What exactly is the phonological feature [nasality] in Ticuna (isolate, Western Amazonia)?
Special thanks!

Javier Sánchez Gregorio and Loida Ángel Ruiz (San Martín de Amacayacu, Colombia)

Myriam Lapierre, Amalia Skilton, Lev Michael (UC Berkeley)

Ana María Ospina (Universidad Nacional de Colombia)

Antoine Guillaume (DDL, Lyon 2)
Main question

What *phonological analysis* would best account for the *surface configuration of nasality* in Ticuna?

[a]  [ba]  [pa]  *[ma]*

[ã]  *[bã]  *[pã]  [mã]*

Specifically:
• is nasality a phonological property of V, C, or σ?
• what rules govern how nasality surfaces in the final output?
Main claim

A number of possible unsatisfactory phonological analyses

One I find much preferable:

• [nasal] is a lexical, privative feature of $\sigma$
• [nasal] is linked to the first segment of $\sigma$
• [nasal] nasalizes the latter if it is a target segment (i.e. V and voiced C); otherwise [nasal] is left unrealized
• phonetic nasality spreads to the right of [nasal]-bearing nasalized segments up to any C (all C are opaque to phonetic nasality spreading)

Happens to correspond exactly to the analysis implied by my supposedly pre-analytical, practical transcription system…
1. Introduction to data and language

2. Structure of the SMAT syllable

3. Nasality as a phonological property of segments?

4. Nasality as a phonological property of syllables?

5. A revised version of nasality as a property of syllables

6. Two elaborations

7. Conclusions
1. Introduction to data and language
1. Introduction to data and language

Data

Fieldwork (2015-2017, PhD project, supervisor: Antoine GUILLAUME, DDL research center & Université Lumière–Lyon 2, ASLAN Labex)

San Martín de Amacayacu Ticuna (SMAT; Colombia)
Language

Ticuna ≈50,000~60,000 speakers (Peru, Colombia, Brazil), vital as a whole

SMA Ticuna ≈550 speakers

Isolate (or Yuri-Ticuna?: Carvalho 2009, Goulard & Montes 2013)
Language

Goulard (2009)
2. Structure of the SMAT syllable
2 major types of syllables

Stressed σ́ vs unstressed σ

Stress is demarcative (i.e. not distinctive); automatically on first syllable of stressed syntactic words

Among other differences, poorer C, V, and tone inventories in σ

N.B.: here we will discuss mostly σ́ (unless stated otherwise)
2. Structure of the SMAT syllable

[toneme]  
[glottal stop]  

\[ \sigma \]

(C)  
V
2. Structure of the SMAT syllable

Obligatory filled in non-epenthetic syllables; mostly lexically determined

Roughly speaking, 10 possible values in ύ; makes use mostly of pitch, but also phonation

Strictly orthogonal to nasality
=> irrelevant for today’s discussion
2. Structure of the SMAT syllable

- Presence (vs Ø) lexically determined
- Realized as coda [ʔ] (often brings about an epenthetic syllable)
  - N.B.: ≠ word-initial non-phonological [ʔ]
- Better analyzed as a feature of σ than as a coda C
- Strictly orthogonal to nasality
- => irrelevant for today’s discussion
2. Structure of the SMAT syllable

N.B.: phones (phonemes); very slightly simplified
2. Structure of the SMAT syllable

N.B.: *phones* (*phonemes*); very slightly simplified
2. Structure of the SMAT syllable

*N.B.: phones (phonemes); very slightly simplified*

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2. Structure of the SMAT syllable

- [toneme]
- [glottal stop]

\[ \sigma \]

\[(C) \rightarrow V\]

Phonological nasality?

Hypothesis 1
2. Structure of the SMAT syllable

- Phonological nasality?
  - Hypothesis 1
  - Hypothesis 2

[toneme] → [glottal stop] → \( \sigma \) → \( (C) \) → \( V \)
2. Structure of the SMAT syllable

- [toneme]
- [glottal stop]
- \( \sigma \)
- (C)
- V

Phonological nasality?
- Hypothesis 1
- Hypothesis 2
- Hypothesis 3
3. Nasality as a phonological property of segments?
3. Nasality as a phonological property of segments?

Hypothesis 1

\[ C = C_{[-\text{voice}][-\text{nasal}]} \cup C_{[+\text{voice}][-\text{nasal}]} \cup C_{[+\text{voice}][+\text{nasal}]} \]

- e.g.: /p/
- /b/
- /m/
- /u/
3. Nasality as a phonological property of segments?

\[
\begin{array}{ccc}
\text{[toneme}^{31}\text{]} & \text{[pu}^{31}\text{]} & \text{‘to get used to’} \\
\text{[glottal stop]} & & \\
\sigma & & \\
\downarrow & & \\
p & & u
\end{array}
\]
3. Nasality as a phonological property of segments?

[tone\textsuperscript{31}]  \[\text{[glottal stop]}\]  \[\text{[pu\textsuperscript{31}] } /\text{pu\textsuperscript{31}}/ \text{ ‘to get used to’}\]

[\text{bu\textsuperscript{31}}]  \text{ ‘to be born’}
3. Nasality as a phonological property of segments?

[toneme ³₁]
[glottal stop]

[pu³₁] /pu³₁/ ‘to get used to’

[bu³₁] /bu³₁/ ‘to be born’

[ʔu³₁] ‘to touch’

(*[u] in stressed σ)
3. Nasality as a phonological property of segments?

- [toneme $^{31}$]
  - [glottal stop]
  - $\sigma$
  - [m $\mu^{31}$]

- [pu$^{31}$] /pu$^{31}$/ ‘to get used to’
- [bu$^{31}$] /bu$^{31}$/ ‘to be born’
- [ʔu$^{31}$] /u$^{31}$/ ‘to touch’
- [mũ$^{31}$] ‘to harpoon’
3. Nasality as a phonological property of segments?

[toneme ³¹]  
[glottal stop]  

[pu³¹] /pu³¹/  ‘to get used to’  
[bu³¹] /bu³¹/  ‘to be born’  
[ʔu³¹] /u³¹/  ‘to touch’  
[mũ³¹]  ‘to harpoon’
3. Nasality as a phonological property of segments?

- [toneme ³¹]
- [glottal stop]
- Σ
- [ʔ]
- u

- [pu³¹] /pu³¹/  ‘to get used to’
- [bu³¹] /bu³¹/  ‘to be born’
- [ʔu³¹] /u³¹/  ‘to touch’
- [mũ³¹] /mu³¹/  ‘to harpoon’
- [ʔũ³¹]  ‘to go.1T2’
3. Nasality as a phonological property of segments?

[toneme\textsuperscript{31}]

[glottal stop]

\[
\begin{array}{c}
\sigma \\
\ \ \ ? \\
\ \ u \ \ [\text{??}] \\
\end{array}
\]

[pu\textsuperscript{31}] /pu\textsuperscript{31}/ ‘to get used to’

[bu\textsuperscript{31}] /bu\textsuperscript{31}/ ‘to be born’

[?u\textsuperscript{31}] /u\textsuperscript{31}/ ‘to touch’

[mũ\textsuperscript{31}] /mu\textsuperscript{31}/ ‘to harpoon’

[?ũ\textsuperscript{31}] [??] ‘to go.\textit{iT2}’
3. Nasality as a phonological property of segments?

Hypothesis 1

C = C_{[-voice, nasal]} e.g. /p/
C_{[+voice]} /b/
C_{[+voice, nasal]} /m/

V = V /u/
3. Nasality as a phonological property of segments?

Hypothesis 2

\[ C = C_{[-\text{voice}]} \]
\[ C_{[+\text{voice}]} \]
\[ \text{e.g.} \]
\[ /p/ \]
\[ /b/ \]

\[ V = V_{[-\text{nasal}]} \]
\[ V_{[+\text{nasal}]} \]
\[ /u/ \]
\[ /ũ/ \]
3. Nasality as a phonological property of segments?

[toneme]  
[glottal stop]  

\[\sigma\]  

\[(C)\]  \[V\]

\[\text{[pu}^{31}\] /pu^{31}/\quad \text{‘to get used to’}\]

\[\text{[bu}^{31}\] /bu^{31}/\quad \text{‘to be born’}\]

\[\text{[?u}^{31}\] /u^{31}/\quad \text{‘to touch’}\]
3. Nasality as a phonological property of segments?

[toneme $^{31}$]

[glottal stop]

[pu$^{31}$] /pu$^{31}$/  
‘to get used to’

[bu$^{31}$] /bu$^{31}$/  
‘to be born’

[ʔu$^{31}$] /u$^{31}$/  
‘to touch’

[mũ$^{31}$]  
‘to harpoon’
3. Nasality as a phonological property of segments?

<table>
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<tr>
<th>[toneme $^{31}$]</th>
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<td>[pu$^{31}$] /pu$^{31}$/</td>
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<td>‘to touch’</td>
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<td>[mũ$^{31}$] /bũ$^{31}$/</td>
<td>‘to harpoon’</td>
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</tbody>
</table>
3. Nasality as a phonological property of segments?

- [toneme³¹]
  - [glottal stop]
    - Σ
      - [ʔ]
      - ũ

- [pu³¹] /pu³¹/  ‘to get used to’
- [bu³¹] /bu³¹/  ‘to be born’
- [ʔu³¹] /u³¹/  ‘to touch’
- [mũ³¹] /bũ³¹/  ‘to harpoon’
- [ʔũ³¹]  ‘to go.1T2’
3. Nasality as a phonological property of segments?

- [toneme $^{31}$]
  - [glottal stop]
    - $\sigma$
      - $\emptyset$
        - $\emptyset$
          - [ʔũ$^{31}$] /ũ$^{31}$/ ‘to go.
          - [ʔu$^{31}$] /u$^{31}$/ ‘to touch’
          - [bu$^{31}$] /bu$^{31}$/ ‘to be born’
          - [pu$^{31}$] /pu$^{31}$/ ‘to get used to’
          - [mũ$^{31}$] /bũ$^{31}$/ ‘to harpoon’
3. Nasality as a phonological property of segments?

[toneme^31]  
[glottal stop]  

[pu^31] /pu^31/  ‘to get used to’
[bu^31] /bu^31/  ‘to be born’
[ʔu^31] /u^31/  ‘to touch’
/pũ/ ?
[mũ^31] /bũ^31/  ‘to harpoon’
[ʔũ^31] /ũ^31/  ‘to go.ɪ̞t2’
3. Nasality as a phonological property of segments?

| [toneme ³¹] | [⁴³¹] /⁴³¹/ | ‘to get used to’ |
| [glottal stop] | [⁴³¹] /⁴³¹/ | ‘to be born’ |
| σ | [⁴³¹] /⁴³¹/ | ‘to touch’ |
| pũ | [⁴³¹] /⁴³¹/ | ‘to harpoon’ |
| ?ũ | [⁴³¹] /⁴³¹/ | ‘to go.ɪ2’ |
3. Nasality as a phonological property of segments?

Why doesn’t expected /pũ/ surface as *[pũ]?  

3 sub-hypotheses

[-voice] and [+nasal] incompatibility in the first place  
C_{[-voice]} and V_{[+nasal]} incompatible  
\textit{e.g.} /p/ + /ũ/ ***

Nasalization of [-voice] consonants  
C_{[-voice]} \rightarrow [C_{[+voice][+nasal]}] / _V_{[+nasal]}  
\textit{e.g.} /pũ/ \rightarrow [mũ]

Denasalization of [+nasal] vowels  
V_{[+nasal]} \rightarrow [V_{[-nasal]}] / C_{[-voice]}_  
\textit{e.g.} /pũ/ \rightarrow [pu]
Why doesn’t expected /pũ/ surface as *[pũ]? 

**N.B.:** morphological or morphophonological processes cannot tell us anything (stressed syllables’ shape is 100% lexical apart from [toneme] and [glottal stop])

⇒ no way to test whether specific cases of [pu] or [mũ] are indeed this hypothetical /pũ/ underlyingly (instead of merely /pu/ and /bũ/ respectively)

⇒ no way to test for any of these 3 (typologically unconvincing) sub-hypotheses
3. Nasality as a phonological property of segments?

**Hypothesis 2**

\[
C = C_{[-\text{voice}]} C_{[+\text{voice}]} \\
V = V_{[-\text{nasal}]} V_{[+\text{nasal}]}
\]

e.g. 
\[
/p/ = C_{[-\text{voice}]} C_{[+\text{voice}]} \\
/b/ = C_{[-\text{voice}]} C_{[+\text{voice}]} \\
/u/ = V_{[-\text{nasal}]} V_{[+\text{nasal}]} \\
/ũ/ = V_{[-\text{nasal}]} V_{[+\text{nasal}]}
\]
4. Nasality as a phonological property of syllables?
4. Nasality as a phonological property of syllables?

Hypothesis 3

\[ C = C_{[-\text{voice}]} \quad e.g. \quad /p/ \]
\[ C_{[+\text{voice}]} \quad /b/ \]

\[ V = V \quad /u/ \]

[nasal] links to all of the domain’s (=\( \sigma \)) segments
4. Nasality as a phonological property of syllables?

\[
\begin{array}{c}
\text{[nasal]} \\
\text{[toneme}^{31}\text{]} \\
\text{[glottal stop]} \\
\sigma \\
/\text{pu}^{31}/ \\
\text{[pu}^{31}\text{]} \quad \text{‘to get used to’} \\
/\text{bu}^{31}/ \\
\text{[bu}^{31}\text{]} \quad \text{‘to be born’} \\
/\text{u}^{31}/ \\
\text{[?u}^{31}\text{]} \quad \text{‘to touch’}
\end{array}
\]
4. Nasality as a phonological property of syllables?

\[
\begin{align*}
&\text{[nasal]} \\
&\text{[toneme 31]} \\
&\text{[glottal stop]} \\
&\sigma \\
&b \quad u \\
\end{align*}
\]

\[
\begin{align*}
&[\text{pu}^{31}] /\text{pu}^{31}/ \quad \text{‘to get used to’} \\
&[\text{bu}^{31}] /\text{bu}^{31}/ \quad \text{‘to be born’} \\
&[\text{ʔu}^{31}] /\text{u}^{31}/ \quad \text{‘to touch’} \\
&[\text{mũ}^{31}] /\text{bu}^{31}[^\text{nasal}] / \quad \text{‘to harpoon’} \\
&[\text{ʔũ}^{31}] /\text{u}^{31}[^\text{nasal}] / \quad \text{‘to go.ɪʔ2’}
\end{align*}
\]
4. Nasality as a phonological property of syllables?

\[
\begin{align*}
\text{[nasal]} & \quad \text{[toneme}^{31}\text{]} & \quad \text{[glottal stop]} & \quad \sigma & \quad \text{p} & \quad \text{u} & \quad ? \\
\text{[pu}^{31}\text{]} & \quad /\text{pu}^{31}/ & \quad \text{‘to get used to’} \\
\text{[bu}^{31}\text{]} & \quad /\text{bu}^{31}/ & \quad \text{‘to be born’} \\
\text{[ʔu}^{31}\text{]} & \quad /\text{u}^{31}/ & \quad \text{‘to touch’} \\
(*[pũ]) & \quad /pũ/ & \quad ? \\
\text{[mũ}^{31}\text{]} & \quad /\text{bu}^{31}[\text{nasal}]// & \quad \text{‘to harpoon’} \\
\text{[ʔũ}^{31}\text{]} & \quad /ũ^{31}[\text{nasal}]// & \quad \text{‘to go.ÎT2’}
\end{align*}
\]
Same problem: why is /pu[nasal]/ not *[pũ]? 

3 sub-hypotheses

[-voice] and syllabic [nasal] incompatibility in the first place
C[-voice] and [nasal] incompatible e.g. /p/ + [nasal] ***

Nasalization of [-voice] consonants
C[-voice] \rightarrow [C[+voice][+nasal]] / σ[nasal] e.g. /pu[nasal]/ \rightarrow [mũ]

No nasalization of vowels
V \rightarrow [V[-nasal]] / C[-voice][nasal] e.g. /pu[nasal]/ \rightarrow [pu]
4. Nasality as a phonological property of syllables?

Hypothesis 3

\[ C = C_{[-\text{voice}]} \quad \text{e.g.} \quad /p/ \]
\[ C_{[+\text{voice}]} \]

\[ V = V \quad /u/ \]

[nasal] links to all of the domain’s (=\( \sigma \)) segments
4. Nasality as a phonological property of syllables?

Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

- [nasal] is **left-aligned** and links rightwards to all segments up to next opaque segment
- /b/ is **target** of [nasal]
- /u/ is **target** of [nasal]
- /p/ is **opaque** to [nasal]
4. Nasality as a phonological property of syllables?

Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

/bu[nasal]/

[nasal]

b       u
4. Nasality as a phonological property of syllables?

Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

/ bu[nasal]/

[ nasal]  
[ m]  

u
4. Nasality as a phonological property of syllables?

Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

/bu[nasal]/
Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

/pu[nasal]/

[nasal]

(ṭ) V

4. Nasality as a phonological property of syllables?
Another sub-hypothesis to allow /pu[nasal]/ while *[pũ]:

/pu[nasal]/

(C)  V

\[\sigma\]

[nasal]

[p u] (hence *[pũ])

4. Nasality as a phonological property of syllables?
BUT

Nasality does indeed spread to the right across syllables and morphemes as a regular process, but **only if next \( \sigma \) has no onset** (all onsets are opaque to nasality spreading)
4. Nasality as a phonological property of syllables?

BUT

[mũ³¹] ‘to harpoon’ [-e¹⁴ru⁴] ‘head’

['mũː³¹e¹⁴ru⁴] ‘to harpoon smth in the head’

[‘nasal]
BUT

[mũ³¹] ‘to harpoon’  [-ɛ¹/⁴ru⁴] ‘head’

[ˈmũː:³¹ɛ¹ru⁴] ‘to harpoon smth in the head’

[mû e
  [nasal]
BUT

[mũ³¹] ‘to harpoon’  [-e¹⁴ru⁴] ‘head’

[‘mũ:³¹ẽ¹ru⁴] ‘to harpoon smth in the head’

[m ū] e

[nasal]

4. Nasality as a phonological property of syllables?
BUT

\[ [mũ^{31}] \text{ ‘to harpoon’} \quad \text{[-ẽ}^{1/4}\text{ru}^{4}] \text{ ‘head’} \]

\[ ['mũː^{31}ẽ^{1}\text{ru}^{4}] \text{ ‘to harpoon smth in the head’} \]

\[ [m \ ũ \ ẽ] \]

\[ [\text{nasal}] \]
BUT

\[ [\text{mũ}^{31}] \text{ ‘to harpoon’} \quad [\text{-be}^{1}\text{ra}^{1}] \text{ ‘lip’} \]

\[ ['\text{mũ}^{31}\text{be}^{1}\text{ra}^{1}] \text{ ‘to harpoon smth in the lips’} \quad (\ast [‘\text{mũ}^{31}\text{me}^{1}\text{ra}^{1}]) \]

\[ x \]
4. Nasality as a phonological property of syllables?

BUT

[mũ³¹] ‘to harpoon’  [-be¹ra¹] ‘lip’

[’mũ:³¹be¹ra¹] ‘to harpoon smth in the lips’ (*[’mũ:³¹me¹ra¹])

b u b

[nasal]
BUT

[mũ³¹] ‘to harpoon’          [-be¹¹ra¹] ‘lip’

['mũː³¹be¹¹ra¹] ‘to harpoon smth in the lips’ (*['mũː³¹me¹¹ra¹])

[m] u  b
[nasal]
BUT

[mũ³¹] ‘to harpoon’  [-be¹¹ra¹] ‘lip’

['mũ:³¹be¹¹ra¹] ‘to harpoon smth in the lips’ (*['mũ:³¹me¹¹ra¹])

[m ŭ] b

[nasal]
4. Nasality as a phonological property of syllables?

BUT

[mũ³¹] ‘to harpoon’    [-be¹ra¹] ‘lip’

['mũː³¹be¹ra¹] ‘to harpoon smth in the lips’ (*['mũː³¹me¹ra¹']

[m ũ b]

[nasal]
BUT

If syllabic [nasal] is left-aligned and links to next segments to the right, then:
• why is /b/ target (➞ [m]) in the syllable [nasal] belongs to,
• BUT opaque in next syllables, even if part of the same morpheme (while [nasal] does link across syllables if no onset in following syllable)?
5. A revised version of nasality as a property of syllables
5. A revised version of nasality as a property of syllables

Two ≠ processes with ≠ rules:
[nasal] linking ≠ nasality spreading
Process A: [nasal] linking

[nasal] links to the first segment in the syllable

/p/ is not target (transparent/opaque) $\rightarrow$ [p]
/b/ is target $\rightarrow$ [m]
/V/ is target $\rightarrow$ [Ṽ]
5. A revised version of nasality as a property of syllables

Process B: nasality spreading

Obtaining phonetic nasality (if any) spreads rightwards until next C (all C are opaque to spreading)

(in some (Brazilian?) Ticuna varieties, obtaining phonetic nasality also seems to spread to the left until next C; see among others "TCA-19910303-AB-BRZ-llivre" from The Language Archive: https://arqling.museu-goeldi.br/corpora/a-z/Ticuna-TCA/Elicitacao-lexico/Metadata/TCA-19910303-AB-BRZ-llivre.imdi)
A: linking

[\text{nasal}] \\
\quad u

B: spreading

(towards immediately following V if any)

/u[\text{nasal}]/ \rightarrow [ũ]
5. A revised version of nasality as a property of syllables

A: linking

\[\text{[nasal]} \quad \text{[pu]}\]

B: spreading

(none)

\(/\text{pu[nasal]}// \rightarrow \text{[pu]}\)
5. A revised version of nasality as a property of syllables

A: linking

B: spreading

/bu[nasal]/ → [mũ]
5. A revised version of nasality as a property of syllables

A: linking

[nasal]

b u e d u

B: spreading

[m] [ˈu] [ˈe] r u

C V V C V

/mu³¹e¹du⁴/ → ['mũ:³¹ẽ¹ru⁴]
5. A revised version of nasality as a property of syllables

A: linking

B: spreading

/mu³¹be¹da¹/ → ['mũː³¹be̞¹ɾa¹]
6. Two elaborations
Phonological nasality is a privative feature ($\emptyset$ vs [nasal])

Lexically non-[nasal] syllables are subject to nasality spreading

By contrast lexically [nasal] syllables are never realized oral

[kuː⁴³-e⁴] ‘your mother’ vs [kuː³¹-ʊ¹] ‘your feces’

[nãː²²-ẽ⁴] ‘his mother’ vs [nãː²²-ũ¹] ‘his feces’

<-/e⁴>/<-/ʊ¹[nasal]/ ‘mother’, phonologically unspecified for nasality <-/ʊ¹[nasal]/ ‘feces’ phonologically specified as [nasal]
Phonological nasality is a privative feature (Ø vs [nasal])

Lexically non-[nasal] syllables are subject to nasality spreading

By contrast lexically [nasal] syllables are never realized oral

⇒ non-[nasal] is default, not a positive feature
The case of [ŋV]

In SMAT (and other Ticuna varieties), one significant case of oral-nasal co-occurrence within syllable: [ŋV] syllables (vs expected [ŋV])

*Ex:* [ŋɔ^modal-creaky^] ‘to appear’ (vs [ŋõ^modal-creaky^] ‘to bite’)
The case of [ŋV]

⇒ at first sight contradictory with nasality spreading if we think it is the realization of /gV[nasal]/; we expect [ŋV] (but *[ŋV])

A

[nasal]

\[\begin{align*}
g & \rightarrow V \\
\end{align*}\]

B

[nasal]

\[\begin{align*}
[ŋ] & \rightarrow [\tilde{V}] \\
\end{align*}\]

6. Two elaborations
The case of [ŋV]

Analysis: /ŋ/ in [ŋV] is a phoneme of its own (diachronic and dialectal evidence); if no [nasal] linked, no nasality spreading

A

{nasal}

ŋ V

B

{nasal}

[ŋ] V → [ŋV]
The case of [ŋV]

=> nasality spreading is sensitive to [nasal]: only occurs from a [nasal]-bearing segment (phonetic nasality of that segment is necessary but not sufficient)
7. Conclusions
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N.B.: phonemes (phones)

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i  u  u  ᵇ  ᵋ  a  a̞  a̞  aŋ
[nasal] links to σ’s first segment, which nasalizes if target (■).
Then high-level spreading of nasality to the right from target (=nasalized) [nasal]-bearing segments until next C

(=> only V’s are targets of nasality spreading)
Residual facts left unaccounted for

• [ŋ, ŋ, ɲ] never found in unstressed syllables (except for 2 secondary instances of [ɲ]) => [nasal] incompatible with /g, w, ɗʑ/ in unstressed syllables? Why? Probably a mere lexical gap synchronically, due to diachronic sources of /g, w, ɗʑ/
Residual facts left unaccounted for

• At least 2 words with probable nasality spreading to the left:
  \[tõː^{43}\ddot{o}^{5}] /to^{43}o^{5}[\text{nasal}]/ (?), ‘\textit{gaviota} (a bird)’
  \[tõː^{43}\ddot{o}^{5}\text{ne}^{1}] /to^{43}o^{5}[\text{nasal}]\text{de}^{1}[\text{nasal}]/ (?), ‘stairs’

• At least 1 onsetless syllable rejects nasal spreading
  (=> specified as [oral]?):
  [-ʔɯ^{1}ra^{1}] /ʔ.ɯ^{1}[\text{oral}]da^{1}/ (?), ‘approximate(ly)’
Typological oddity

Only one nasal segment: /ŋ/!

Result of a complex and probably unusual diachronic process

In fact, younger speakers of Nazareth Ticuna (Colombia) have merged what must have been the reflex of SMAT /ŋ/ into /g/

No signs of instability in SMAT however
Three different sources for nasality on the surface

• nasality as a property of C: unique case of [ŋ(V)]; static

• nasality as an exponent of [nasal]: cases of [m, n, ɲ, ŋ(Ṽ), ŵ], and some [Ṽ]; triggers nasality spreading

• nasality as a consequence of spreading: cases of other [Ṽ]s; spreads until next C
Three different sources for nasality on the surface

Would be interesting to collect experimental nasal airflow measurements for the last two types of nasality ([nasal]-linking vs nasality spreading)

Impressionistic observation that [\u00f9] due to [nasal]-linking are more nasal (i.e. involve more nasal airflow) than [\u0113] due to nasal spreading; if confirmed, would strengthen the analysis
References

