Phonetic Basis on the Markedness Constraint Banning on Onset Velar Nasal: Evidence from Germanic and the Related Languages

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1. Introduction

Functional phonology – the reason why a phonological entity operates in UG or individual language
Phonetic bases – movement and posture, air flow, sequential difficulty or smoothness


This paper – ban on onset velar nasal onset /m, n/, */r̚/ and coda /m, n, r̚/

The total ban - Dutch (Trommelen 1984, van Oostendorp 1998), Marathi (Pandhariponde 1998), Italian (Krämer 2009), Standard German (Vennemann 1970), Korean (Song 2005), etc.

The restricted occurrences in syllabic phonology
Filling /r̚/ in empty onsets – Chinese (Duanmu 2009)

The restricted occurrences in sequences
difftong ‘diphthong’ – Norwegian (Kristoffersen 1998) birjnga – Fula (Ladefoged and Maddieson 1996)

[ŋn]
gemination – Galician (Colina 2004, Colina and Díaz-Campos 2006)
unha ‘a’, algunha ‘some’

ichigo ‘strawberry’, kagami ‘mirror’

2. Four dimensions of soft palate

Velum is raised for oral sounds and lowered for nasal sounds, but not vice versa. The reason for this stems from the fact that air flow is vented outside by passing through each of the cavities. (Universal)

Consonants articulated with velar have the requirement that soft palate make a contact with the back of the tongue in order to produce them. The contact is implied to be lowered soft palate relative to the one with nonvelars in each of oral and nasal sounds. (Universal)

Velar nasal – much lowering
Nonvelar nasal – mid lowering
Velar oral – mid raising
Nonvelar oral – much raising
The conditioning in the markedness – the three-degreed movement (i.e. velar nasal + oral vowel)

Why the three degrees? The crucial reason comes not from the longest distance (militating against principle of economy) but from no shared phonetic feature between the two, which leads to the incompatibility on the movement of the articulators.

Shared feature
(a) The one-degreed movements
   velar nasal + nonvelar nasal - air flow is freely vented outside the nasal cavity
   The air flow between them might be orally leaked, but have the less marked status than the sequence with oral vowel.
   velar oral + nonvelar oral - air flow is freely vented outside the lips

Nonvelar nasal + velar oral - Soft palate does not make a contact with the articulator. The movement between the two sounds is readily accessible owing to the partial similarity.

(b) The two-degreed movements
   Velar nasal + velar oral – The contact of velum with the back of the tongue remains stable.
   Nonvelar nasal + nonvelar oral – No contact is consistently made.

(c) The three-degreed movement
   Air flow – Both velar nasal and oral vowel block the air flow into oral and nasal cavities, respectively. Instead of the velar nasal + the oral vowel, velar stop and nasalized vowel substitute each of the corresponding sounds, the sequence at issue is facilitated.
   Contact – with or without the one with the back of the tongue
   The crosslinguistically common forms with velar nasal
   Post-vocalic [ŋk, ŋg] (Jun 1996) – the preceding vowel is predominantly nasalized. The distance between the velar nasal and the two adjacent sounds is each one and two.
   /k/ plus syllabic velar nasal, especially in word-final position – The distance on it in the four dimensions is two.

3. Heterosyllabicification
3.1. Galician gemination
   Galician – phonologically (in the underlying, but not the surface, forms), no velar nasal in the onset
   It has the velar nasals affiliated to the coda, except for the one influenced by the spelling.
   Unha ‘a, one’ nengunha ‘none’ tren alemán ‘German train’
   [uŋ̪.a] [n̪ʊŋ̪.ɣ̪ʊŋ̪.a] [tr̪.ŋ̪.li.man̪]

   A controversial issue – phonological process on the gemination in the phonology
   Unha ‘a, one’
   /uŋ̪a/ → [uŋ̪.ŋ̪a]
   Colina and Díaz-Campos (2006) – the underlying coda shifts to the geminate
   the onset filling due to the syllabic requirement

   In my assumption, the satisfaction of the onset in the form with the geminated velar nasal stems not from the requirement that the onset be filled, but from the posited phonetic basis (the distance of three in the four dimensions).
   (a) NV ŋ, V (b) NVŋ + ŋ V (c) *ŋ V
      1 + 3 0 + 3 3 + 3

   The less marked (a) and (b) – the marked movement only once
   The marked (c) – the marked movement twice at the same time
3.2. Ambisyllabicity

The syllabic phonology in English (Kahn 1980 and the subsequent works) — the velar nasal in the coda (thinking, finger)
Cf. The prosodic approach (Jensen 2000) specifies the hierarchy syllable (i.e. coda), but not the others.

The ambisyllabic velar nasal - stem-final /ŋ/ + <-er> hanger singer
VN ŋ. ŋ η/r
the movement of the soft palate in the four dimensions – 0 + 3

VN ŋ k/g V (thinking) – 1 + 2
VN ŋ + oral sound (kingly) – 1 + 3

The prohibited form *ŋV other than the one with the ambisyllabic velar nasal – 3 + 3

Most common one VN ŋ k/g V (thinking, 1 + 2) – no movement by the distance of three
Relatively uncommon one stem-final /ŋ/ + <-er> (hanger, 0 + 3) – the marked movement only once
Relatively uncommon one VN ŋ + oral sound (kingly, 1 + 3) – the marked movement only once
The prohibited form *ŋV (3 + 3) – the marked movement twice simultaneously

4. The marked and uncommon velar nasals

The crosslinguistic disposition and the phonetic movement
(a) Ban on onset velar nasal – marked three degrees ŋ
(b) /ŋ/ + /k, g/ (Jun 1995, 2004) – less marked two degrees
(c) /k, g/ + syllabic velar nasal (in, but not restricted within, some Germanic languages) – the less marked two degrees

Postvocalic

The application of the three constraints

The form (a): no example such as *ŋat
According to Booij (1995), the nasalized vowels occur in the finals of the loanwords from French ([ɛ̃] enfîn ‘anyway’).
The sequence onset velar nasal + oral vowel turns out to be phonetically marked.
The form (c): [pakoŋ] ‘to take’ (according to van Oostendorp, Netherlands Low Saxonian and Frisian)
In sum, the distance of the movements makes a clear-cut distribution between three and two.

Another case - /ŋ/ - less marked two degrees
Ingewoon  inglés mangrove
[ŋw] [ŋr]
The phonological process – the epenthesis of the voiced velar fricative
This serves as the resolution of the phonetic markedness that implies that the distance between the two consonants shifts
from three to two in the sequences at issue.

5. Onset-nucleus sequence

Italian (Nikiema 1992, Krämer 2009) lacks both onset velar nasal and the nasal vowels assimilated by the coda.

The phonology – gemination tutti ‘everything’, hormorganic nasal-stop angùria ‘watermelon’
No assimilation occurs in rhyme and no nasalized vowel occurs
The three-degreed movement and no sequence as ŋ + V
6. Summary
Common sequences
Postvocalic /ŋk, ŋɡ/ : 2
Nasalized vowel + coda /ŋ/: 1

The four languages without onset velar nasal in the phonologies
(a) Galician: the geminated /ŋ/
   coda: 1 + 3
   geminate: 0 + 3
   *onset: 3 + 3
(b) English ambisyllabicity: the stem-final /ŋ/ + <-er>
   coda: 1 + 2, or 1 + 3
   derivative form: 0 + 3
   *onset: 3 + 3
(c) Dutch: common and rare velar nasals
   Postvocalic [ŋk]: 2
   [k] + syllabic velar nasal: 2
   *σŋ + oral V : 3
   Epenthetic [ŋ]: 3 to 2 (repair strategy)
(d) Italian: no rhyme-based assimilation
   *σŋ + oral V : 3 (natural outcome)

(Partial) References