Patterns of nasalisation in languages near Vanimo

Mark Donohue
University of Sydney
donohue@linguistics.usyd.edu.au

Lila San Roque
University of Sydney
lilasanroque@angelfire.com

Nasalisation is examined in languages of the Vanimo coast area of New Guinea. We find evidence that in some languages the specification [± nasal] is applied to each segment; there are both underlyingly oral and nasal vowels, and oral and nasal voiced stops. Other languages show a [± nasal] contrast at a syllable level: nasalisation is realised on a syllable, and there are no segments which are underlyingly specified as nasal. Most interestingly, there is a group of languages in which nasalisation is specified on a segment-by-segment basis, but realised on a syllable-by-syllable level.

1. Nasalisation

Nasalisation, whether contrastive or simply a phonetic spread from some other contrastive element in an utterance, is a gesture involving the lowering of the uvulum during the production of an oral segment.

Nasalisation as a contrastive feature implies that there is a contrast between a lowered uvulum and a non-lowered uvulum for an utterance, or part of an utterance, that is otherwise gesturally identical, such as the contrast between d and n in English, which differ only in the position of the uvulum during production of the consonant. We will discuss the domain of this contrast in the sections that follow, and argue that viewing nasalisation as a feature that is localised on a particular segment is not the best analysis of the data from the Vanimo coast.

English:

Nasalisation is contrastive in English, and is specified by the segment, on onsets or codas.

Dad mad Mum dumb

Although there is contrastive nasalisation on consonants, there is no contrastive nasalisation on vowels in English: * a ≠ ā. Although there’s no contrastive nasalisation on the vowel, there is phonetic nasalisation to some degree: adjacent to nasal consonants, vowels acquire some degree of nasalisation: mad [mæd]. This is an expected phonetic feature, resulting from time delays in setting the position of the uvulum.

French

In French, nasalisation is contrastive on the segment, and can appear contrastively on onsets, nuclei and codas.

Each place in the syllable is independently specified, except that no contrastive nasalisation is found on vowels in syllables with a nasal coda. Apart from this, there is a greater range of syllable positions that can appear nasalised in French than in English, but they show similar behaviour in that they both specify nasalisation segment-by-segment.

ALTERNATIVES:
Nasalisation can be viewed as a suprasegmental feature: this is reported in Sundanese and other languages of western Indonesia, in which nasalisation spreads rightward from any nasally specified segment until interrupted by a non-oral segment.\(^1\)

English: \[ \begin{array}{c}
\sigma \\
\pm N \\
\text{or} \\
\pm N \\
\end{array} \]

French: \[ \begin{array}{c}
\sigma \\
\pm N \\
\pm N \\
\pm N \\
\end{array} \]

2. Languages of the Vanimo region

2.1 PHONOLOGICAL SKETCH AND PHONOTACTICS IN SKO / KRISA
The languages that will be examined in this investigation are:

Skou – Leitre/Dumo/Wutung (/Dusur) – Krisa

The first of these are members of the Skou family; Krisa appears to be an isolate, or at best a distant relative of the other Skou languages. All of the languages are tonal, with Skou, Leitre and Dusur showing three contrastive tones, Krisa showing four tones; these are not relevant to the nasalisation discussion here.

2.2 NOTATIONAL CONVENTIONS
For the remainder of this paper it will be necessary to distinguish three degrees of possible nasalisation on vowels, and these will be annotated as follows:

Oral vowel: \( V \)
Slightly nasalised vowel: \( V-\pm N \)
Heavily nasalised vowel: \( V-\pm NN \)

The degrees of nasalisation can be plainly distinguished aurally. Oral vowels are similar to those found in words such as the English \textit{Dad}; the V-N notation refers to a phonetically nasalised vowel, without strong nasalisation, such as in \textit{mad}. The final notation, V-NN, refers to a strongly nasalised vowel, as in the French \textit{mon}. In addition to the degree of nasality heard on the vowel, strong nasalisation can be distinguished from weak nasalisation by the fact that it causes prenasalisation of a following stop, whereas weak nasalisation has no prenasalising effects. For example, the following phrases from Leitre show that the weak nasalisation that comes with a nasal onset in the second syllable

\(^1\) See Donohue (1997) for a discussion of the localisation of tone as a syllable or word level phenomenon; this concept is easily extendable to other suprasegmental phenomena.
of *kwónu* ‘stone’ does not have any effect on the following possessive pronoun. In contrast to this, however, the strong nasalisation that is associated with *nakung* ‘nose’ does cause prenasalisation of the same possessive pronoun:

\[
\begin{array}{cccc}
N & N & NN \\
\hline
[ba ke] & [k*ánu ke] & [na ku ŋke] \\
\text{‘pig’} & \text{‘stone’} & \text{‘nose’} \\
pig 3SG.M & \text{3SG.M} & \text{3SG.M} \\
\end{array}
\]

As mentioned above, tone is not relevant to a discussion of nasalisation,\(^2\) but for the sake of preserving the phonological record different pitches shall be marked with the following diacritics:

**Skou, Leitre (Dumo, Dusur, Wutung) Krisa, Rawo**

- Low tone: unmarked: a
- High tone: acute accent: á
- Falling tone: grave accent: à
- Low tone: unmarked: a
- High tone: apostrophe: a'
- Rising tone: acute accent: á
- Falling tone: grave accent: à

The notation of contrastive nasalisation in the orthographies with the digraph ng following the vowel, used in Skou, Wutung, Dumo and Krisa, and in recommendation for Leitre, will not be followed here, with the above-mentioned nasalisation conventions followed in its place.

Segments will be written as in orthographies; the only digraphs employed are ng for a velar nasal, kw gw and ngw for a rounded velar series in Leitre, and for vowels ue for [u], oe for [ø] in Skou.

It is necessary to distinguish three classes of onsets, those involving nasal stops, those involving a stop that, apart from the lack of a uvular lowering, would be a nasal stop (that is, voiced stop segments), and other onsets, which differ from nasal stops in more manners than just the uvular gesture, either through (lack of) voicing, through manner (fricative, etc.), or through the absence of any oral occlusion (being a vowel with no consonantal onset). These will be abbreviated with the following conventions:

- Nasal stop onset: C\(_M\)
- Voiced stop onset: C\(_B\)
- Any other onset (including Ø): C\(_\text{else} / Ø\)

The choice of M and B, rather than N and D, to represent the different classes reflects the lack of a /d/ in Skou, and is not significant. Importantly, the classes C\(_M\) and C\(_B\) differ only in the gesture [± nasal]; all other features specified for these consonants are identical.

### 3. Skou: segmental specification

Skou is the westernmost language of the Sko family, and behaves in many ways differently to the other members of the family it is in. With respect to nasalisation, we should note that:

---

\(^2\) Not entirely true; in Skou at least there are complex restrictions on the allowed combinations of vowel, tone, nasalisation and consonant onset. The larger patterns described in this paper, however, are not affected by the tone of a syllable.
1. All syllables can appear with two contrastive degrees of nasalisation on the vowel:

   - bà ‘who’       moe–N ‘go’
   - bà–NN ‘beach’  moe–NN ‘stay’

In the case of syllables with a C_B or C_else / Ø onset, the contrast is between a completely unnasalised vowel and a strongly nasalised one. With a syllable that displays a C_M onset, the contrast is between a weakly nasalised and a strongly nasalised vowel. Although the nature of the contrast is different, there is a two way contrast possible for all onset types.

2. Nasal onsets are always accompanied by slight nasalisation in the nucleus, but this is not as strong as the contrastive nasalisation.

   - ni–N ‘I’ vs ti ‘sea’

When the onset is nasal, then the vowel must display some degree of nasalisation: although this weak nasalisation can be ‘overwritten’ by having nasalisation specified contrastively on the vowel, a completely oral vowel cannot follow a nasal onset.

Notice that strong vocalic nasalisation is contrastive after oral onsets and after nasal onsets. The patterns of vocal nasality in Skou are:

<table>
<thead>
<tr>
<th>Onset / Rhyme</th>
<th>oral</th>
<th>weak nasal</th>
<th>strong nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_M</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>C_B</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>C_else / Ø</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **Krisa: syllable specification**

Nasality seems best dealt with as a syllable-level phenomenon in Krisa; this will be explained in more detail, but essentially:

1. Nasal onsets are accompanied by slight nasalisation in the nucleus; this nasalisation, however, is variable

   - ni’–NN ~ ni’–N ‘breast’ vs ti ‘fire’

2. Oral vowels appear with non-nasal onsets

   - pai ‘arrow’
   - dou ‘I shoot them’

3. Nasalised vowels appear with C_M or C_else / Ø only; an onset that is a non-nasal sonorant ([w j], underlingly /u i/) which precedes a nasalised vowel will appear nasalised itself.

   - [wi–NN] ‘banana’
   - pái–NN ‘sling’
Krisa onset + rhyme patterns

<table>
<thead>
<tr>
<th>Onset / Rhyme</th>
<th>oral</th>
<th>weak nasal</th>
<th>strong nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_M</td>
<td>←±→</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C_B</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C_else / Ø</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

5. **Leitre: segmental specification, syllabic realisation**

The coastal languages near Vanimo, namely Leitre, Dumo and Wutung, of which Leitre will be used as a representative exemplar, show interesting patterns of nasality. Underlyingly they appear to function in the same way as Skou, with naslisation specified segment-by-segment, but phonetically naslisation is realised by the syllable. The relevant data is that:

1. Oral consonants or empty onsets allow for contrastive naslisation on vowels
   
   bà ‘pig’ vs dæ–NN ‘bird’

2. Nasal onsets are always accompanied by slight naslisation (not as strong as the contrastive naslisation found with non-nasal onsets).
   
   má–N ‘bark’ *ma–NN, * ma

3. There are no syllables with strong naslisation on the vowel following a nasal onset. The (non-contrastive) weak naslisation described in 2. is the only nasal gesture possible in this environment.
   
   *ma–NN, * ma

Nasalisation is contrastive only after non-nasal onsets.

Leitre onset + rhyme patterns

<table>
<thead>
<tr>
<th>Onset / Rhyme</th>
<th>oral</th>
<th>weak nasal</th>
<th>strong nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_M</td>
<td>←±→</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C_B</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C_else / Ø</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

Most interestingly, we can see that these patterns of onset-nucleus interaction are dynamic. Some verbs are specified with nasalised vowels, and some with oral vowels. When the subject prefix of the verb is non-nasal (k-, b- or d-), naslisation on the vowel is strong:

(99)  

<table>
<thead>
<tr>
<th>ke</th>
<th>ya</th>
<th>kî.</th>
<th>V–NN</th>
</tr>
</thead>
<tbody>
<tr>
<td>3SG.M thing</td>
<td>3SG.M::eat</td>
<td>‘He ate’</td>
<td></td>
</tr>
</tbody>
</table>

(99)  

<table>
<thead>
<tr>
<th>bi</th>
<th>ya</th>
<th>bî.</th>
<th>V–NN</th>
</tr>
</thead>
<tbody>
<tr>
<td>3SG.F thing</td>
<td>3SG.F::eat</td>
<td>‘She ate’</td>
<td></td>
</tr>
</tbody>
</table>

When the prefix is nasal (n-, m-, n-, ηw-), weak naslisation is heard:
(99) \( \text{ni} \quad \text{ya} \quad \text{nji} \quad \text{V–N} \)

1SG thing 1SG:eat

‘I ate’

Other verbs are found with oral vowels following oral prefixes, and weakly nasalised vowels following nasal prefixes. This implies that underlying (strong) nasalisation cannot realised following a nasal prefix.

<table>
<thead>
<tr>
<th>Prefix \ Verb</th>
<th>nasal vowel</th>
<th>oral vowel</th>
</tr>
</thead>
<tbody>
<tr>
<td>n m n nw</td>
<td>V–N</td>
<td>V–N</td>
</tr>
<tr>
<td>k b d</td>
<td>V–NN</td>
<td>V</td>
</tr>
</tbody>
</table>

Clearly nasalisation is contrastive on stops; it is also contrastive on vowels after oral stops; it is a feature of the vowel, and not of any higher unit. Interestingly, however, there is interaction between the onset and the vowel in terms of the realisation of contrastive nasalisation: if the onset segment is specified as nasal, then there cannot be any specification of the rhyme as nasal. The only nasalisation that can (and must) appear is phonetic spreading (weak nasalisation) from the nasal onset.

5. **Dusur: variation**

The language spoken on the headland of Vanimo and in Lido, Dusur, presents an interesting variant on the above pattern.

1. Oral consonants or empty onsets allow for contrastive nasalisation on vowels

   da ‘pig’ vs dì–NN ‘bird’

2. Nasal onsets are always accompanied by heavy nasalisation (as strong as the contrastive nasalisation found with non-nasal onsets).

   na–NN ‘taro’

Nasalisation is contrastive only after non-nasal onsets.

Dusur onset + rhyme patterns

<table>
<thead>
<tr>
<th>Onset / Rhyme</th>
<th>oral</th>
<th>weak nasal</th>
<th>strong nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_M</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>C_B</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>C_else / Ø</td>
<td>+</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

6. **Comparative status of nasalisation**

The realisation of nasality in the different languages is plotted below:

<table>
<thead>
<tr>
<th>Onset</th>
<th>C_M</th>
<th>C_else / Ø, C_B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nucleus</td>
<td>oral</td>
<td>weak n</td>
</tr>
<tr>
<td>Skou</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Leitre</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Krisa</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Dusur</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Where does this all leave us? In Skou, nasalisation is not particularly interesting: each segment is specified as being + or - nasal, and there is only low-level phonetic interaction between the different segments of the one syllable. Krísa in many respects is the opposite pattern: the nasality of the nucleus is completely predictable based on the nasality of the onset, and there is no independent specification of nasality on a segment by segment basis: a syllable, once specified as nasal, realises nasality wherever possible (wherever there is voicing, essentially). Leítre seems to be a halfway house: nasality is clearly represented segmentally, but is realised on a syllable basis, making the locus of nasality rather hard to define in this language and the others in its sub-family. Dusur is a variation on this pattern, with strong nasalisation a characteristic of syllables with either a nasal onset or a nasal rhyme.

**Bibliography**