bora (NW Amazon) Mielke & Parker 2023
- Ryukyuan languages Shinohara & Shao 2023; Aoi 2024

- And quite a few languages of west/central Africa

Within the “Macro-Sudan Belt”

see Rolle et al. 2020

Phonetic characterization

Fieldwork in Douala

- Diaspora populations from North West region residing in western suburbs
- Variety of Western Grassfields, Eastern Grassfields, and Yemne-Kimbi languages

Basic lexical elicitation is the bulk of the data

Phonetic fieldwork (production studies): **audio**, **video**, and **ultrasound** data

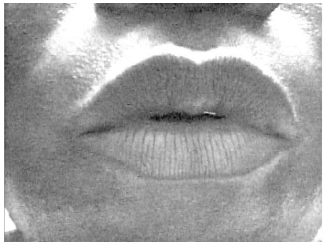
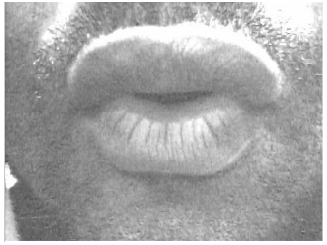
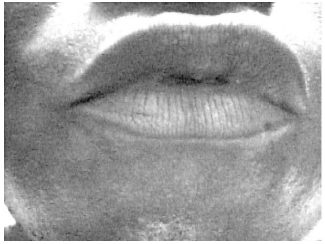
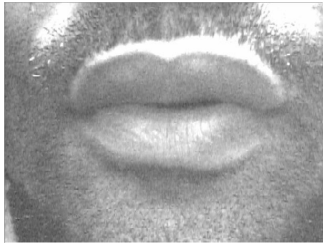
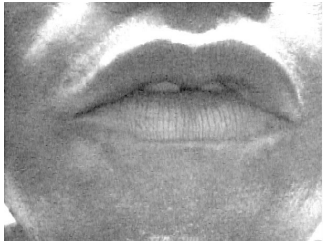
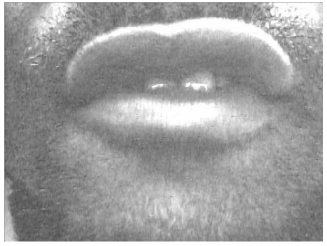
About ultrasound

Heavily used in the production studies

- Highly portable
- Images tongue from blade to root
- Speakers tend to be familiar with sonography and don’t view it with suspicion

When used to image e.g. the coronal vowels, **right** is **anterior** and traces represent the imaged location of the tongue surface

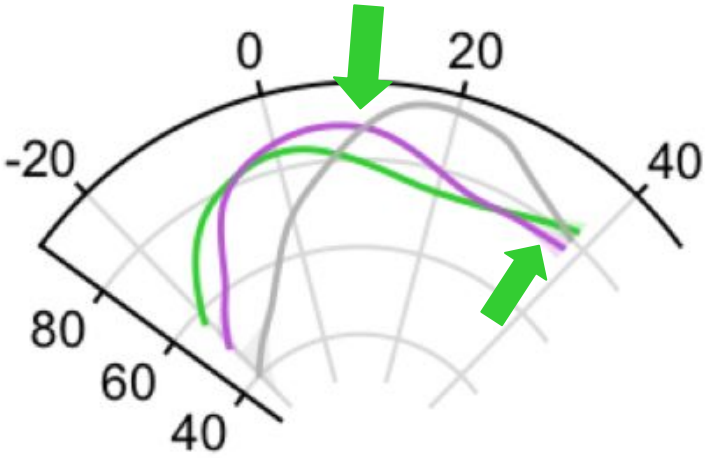
Labial vowels

	Koshin	Babanki	Lus
[u]			
Bilabial [ɨβ]			
Labiodental [ɨᵛ]			

Coronal vowels

Lus

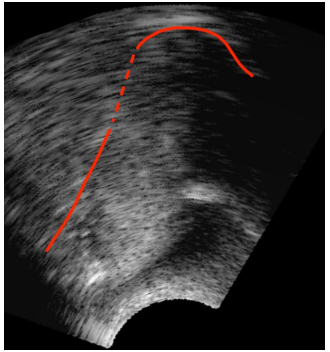
[ɨᶻ] [ɨ]



Kom

[ɨᶻ]

[i]

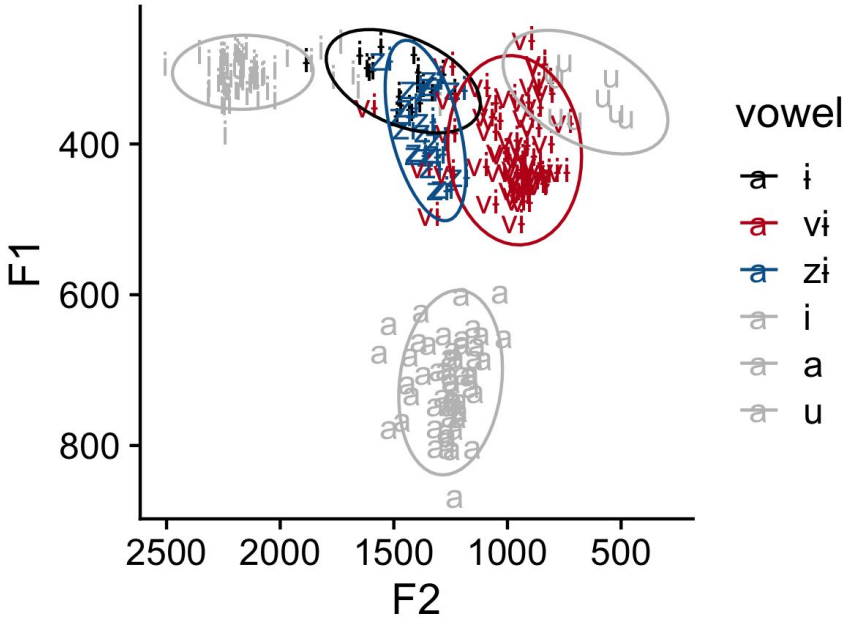


Acoustics - formants and noise

Constriction at locations fronter than [i] *lowers* F2; vowels sound centralized Ling 2007

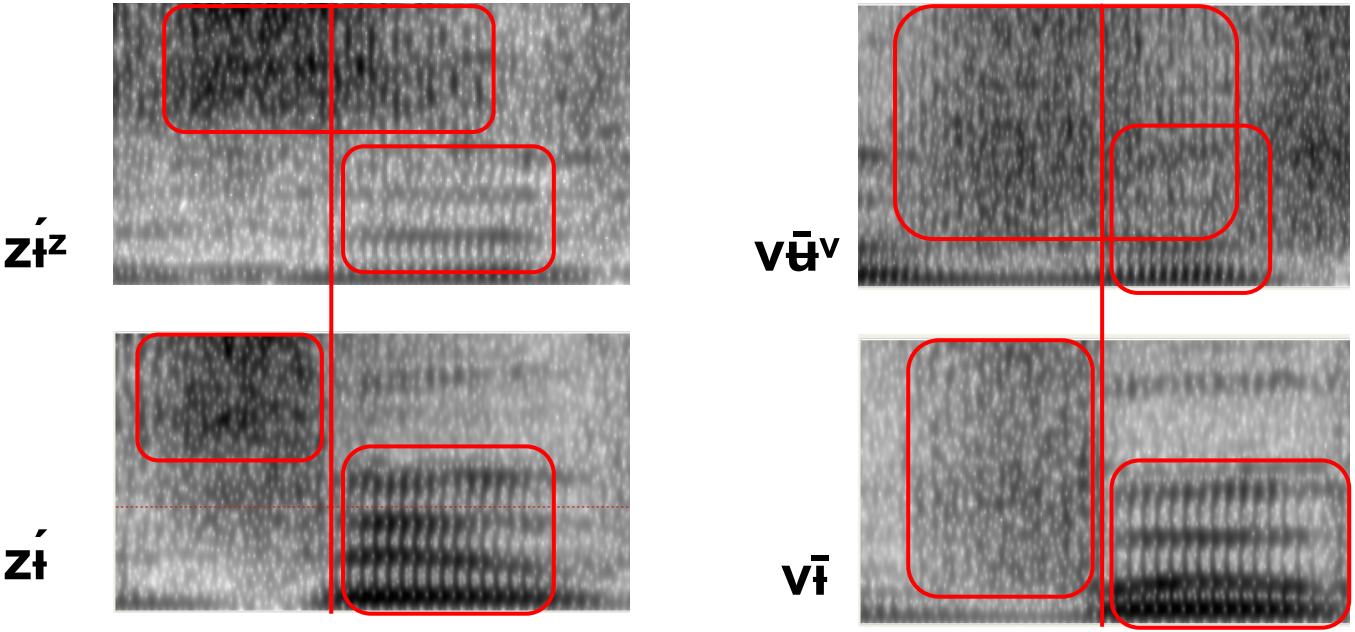
- Results in acoustic overlap with central vowels
- But they remain distinguishable by the **noise** which is frequently present
- Or other contextual cues such as affricated onset consonants, lengthened VOT e.g. Voll 2017, Faytak et al. 2023

Selected **Kom** vowels, 1 male speaker



Some acoustic characteristics

- Some **formant** structure, unlike fricative Cs; weaker than [ɨ]'s formants
- **Frication** is present, but less than in fricative Cs; not present in [ɨ]

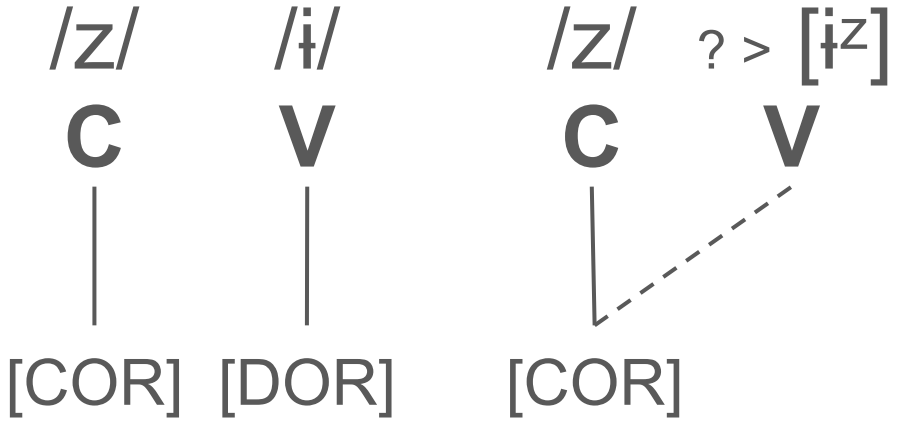


Featural characterization and phonotactics

Frication/place from assimilation

Spread place from C onset, due to underspecification of major place on the vowel itself

- Attested in Lus, Lendu, Babanki, Standard Mandarin, ...
- More or less the usual analysis for Standard Mandarin see Hu 2024
- “Whole-syllable features” in SE Asian languages Michaud 2012



Frication/place intrinsic to vowel

Cannot attribute vowel's characteristics to coarticulation with the onset

Vowels with "intrinsic" place often have **interactions** with onset consonants which do not occur with dorsal vowels

- Koshin /ɨᶻ/ assimilates to labial onsets, adding lip compression: [ɨᶻβ] (!?)
- Also a variable process in Kom, with speakers occasionally merging this [ɨᶻβ] with [ɨᵛ]

Koshin

	Dorsal	Non-dorsal
/i/ - /ɨᶻ/	bí 'kola'	bɨ́ᶻ 'dogs'
/u/ - /ɨᵛ/	b ū 'hunger'	ⁿbɨ́ᵛ 'flute'
/i/ - /ɨᶻ/	kāt ī 'stone'	kātɨ́ᶻ 'foundation'
/u/ - /ɨᵛ/	kātū 'INF-take'	tātɨ́ᵛ 'toilets'

Implications

A quick one: complicates boundary between “**consonants**” and “**vowels**” based on typical definitions see Shao 2020

Implications for C vs. V features

Lots of theoretical debate over how to represent C and V place features, especially when they interact with each other Calabrese 1993; Halle et al. 2000; Flemming 2003, et seq

- The same, “unified”
- Different, and subjected to equivalency relations/transforms/filters
- Major equivalency relation: coronal consonants :: front (dorsal) vowels Calabrese 1993

Non-dorsal vowels throw some wrenches into the works, specifically in how vowels must be specified featurally

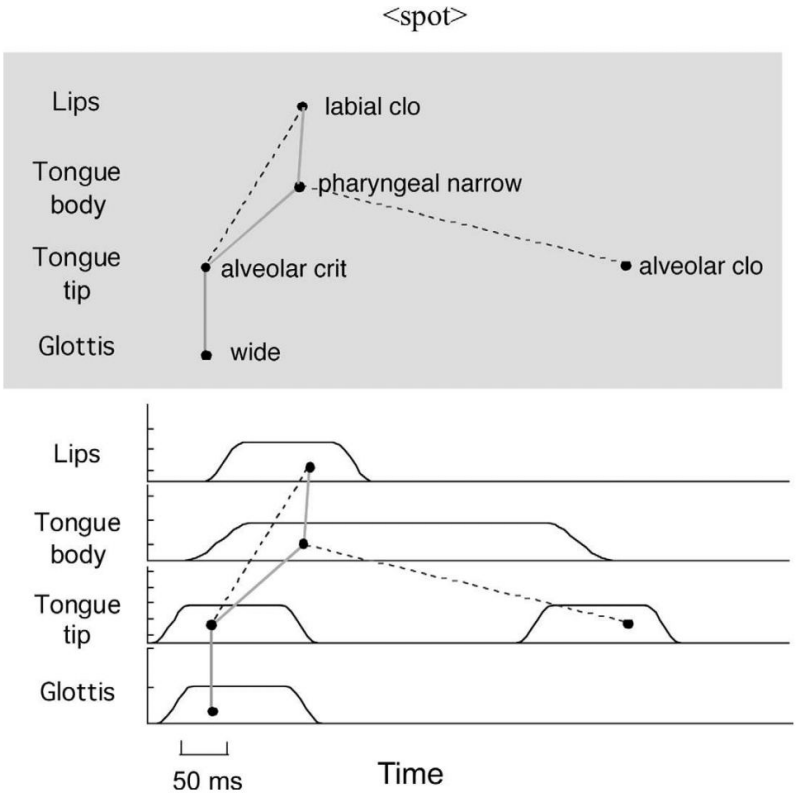
- If vowels can be [CORONAL] in some *literal* sense, it means front vowels cannot be [coronal] but must also be [DORSAL]; suggests vowels have anteriority within [DORSAL]
- It may also not be enough to represent vowels as [+/- round] since labial vowels have different lip activity

Gestural models: content and timing

How are the successive place gestures in something like **kɨ^{v}** or **bɨ^{z}** phased?

- Consonant-vowel coordination e.g. Goldstein et al. 2006
- Consonant clusters or complex segments e.g. Shaw et al. 2021

Permeability to coarticulation, i.e. “coarticulatory resistance” Foley 2023



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Simultaneously produced features

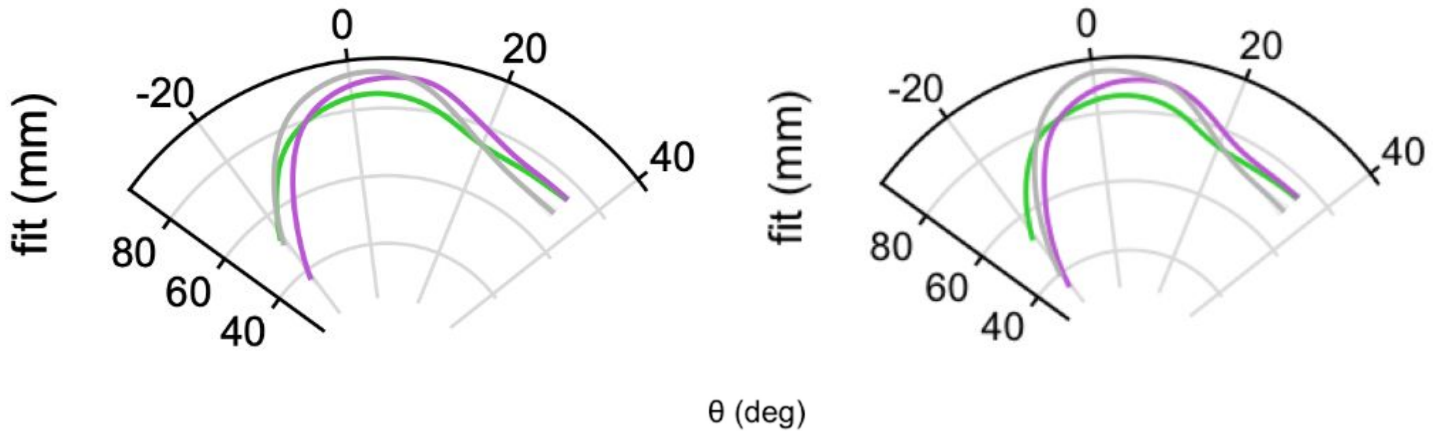
Phonologically, these really do act like vowels: they are perfectly good tone-bearing units (no obvious distributional restrictions)

Often exhibit features commonly observed on other vowels:

- Rounding (more common in Sinitic languages)
- Labial vowels seemingly can be front or back tongue body (some speakers of Kom; some Wu dialects)
- Nasalization, both due to coarticulation (Kom /mɨᶻ/ > [mɨ̃ᶻ]) and underlyingly (Koshin)
- [ATR]/[RTR] participating in ATR/RTR cooccurrence restrictions (Lendu; *rare*)

[ɨᵛ, ɨᵝ] have less tongue raising

Compared to back rounded **[u]** and central unrounded **[ɨ]**



Ultrasound, [z] vs [ɨᶻ]

- Tongue posture of [ɨᶻ] is similar to onset **consonant** [z], but entire tongue is slightly retracted (lowered blade, backed dorsum/root)
- Tip appears to have slightly withdrawn position for 3 of 4 speakers (not GP)