

# A Q-THEORETIC SOLUTION TO A'INGAE POSTLABIAL RAISING

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## Overview

### TYPOLOGICALLY UNUSUAL POSTLABIAL RAISING IN A'INGAE (OR COFÁN, ISO 639-3: con)

- (1) a. /ai/ → [ii] / B \_ b. /ae/ → [oe] / B \_ c. /a/ → [a] / B \_  
/ koehefa -ite / / sefa -ẽ / / sefa /  
[ koehefiite ] [ sefõẽ ] [ sefa ]  
summer -PRD end -CAUS end

where **B** stands for *m*, *<sup>mb</sup>*, *p*, *p<sup>h</sup>*, *f*, *v*

- Theoretically interesting for two reasons:
  - no obvious phonetic or cognitive motivation,
  - ffects different diphthongs differently (1a-b) and it does not affect monophthongs (1c)
- Accounting for the difference between (1a) and (1b):
  - a weighting of feature IDENTITY constraints such that [ii] and [oe] are the optimal candidates given input /ai/ and /ae/, respectively
- Accounting the underapplication of postlabial raising to /a/:
  - Q-Theoretic (Garvin, Lapierre, and Inkelas, 2018; Garvin, Lapierre, Schwarz, et al., 2020; Inkelas et al., 2016, 2017) representation of vowels:
    - \* the monophthongal *a* consists of three subsegments (*a*<sup>1</sup>, *a*<sup>2</sup>, *a*<sup>3</sup>)
    - \* the *a*-component of a diphthong – only of two (*a*<sup>1</sup>, *a*<sup>2</sup>, *i*<sup>3</sup>, *i*<sup>4</sup>)

### ONE VOCALIC TARGET OF A DIPHTHONG CORRESPONDS TO FEWER SUBSEGMENTS THAN A MONOPHTHONG

- Assuming each subsegment is subject to IDENTITY, this predicts:
  - diphthongs might show TETU effects (McCarthy et al., 1994)
  - while monophthongs surface faithfully

### PREDICTION BORNE OUT BY A'INGAE POSTLABIAL RAISING, CONTRIBUTING A NOVEL ARGUMENT FOR Q-THEORY

## Licit diphthongs and /ea, ia/ → [ia], /ae/ → [ai]

A'ingae has the five vowels: *i*, *i*, *e*, *a*, *o* and seven licit diphthongs (2).

- (2) LICIT DIPHTHONGS: *ai*, *ia*, *oe*, *oa*, *oi*, *ii*, *ao*

All of the A'ingae diphthongs have *i* or *o* as their non-syllabic component. All the vowels have nasal counterparts.

The sequences \*[ea], \*[ae], \*[ia], and \*[ai] are not licit diphthongs. Underlying /ea/, /ae/, and /ia/ surface as licit diphthongs (3).

- (3) a. /ea/ → [ia] b. /ia/ → [ia] c. /ae/ → [ai]  
/ koʔfe -ã / / indzi -a / / pa<sup>n</sup>dza -ẽ /  
[ koʔfiã ] [ indzia ] [ pa<sup>n</sup>dzãĩ ]  
play -CAUS green -ADN hunt -CAUS

## Postlabial raising

After a non-labial consonant, any diphthong is allowed, including the *a*-initial *ai* (4a-b) and *ao* (4c-d) as well as other diphthongs (4e-f).

- (4) a. dʒai b. sai c. tsaoʔpa d. taoʔpa e. koeʔhe f. tiĩ  
sit pull out nest fluff sun splash

However, aV diphthongs may not appear after a B. Sequences \*BaV do not appear in roots. In derived environments, they undergo:

POSTLABIAL RAISING: /ai/ → [ii] / B \_ (/ai/ → [ai] / elsw)

- (5) a. / koehefa -ite / b. / waita / (Kichwa) c. / bailar / (Spanish)  
[ koehefiite ] [ (rosa)viita ] [ biira ]  
summer -PRD calendula dance  
(6) a. / na -ite / b. / airo / (Secoya)  
[ naite ] [ airo ]  
fruit -PRD mountain

POSTLABIAL RAISING: /ae/ → [oe] / B \_ (/ae/ → [ai] / elsw)

- (7) a. / sefa -ẽ / b. / atapa -ẽ / c. / sema -ẽ / d. / pa<sup>n</sup>dza -ẽ /  
[ sefõẽ ] [ atapõẽ ] [ semõẽ ] [ pa<sup>n</sup>dzãĩ ]  
end -CAUS breed -CAUS work -CAUS hunt -CAUS

NO POSTLABIAL RAISING: /a/ → [a] / B \_

- (8) a. / sefa / b. / atapa / c. / sema /  
[ sefa ] [ atapa ] [ sema ]  
end breed work

## Analysis of /ea, ia/ → [ia], /ae/ → [ai]

I analyze the diphthongal processes as aimed at averting marked structures. I assume the featural specifications of (11).

- (9) LICIT, or: LIC Assign a violation mark for a sequence of two vowels which do not form a licit diphthong in the language.  
(10) IDENTITY(FEATURE), or: IDF Assign a violation mark each time F(EATURE) has a different value in the input than in the output.

(11)	i	i	e	a	o
H(IGH)	+	+	–	–	+
B(ACK)	–	+	–	+	+
R(OUND)	–	–	–	–	+

(12)	ea	Lic	IdH	IdR	IdB	H
i. ea	1	17.7	14.5	9.7	6.9	17.7
ii. ia			1			14.5
iii. oa		1	1	1		31.1
iv. ii			2	2		33.2

(13)	ia	Lic	IdH	IdR	IdB	H
i. ia	1	17.7	14.5	9.7	6.9	17.7
ii. ia				1		6.9
iii. oa				1		9.7
iv. ii		1		1		21.4

(14)	ae	Lic	IdH	IdR	IdB	H
i. ae	1	17.7	14.5	9.7	6.9	17.7
ii. ai			1			14.5
iii. ao		1	1	1		31.1
iv. oe		1	1			24.2

## Analysis of postlabial raising

I propose that postlabial raising reveals a dispreference for sequences of a labial consonant followed by a low vowel (15).

- (15) \*C[+LABIAL]V[–HIGH], or: \*BA Assign a violation mark for each low vowel after a labial consonant.

**PROBLEM 1:** postlabial raising does not affect monophthongs: /Ba/ → [Ba]. Unless something more is said about the difference between monophthongs and diphthongs, \*BA targets the two equally. If \*BA has a weight high enough to correctly predict diphthongal outputs (16), it will incorrectly predict the raising of monophthongs after labials (17), and vice versa (18).

(16)	Bai	Lic	*BA	IdH	H
		17.7	15	14.5	
i. Bai		1			15
ii. Biĩ				1	14.5

(17)	Ba	Lic	*BA	IdH	H
		17.7	15	14.5	
i. Ba		1			15
ii. Bi				1	14.5

(18)	Bai	Lic	*BA	IdH	H
		17.7	12.1	14.5	
i. Bai		1			12.1
ii. Biĩ				1	14.5

**PROBLEM 2:** different diphthongs undergo different processes: /Bai/ → [Biĩ] but /Bae/ → [Boe].

**SOLUTION TO PROBLEM 1:** capturing postlabial raising seen in diphthongs as well as its underapplication to monophthongs with subsegments of Q-Theory (Inkelas et al., 2016):

- each segment (Q) consists of subsegments, commonly closure (q<sup>1</sup>), hold (q<sup>2</sup>), and release (q<sup>3</sup>)
- segments (Q) with one articulatory target have identical cues (q), e. g. *a* = (*a*<sup>1</sup>, *a*<sup>2</sup>, *a*<sup>3</sup>)
- internally complex segments (Q) have different cues (q), e. g. *ts* = (*t*<sup>1</sup>, *s*<sup>2</sup>, *s*<sup>3</sup>), *<sup>b</sup>m* = (*b*<sup>1</sup>, *m*<sup>2</sup>, *b*<sup>3</sup>)
- I model A'ingae diphthongs with four q's. The first two q's correspond the the first target of the diphthong; the other two q's – to the second one, e. g. *ai* = (*a*<sup>1</sup>, *a*<sup>2</sup>, *i*<sup>3</sup>, *i*<sup>4</sup>), *oe* = (*o*<sup>1</sup>, *o*<sup>2</sup>, *e*<sup>3</sup>, *e*<sup>4</sup>):
- I assume that changing the feature of a q incurs only 0.3̄ of an IDENTITY violation:

- predicts that a monophthong may surface faithfully, while the same vowel in a diphthong exhibits a TETU effect; PREDICTION BORNE OUT BY THE A'INGAE POSTLABIAL RAISING

(19)	Ba = B(a, a, a)	Lic	*BA	IdH	IdR	IdB	H
		17.7	12.1	14.5	9.7	6.9	
i. Ba = B(a, a, a)		1					12.1
ii. Bo = B(o, o, o)				1	1		24.2
iii. Bi = B(i, i, i)				1			14.5

**SOLUTION TO PROBLEM 2:** /ai/ surfaces as [ii], but /ae/ surfaces as [oe].

- different outcomes are due to phonological optimization given licit diphthong inventory
- modeled with relative weights of the feature IDENT constraints

(20)	Bai = B(a, a, i, i)	Lic	*BA	IdH	IdR	IdB	H
		17.7	12.1	14.5	9.7	6.9	
i. Bae = B(a, a, e, e)	1	1	0.6̄				39.5
ii. Boe = B(o, o, e, e)			1.3̄	0.6̄			25.8
iii. Bie = B(i, i, e, e)	1		1.3̄				37.0
iv. Bai = B(a, a, i, i)		1					12.1
v. Biĩ = B(i, i, i, i)			0.6̄				9.7

(21)	Bae = B(a, a, e, e)	Lic	*BA	IdH	IdR	IdB	H
		17.7	12.1	14.5	9.7	6.9	
i. Bae = B(a, a, e, e)	1	1					29.8
ii. Boe = B(o, o, e, e)			0.6̄	0.6̄			16.1
iii. Bie = B(i, i, e, e)	1		0.6̄				27.4
iv. Bai = B(a, a, i, i)		1	0.6̄				21.8
v. Biĩ = B(i, i, i, i)			1.3̄				19.3

Q-THEORY'S SUBSEGMENTAL REPRESENTATIONS CAPTURE A'INGAE POSTLABIAL RAISING