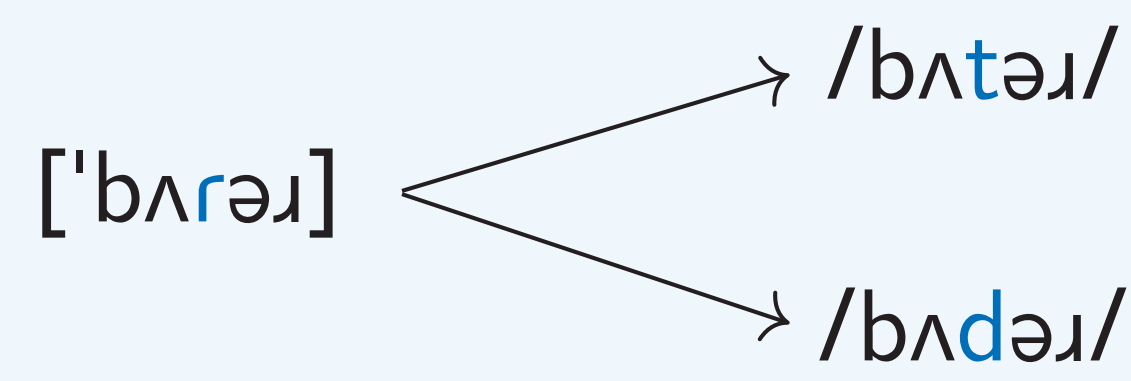


Hiatus avoidance and the development of Maori passive allomorphy

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1 Overview

How do learners deal with surface ambiguity?



- Possible factors:
 - frequency-matching (Ernestus and Baayen, 2003; Albright, 2002)
 - Other biases (Moreton, 2008)
- Paradigm reanalysis** as window into phonological learning (Kiparsky, 1965)
- Case study:** Maori passive allomorphy
- Results:** effects of **markedness bias**
 - Avoidance of diphthongs and hiatus

2 Background: Maori

- Passive allomorphs: -a, -ia, -ina, -na, -Cia
- C=variable consonant

Cia	stem	suffixed
a	fao	fao-a (V-initial)
ia	pa:	pa:ia (V-initial, after [a])
ina	uta	uta-ina
na	aŋi	aŋi-na
mia	inu	inu-mia
tia	ai	ai-tia ('Default' option)
ria	mataku	mataku-ria
kia	rere	rere-kia
ŋia	ku:	ku:-ŋia
hia	motu	motu-hia

- Origin: final C deletion & regular vowel alternations (Pawley, 2001; Evans, 2001).

V-final	a-final
*paRo/paRo-ia	*paRa/paRa-ia
-	(C-del)
fao/fao-a	(i>∅/_a)
fao/fao-a	pa:/pa:ia

△Allomorphy of /a, ia/ in historically V-final stems.

C-final
*bikit/bikit-ia
piki/pikitia (C-del)
- (i>∅/_a)
piki/piki-tia

△/Cia/ in historically C-final stems.

3 Reanalysis in passive allomorphs

Method: Compare historical and modern Maori

- Historical: Proto-Oceanic (POc) protoforms from Austronesian Comparative Dictionary (ACD; Blust et al., 2023)
- Modern: Williams 7th ed. dictionary (Williams, 1971)
- Example reanalysis: POc *bulut → Maori *puru-a* (cf. *pulu-tia)

Predicted vs. observed reanalyses:

- Frequency-matching models predict reanalysis towards /a/ and /ia/.
- However, /ia/ is much less frequent than expected, suggesting /ia/→/tia, Cia/

Fig: Passive allomorphs in POc vs. Maori, by stem-final V (POc preference for /a, ia/ vs. Maori preference for /a, tia/)

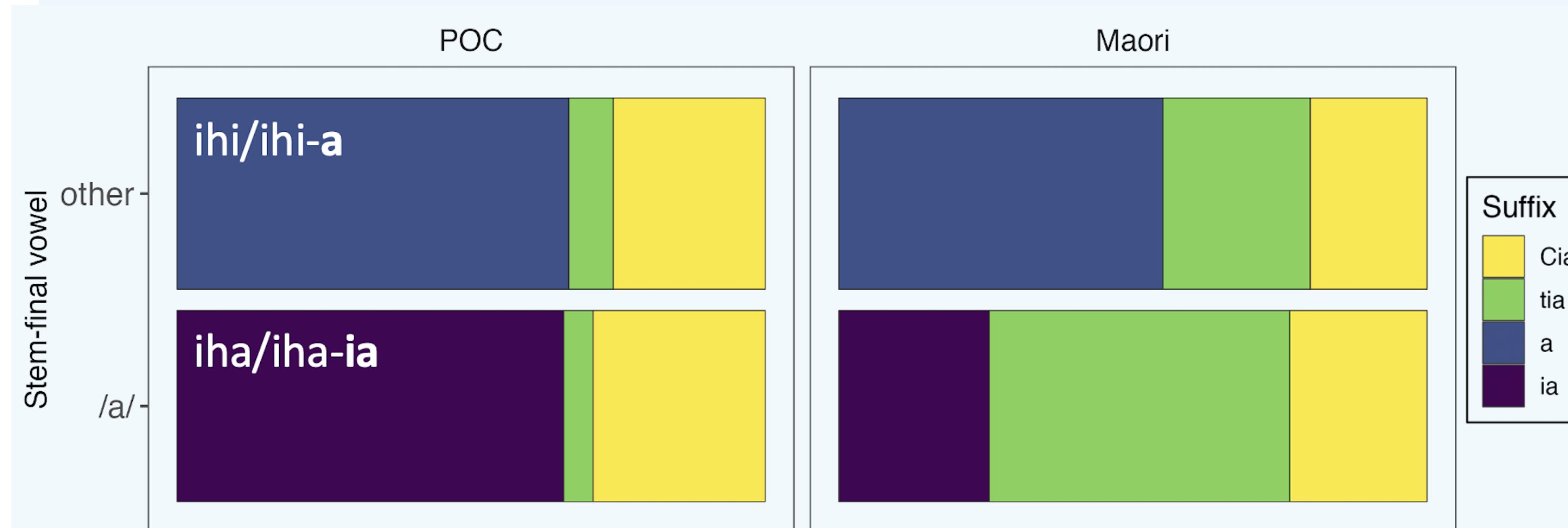


Table: Mismatches between POc and Maori, by historical stem-final V.

FINAL V	MATCH	N	P
not [a]	yes	53	0.71
	no	22	0.29
[a]	yes	11	0.37
	no	19	0.63

Reanalysis is mostly from ia→tia, NOT predicted by distributions

6 Modeling reanalysis with a markedness bias

Result: Reanalysis in Maori explained by successive generations of learning, modulated by *Hiatus and *LongNuc

Model components:

- MaxEnt Harmonic Grammar** (Goldwater and Johnson, 2003) to capture gradient alternations.
- Bias** implemented as a Gaussian prior (Wilson, 2006; White, 2013).
- Iterative:** Predictions of one iteration is input to next iteration.

Model constraints:

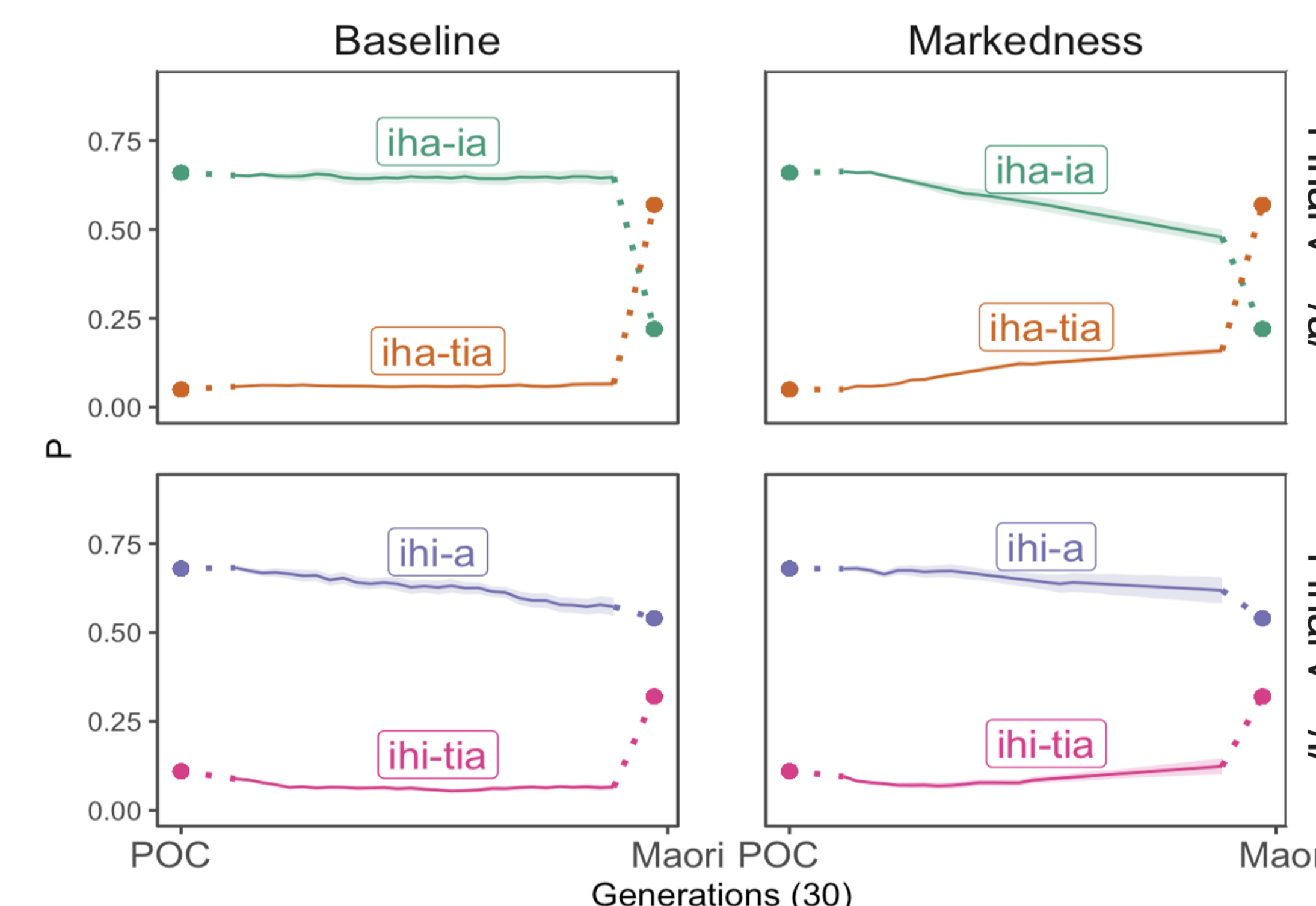
- Morpheme exponence constraints (Kager, 1996): demand a particular exponent for a particular morphological category, e.g. 'PASS=/tia/'
- Markedness: *LongNuc and *Hiatus

Model evaluation:

- Compare models with markedness bias against controls with no bias.

Bias terms: ($\mu \approx$ preferred weight)

- Flat prior (control):** uniform μ
- Markedness:** $\mu(*\text{LongNuc}, *Hiatus) > \mu(\text{Faith})$



△ **Figure:** Markedness-biased model predicts decrease in words that take /-ia/. (Predicted change in allomorphs taken by [a] and [i]-final stems (30 iterations))

4 Markedness + frequency

Markedness bias against heavy nuclei and vowel hiatus explains reanalysis away from /-ia/.

- Constraints: *LONGNUCLEUS, *HIATUS
- Typological & articulatory basis (e.g. Blevins, 1995; Flemming, 2004)

UR	SR	
/aka-ia/	[akai.a]	(*HIATUS & *VV)
/aka-ina/	[akai.na]	(*VV)
/aka-tia/	[aka.ti.a]	(*HIATUS)
/aka-ŋia/	[aka.ŋi.a]	(*HIATUS)

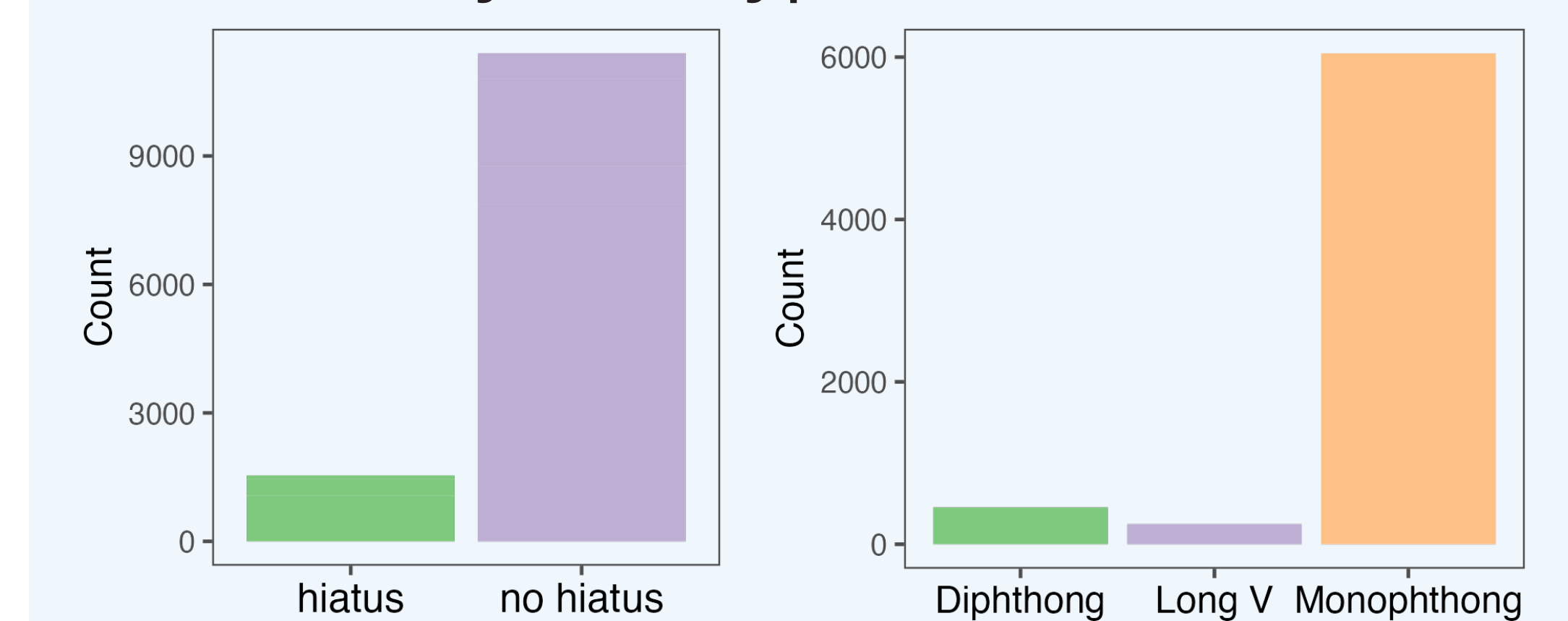
Frequency: Why change towards /tia/?
-Most frequent C-initial allomorph

5 Sources of markedness

Q: Which markedness effects can influence reanalysis?

Proposal: present in stem phonotactics

Figs: Hiatus and VV nuclei are infrequent (Counts of syllable types in Maori stems)



- Data:** 7430 headwords (Williams 6th ed. dictionary)
- Analogous results found using protoform corpus (Greenhill and Clark, 2011)

Takeaway

Markedness effects are found in reanalysis, and may be constrained by stem phonotactics

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