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

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ABSTRACT I describe and analyze a process of postlabial rounding in A'ingae (isolate, ISO 639-3: `con`): after labial consonants, the diphthong /*ae*/ may surface as [*oe*]. However, a postlabial monophthongal /*a*/ always surfaces faithfully as [*a*]. To capture these facts, I propose an analysis couched in Q-Theory, where one vocalic target of a diphthong corresponds to fewer subsegments than a monophthong. This predicts that diphthongs might show an emergence-of-the-unmarked (TETU) effect, while monophthongs surface faithfully. The prediction is borne out by A'ingae postlabial rounding, contributing a novel argument for the Q-Theoretic representations. Finally, I show that similar asymmetries between diphthongs and monophthongs have recurred throughout the language's history, further strengthening the proposal.

KEYWORDS diphthong, labialization, TETU, Cofán, assimilation, subsegment

## 1 INTRODUCTION

This paper describes and analyzes the A'ingae process of postlabial rounding. In A'ingae (or Cofán, an Amazonian isolate, ISO 639-3: `con`), the underlying sequence /*ae*/ optionally rounds to [*oe*] after labial consonants (*p* $p^h$ ${}^m b$ *f v m*). While postlabial rounding has been reported in previous literature (e. g. Galloway, 1990; Lakshmi, 1982; Lionnet, 2017), the A'ingae pattern is unusual in that it is restricted to a diphthong; the monophthongal /*a*/ never rounds to ˣ[*o*] in the same postlabial environments.

To account for the fact that the postlabial rounding may apply to /*ae*/, but not /*a*/, I adopt a Q-Theoretic (e. g. Garvin, Lapierre, and Inkelas, 2018; Inkelas and Shih, 2016, 2017) representation of vowels. I assume that the monophthongal *a* consists of three subsegments ($a^1\ a^2\ a^3$), but the *a*-component of a diphthong – only of two ($a^1\ a^2\ e^2\ e^3$). As such, one vocalic target of a diphthong is weaker (i. e. corresponds to fewer subsegments) than a monophthong (Garvin, Lapierre, Schwarz, et al., 2020; Schwarz et al., 2019). Since each subsegment may be independently subject to feature IDENTITY constraints, Q-Theory predicts that diphthongs might show emergence-of-the-unmarked (TETU) effects (McCarthy and Prince, 1994), while monophthongs surface faithfully. This prediction is borne out by A'ingae postlabial rounding, contributing a novel argument for the subsegmental representations of Q-Theory. (The process does not apply to other diphthongs, including /*ai*/. A specific account of the underapplication of postlabial rounding is beyond the scope of this paper.)

The rest of the paper is structured as follows. Section 2 gives background on the language and its speakers. Section 3 presents basic aspects of the A'ingae phonemic inventory and describes the postlabial rounding of /*ae*/. Section 4 proposes a Q-Theoretic analysis of the process. Section 5 discusses the postlabial diachrony of other diphthongs. Section 6 concludes.

## 2 LANGUAGE BACKGROUND

A'ingae (or Cofán, ISO 639-3: `con`) is an Amazonian isolate (AnderBois et al., 2019; Hammarström et al., 2020; cf. Rivet, 1924, 1952; Ruhlen, 1987) with ca. 1,500 native speakers in the northeast Ecuadorian province of Sucumbíos and the southern Colombian department of Putumayo. The language is endangered and under severe socioeconomic pressures. Despite challenges, language attitudes among the Cofán are uniformly positive (Dąbkowski, 2021a).

Previous work on A'ingae includes Brandt's (2024) and Repetti-Ludlow et al.'s (2019) phonetic studies, Borman's (1962) and Dąbkowski's (2024) phonological descriptions, Dąbkowski's (2023a) diachronic account of postlabial raising, Sanker and AnderBois's (t.a.) internal reconstruction of nasality, Repetti-Ludlow's (2021) analysis of laryngeal co-occurrence restrictions, Dąbkowski's (2021b, 2023b, t.a.) work on stress and glottalization, and Fischer and Hengeveld's (2023) grammatical sketch.

The data presented in this paper represents the Ecuadorian language variety and reflects the judgments of three native language consultants from Dureno and Sinangoé, Sucumbíos. All the fieldwork data has been deposited in the California Language Archive as Dąbkowski (2020). Section 5 incorporates data from Borman's (1976) dictionary, which reflects the language as spoken ca. 50–70 years ago.

## 3 DESCRIPTION

The A'ingae syllable structure can be schematized (C)V(V)(ʔ), with optional consonantal onsets, maximally diphthongal nuclei, and optional coda glottals (Dąbkowski, 2024). The language's phonemic inventory is moderately large, totaling 27 consonants (Table 1) and 5 monophthongal vowels (Table 2) (Borman, 1962; Repetti-Ludlow et al., 2019). Phonetically, the A'ingae vowels have the following properties: *i* is high and front; *ɨ* is high and central (to back); *e* is (high-)mid and front; *a* is central and low; and *o* is back, high-mid (to high), and rounded (Brandt,

| | LABIAL | ALVEOAR | SIBILANT | POSTALV | VELAR | GLOTTAL |
|---|---|---|---|---|---|---|
| PLAIN STOP | *p* | *t* | *ts* | *tʃ* | *k* | *ʔ* |
| ASPIRATED STOP | *pʰ* | *tʰ* | *tsʰ* | *tʃʰ* | *kʰ* | |
| PRENASAL STOP | *ᵐb* | *ⁿd* | *ⁿdz* | *ⁿdʒ* | *ᵑg* | |
| FRICATIVE | *f* | | *s* | *ʃ* | | *h* |
| ORAL SONORANT | *ʋ* | *ɾ* | | *j* | *ɰ* | |
| NASAL STOP | *m* | *n* | | *ɲ* | | |

Table 1: A'ingae consonants

| | FRONT | CENTRAL | BACK |
|---|---|---|---|
| HIGH | *i*, *ĩ* | *ɨ*, *ɨ̃* | *o*, *õ* |
| LOW | *e*, *ẽ* | *a*, *ã* | |

Table 2: A'ingae monophthongs

| | | |
|---|---|---|
| *ie*, *ĩẽ* | *ɨi*, *ɨ̃ĩ* | *io*, *ĩõ* |
| *ei*, *ẽĩ* | *oe*, *õẽ* | *oi*, *õĩ* |
| *ia*, *ĩã* | *ae*, *ãẽ* | *oa*, *õã* |
| *ai*, *ãĩ* | | *ao*, *ãõ* |

Table 3: A'ingae diphthongs

2024; Repetti-Ludlow et al., 2019). The five vowel qualities form eleven contrastive diphthongs (Table 3) (Dąbkowski, 2023a, 2024). Both monophthongs and diphthongs contrast oral and nasal articulations; diphthongs are either fully oral or nasal.

Word-initially (1a)[1] and after a non-labial consonant (1b-f), all of the A'ingae diphthongs are realized faithfully, including /*ae*/ (1d-e).

(1) FAITHFUL REALIZATION OF DIPHTHONGS IN MOST CONTEXTS

| a. | b. | c. | d. | e. |
|---|---|---|---|---|
| / *ãĩ* / | / *tʃʰoi* / | / *kʰɨi* / | / *ãnãẽʔmã* / | / *ãkãẽ* / |
| [ *ãĩ* ] | [ *tʃʰoi* ] | [ *kʰɨi* ] | [ *ãnãẽʔmã* ] | [ *ãkãẽ* ] |
| dog | row | lie down | hammock | install |

However, after a labial consonant, the diphthong /*ae*/ is optionally (though often) rounded to [*oe*] (Dąbkowski, 2024). The process is exceptionless in that all instances postlabial /*ae*/ can (but need not) be rounded. Rounded realizations ([*oe*]) predominate in regular and fast speech. Unrounded realizations ([*ae*]) can be heard in careful or drawn-out pronunciation. I. e., the postlabial rounding of /*ae*/ is speech rate-dependent. This variability finds a reflection in written language, with speakers choosing alternately "*ae*" or "*oe*/*ue*" (depending on the orthography) to represent the postlabial diphthong. Postlabial rounding is observed in roots (2) as well as derived environments (3), and is unaffected by nasality, with both /*ae*/ and /*ãẽ*/ optionally rounded to [*oe*] (2a-c, 3d) and [*õẽ*] (2d, 3a-c). An unrounded realization of (2a) is given in Figure 1. A rounded realization is given in Figure 2.

(2) ROUNDING OF /*ae*/ AFTER LABIALS MORPHEME-INTERNALLY

| | | | |
|---|---|---|---|
| a. / *fae* / | b. / *faesɨ* / | c. / *vaeji* / | d. / *mãẽ* / |
| [ *fae* ] | [ *faesɨ* ] | [ *vaeji* ] | [ *mãẽ* ] |
| [ *foe* ] | [ *foesɨ* ] | [ *voeji* ] | [ *mõẽ* ] |
| one | other | recently | command |

(3) ROUNDING OF /*ae*/ AFTER LABIALS ACROSS MORPHEME BOUNDARIES

| | | | |
|---|---|---|---|
| a. / *atapa -ẽ* / | b. / *nã$^m$ba -ẽ* / | c. / *sĩʔmã -e* / | d. / *tseʔfa -e* / |
| [ *atapãẽ* ] | [ *nã$^m$bãẽ* ] | [ *sĩʔmãẽ* ] | [ *tseʔfae* ] |
| [ *atapõẽ* ] | [ *nã$^m$bõẽ* ] | [ *sĩʔmõẽ* ] | [ *tseʔfoe* ] |
| breed -CAUS | turbid -CAUS | bruised -ADV | that side -ADV |

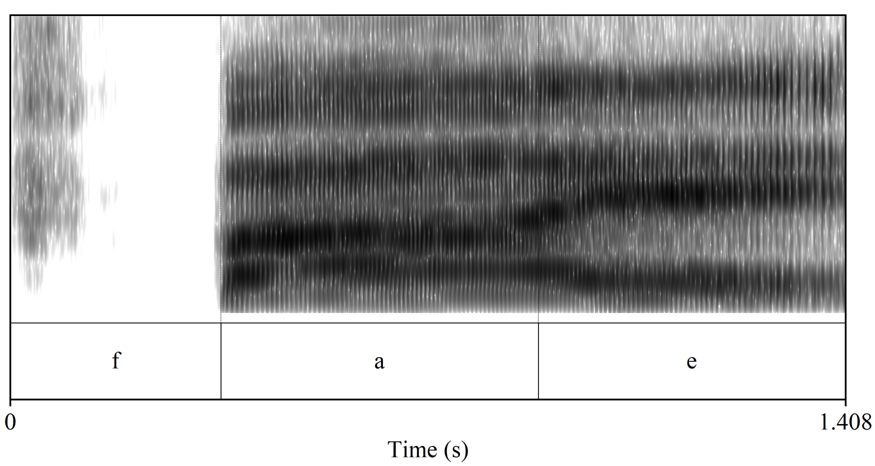


Figure 1: Unrounded realization of /*fae*/ 'one'

The monophthongal /*a*/ does not undergo rounding after labial consonants, and is always faithfully realized as [*a*] (4).

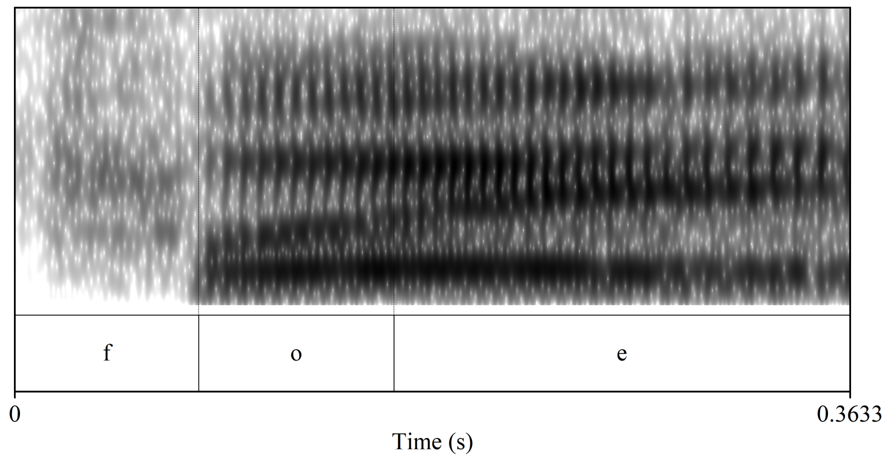


Figure 2: Rounded realization of /*fae*/ 'one'

(4) NO ROUNDING OF MONOPHTHONGAL /*a*/ AFTER LABIALS

| a. | b. | c. | d. |
|---|---|---|---|
| / *pa* / | / *fãʔfã* / | / *va* / | / *mãʔp*$^h$*ã* / |
| [ *pa* ] | [ *fãʔfã* ] | [ *va* ] | [ *mãʔp*$^h$*ã* ] |
| die | diarrhoea | this | wash |

4 ANALYSIS Postlabial rounding is an instance of assimilation, whereby the labial feature of a consonant "spreads" onto the following vowel. I preliminarily capture the process with the LABIALASSIMILATION constraint (5). (LABIALASSIMILATION will be later revised to refer to Q-Theoretic subsegments.)

(5) LABIALASSIMILATION, or: PASSM (to be revised)
*Assign a violation mark for each consonant immediately followed by a vowel with a different* [±LABIAL] *value.*

Gratuitous labialization is prevented by the opposing force of input-output faithfulness. Specifically, I use a relativized IDENTITY constraint, which penalizes output candidates that differ from the input with respect to a specific feature. Following Brandt (2024), I assume featural specifications for the A'ingae vowels as given in

Table 4. Since *a* and *o* only differ in the [±LABIAL] feature, the constraint relevant to postlabial rounding is IDENTITY(LABIAL) (6).

| | *i* | *ɨ* | *e* | *a* | *o* |
|---|---|---|---|---|---|
| HIGH | + | + | − | − | − |
| FRONT | + | − | + | − | − |
| LABIAL | − | − | − | − | + |

Table 4: A'ingae vowel features (based on Brandt, 2024)

(6) IDENTITY[±LABIAL], or: IDENTP

*Assign a violation mark each time the feature [±LABIAL] has a different value in the input than in the output.*

To capture the optionality in A'ingae postlabial rounding, I adopt a weighted-constraint model of the grammar (Smolensky and Legendre, 2006). The relative counts of rounded and unrounded postlabial realizations of /*ae*/ are unavailable. In the analysis to be presented, I assume that both are equally frequent (although using any other ratio would not affect the core claim of the proposal).

Now, the markedness constraint PASSM penalizes sequences of a labial consonant plus an unrounded vowel, but its activity is revealed only in its effect on the diphthong /*ae*/; monophthongs are unaffected. This is a challenge because—unless something more is said about the difference between monophthongs and diphthongs—the constraint PASSM targets the two equally. This is to say, if PASSM has a weight high enough to correctly predict that diphthongs undergo optional rounding, it will incorrectly predict that monophthongs should also be able to round after labials (Table 5).

If, on the other hand, PASSM has a weight low enough to predict monophthongal faithfulness, it fails to predict the possibility of diphthongal rounding (Table 6).

| | *Pae* | PAssm 10 | IdentP 10 | $\mathcal{H}$ |
|---|---|---|---|---|
| ☞$_{0.5}$ i. | *Pae* | 10 | | 10 |
| ☞$_{0.5}$ ii. | *Poe* | | 10 | 10 |

| | *Pa* | PAssm 10 | IdentP 10 | $\mathcal{H}$ |
|---|---|---|---|---|
| ☹$_{0.5}$ i. | *Pa* | 10 | | 10 |
| 💣$_{0.5}$ ii. | *Po* | | 10 | 10 |

Table 5: Monophthongs incorrectly predicted to optionally round after labials

| | *Pae* | PAssm 1 | IdentP 10 | $\mathcal{H}$ |
|---|---|---|---|---|
| 💣$_{0.5}$ i. | *Pae* | 1 | | 1 |
| ☹$_{0.5}$ ii. | *Poe* | | 10 | 10 |

| | *Pa* | PAssm 1 | IdentP 10 | $\mathcal{H}$ |
|---|---|---|---|---|
| ☞ i. | *Pa* | 1 | | 1 |
| ii. | *Po* | | 10 | 10 |

Table 6: Diphthongs incorrectly predicted not to round after labials

To capture both the postlabial rounding seen in diphthongs as well as its underapplication to monophthongs, I adopt the subsegmental representations of Q-Theory (Inkelas and Shih, 2016). Q-Theory posits that each segment (Q) consists of multiple—most commonly three—subsegments (q) representing closure ($q^1$), hold ($q^2$), and release ($q^3$). In segments with one articulatory target, the three q's are identical. For example, the low vowel segment (Q) *a* is represented with three subsegments as $(a^1\ a^2\ a^3)$. Internally complex segments have multiple articulatory targets. In Q-Theory, the different targets are mapped onto different q's. The affricate *ts*, for example, may be represented as $(t^1\ s^2\ s^3)$ (Inkelas and Shih, 2017). The circumoralized nasal $^b m^b$ may be represented as $(b^1\ m^2\ b^3)$ (Garvin, Lapierre, and Inkelas, 2018; Garvin, Lapierre, Schwarz, et al., 2020).

Building directly on Garvin, Lapierre, and Inkelas's (2018) treatment of geminates, *tː* = $(t^1\ t^2\ .\ t^2\ t^3)$, I propose that A'ingae diphthongs consist of four q's. The first two q's correspond to the first target of the diphthong; the other two q's correspond to the second target. Thus, for example, *ae* = ($a^1$ $a^2$ $e^2$ $e^3$) and *oe* = ($o^1$ $o^2$ $e^2$ $e^3$). This correctly predicts that while A'ingae diphthongs are longer than monophthongs, one component of a diphthong is shorter than a monophthong. Diphthongs arising in morphologically complex words involve two monophthongal vowels in the input. I assume that the two vowels fuse into one and undergo a reduction of the transitional ($q^3$ $q^1$) subsegments, e. g. *a*+*e* = ($a^1$ $a^2$ $a^3$)($e^1$ $e^2$ $e^3$) → *ae* = ($a^1$ $a^2$ $e^2$ $e^3$), along with or before postlabial rounding. Similar reduction of transitional subsegments has been previously proposed by Inkelas and Shih (2017, p. 14) for Polish singly articulated geminate affricates, e. g. ($t^1$ $t^2$ $ɕ^3$)($t^1$ $t^2$ $ɕ^3$) → ($t^1$ $t^2$ $t^2$ $ɕ^3$).

Furthermore, I assume that changing the feature of one subsegment (q) between the input and the output incurs only one-third, or $^1/_3$, of a violation of the respective Identity constraint. Under this assumption, changing a feature of a monophthongal vowel (which consists of three q's) incurs a full violation ($3 \times {}^1/_3 = 1$), but changing a feature of one vocalic target of a diphthong (which consists of two q's) incurs only two-thirds of a violation ($2 \times {}^1/_3 = {}^2/_3$).[2] This predicts that a monophthongal vowel may surface faithfully, whereas the same vowel in a diphthong exhibits a TETU effect. More specifically, if PAssm has an appropriately low weight, the monophthongal /*a*/ will not round after labial consonants; rounding all three subsegments of a monophthong incurs sufficiently many Identity violations to rule it out. This pattern matches the findings of Garvin, Lapierre, Schwarz, et al. (2020) and Schwarz et al. (2019), who observe that the number of subsegments corresponds to vowel strength, resulting in the application or underapplication of various phonological processes.

Additionally, I assume that the first subsegment ($q^1$ — the transition into a vowel) and the last subsegment ($q^3$ — the transition out of a vowel) must match the quality of the adjacent subsegment they transition into or out of. I formalize this with the

*Lone-q constraint (7). The *Lone-q constraint rules out outputs where only one or two of a monophthong's subsegments become rounded.

(7) *Lone-q

*Assign a violation for each subsegment that is not adjacent to an identical subsegment.*

Finally, I recast LabialAssimilation (5) as a subsegmental correspondence constraint couched in Agreement by Projection (Hansson, 2014), a refinement of Agreement by Correspondence (Hansson, 2001; Rose and Walker, 2004; Shih and Inkelas, 2019), which models "spreading" as featural agreement. Specifically, I use *[+Labial][−Labial]/c::v (8), which requires that a vocalic subsegment (v) have the same value for labiality as its preceding consonantal subsegment (c). For a similar account of vowel breaking in Huave (Kim, 2008), see Inkelas and Shih (2017).

(8) *[+Labial][−Labial]/c::v, or: $*{+}\mathrm{P}{-}\mathrm{P}_{\mathrm{c::v}}$

*Assign a violation mark for each consonantal subsegment* (c) *immediately followed by a vocalic subsegment* (v) *with a mismatched* [±labial] *value.*

The tableau capturing the fact that monophthongs do not round after labial vowels is given in Table 7. The capital "P" in the input and the output candidates stands

| | P ($a^1\ a^2\ a^3$) | $*{+}\mathrm{P}{-}\mathrm{P}_{\mathrm{c::v}}$ 12.5 | IdentP 18.8 | *Lone-q 14.4 | $\mathcal{H}$ |
|---|---|---|---|---|---|
| ☞ i. | P ($a^1\ a^2\ a^3$) | 1 | | | 12.5 |
| ii. | P ($o^1\ a^2\ a^3$) | | $^1/_3$ | 1 | 20.6 |
| iii. | P ($o^1\ o^2\ a^3$) | | $^2/_3$ | 1 | 26.9 |
| iv. | P ($o^1\ o^2\ o^3$) | | 1 | | 18.8 |

Table 7: Monophthongs correctly predicted not to round after labials

for an internally uniform labial consonant, i. e. P = (p¹ p² p³). The (approximated) constraint weights were found using the Maxent Grammar Tool (Hayes, 2008).

The diphthong /*ae*/, on the other hand, can optionally undergo rounding when preceded by a labial consonant, because its first portion has only two subsegments. This represents a case of the emergence of the unmarked (TETU; McCarthy and Prince, 1994)—with fewer subsegments come fewer faithfulness (IDENTITY) violations, making it possible for the unmarked structure (*+P−$P_{C::V}$) to emerge, where the labial features of the consonant and the first part of the diphthong match (Table 8). (Since the actual counts of rounded and unrounded realizations of /*ae*/ are unavailable, the constraint weights were found assuming that both are equally likely.)

| | P ($a^1\ a^2\ e^2\ e^3$) | *+P−$P_{C::V}$ 12.5 | IDENTP 18.8 | *LONE-q 14.4 | $\mathcal{H}$ |
|---|---|---|---|---|---|
| ☞$_{0.5}$ i. | P ($a^1\ a^2\ e^2\ e^3$) | 1 | | | 12.5 |
| ii. | P ($o^1\ a^2\ e^2\ e^3$) | | $^1/_3$ | 2 | 35.0 |
| ☞$_{0.5}$ iii. | P ($o^1\ o^2\ e^2\ e^3$) | | $^2/_3$ | | 12.5 |
| iv. | P ($o^1\ o^2\ o^2\ e^3$) | | 1 | 1 | 33.2 |
| v. | P ($o^1\ o^2\ o^2\ o^3$) | | $1^1/_3$ | | 25.0 |

Table 8: Diphthongs correctly predicted to optionally round after labials

| | C ($a^1\ a^2\ e^2\ e^3$) | *+P−$P_{C::V}$ 12.5 | IDENTP 18.8 | *LONE-q 14.4 | $\mathcal{H}$ |
|---|---|---|---|---|---|
| ☞ i. | C ($a^1\ a^2\ e^2\ e^3$) | | | | 0.0 |
| ii. | C ($o^1\ a^2\ e^2\ e^3$) | 1 | $^1/_3$ | 2 | 47.5 |
| iii. | C ($o^1\ o^2\ e^2\ e^3$) | 1 | $^2/_3$ | | 25.0 |
| iv. | C ($o^1\ o^2\ o^2\ e^3$) | 1 | 1 | 1 | 45.7 |
| v. | C ($o^1\ o^2\ o^2\ o^3$) | 1 | $1^1/_3$ | | 37.5 |

Table 9: Diphthongs correctly predicted not to round after non-labials

Finally, $*{+}\mathrm{P}{-}\mathrm{P}_{\mathrm{C::V}}$ penalizes labialization when /*ae*/ is preceded by a non-labial onset. As such, the diphthong never rounds after coronals, velars, etc. (Table 9).

In an interim summary, the adoption of Q-Theory's subsegmental representations captures the fact that while the diphthongal /*ae*/ undergoes optional rounding after labial consonants, the monophthongal /*a*/ always surfaces faithfully.

## 5 DIACHRONY OF OTHER DIPHTHONGS

The Q-Theoretic analysis accounts for the fact that a phonological process aimed at markedness reduction (such as post-labial rounding) may target diphthongs, while monophthongs remain unaffected. In contemporary A'ingae, postlabial rounding applies only to /*ae*/. However, the language's diachrony reveals that other diphthongs also used to be affected.

Drawing on data from morphologically complex words and borrowings, Dąbkowski (2023a) identifies a diachronic *postlabial raising*, whereby postlabial **ai* developed into contemporary *ɨi*. I propose that the development of postlabial raising took place in two steps (9). First, postlabial **ai* rounded to **oi*, i. e. **ai* > **oi* / P _ (9i). Second, postlabial **oi* unrounded to *ɨi*, i. e. **oi* > *ɨi* / P _ (9ii).[3]

(9) POSTLABIAL RAISING (data from Borman, 1976; Dąbkowski, 2023a)

| | | | | |
|---|---|---|---|---|
| o. | **koehefa -ite* | **taʔva -ite* | *waita* (Kichwa)[4] | *baila* (Spanish) |
| i. | **koehefoite* | **tavoite* | *(*ɾosa*)*voita* | *ᵐboiɾa* |
| ii. | *koehefɨite* | *tavɨite* | (*ɾosa*)*vɨita* | *ᵐbɨiɾa* |
| | summer -PRD | cotton -PRD | calendula | dance |

Both sound changes are directly attested. First, the postlabial rounding of *ai* is observed in one borrowing from Spanish, reported in Borman's (1976) dictionary with *oi*. Additionally, there is one instance of postlabial rounding of *ei* (10i). (For comparison, non-postlabial diphthongs, e. g. *ai* in *aiɾo* 'mountain,' have not been affected.)

(10) STEP I: POSTLABIAL ROUNDING OF *AI*, *EI* (data from Borman, 1976)

| | | | | |
|---|---|---|---|---|
| o. | SOURCE | *baila* (Spanish) | *peineta* (Spanish) | *aiɾo* (Secoya)[5] |
| i. | BORMAN | $^{m}$*boiɾa* | $^{m}$*bõĩnẽta* | *aiɾo* |
| | | dance | comb | mountain |

Second, all the words reported in Borman (1976) with a postlabial *oi* are nowadays realized with *ɨi* (11ii).[6] (Non-postlabial *oi*, as in *sõĩ* 'tamal,' has not been affected.) The phonetic motivation for postlabial unrounding is not clear. I suggest it may be construed as centralization, reflecting a cross-linguistic affinity between labial consonants and central vowels (Vallée, Rossato, and Rousset, 2009) or as an instance of hypercorrective dissimilation.

(11) STEP II: POSTLABIAL UNROUNDING OF *OI*

| | | | | | | |
|---|---|---|---|---|---|---|
| i. | BORMAN | *põĩnẽ* | *p$^{h}$oikã* | $^{m}$*boiɾa* | *mõĩte* | *sõĩ* |
| ii. | PRESENT | *pɨ̃ĩnẽ* | *p$^{h}$ɨikã* | $^{m}$*bɨiɾa* | *mɨ̃ĩte* | *sõĩ* |
| | | both | glimpse | dance | when not | tamal |

Postlabial rounding (**ai* > **oi*) and unrounding (**oi* > *ɨi*) both applied only to diphthongs, with postlabial monophthongs e. g. in *pa* 'die,' *p$^{h}$oɾo* 'be touching,' $^{m}$*baʔve* 'more or less,' $^{m}$*bo* 'gather,' *fõɲõ* 'skirt,' *va* 'this,' and *mẽtʃo* 'not have' unaffected.

The postlabial rounding (or the telescoped postlabial raising) of **ai* is not a productive phonological process. First, postlabial raising sustains lexical exceptions, such as *paitsɨ* 'paiche.' Second, postlabial raising does not apply regularly to new derivatives (although it has been acquired as an optional derived-environment rule by some). Third, many historically complex forms with *ɨi*, such as *koehefɨite* 'summer-PRD' and *tavɨite* 'cotton-PRD' (9ii) have been, for some speakers, leveled back to *koehefaite*, *tavaite*. (For more information on postlabial raising, see Dąbkowski, 2023a.)

Nevertheless, the rounding of **ai* as well the subsequent unrounding of **oi* affected postlabial diphthongs, to the exclusion of the monophthongal **a* and **o*. Since sound changes are the result of once active phonetic and phonological pressures, they provide additional evidence that A'ingae has—also in its past—shown less faithfulness to one component of a diphthong than to the corresponding monophthong, further strengthening the case for the representational apparatus of Q-Theory, which predicts this exact asymmetry.

## 6 CONCLUSION

In conclusion, I describe and analyze the process of postlabial rounding in A'ingae. After labials, the diphthongal /*ae*/ may optionally surface as [*oe*], but the monophthongal /*a*/ always surfaces as [*a*]. Similar asymmetries can be observed in the language's history: postlabial **ai* rounded to **oi*, and postlabial **oi* centralized to *ɨi*. Both sound changes affected only diphthongs, to the exclusion of postlabial **a* and **o* (although they did not give rise to active phonological processes). Thus, we observe a recurring pattern where the language's diphthongs—but not monophthongs—are prone to assimilation and centralization/dissimilation.

To account for the systematic difference between monophthongs and diphthongs, I adopt the subsegmental representations of Q-Theory. A monophthong is longer and consists of more subsegments than one component of a diphthong. Thus, unfaithfulness to the features of the latter incurs fewer IDENTITY violations, creating conditions in which unmarked structures (such as labial assimilation) may be observed to emerge. As such, the A'ingae patterns bear out a prediction of Q-Theory.

Finally, by allowing subsegments to incur partial constraint violations, Q-Theory has been demonstrated to have some of the same capacity for modeling gradient phonology as the Gradient Symbolic Representations framework (e. g. Rosen, 2016; Smolensky and Goldrick, 2016). The subsegments of Q-Theory, however, are phonetically motivated and discrete, making it the more restrictive of the two frameworks.

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[1]The following glossing abbreviations have been used: ADV = adverbial, CAUS = causative, PRD = periodic.

[2]Alternatively, the IDENTITY constraints could be defined as counting violations of subsegmental q's, as opposed to full segments. If this analysis were adopted, the weight of IDENTITY(LABIAL) would be correspondingly lower, but the core mechanics of the account would remain unchanged.

[3]Dąbkowski (2023a) proposes a different trajectory, where the postlabial **ai* first rounded to **ui* (**ai* > **ui* / P _) and then **u* unconditionally unrounded to *ɨ* (**u* > *ɨ*). Either trajectory involves a postlabial rounding of **ai* to the exclusion of **a*, supporting the main claim of the present paper.

[4](ALDP, 2018; Chango A. and Potosí C., 2009)

[5](ALDP, 2018)

[6]Borman worked in the Cofán communities since 1954 (Hugo Lucitante, p.c.). As such, the postlabial unrounding of *oi* must have taken place in the past ca. 50–70 years.