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*/ → [*ɨi*] / B _ b. /*ae*/ → [*oe*] / B _ c. /*a*/ → [*a*] / B _

/ *koehefa -ite* /	/ *sefa -ẽ* /	/ *sefa* /
[*koehefɨite*]	[*sefõẽ*]	[*sefa*]
summer -PRD	end -CAUS	end

where B stands for *m*, ^{m}b, *p*, p^{h}, *f*, *v*

- Theoretically interesting for two reasons:
  - no obvious phonetic or cognitive motivation,
  - affects 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 [*ɨi*] 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^1, a^2, a^3)
    - the *a*-component of a diphthong – only of two (a^1, a^2, i^3, i^4)

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, ɨa/ → [ia], /ae/ → [ai]

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

(2) LICIT DIPHTHONGS: *ai*, *ia*, *oe*, *oa*, *oi*, *ɨi*, *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*], *[*ɨa*], and *[*aɨ*] are not licit diphthongs. Underlying /*ea*/, /*ae*/, and /*ɨa*/ surface as licit diphthongs (3).

(3) a. /*ea*/ → [*ia*] / *koʔfe -ã* / [*koʔfĩã*] play -CAUS
b. /*ɨa*/ → [*ia*] / *indzɨ -a* / [*indzia*] green -ADN
c. /*ae*/ → [*ai*] / *pa^{n}dza -ẽ* / [*pa^{n}dzãĩ*] 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. *ʤai* sit b. *sai* pull out c. *tsaoʔpa* nest d. *taoʔpa* fluff e. *koeʔhe* sun f. *tɨi* splash

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

POSTLABIAL RAISING: /*ai*/ → [*ɨi*] / B _ (/*ai*/ → [*ai*] / elsw)

(5) a. / *koehefa -ite* / [*koehefɨite*] summer -PRD b. / *waita* / (Kichwa) [(*rosa*)*vɨita*] calendula c. / *bailar* / (Spanish) [*bɨira*] dance

(6) a. / *na -ite* / [*naite*] fruit -PRD b. / *airo* / (Secoya) [*airo*] mountain

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

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

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

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

Analysis of /ea, ɨa/ → [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	*ɨ*	*e*	*a*	*o*
H(IGH)	+	+	−	−	+
B(ACK)	−	+	−	+	+
R(OUND)	−	−	−	−	+

(12) */ea/*

	LIC 17.7	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
i. *ea*	1				17.7
☞ ii. *ia*		1			14.5
iii. *oa*		1	1	1	31.1
iv. *ii*			2	2	33.2

(13) */ɨa/*

	LIC 17.7	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
i. *ɨa*	1				17.7
☞ ii. *ia*				1	6.9
iii. *oa*			1		9.7
iv. *ii*		1		1	21.4

(14) */ae/*

	LIC 17.7	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
i. *ae*	1				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: /B*a*/ → [B*a*]. 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) B*ai*

	LIC 17.7	*BA 15	IDH 14.5	$\mathcal{H}$
i. B*ai*		1		15
☞ ii. B*ɨi*			1	14.5

(17) B*a*

	LIC 17.7	*BA 15	IDH 14.5	$\mathcal{H}$
☹ i. B*a*		1		15
💣 ii. B*ɨ*			1	14.5

(18) B*ai*

	LIC 17.7	*BA 12.1	IDH 14.5	$\mathcal{H}$
💣 i. B*ai*		1		12.1
☹ ii. B*ɨi*			1	14.5

PROBLEM 2: different diphthongs undergo different processes: /B*ai*/ → [B*ɨi*] but /B*ae*/ → [B*oe*].

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^1), hold (q^2), and release (q^3)
- segments (Q) with one articulatory target have identical cues (q), e. g. *a* = (a^1, a^2, a^3)
- internally complex segments (Q) have different cues (q), e. g. *ts* = (t^1, s^2, s^3), $^{b}m^{b}$ = (b^1, m^2, b^3)

- 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^1, a^2, i^3, i^4), *oe* = (o^1, o^2, e^3, e^4):
- I assume that changing the feature of a q incurs only $0.\overline{3}$ 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) B*a* = B(*a*, *a*, *a*)

	LIC 17.7	*BA 12.1	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
☞ i. B*a* = B(*a*, *a*, *a*)		1				12.1
ii. B*o* = B(*o*, *o*, *o*)			1	1		24.2
iii. B*ɨ* = B(*ɨ*, *ɨ*, *i*)			1			14.5

SOLUTION TO PROBLEM 2: /*ai*/ surfaces as [*ɨi*], 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) B*ai* = B(*a*, *a*, *i*, *i*)

	LIC 17.7	*BA 12.1	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
i. B*ae* = B(*a*, *a*, *e*, *e*)	1	1	$0.\overline{6}$			39.5
ii. B*oe* = B(*o*, *o*, *e*, *e*)			$1.\overline{3}$	$0.\overline{6}$		25.8
iii. B*ɨe* = B(*ɨ*, *ɨ*, *e*, *e*)	1		$1.\overline{3}$			37.0
iv. B*ai* = B(*a*, *a*, *i*, *i*)		1				12.1
☞ v. B*ɨi* = B(*ɨ*, *ɨ*, *i*, *i*)			$0.\overline{6}$			9.7

(21) B*ae* = B(*a*, *a*, *e*, *e*)

	LIC 17.7	*BA 12.1	IDH 14.5	IDR 9.7	IDB 6.9	$\mathcal{H}$
i. B*ae* = B(*a*, *a*, *e*, *e*)	1	1				29.8
☞ ii. B*oe* = B(*o*, *o*, *e*, *e*)			$0.\overline{6}$	$0.\overline{6}$		16.1
iii. B*ɨe* = B(*ɨ*, *ɨ*, *e*, *e*)	1		$0.\overline{6}$			27.4
iv. B*ai* = B(*a*, *a*, *i*, *i*)		1	$0.\overline{6}$			21.8
v. B*ɨi* = B(*ɨ*, *ɨ*, *i*, *i*)			$1.\overline{3}$			19.3

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