Tonogenesis and Reduplication in Balsas River Nahuatl of Central Guerrero, Mexico

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Overview

- Embedded in a Nahuatl-speaking region of central Guerrero, Mexico, are seven historically related villages that have developed three distinct manifestations of a hybrid stress and tone system from a breathy-voiced coda segment [ʰ]. This segment has been shown to lower F0 in a tautosyllabic vowel, creating a H-L F0 contour beginning on the preceding syllable.
  - Group 1: Ahuelicán (prehispanic migrants from Oapan)
  - Group 2: Oapan, Tula del Río (19th c. migrants from Oapan), Analco (recent offshoot of Oapan)
  - Group 3: Ameyaltepec (prehispanic “barrio” of Oapan); Oacacingo (unknown historical status)

- Two of the three groups (Ahuelicán and Oapan) have also developed an unusual pattern of reduplication. Nahuatl languages manifest three patterns of reduplication:
  - μ- (monomoraic),
  - μʰ- (monomoraic with a fixed coda segment)
  - μμ- (bimoraic)

  All other Nahuatl languages reduplicate stem material. These two groups prefer, when possible, to use material left of the stem (S or O prefixes, directional on-, incorporated nouns), lengthening a short vowel (adding μ) or (Oapan group), simply marking a preceding long vowel with high tone.

- This presentation explores the history and phonology of tone and reduplication, particularly innovative use in two of the three groups: (1) Oapan Nahuatl and (2) Ahuelicán Nahuatl. The Ameyaltepec group has apparently lost (or had never developed) any tonogenetic phenomena.
Three patterns

- **Ahuelican (conservative tonogenesis)**
  - retention of *h* the trigger for a phonologized high-low F0 contour beginning on the syllable preceding that with coda [h]
  - low both inhibits stress and fails to interact in a "clash avoidance" pattern with tonogenetic F0 excursions on the adjacent syllable
  - **reduplication:** C-initial stems realize μ- and μh- reduplication by lengthening preceding short vowels in preceding open and closed syllables; *h* of μh- is lost in closed syllables preceding the stem

- **Oapan (highly innovative tonogenesis)**
  - trigger, *h*, has been lost and, along with it, specification of low on a tautosyllabic nucleus
  - tone and stress interact in a mora-based "clash avoidance" pattern, resulting in a rightward shift of the latter (except in at least one case of leftward shift)
  - **reduplication:** C-initial stems realize μ- and μh- reduplication by lengthening short vowels in preceding syllables, both open and close. V-initial stems manifest reduplication by lengthening and assigning H to short vowels and simply assigning H to long vowels.
  - **reduplication:** on C1V1C1V1 stems infixation C1V1 μhC1V1 overrides reduplication on elements preceding the stem

- **Ameyaltepec (loss of *h and hypothesized “regularization” of stress; non-tonogenetic)**
  - prehispanic offshoot of Oapan (as is Ahuelicán) embedded in the lands of Tetelcingo, a non-tonogenetic village that has retained *h* and has no marked F0 excursions.
  - same word-internal loss of *h* as its parent village, Oapan, but without the F0 excursions that mark the Nahuatl of its two sister villages, Oapan and Ahuelicán
  - **reduplication:** no innovations from expected historical patterns
Tonogenetic Nahuatl: *h in trisyllabic words comparing *h coda on second vs. first syllable

### #1
Coda *h* in the second syllable of a trisyllabic word produces a H-L pattern on the first two syllables. Stress is syllable final though analysis differs for each variant:

**Ahuelicán**: middle syllable is specified L and precludes stress.

**Oapan**: stress clashes with H and shifts right to final syllable.

### #2
Coda *h* in the first syllable produces divergent patterns:

**Ahuelicán**: initial syllable is specified L and stress is realized on second syllable. No H tone.

**Oapan**: now free from its motivating context (overt coda *h*) initial syllable with coda *h* is realized as H; stress shifts to final syllable.
Impact of *h in disyllabic words: Three variants

Ahuelicán: *h coda creates falling pitch on initial syllable (specified L) and stress shifted to final syllable

Oapan: *h coda yields H on tautosyllabic nucleus and stress shifted to final syllable

Ameyaltepec: *h coda has left no reflex; pattern is penultimate stress typical of Nahuatl
Historically, the plural marker is \(^{-}h\).

- In the tonogenetic variants (Oapan and Ahuelicán) the plural marker \(-h\) in non-phrase final position has the expected reflex of a H-L sequence ending on the nucleus tautosyllabic to \(^{-}h\). The pitch contour, not the final underlying \(-h\) plural marker, is the most salient feature of plural subject.

- In the non-tonogenetic variant (Ameyaltepec) the plural marker \(-h\) has shifted to a nasal (\(-n\)). In the absence of tonogenesis this nasal is the most salient marker of subject plurality. There is no notable pitch excursion to accompany plurality.
Summary of *h and tonogenesis

- Coda *h lowers the pitch on the tautosyllabic nucleus. This is an acoustic phenomenon that is manifested in all Balsas Nahuatl variants, tonogenetic and non-tonogenetic (note that surface /h/ from geminates (kk > hk) are not considered *h although they have the same effect on pitch).

- Although on explanation of tonogenesis posits compensation for loss of *h coda through phonologization of tone (in Oapan group variants) Ahuelicán has both retained the trigger and developed pitch excursions (tone) that is beyond the simple effect of breathy-voiced coda segment [ɦ].

- Ahuelicán: Syllable with breathy-voiced coda segment [ɦ] is always L and is never stressed. Adjacent syllables (light or heavy) may be stressed.

- Oapan: *h (historical breathy-voiced coda segment [ɦ]) lost in all but phrase-final position.

- H tone has become disassociated from its historical position tautosyllabic to *h. The nucleus tautosyllabic to *h is now often, not always, H (depending on word syllable structure). When H it cannot be stressed.
Monomoraic reduplicant with no coda segment: $\mu$-

*Tla-tso-tsona* (‘to play music’) is realized in Oapan and Ahuelicán as *tlātsona* with melody for $\mu$ taken from the non-referential non-human marker *tla-,* the vowel of which is lengthened.

Moreover, in Oapan *tla+$\mu$+tsona* is never realized as *tlatsotsona* always as *tlātsona*
Monomoraic reduplicant with coda segment $\mu h$- with consonant-initial stems: Non-tonogenetic Nahuatl

San Miguel Tecuiciapan:
*\(h\) is retained in all contexts, here as the fixed coda segment in the monomoraic reduplicant $\mu h$-

Ameyaltepec:
Historically related to Oapan, Ameyaltepec loses *\(h\) in all word-internal contexts though without any tonogenetic implications.
Monomoraic reduplicant with coda segment ($\mu h$-)
with consonant-initial stems and long vowel in syllable preceding stem: Tonogenetic Nahuatl

Ahue
cán and Oapan:

With few exceptions, when the syllable preceding the reduplicant is heavy the $\mu h$- reduplicant is realized by taking melody from the stem and the H-L sequence ends with a L on the nucleus tautosyllabic with coda *h.
Oapan H tone preceding reduplicant *teh-tēmowa ‘to look for’

Single word with reduplicant $\mu h$- elicited in isolation, the H-L sequence ending on the reduplicant is clear.
Monomoraic reduplicant with coda segment $\mu h$- with consonant-initial stems and short vowel in preceding open syllable ($ki$-, $ni$-): Tonogenetic Nahuatl

Ahuelicán:
C-initial stem and a preceding open light syllable, $\mu h$- lengthens the vowel preceding the stem and retains coda /h/. The portmanteau pitch is HL, the effect of the breathy voiced coda.

Notes: No rightward stress shift. Long vowel + underlying /h/ is limited to this portmanteau morpheme.

Oapan:
Similar to Ahuelicán but
- the coda /h/ is lost,
- tone is H (rising),
- stress (high pitch) shifts rightward.
Monomoraic reduplicant with coda segment $\mu h$- with consonant-initial stems and short vowel in preceding closed syllable (*mits-): Tonogenetic Nahuatl

Ahuelicán:
The $\mu h$- reduplicant is realized lengthening the short vowel to the left of the stem which acquires a HL pitch

**Note:** Perhaps given phonotactic constraints on CC codas, the trigger (*$h$) for tonogenesis is lost.

Oapan:
Process mirrors Ahuelicán with a key difference: the pitch of the bimoraic lengthened vowel is not falling. A penultimate bimoraic syllable retains stress, not so a monomoraic syllable.
Monomoraic reduplicant with coda segment $\mu h$- (consonant-initial stem and preceding short vowel) comparison of singular and plural: Tonogenetic Nahuatl

The plural marker (second clause) on the verb *teki* ‘to cut’ creates a high tone not present in the singular (first clause).

Ahuelicán and Oapan differ in placement of the H related to the plural marker.

**Ahuelicán:** “Plural” H maintained on syllable preceding that with $-h$, *perhaps facilitated by HL contour.*

**Oapan:** “Plural” H shifted right.

**Note:** Both stress (*ni:nemi*) and tone (*ki:tekih*) shift in Oapan.
Leftward shift of stress in rare case(s) of reduplicant manifested on final syllable

Note: Stress shift away from reduplicant H long vowel occurs in two directions depending on the morphology and syllable structure of the word in question. The primary direction of shift is rightward, as demonstrated by niké:was in which the syllables ni and was are both adjacent to the reduplicant. However, in o:niké:w stress shifts leftward from the penultimate, which would clash with syllable-final H, to the antepenultimate.
Monomoraic reduplicant with coda segment $\mu h$- on stems with short initial vowel:

Ahuelicán:
Regardless of the preceding elements, the reduplicant utilizes melody from the stem. This process is identical to that found in other Nahuatl languages.

In the same context **Oapan** apparently lengthens the stem-initial vowel, which receives H tone.

**Note:** It is possible that the analysis is best understood as $\mu h$-V followed by loss of *h and vowel degemination ($i:i > i$). But such degemination does not occur with $\mu \mu$-reduplication.
Monomoraic reduplicant with coda segment $\mu h$- on stems with long initial vowel

Tonogenetic Nahuatl

**Ahuelicán:**
Overt manifestation of the $\mu h$- reduplicant with material from the stem. There is a clear H-L contour spread across the reduplicant and stem-initial vowel.

**Oapan:**
No overt segmental manifestation of the $\mu h$- reduplicant such as a double (e.g., $a\ddot{a}$) or extra long vowel. Reduplicant manifested simply by H tone.

**Note:** Although *h* in Ahuelicán follows the first vowel, it is the second that is low in the $ah\ddot{a}$... sequence.
Monomoraic reduplicant with coda segment $\mu h$- on stems with long initial vowel and preceding short vowel prefix in open syllable: Comparison of $tla$ - $\mu h$ - $\ddot{oy}$a ‘to shell corn’ in Ahuelicán and Oapan

**Ahuelicán:**
The $\mu h$- reduplicant is manifested on the nonreferential nonhuman object prefix $tla$- (lengthened and H-L pitch excursion). **Note:** Mitsihita shows no manifestation of reduplication on the prefix while $tlá:hōyaskeh$ does.

**Oapan:**
On vowel-initial stems, Oapan favors $\mu h$-reduplication on the stem-initial vowel. It thus produces a surface form quite distinct from Ahuelicán
Monomoraic reduplicant with coda segment μh- on stems preceded by extraverse directional on-

Ahuelicán and Oapan:
Any element with a final light syllable (open or closed) preceding a consonant-initial stem can manifest the monomoraic reduplicant (e.g., extraverse directional on-, incorporated noun stem)

Note: Ahuelicán manifests a falling tone and no rightward shift of stress. Oapan has a high tone and rightward shift of stress.

HL realization in Ahuelicán might avoid “clash” and make shift unnecessary
Monomoraic reduplicant with coda segment $\mu h$- on stems with preceding incorporated noun (*nakas* ‘ear’) with light final syllable

As with the object marker *mits*- (2sgO), infixation of a reduplicant in a closed syllable impedes surface realization of underlying /h/, which would otherwise occur in Ahuelicán.

Note: Despite loss of trigger in a closed syllable the Ahuelicán pitch contour is still falling and quite distinction from the Oapan pattern.
Monomoraic reduplicant with coda segment $\mu h$- manifested on long vowels in syllables preceding the “reduplicated” stems (limited manifestation)

Reduplicant realized on te:- Nonreferential human object

Ahuelicán:
Te: + $\mu h$- yields slightly longer /e:/, falling pitch. No rightward stress shift in trisyllabic forms.

Note: Lengthened te:h- might represent effect of contour tone.

Oapan:
Te: + $\mu h$- yields no apparent difference in comparison to the /e:/ followed by an overt stem $\mu h$- reduplicant. Rightward shift of stress in trisyllabic form.
Oapan only (not in Ahuelicán): Monomoraic reduplicant with coda segment μh- on stems with $C_1V_1C_1V_1$ (pepetlaka ‘to sparkle’ and (wiwitla ‘to pull out’)

Oapan: $C_1V_1C_1V_1$ stems “infix” the monomoraic reduplicant: lengthening initial syllable and assigning H tone. Cognate process has not developed in Ahuelicán though one speaker Tetelcingo speaker did give pehpepetlaka ‘to sparkle in places’.

Note: Stems $C_1V_1C_1V_1$ do not allow infixation of the reduplicant μh-. Thus ne:chpi:pitsowa ‘s/he kisses me’ reduplicates through prefixation to the stem: né:chpipi:pitsowa

Note: $C_1V_1C_1V_1$ stem pepetla can be analyzed as μh-petla-ka and pé:petlaka as μh-μh-petla-ka
Multiple reduplicants can be manifested in “overlapping” fashion given the morphological processes innovated in Oapan and Ahuelicán:

Oapan: “Infixation” of $C_1V_1C_1V_1$ occurs regardless of the morphological structure of the $C_1V_1C_1V_1$ pattern. It is often the case, however, that the first syllable is a synchronically productive reduplicant ($μh$- or $μ$-). Form a2: $μh-μh$- is realized as a long vowel reduplicant with H tone.

For bimoraic reduplicants ($μμ$-) the initial pattern is $C_1V_1C_1V_1$ and the $μh$-reduplicant is either expressed overtly (b2) or, if there is a preceding short vowel, with lengthening and high tone on the stem-preceding syllable: $mï:ste:tekilia$ ({$mits+ μh$}- ($μμ$-tekilia)}.
If a heavy syllable precede the reduplicated stem $\mu h$- reduplicant may be realized in various manners: (1) overt stem material; (2) tone on heavy syllable; (3) tone and lengthening on prefix; (4) dummy morpheme -*te*-

**Multiple realizations of $\mu h$-reduplicant on transitive compound** _ma:tlatsi:nia_ (‘hand + slap’):

a2) overt stem reduplicant

a3) tone on heavy syllable of incorporated noun _ma_: (common on body part incorporation)

b1) lengthening and tone on object prefix _mits_- (in this case the _ma:-_ noun stem is reduplicated, not the verb stem)

b2) insertion of semi-dummy morpheme _*te*- (intensifier) to carry lengthening and tone
Summary of reduplication and tonogenesis: Ahuelicán and Oapan variants

- **μ- reduplicant** is realized as lengthening on short vowels preceding the stem or reduplication of stem material (C)V- if there is no stem preceding vowel or the vowel is long.

- **Consonant initial stems**: μh- reduplicant is realized as lengthening on short vowels preceding the stem or reduplication of stem material (C)V- if there is no stem preceding vowel or the vowel is long (certain exceptions in Oapan, mostly body part incorporation, te:- )

- **Vowel initial stems**: Ahuelicán manifests expected stem reduplication with intervocalic /h/. Vowel preceding /h/ is H, following vowel L > HL pattern but without coda *h

- **Vowel initial stems**: Oapan manifests lengthening and H on stem-initial vowels irregardless of material to the left of stem. HL on the reduplicant seems to be a phonetic development from Stress on adjacent syllable [mits í: ‘ta] but is absent in other cases [á: po ‘la ki]


- **Oapan innovation**: μh-C₁V₁C₁V₁ > C₁C₁V₁ probably derived from μh+μh- despite lack of productivity in stem forms such as pepetlaka (frecuentative)

- **Oapan**: multiple manifestations of reduplicant patterns may occur when target vowel (left of stem) is long (cf. ma:tlatsi:ntla). Note that in general long vowels do not carry reduplicant. Thus ni-k-on- μh-te:mowa > (1) nikó:nte:mowa or (2) nó:ntete:mowa (loss of intervocalic /k/).
In memory of Susan Guion