



# POSTERIOR AFFRICATE IN MEE AND CONSONANT-VOWEL PLACE INTERACTIONS

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## Overview

- Primary data on a laterally-released velar stop in Mee, Papuan
- Evidence that this consonant is /g/ phonologically
- Previously undocumented allophonic variation: [g<sup>l</sup>] before front vowels ~ [g<sup>ɸ</sup>] before back vowels, supported in an acoustic study
- Potential historical stage in the development of uniform velar laterals
- Consonant-Vowel place interaction in major place (contra Ní Chiosáin & Padgett 1993)

## Mee basics (iso ekg; a.k.a Ekari, Ekagi)

- Paniai Lakes Papuan language (Doble 1987, a.o.)
- System of tonal contrasts analyzed by Hyman & Kobepa (2013)
- Syllables: (C)V(V) (onsetless – word-initial only)

Consonants:

	Labial	Coronal	Dorsal
Stops	p b	t d	k g
Nasals	m	n	
Glides	w	j	

Vowels and diphthongs:

i i:	u u:
e e: ei eu	o o: ou
a a:	ai au

## The velar/uvular affricate: a rare sound

- Voiced closure + lateral/fricative release. New uvular allophone.
- **Mee allophony:** velar [g<sup>l</sup>] before front vowels, and uvular [g<sup>ɸ</sup>] before back vowels. The latter allophone never reported before.

- (1) g<sup>l</sup>e:g<sup>l</sup>e: 'to dry in the sun'      (2) g<sup>ɸ</sup>a:ti 'ten'  
 jug<sup>l</sup>ei 'to crush'                      dag<sup>ɸ</sup>u 'room'  
 jag<sup>l</sup>i: 'to fall'                            eg<sup>ɸ</sup>ou 'to pull'

- **Vowel reduction:** short /i e/ are over-short and highly lateralized after [g<sup>l</sup>]

- (3) g<sup>l</sup>i:di: 'to take out'; g<sup>l</sup>əmo: 'cool'; dag<sup>l</sup>i 'head'

**Mee velar lateral corresponds to a stop /g/ phonologically**

- Patterns as a stop in the consonant system (Doble 1987)
- Corresponds to a 'proper' stop [g/k] in a related language Moni (Tebay 2018)
- Always has a clearly identifiable closure

**Some cross-linguistic parallels:**

- Pre-stopped velar lateral in Hiw, Oceanic (François 2010)
- In Mid-Waghi it variably lacks the closure phase (Ladefoged et al. 1977)
- In general though, velar laterals are *almost always pre-stopped* in other languages (Blevins 1993; François 2010)
- [g<sup>ɸ</sup>] is a variant of [g], marginal in Xumi (Chirkova & Chen 2013)

## Data and method

Data from two consultants, both men between 25 and 35 years old

- S1: elicitation data and a controlled set of /g/ recordings
- S2: only elicitation data

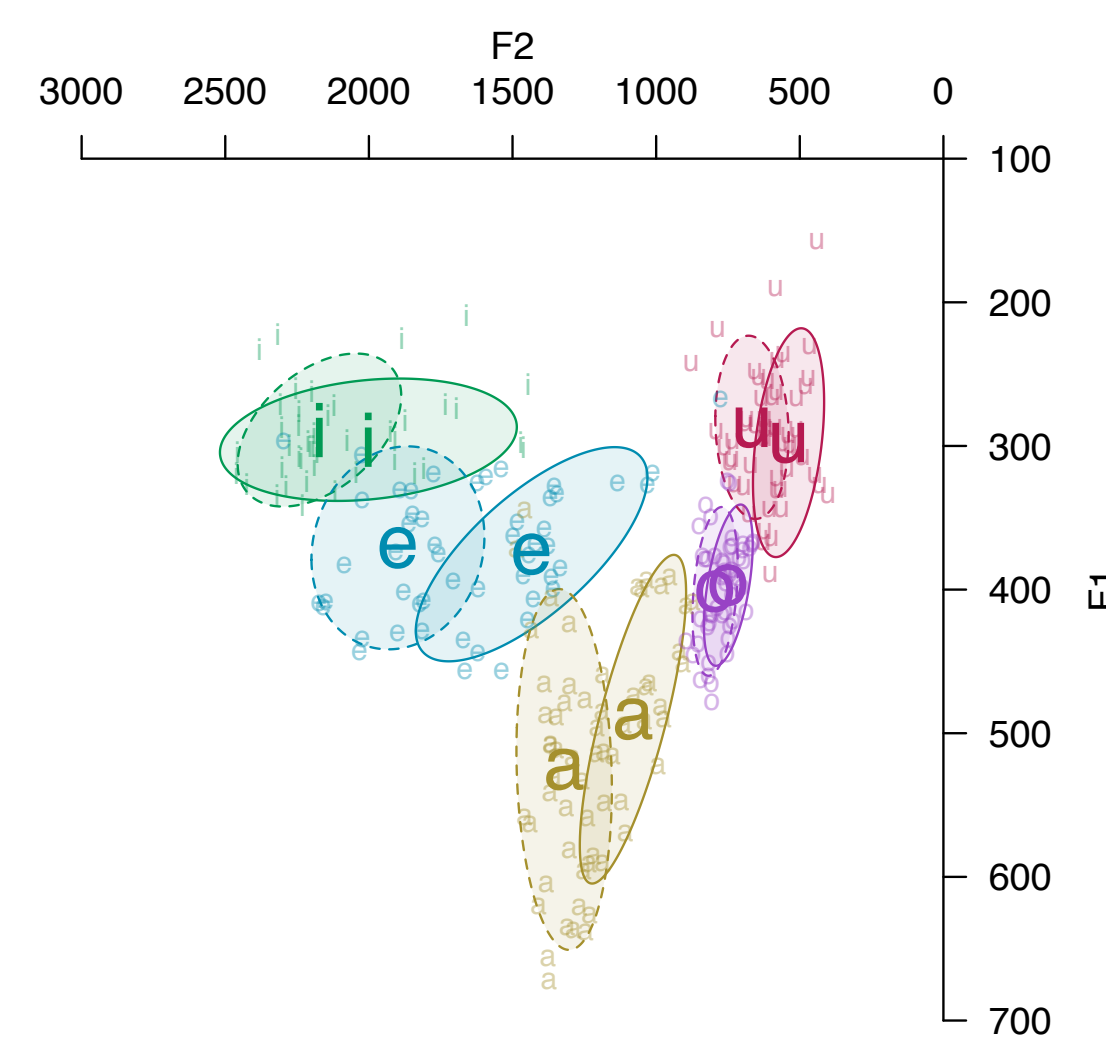
Although we will focus on the results from S1, the elicitations with S2 suggest the same pattern.

**Controlled recordings:**

- Bisyllabic or longer words, tone is not controlled for
- 158 tokens (52 words) for g\_V[-bk] and 154 tokens (45 words) for g\_V[+bk]
- All vowel contexts represented, except for i\_u
- Randomly interspersed with fillers with 1-to-1 ratio. Carrier phrase.

## Formant transitions in V<sub>1</sub>gV<sub>2</sub>

F1 and F2 transitions (at 9/10 of V<sub>1</sub> duration) into [g<sup>l</sup>] (dotted) and [g<sup>ɸ</sup>] (solid). Ellipses show ±1 s. d.



- V<sub>1</sub> transitions had a higher F2 before [g<sup>l</sup>] than before [g<sup>ɸ</sup>], compatible with our description ( $\beta = 220; SE = 60; p < 0.001$ ). LME regression with V<sub>1</sub> quality and V<sub>2</sub> frontness as fixed effects; item and repetition number as random effects

- Significant interaction: V<sub>2</sub>-frontness with V<sub>1</sub> being /e/ ( $\beta = 246; SE = 87; p < 0.01$ ), and marginal V<sub>2</sub>-frontness with V<sub>1</sub> being /o/ ( $\beta = -175; SE = 90; p = 0.055$ ). See the Figure.

- We don't yet have a full explanation for the special behavior of /e/ and /o/

## Release quality

- We could separate the release from V<sub>2</sub> in about a third of the tokens: aperiodic signal or attenuated energy in higher frequencies
- Perceptually very distinct release for [g<sup>l</sup>] vs. [g<sup>ɸ</sup>]

- Release periodicity annotated
- Release tends to be periodic for [g<sup>l</sup>] but aperiodic for [g<sup>ɸ</sup>]
- Confound: V<sub>2</sub> qualities are different for [g<sup>l</sup>] vs. [g<sup>ɸ</sup>], hence no direct acoustic comparison is possible

Release periodicity:

	[g <sup>l</sup> ]	[g <sup>ɸ</sup> ]	Total
Aperiodic	6	23	29
Periodic	35	39	74
Total	41	62	103

## Discussion

Our acoustic results are compatible with a categorical [g<sup>l</sup>] ~ [g<sup>ɸ</sup>] allophony pattern, based on V<sub>2</sub> frontness

- Release quality is different for two /g/ allophones
- V<sub>1</sub> transitions are different, suggesting a distinction in constriction location

## C-V coarticulation: potential history for [g<sup>l</sup>] ?

**Velar laterals from stops:** Tebay (2018): \*g > g<sup>l</sup> for Paniai Lakes

- Hypothetical two-step development, for Paniai Lakes languages:  
 C-V coarticulation > Categorical allophony > Leveling to [g<sup>l</sup>]  
 \*g + V (Moni)                      [g<sup>l</sup>~g<sup>ɸ</sup>](Mee)                      [g<sup>l</sup>] (Wodani)

**Velar laterals from rhotics:** François (2010): \*r > <sup>6</sup>L in Hiw (Oceanic)

- François suggests \*r > r as a first step in this development
- C-V coarticulation could contribute to reinterpreting \*r as [g<sup>ɸ</sup>] and to the development of an allophonic pattern, akin to that in Mee
- This hypothesis relies on phonetic similarity and phonological affinity between uvular fricatives and rhotics
- Later leveling towards just the velar variant (as above, for Paniai Lakes)

**Summary:** Mee could represent a stage in the emergence of velar laterals.

- If reinterpretation of C-V transitions is a common source of velar laterals, this might explain why these sounds are almost always pre-stopped
- This hypothesis remains to be further investigated

## Implications: CV interactions

CV coarticulation in Mee extends to both the closure and the release, thus targeting major place of the dorsal/uvular affricate.

- This goes against the claim that C-V place interactions only affect secondary place (Ní Chiosáin & Padgett 1993)

**Assumptions:**

- Complex segments like /g/ in Mee have two distinct phases
- Uvular laterals do not exist, hence the release changes to fricated, rather than lateral

**Summary of the account:**

- CV-coarticulation constraints account for a place difference in the release



- Additional pressure: closure and release must have the same place.

- Overall effect: major place of the whole consonant affected