Diphthongization and contrast realization in Huave

Yuni Kim, University of Manchester
yuni.kim@manchester.ac.uk
January 29, 2010 * Old World Conference in Phonology 7 * Nice

A Introduction

(1) Huave
   • A language isolate spoken in Oaxaca State, Mexico by about 14,000 people in four towns
   • Data in this talk are from fieldwork on the San Francisco del Mar dialect, spoken by fewer than 100
     people nearly all over 70 years old (see Kim 2008)

(2) Basic consonants:

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Coronal</th>
<th>Velar</th>
<th>Labiovelar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stops</td>
<td>p</td>
<td>mb</td>
<td>t</td>
<td>nd</td>
<td>kw[n]</td>
</tr>
<tr>
<td>Affricates</td>
<td>ts</td>
<td>nts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td>s[f]</td>
<td>s</td>
<td></td>
<td></td>
<td>h</td>
</tr>
<tr>
<td>Nasals</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids</td>
<td>l[r]</td>
<td>rr[r]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glides</td>
<td>w</td>
<td>j</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(3) All consonants come in plain and palatalized versions (/C^[i]/, /C^[p]i/)
   • Palatalization as secondary/abstract (no POA change): All non-coronals and rhotics (exception: ng^[p]i
     optionally realized as ñ word-finally)
   • Palatalization in inherent place: Non-rhotic coronals

<table>
<thead>
<tr>
<th></th>
<th>Plain</th>
<th>s</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palatal</td>
<td>t</td>
<td>ts</td>
<td>nts</td>
</tr>
<tr>
<td></td>
<td>hy[c]</td>
<td>ly[ɑ]</td>
<td>ch[ʨ]</td>
</tr>
</tbody>
</table>

(4) Surface vowels: monophthongs and diphthongs

Front monophthongs [i e]
   a. xix 'mosquito'
   b. pek 'shoulder'
   c. miok 'bat'
   d. piats 'tortilla'
   e. pang 'chair'
   f. ndok 'fishing net'
   g. xur 'pot'
   h. u-laik 'his/her tooth'
   i. a-loing 'hang, 3sg.'
   j. puik 'feather; fur'
Central/Back monophthongs [a o u]
   a. miok 'bat'
   b. hok 'bird'
   c. moik 'mouse'
   d. nook 'food'
   e. look 'head'
   f. xur 'pot'
   g. yur 'fire'
   h. hak 'bone'
   i. pak 'plate'
   j. lak 'bead'
   k. yok 'wheel'
   l. yau 'sun'
   m. ahuik 'beef'
   n. iauk 'fish'
   o. uauk 'salt'
   p. yauk 'hedgehog'

(5) Claim: Huave has underlying monophthongs only. Diphthongization is a contrast realization strategy for
   a plain vs. palatal(ized) distinction on final consonants. This analysis unifies a variety of
distributional observations, alternations, and other language-internal phonetic/phonological facts.

(6) Significance in cross-linguistic perspective
   • Plain vs. palatal consonants in Huave: an equipollent opposition with both feature values active
   • Context-dependent linearization of secondary place features
   • Phonetic and phonological evidence converges on a “palatalizability” hierarchy in Huave: coronals
     >>> noncoronals >>> rhotics (cf. Rose 1997, Kochetov 2002)

B Palatalizability in Huave: evidence from onsets

(7) In onsets, palatalization is allophonic for non-rhotic coronals only.
   a. xikh 'cigar'
   b. xex 'bowl'
   c. xur 'pot'
   d. xo 'pig'
   e. sox 'grass'
   f. sap 'sheep; pimple; cotton'

1
(8) Morpheme Structure Constraint: palatalization of non-rhotic coronals before /i e u/ (front & high Vs)

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>e</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>tyim</td>
<td>tyety</td>
<td>tyum</td>
</tr>
<tr>
<td>b.</td>
<td>lyily</td>
<td>kandyly</td>
<td>chuk</td>
</tr>
<tr>
<td>c.</td>
<td>ñity</td>
<td>ñichew</td>
<td>ñihty</td>
</tr>
</tbody>
</table>

(9) Alternations: palatalization as an active phonological process. Valence-decreasing theme vowel u:

<table>
<thead>
<tr>
<th></th>
<th>n- a- ty</th>
<th>ñ- u- ty</th>
<th>m- a- ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>SB TV eat</td>
<td>SB TV eat</td>
<td>SB TV eat</td>
</tr>
<tr>
<td>b.</td>
<td>'(that) I eat (it)'</td>
<td>'(that) I eat' (itr.)</td>
<td>'(that) s/he eats (sthg)'</td>
</tr>
<tr>
<td>c.</td>
<td>SB TV stain</td>
<td>SB TV stain</td>
<td>'s/he stained (it)'</td>
</tr>
<tr>
<td>d.</td>
<td>'it was stained'</td>
<td>'it was stained'</td>
<td>'it was stained'</td>
</tr>
</tbody>
</table>

(10) On the other hand, onset rhotics, labials, velars, and [h] do not have palatal offglides (most clear in the [u] context; Suarez 1975). This is true as a morpheme structure constraint...

<table>
<thead>
<tr>
<th></th>
<th>k- ly</th>
<th>k- keh</th>
<th>k- kuh</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>'parrot'</td>
<td>'blood'</td>
<td>'metate'</td>
</tr>
<tr>
<td>b.</td>
<td>'lisa fish'</td>
<td>'fingernail'</td>
<td>'turtledove'</td>
</tr>
<tr>
<td>c.</td>
<td>'breast'</td>
<td>'clothing'</td>
<td>'buluxio fish'</td>
</tr>
</tbody>
</table>

(11) ... And, in the u-theme context, these segments do not acquire a palatal offglide.

<table>
<thead>
<tr>
<th></th>
<th>m- a- ty</th>
<th>m- u- ty</th>
<th>m- e- r- u- ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>SB TV eat</td>
<td>SB TV eat</td>
<td>SB 2 TVTV TV eat</td>
</tr>
<tr>
<td>b.</td>
<td>'(that) s/he eats (sthg)'</td>
<td>'(that) s/he eats'</td>
<td>'(that) you (sg.) eat'</td>
</tr>
<tr>
<td>c.</td>
<td>'it was stained'</td>
<td>'it was stained'</td>
<td>'it was stained'</td>
</tr>
</tbody>
</table>

(12) Another example: Diminutivization raises all root vowels to [+high], taking e.g. [o] to [u]. When this happens, preceding coronals palatalize, but non-coronals don’t.

Aug. | Dim.
---|---
| a. | sonong | xuñung | 'to pile up' |
| b. | sopop | upup | 'to drizzle' |
| c. | koñ | kuñ | 'to fold' |

C Palatalization contrast in codas

(13) Although there is no palatalization contrast in onsets, there is in codas (=word-finally).

<table>
<thead>
<tr>
<th></th>
<th>n-a-ngen</th>
<th>n-a-ngañ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>NOM-TV-sweet</td>
<td>NOM-TV-drink</td>
</tr>
<tr>
<td>b.</td>
<td>'sugar'</td>
<td>'drunk'</td>
</tr>
<tr>
<td>c.</td>
<td>a-m</td>
<td>aïm</td>
</tr>
</tbody>
</table>

(14) Argument #1 in favor of analyzing (13cd) as a final-C contrast: Falling diphthongs are only ever found before non-coronals (i.e. Cs which cannot realize palatalization inherently), never before coronals.

|---|---|---|---|

(15) Argument #2 in favor of analyzing (13cd) as a final-consonant contrast: When suffixes are added to a root with a u, o or a diphthong, the palatal offglide disappears; the palatalization manifests itself in the front status of the epenthetic vowel introduced by the suffix.

<table>
<thead>
<tr>
<th></th>
<th>/i-lak pal/</th>
<th>i-lak</th>
<th>/i-lak-pal-iñ/</th>
<th>i-lak-ion</th>
<th>/a-long pal/</th>
<th>a-long</th>
<th>/a-long-pal-iñ/</th>
<th>a-long-iof</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>/i-lak pal/</td>
<td>i-lal</td>
<td>/i-lak-pal-iñ/</td>
<td>i-lak-ion</td>
<td>/a-long pal/</td>
<td>a-lone</td>
<td>/a-long-pal-iñ/</td>
<td>a-long-iof</td>
</tr>
<tr>
<td>b.</td>
<td>/i-lak pal-iñ/</td>
<td>i-lak-ion</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long-pal-iñ/</td>
<td>a-long-iof</td>
</tr>
<tr>
<td>c.</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
</tr>
<tr>
<td>d.</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
<td>/a-long pal-iñ/</td>
<td>a-long-iof</td>
</tr>
</tbody>
</table>
This “metathetic” realization of palatalization in (16c) is attested in Mixe (Van Haitsma & Van Haitsma 1976:10, Hoogshagen and Bartholomew 1993:342-344) and Maxakali (Wetzels & Sluyters 1995), and is reminiscent of Austronesian metatheses (Blevins & Garrett 1998).

More general observation: in all diphthongs, the latter part of the vowel usually cues the “back” (plain) or “front” (palatal) status of the coda consonant.

Falling diphthongs ai, oi, ui occur in syllables with underlying front vowels; the palatal offglide cues palatality (“frontness”) of the final consonant.

- /u-la^kpal/ u-la^k ‘his/her tooth’
- /a-long^kal/ a-loing ‘hang, 3sg.’
- /pu^kal/ pu^k ‘feather; fur’
- /o^kal/ o^k ‘cloud’

Diphthongization is triggered only when underlying vowel-coda consonant sequences conflict in frontness/backness. When the vowel and coda consonant already match for frontness or backness, no diphthongization occurs.

Front V + Front C Back V + Back C
a. /mI^pal/ mily ‘lisa fish’ c. /kants^bk/ kants ‘chile’
b. /s^pal e^pal/ xex ‘bowl’ d. /ndok^bk/ ndok ‘fishing net’

Rising diphthongs io [ja, jo] and ia [ja] occur in syllables with underlying front vowels; the central/back nucleus cues plainness (“backness”) of the final consonant.

a. /I^k/ ----> ioC
b. /e^k/ ----> iaC

TV-have a-ji^ti-af ‘they have’

Prefix alternations before single-consonant roots
a. /i-w^pul/ i-w ‘you borrow’
   /i-mb^bk/ io-m ‘you go’

b. /t-e-t^pul/ t-e-ty ‘you ate (it)’
   /t-e-m^bk/ t-ia-m ‘you went’

Exception to the VC-matching generalization:
Back V + Front C Inherent palatals: no fission despite the back-vowel environment
a. /kat^mk/ katty ‘fish’
   /mas^mk/ max ‘canoe’

The generalization that “the second half of the vowel realizes the front vs. back status of the final consonant” is not really correct.

- Correct generalization: The underlying front vs. back status of the final consonant must be realized on the surface. In most cases, it is realized on the preceding vowel; this is the source of all diphthongs.
- But with inherently palatal consonants, it is realized on the consonant itself; there is no need to realize it on the preceding vowel as well.

How do we distinguish between coarticulation and diphthongization with final palatals, given that some degree of coarticulation is inevitable?
(27) True diphthongs (left) reach a steady state for both components, indicating two distinct targets. Back vowels before palatal coronals (right) show a more linear transition that suggests coarticulation.

D Diachronic explanation

(28) Notably, the palatalization contrast only obtains in a position where it is difficult to perceive (Kochetov 2002; Ni Chiosain & Padgett, to appear). The historical explanation lies in the loss of final vowels.

(29) Diphthongization can be understood diachronically as the phonologization of V-to-V coarticulation upon final vowel loss (Suarez 1975). Final vowels thus left their front/back stamp on both preceding Cs and preceding Vs, and this is behind the VC “matching” seen in (18) and (20).

a. Front vowels: *ndéka > *ndé’ka > *ndésk > *ndeák > ndjak
b. Back vowels: *-láki > -lá’ki > -lajk

(30) Some of the hypothesized intermediate stages in (29a) are attested in other Huave dialects. The presumably longer duration of stressed vowels (the only ones which diphthongize) could have contributed to perception of the offglide as a distinct phase.

(31) Coronal consonants acquired palatal place of articulation before front vowels. That is, the (historical) final vowel’s front/back status was phonologized on the consonant itself, rather than on the preceding vowel. Palatal coarticulation on the vowel remained predictable, and phonetic.

*katí > *katí[pal]i > ká’tí[pal]

(32) Loanword evidence

a. CVCi, CVCe > CVC[pal]
   b. Sp. mélon ‘melon’ > PHu. *méloni > Hu. méloñ
   c. CVCa, CVCo, etc. > CVC
   d. Sp. cocina ‘kitchen’ > PHu. *kosina > Hu. /kosin[bc]/> kosión

E Synchronic analysis: sketch

(33) Consonants bear both primary and secondary place features, except for inherent palatals, which have only a primary place feature.

<table>
<thead>
<tr>
<th>Primary place</th>
<th>Secondary place</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/</td>
<td>/p[pal]/</td>
</tr>
<tr>
<td>/t/</td>
<td>/t[pal]/</td>
</tr>
<tr>
<td>/k/</td>
<td>/k[pal]/</td>
</tr>
<tr>
<td>Primary place</td>
<td>[lab]</td>
</tr>
<tr>
<td>Secondary place</td>
<td>[back]</td>
</tr>
<tr>
<td>[lab]</td>
<td>[pal]</td>
</tr>
<tr>
<td>[dent]</td>
<td>[back]</td>
</tr>
<tr>
<td>[pal]</td>
<td>[back]</td>
</tr>
<tr>
<td>[vel]</td>
<td>[pal]</td>
</tr>
</tbody>
</table>
(34) Diphthongization results when a consonant feature must surface on the preceding vowel nucleus in order to surface at all (high-ranked MAX).

a. Rising diphthongs

\[
\begin{array}{c}
\text{Primary} & [\text{pal}[\text{dent}]] & [\text{pal}] & [\text{pal}[\text{bk}][\text{dent}]] \\
\text{Secondary} & [\text{bk}] & [\text{bk}] \\
\end{array}
\]

b. Falling diphthongs

\[
\begin{array}{c}
\text{Primary} & [\text{bk}] & [\text{vel}] & [\text{bk}][\text{vel}] \\
\text{Secondary} & [\text{pal}] & [\text{pal}] \\
\end{array}
\]

c. No change: “front” context

\[
\begin{array}{c}
\text{Primary} & [\text{pal}][\text{vel}] & [\text{pal}] & [\text{pal}][\text{vel}] \\
\text{Secondary} & [\text{pal}] & [\text{pal}] \\
\end{array}
\]

d. No change: “back” context

\[
\begin{array}{c}
\text{Primary} & [\text{bk}][\text{lab}] & [\text{bk}][\text{lab}] \\
\text{Secondary} & [\text{bk}] & [\text{bk}] \\
\end{array}
\]

e. No change (coarticulation only): inherent palatals

\[
\begin{array}{c}
\text{Primary} & [\text{bk}][\text{pal}] & [\text{bk}][\text{pal}] \\
\text{Secondary} & [\text{bk}] & [\text{bk}] \\
\end{array}
\]

F Discussion

(35) Diphthongization can be seen as a process of consonant fission, which ensures that consonant features for plainness or palatality are realized on the preceding nucleus (or VC transition) when they cannot be realized on the consonant itself.

• Palatal coronals do not undergo fission since they already have inherent palatal place of articulation
• The plain status of non-palatalized consonants is always enhanced after front vowels; there is no set of consonants that “inherently” realizes [back].
• Both [back] and [pal] are active; if the opposition was privative and non-palatality features were not specified, hard to see how the [back] element of rising diphthongs io and ia could come about.

(36) What about rhotics?

• Rhotics can be underlyingly palatalized - /r[\text{pal}]/ exists - but this is the one case where a secondary consonant feature is blocked from appearing on the surface (violation of MAX), presumably due to constraints against [ir] sequences or rhotic palatalization in general.
• We can distinguish /t[\text{bk}]/ from /t[\text{pal}]/ based on vowel harmony behavior.

a. /t-a-htsor[u]\text{-pal}/

\[
t-a-htsor \ 's/he left for home' \quad \text{and} \quad *t-a-htsoir
\]

b. /t-a-htsor[u]-i\text{fbk}/

\[
t-a-htsor-\text{uif} \ 'they left for home'
\]
c. /a-ntsor\bh/  
   a-ntsor  
   'it barks'  
   TV-bark

d. /a-ntsor\bh-o/  
   a-ntsor-oh  
   'they bark'  
   TV-bark-3PL

(37) Palatalizability hierarchy in Huave:

- Coronals (can be phonetically palatal)
  - Non-coronals (realize palatalization on adjacent nuclei)
  - Rhotics (sometimes do not realize palatalization at all)

(38) Next steps: quantitative investigation of falling diphthongs and pre-palatal coarticulation

- establish whether the steady-state target vs. lack thereof is really consistent and categorical
- durational differences?
- different patterns of interaction with vowel aspiration?

Abbreviations

- CPL=completive, 2ITR=second person intransitive, NOM=nominalizer, 3PL=third person plural, PL=unmarked plural, 1SB=first person subordinate, SB=subordinate, TV=theme vowel, 2=second person.

References

Van Haitsma, Julia and Willard Van Haitsma. 1976. *A hierarchical sketch of Mixe as spoken in San José el Paraiso*. SIL.