Phonological diffusion in the Amazonian Vaupés

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Introduction:
The languages of Amazonia

High diversity:
• 240-300 languages
• some 52 distinct groupings
Introduction

Northern Amazonian languages
Introduction

The languages of Amazonia

Language endangerment:

• Some 600-1,500 languages spoken in South America at Contact
• Perhaps 65% of these are now extinct
• At least 77 out of some 300 remaining languages are now critically endangered (Moore 2007)

Urgent need for documentation:

• Good description: 19% of native languages of Brazil
• Some description: 64%
• No description: 13%
  (Franchetto 2000, in Moore 2007:30)
Introduction

The languages of Amazonia

• Many typologically and theoretically noteworthy features, phonological and morphosyntactic
• Diversity + contact means that some of these features are widely distributed among languages
• Amazonian languages give us an opportunity to:
  – Investigate different permutations of particular phenomena across languages
  – Consider the variability and stability of these phenomena over time and space
  – Gain insights into Amazonian prehistory
Introduction

The languages of Amazonia

Goals of this talk:

• Investigate the phonological systems in languages of the Vaupés region (northwest Amazonia)

• Examine noteworthy aspects of these systems, as instantiated across languages

• Consider the role of areal diffusion in the distribution of phonological features
Languages of the Vaupés region

- East Tukanoan
- Arawak
- Nadahup
- Kakua-Nukak
Eastern Tukanoan and Arawak peoples:

- Interact through linguistic exogamy (marriage across language groups).
- River dwellers; focus on fishing and agriculture.
- Economic interaction with Nadahup/Kakua peoples: take socially superior role.

Multilingual (people typically speak parents’ languages, among others).
Resistance to language-mixing motivated by linguistic exogamy (limited lexical borrowing but heavy grammatical diffusion)
Nadahup and Kakua peoples:

- Do not practice linguistic exogamy.
- Forest dwellers; focus on hunting, gathering.
- Economic interaction with Tukanoan (and Arawak) peoples: treated as socially inferior.

High rate of bilingualism in East Tukanoan languages

Resistance to language-mixing (in line with regional practices despite no linguistic exogamy; limited lexical borrowing but heavy grammatical diffusion)
Languages of the Vaupés region

Documented cases of language contact

- East Tukanoan > Tariana (Arawak) (Aikhenvald 2002)
- East Tukanoan > Hup/Yuhup/[Daw] (Nadahup) (Epps 2007, 2008)
- East Tukanoan > Kakua (Bolaños & Epps 2009, Bolaños 2010)
- Hup (Nadahup) > Kakua (Bolaños & Epps 2009)
- Baniwa (Arawak) > Cubeo (ET) (Gomez-Imbert 1996)
- Yucuna (Arawak) <> Tanimuca/Retuarã (ET) (Aikhenvald 2002)
- Other? Arawak > Kotiria, possibly Nadahup/Kakua > Cubeo (and other ET/Arawak?) (Goldman 1963)

Within broader northwest Amazon region:
- Bora (Boran) > Resigaro (Arawak) (Aikhenvald 2002)
- East Tukanoan > Nukak (Kakua-Nukak) (Bolaños & Epps 2009)
Languages of the Vaupés region

Phonological features

• Segmental inventories
• Phonological word and syllable structure
• Prosodic/suprasegmental features: nasalization tone glottalization

Some Hup words:
cáʔ ‘box’
cǎʔ ‘root clump’
j’áʔ ‘turi (torch wood)’
cǎn ‘antler’
j’áh ‘earth’
j’āʔh ‘Dioscorea tuber’
j’á ‘black’
Languages of the Vaupés region

Hup
Vowels

Large inventories:
• Nadahup languages
  i
  e  ə (ʌ)  o
  æ  a  ɔ

Phonemic vowel length:
  Nadëb only (< Arawak?)

Small inventories:
• Tukanoan languages (E & W)
  i
  e  o
  a

  Tanimuca has lost i, probably due to Yucuna (Arawak) influence (Aikhenvald 2002).
Vowels

Small inventories:

• North Arawak (typical pattern)
  
  i    u
  
  e    a

Most North Arawak languages have phonemic vowel length. Tariana is developing i and probably o (but without length) under Tukanoan influence. Yucuna gained o and lost length, probably under Tanimuca (Tukanoan) influence (Aikhenvald 2002).

• Kakua-Nukak
  
  i    i    u
  
  e    (ʌ)    (o?)
  
  a

Uncertain status of o in Kakua and Nukak (Bolaños 2010); may be emerging under ET influence.
Consonants

Voiceless stops: all languages

Voiced stops: (generally lacking in Carib, Yanomami, some W. Tukanoan)
• /b/ marginal in some N. Arawak lgs
• /g/ missing/marginal:
  – N. Arawak languages (but Resigaro developed under Bora influence)
  – E. Tukanoan: those in close contact with Arawak lack /g/ (Tanimuca/Cubeo, also some W. Tukanoan); those in eastern Vaupés lack /g/ in word-initial position. Chacon (2010): proto-Tukanoan glottalized voiceless stops > voiced stops, except in some cases word-initial /g/ - Arawak influence?
  – Nadahup: all languages lack [g] word-initially
• Oral-nasal contours for voiced stops: some E. Tuk, all Nadahup, Kakua-Nukak

Aspirated consonants:
• Common in N. Arawak languages only (also Yanomami)
• Aspirated voiceless stops developed in Kotiria [Wanano] (< Arawak)
• Some loss of aspiration in Tariana/Yucuna (Arawak) < Tukanoan
Consonants

**Palatal stops:** Nadahup (also Resigaro < Boran)

**Fricatives:**
- Labial: Kakua-Nukak (and Boran)
- Sibilant fricatives/affricates: 1 Tukanoan, 2+ Arawak, lacking Nadahup/Kakua-Nukak (except Dâw and Nadëb)
- Glottal/velar: most lgs have glottal; velar + glottal in Dâw and (probably) proto-Nadahup

**Liquids:** widespread, but allophonic in Hup/Yuhup

**Glides:** widespread
Word and syllable structure

Preferred patterns:

• Tukanoan, Arawak:
  – CV syllable
  – 2-3 syllables per root morpheme (typical of other NW Amazonian languages)

• Nadahup and Kakua/Nukak:
  – CVC syllable
  – 1 syllable per root morpheme
  – Strong nasal contours on final voiced stops
  – Unique and highly salient pattern in the NW Amazonian context
Glottalization

• Glottal/laryngeal features (beyond presence of ? / h segments) are widespread in Vaupés languages
• Found in Tukanoan, Nadahup, Kakua-Nukak, and (marginally) Arawak
• Problematic for analyses; associated with consonants, vowels, or suprasegmental?
Glottalization: Tukanoan

Glottalization in East Tukanoan languages of the eastern Vaupés:
Tukano, Piratapuyo, Desano, Siriano

• Only occurs in CV?CV and CV?V positions
• Only occurs in root morphemes (i.e. multisyllabic)
• Contrasts with (predictable) pre-aspiration on voiceless obstruents
• Sometimes conditions laryngealization on preceding vowel

Kotiria [Wanano] (Stenzel 2007:333)

\[\text{du’ti} \ [\text{du’ti}] \ ‘\text{hide/escape’} \quad \text{duti} \ [\text{du’hö}] \ ‘\text{illness’}\]
\[\sim\text{da’bo} \ [\text{nâ?mò}] \ ‘\text{rope’} \quad \sim\text{dabo} \ [\text{nâmò}] \ ‘\text{wife’}\]
\[\text{su’a} \ [\text{su’á}] \ ‘\text{weave’} \quad \text{sua} \ [\text{suá}] \ ‘\text{pick fruit’}\]
Glottalization:

Tukanoan

Variable analyses:

– ‘Laryngealized tone’ (Ramirez 1997 for Tukano, where glottalization correlates with low tone on 1st syllable – but not true for other ET languages)

– Series of laryngealized vowels (Sorensen 1969:19-23)

– Glottal stop segment with restricted distribution (and as only licensed coda C; e.g. Miller 1999 for Desano)

Glottalization as a suprasegmental feature:

Stenzel 2007 for Kotiria and other languages; see also Silva 2010 for Desano

• Feature [constricted glottis] associates to the right edge of the first mora (in a subset of root morphemes)

• Unlike other prosodic features in ET languages (nasalization and tone), does not spread
Tukanoan glottalization in historical perspective:

- $C' > C[^\text{voiced}]$ in many East/West Tukanoan languages
- In Tukano, Kotiria, and others:
  - $*C' > \text{voiced stop} / \#_ (\text{except g})$
  - $*C' > V'C / V_V$
Glottalization: Nadahup

Glottalization in Hup (Epps 2008)

- Property of consonants; series of glottalized stops: b’, d’, j’, g’ and glottalized glides: j’, w’
- Glottalized stops do not contrast for voice
- As onsets: realized as laryngealization on following vowel [CV]
- As codas: realized as unreleased (voiceless) stop

/\do/?  [\nd\d?]  ‘take’
/t\d’/  [t\d’]  ‘jar, bottle’
/t\d’-\d/  [t\d.^\d’]  (jar + Oblique case)  ‘with jar, bottle’

In Yuhup:

- Much like Hup, except that initial C’V is frequently realized as [V?V]
- Ospina (2002) analyzes as a suprasegmental feature
In Dâw (Martins 2004):

- Phonemic glottalized consonants: m', n', ɲ', l', w', j'
- [k’] and [c’] also exist, analyzed as allophones of [g] and [c] (but correspond to Hup /g’/ and /j’/ in cognates)
- Possible that full range of glottalized Cs occurs, but d’ and b’ do not occur as onsets

In Nadēb (Barbosa 2005):

- [k’] and [tʃ’] exist, analyzed as allophones of [g] and [ʃ] (but correspond to Hup /g’/ and /ʃ’/ in cognates)
- Laryngealization also occurs on any vowel in a stressed syllable; analyzed as a suprasegmental feature
Glottalization:

Kakua-Nukak

Nukak:
• Glottalized voiced consonants may exist (p.c. Dany Mahecha to Katherine Bolaños)

Kakua (Bolaños 2010):
• Glottalized stops and glides exist, as in Hup, but:
  – /b’/ is only clearly attested glottalization contrast in onset position
  – /b’/, /d’/, /g’/, /j’/, /w’/ in coda position
Glottalization generally lacking in other regional languages (Arawak, Carib, Yanomami, Bora)

**Arawak** (Aikhenvald 2002):
- Tariana: Some insertion of [h] before medial voiceless consonants; some sporadic insertion of word-final ?, attributed to Tukanoan influence
- Some glottalization present in Yucuna, possible influence from Tanimuca

**SUMMARY**:
- Variable status of glottalization in Vaupés languages as property of consonants or suprasegmental
- May reconstruct to Nadahup, Tukanoan, Kakua-Nukak – origin unclear
- Contact has likely influenced their distribution and realization
Nasalization

• Nasalization in Vaupés languages is a suprasegmental feature – property of syllable and/or morpheme, undergoes spreading

• Tukanoan nasal harmony much discussed (e.g. Kaye 1971, Noske 1995, Piggott & Van der Hulst 1997)

• Other area languages have similar phenomena – but with interesting variations

Suffixes in many ET languages are lexically marked as inherently nasal [+nasal], inherently oral [-nasal], or as unmarked (ø nasal) – a 3-way contrast!
Nasalization:

Tukanoan

Nasal harmony targets sonorants (includes voiced oral stops, see Rice 1993).

2 harmony types:

a) Non-targets (voiceless obstruents) are blocked by nasal spread
   e.g. Secoya (WT): nasalization spreads progressively until it encounters a non-target; spreads reggressively within the syllable:
   \[ \text{m\text{"e}\text{"a} ‘variety of ant’ n\text{"a}\text{"o}so ‘crayfish’} \]

b) Non-targets (voiceless obstruents) are transparent to nasal spread
   e.g. Tuyuca (ET):
   \[ \text{n\text{"i}\text{"i} ‘coal’ t\text{"i}g\text{"o} ‘Yapara rapids’} \] (exs. Botma 2005:4)

Most systems of this type results in wholly nasal or oral morphemes, but in Southern Barasano nasalization is associated with a vowel and spreads progressively (and reggressively within syllable).
Nasalization: Arawak

• In most N. Arawak language, nasalization is a property primarily of consonants; no nasal harmony.

• Tariana (Aikhenvald 2002:24, 46, 2003):
  – Domain of nasalization is phonological word: spreads onto bound morphemes (progressive/regressive), skips over voiceless Cs
  – Result of Tukano influence.
  – Variation among speakers and dialects; those under more ET influence have more pervasive nasal harmony

• Yucuna: some nasal harmony, attributed to influence of Tanimuca (Tukanoan; Aikhenvald 2002:55)
Nasalization:
Nadahup

Hup (Epps 2008):
• Nasalization is morpheme-level property, as in E. Tukanoan – not contrastive for segments
• Spreading: only with vowel-copying suffixes, e.g. Oblique case –VT:

\[ \text{núh-ūt} [nūh-ūt] \text{‘on head’} \quad \text{tēg-ōt} [tēg\text{n}.gōt] \text{‘on tooth’} \]

• Nasalization is morpheme-level, as in Hup
• But some vowel-initial suffixes following post-nasalized consonants undergo nasal spreading – typologically anomolous! (note pre-nasalization understood as phonologically irrelevant in Tukanoan languages)

\[ \text{[tē:d\text{n}-īh]} \text{‘beating’} \quad \text{[ē:g\text{n}-īh]} \text{‘drinking’} \]
Nasalization:

Nadahup

Dâw:

• Martins (2004) includes both nasal consonants and vowels in phonemic inventory; contrastive:

  \( n\hat{e}g \) 'honey’  \( mab \) 'sibling’

• BUT segmental contrasts within the morpheme are limited; most morphemes in her data are either all nasal or all oral (wrt potential targets), e.g. \( m\hat{\iota}n \) [m\(\ddot{\text{i}}\):n] 'inga'.
• Nasal harmony limited to vowel-copying suffix -\( V\?' \) 'focus’

Nadëb:

• Barbosa (2005) includes both nasal consonants and vowels in phonemic inventory
• But, as in Dâw, actual examples of morphemes with both nasal and oral segments are very limited; e.g. \( mog \) ‘tree sp.’
Nasalization: Kakua-Nukak

**Nukak** (Cabrera et al. 1999: 363-404):
- Nasalization appears to be a morpheme-level property (though analyzed by Cabrera et al. as property of vowels)
- V-initial suffixes are nasalized by the post-nasalization of a root-final stop – like Yuhup!

\[\text{diw-at} \ '\text{be born}’ \quad \text{ub-at} \ [\text{ubmãt}] \ '\text{be afraid}’\]

**Kakua** (Bolaños 2010 and p.c.):
- Nasalization is morpheme-level
- Spreading mostly limited to vowel-copying suffixes
- BUT for suffixes with a specified initial vowel, spreading *does* occur across a root-final /h/.
- Spreading sometimes occurs from a nasal CV root (no coda C), but speakers consider this a mistake
Nasalization:
Vaupés languages

SUMMARY:
Extensive nasal harmony (associated with morpheme and/or phonological word) is a feature of Vaupés languages: East Tukanoan, Nadahup, Kakua-Nukak

Probably originated with E Tukanoan and spread to others in region (but Kakua-Nukak unclear)

Nasal harmony has a range of realizations across the region:
• (voiceless) obstruents transparent to nasalization
• (voiceless) obstruents block nasal spreading
• post-nasalization of root-final consonant may be inert or may spread
• other variations in spreading, e.g. transparent nature of /h/ in Kakua
Tone

• Widespread in Vaupés languages (and beyond, primarily to west)
• Like nasalization, prone to spreading
• Variation across area languages
Varying analyses within Tukanoan as stress, tone, accent, ‘pitch-accent’ (see Hyman 2010, Chacon 2010)

All can be classified as tone languages, except Siona and Secoya (West Tukanoan); Chacon (2010) reconstructs tone for Proto-Tukanoan.

Some are [+ stress] [+ tone], where tone and stress correlate.
Others are [- stress] [+ tone] (cf. Hyman 2009)
Tone

Tukanoan

Kotiria ([- stress] [+ tone], Stenzel 2007:345-352; compare Barasano, Gomez-Imbert and Kenstowicz 2000):

- H and HL; both can occur with extrametrical (L) associating with left edge of word
- Associates with either 1<sup>st</sup> or 2<sup>nd</sup> mora of word; spreads progressively through phonological word

\[\text{H and HL; both can occur with extrametrical (L) associating with left edge of word}\]
\[\text{Associates with either 1}\textsuperscript{st} \text{or 2}\textsuperscript{nd} \text{mora of word; spreads progressively through phonological word}\]
Kotiria (Stenzel 2007:351):

- In compounds, the tone of the first root takes precedence, spreading throughout phonological word:

\[ \text{Head root} \quad \text{Derivation and resulting phonological word with LHL melody} \]

\[ \begin{align*}
\text{L HL} & \quad \text{L HL HL} \\
\phi_i' a & \quad \phi_i' a + \sim s \# + a \\
[p^{\phi_i'a}] & \quad \text{go.out.into-arrive-ASSERT.PERF}\\
\text{‘go out into’} & \quad \text{‘(he) went out into (a clearing)’}
\end{align*} \]

\[ \text{L HL} \]

\[ \text{L HL} \]
Variations in tone patterns:

• Gomez-Imbert (1999) discusses tonal differences between Barasano and Taiwano, two closely related languages.

• Their speakers regularly intermarry; linguistic exogamy requires their languages to be distinct.

• Gomez-Imbert argues that "tones are used as markers of difference" (15) while segmental/lexical distinctions are minimal.
Tone
Nadahup

Hup (Epps 2008):
• Rising vs. high
• No tonal spreading
• Tone appears on stressed syllable only: [+ stress] [+ tone]
• Tone contrasts absent from verb roots
  \textit{núh} (H) ‘head’ \textit{nǔh} (R) ‘tapioca’

Yuhup (Ospina 2002 and my fieldnotes)
• Like Hup, but tone values are \textit{reversed}:
  \textit{nǔh} (R) ‘head’ \textit{núh} (H) ‘tapioca’
Tone

Nadahup

Dâw (Martins 2004):
• Rising, falling, and Ø tone
• Rising and falling correlate with vowel length
  mãj (Ø) 'payment'  mãj (R) 'hole'  mãj (F) 'much'

Nadëb (Martins 2005, Barbosa 2005):
• No tone
Tone
Nadahup

Nadahup correspondences:
• short V Nadeb:: ø tone Daw:: high tone Hup:: rising Yuhup
• long V Nadeb:: rising tone Daw (voiceless coda):: falling tone Daw (voiced coda):: rising tone Hup:: high tone Yuhup

Nadahup tonogenesis?
• Hup-Yuhup-Dâw (subgroup) probably innovated tone under Tukanoan influence
• Yuhup almost certainly underwent a tone reversal
• But it is also possible that Nadëb lost tone and developed contrastive vowel length under Arawak influence
Tone

Kakua-Nukak and Arawak

Kakua (Bolaños 2010):
- Rising vs. falling vs. low (all roots, including verbs)
- [- stress] [+ tone]
- Tone spreads to affixes

Nukak (Cabrera et al. 1999: 374):
- Tone – phonetic high, mid, low, rising, falling; no further info

Arawak (Aikhenvald 2002, Ramirez 2001):
- Languages vary in presence/absence of tone; Tariana and Baniwa (in/near Vaupés) have tone
SUMMARY

• Tone occurs throughout the Vaupés, but varies across languages according to correlation with stress, number of contrasts, etc.

• Areality suggests speakers adopt tone in order to sound similar.

• But tone also seems particularly prone to change – may be manipulated to emphasize linguistic difference (e.g. Barasano ~ Taiwano; Hup ~ Yuhup)
Phonological diffusion

• What do we know about phonology in language contact generally? What is the relative stability of different types of features?

• Phoneme transfer: may piggy-back into a language on loan vocabulary; be transferred from speech community’s L1 in process of language shift

• Situations of pervasive multilingualism may involve significant transfer without shift – “phonological metatypy” (Ross 1996, Foley 2010)

• Are some phonological features particularly prone to diffusion, and others more stable? e.g. prosodic features as prone to transfer – like copying an ‘accent’ (Urban & Sherzer 1988, Matisoff 2001)
Phonological diffusion

Relative stability/diffusibility of phonological features in the NW Amazon:

• Highly diffusible: tone, nasalization, glottalization (?)
• Somewhat diffusible: vowel contrasts; aspiration and voicing contrasts
• Relatively stable: word/syllable structure

• Coded for 39 phonological features (segmental, phonotactic, prosodic) across 29 languages (E/W Tukanoan, Arawak, Nadahup, Kakua-Nukak)
• Evaluation of relative similarity (due to inheritance or contact) using NeighborNet (Huson & Bryant 2006)
Phonological diffusion:

Segmental features / syllable structure

Consonants:

- /b/ liquid(s) at least 1 sibilant fricative
- /d/ glottal stop 2+ sibilant fricatives
- /g/ (robust) labial fricative
- [g] word initial affricate(s)
- aspirated stops velar fricative
- palatal stops glottal fricative

Vowels:

- /i/ /e/ /ɔ/ Diphthongs
- /ɪ/ or /u/ /ɛ/ or /æ/ /o/
- /u/ or /ʊ/ /ə/ or /ʌ/ /a/

Syllable/word structure:

- Morphemes usually 1 syllable
- No/restricted codas
Phonological diffusion:
Segmental features / syllable structure
Phonological diffusion:
Prosodic and related features

Nasalization:
property of (most) morphemes/phonological words
property of syllables (only)
property of Cs
property of Vs (robust)
nasal spreading across some morpheme boundaries
voiced Cs with oral/nasal contours (e.g. [bm])

Tone:
contrastive tone or stress/pitch-accent

Glottalization:
glottalization (not associated with glottal stop segment) exists
glottalization of Cs
glottalization/laryngealization of Vs (not associated with Cs)
glottalization is suprasegmental

Other:
Vowel harmony
Vowel length
Contact and NW Amazonian prehistory
Contact and NW Amazonian prehistory

Some speculations:

• Tukanoan family may have originated in area between current E/W branches (see Chacon 2010); early contact with Boran/Witotoan languages; move of ET languages into Vaupés

• Early Kakua-Nukak and Nadahup relationship (contact or genetic?) in Vaupés/Rio Negro region, before/independent of Tukanoans

• Prolonged contact between Tukanoan and Kakua-Nukak; Nukak later move out to northwest

• Prolonged contact Tukanoan and Hup-Yuhup, some Dâw

• Localized Tukanoan-Arawak contact within Vaupés

• Contact Nadëb and Arawak (and/or Carib?)
Conclusions

• Amazonian languages are widely endangered and little documented – but many intriguing phonological (and other!) features

• Diversity + contact provides insights into the variability and relative stability of phonological features

• Distribution of phonological features gives glimpses into prehistory – e.g. an ancient association between Nadahup and Kakua/Nukak?

• A puzzle still in need of much work – and languages in need of much documentation!
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