

A Unified Approach to Nasality and Voicing



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by

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For my family

Abstract

This study marks a first attempt to develop a model of melodic representation which directly encodes the interrelationship between nasality and voicing. Specifically, it aims to capture the relational typology of these two properties, together with their universal and language-specific patterns of alternation such as nasal harmony and voicing assimilation. The approach adopted here investigates a large number of different languages in pursuit of this goal, and exploits the advances made within recent theoretical frameworks which aim to reduce the set of traditionally established melodic distinctions in the interests of generative restrictiveness.

In order to incorporate both nasality and voicing into melodic representation, I propose that these two properties are phonetic manifestations of the same phonological category. The choice between their respective phonetic interpretations is controlled by the notion of complement tier (Backley 1998, Backley and Takahashi 1998). When the complement (N-[comp]) of the nasal-voice unit ([N]) is licensed, the entire expression is realised as voicing. On the other hand, an unlicensed complement tier results in nasality. Under this approach, the complement tier is treated as a melodic unit on a par with elements, which means that it contributes to segmental complexity. Consequently, a voiced expression is more complex than nasal one, since the former contains an additional unit N-[comp] which is licensed by [N].

The dependency and complexity relations between [N] and N-[comp] straightforwardly reflect the relational typology of nasality and voicing: the existence of long-lead voicing implies the existence of nasal; and furthermore, languages typically exploit contrastive nasality, whereas voicing is parametrically controlled. In addition, these relations serve to deepen our understanding of recurrent assimilatory phenomena such as nasal harmony, postnasal voicing assimilation, voiced-obstruent voicing assimilation and spontaneous prenasalisation.

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Abbreviations and symbols

1 Abbreviations

ATR	advanced tongue root
C	oral consonant
comp	complement tier
CTJ	conservative Tokyo Japanese
DP	Dependency Phonology
DR	derivational rule
ET	Element Theory
F	formant
Ft	foot
gen.	genitive
GLP	government/licensing-based approach
indic.	indicative
ISP	INHERENT STRUCTURE PRESERVATION
N/Nas/nas	nasal consonant
NC	nasal-obstruent
nom.	nominative
Non-nuc	non-nucleus
NTJ	Northern Tohoku Japanese
Nuc	nucleus
Obs	obstruent
OCP	OBLIGATORY CONTOUR PRINCIPLE
ODT	Optimal Domains Theory
Ons	onset
OT	Optimality Theory
PEx	PRINCIPLE OF EXTENSION
pl.	plural
R	root
Res	resonance element
sg.	singular
SP	soft palate, Structure Preservation
SPE	<i>The Sound Pattern of English</i> (Chomsky and Halle 1968)

SPN	spontaneous prenasalisation
STJ	Sorthern Tohoku Japanese
SV	spontaneous voicing
SVN	spontaneous velar nasalisation
UPSID	UCLA Phonological Segment Inventory Database
UT	Underspecification Theory
V	vowel
VOT	voice onset time
WSA	WIDE SCOPE ALIGNMENT

2 Symbols

α	variable feature coefficient	!	fatal violation
σ	syllable		optimal candidate
x	prosodic/skeletal position	\square	empty nucleus
#	word boundary	\star	impossible structure
*	ungrammatical, violation	\emptyset	phonetically uninterpreted nucleus
@	base-line for elements		

Chapter 1

Nasal-voice affinities

1.1. Introduction

Phonological studies reveal that nasals and voiced obstruents show some robust correlations. A typical instance of such a relation is postnasal voicing assimilation, found in many languages such as Quichua, Zoque and Yamato Japanese, where an obstruent preceded by a nasal is obligatorily voiced. In such systems, nasal sounds are thought to contain a voice feature and trigger an assimilatory process on to the following obstruent. Among them, however, Yamato Japanese presents a challenge to this assumption, since this system seems to recognise two types of nasals, differentiated according to phonological context: in postnasal voicing assimilation, nasals appear to be specified for voice; on the other hand, in Rendaku (which I shall describe in §1.2.1.2), nasals behave as if they have no voice feature.

Another example of the relation between nasal and voice is found in processes involving alternations between voiced obstruents and their nasal reflexes — such as fully-nasalised and prenasalised voiced cognates. This kind of process is often observed in intervocalic contexts. For example, voiced obstruent prenasalisation is witnessed in Northern Tohoku Japanese, languages of the Reef Island-Santa Cruz family, those in the Pacific area and several Bantu languages; in the same context, conservative Tokyo Japanese exhibits voiced-velar-obstruent nasalisation in intervocalic positions. Furthermore, in the verbal inflexion of Yamato Japanese, the stem-final *b* in a verbal stem such as *tob* ‘to fly’ is realised as a nasal that is homorganic with the suffix-initial obstruent of a suffix such as *-te* (gerundive). In these cases, only truly voiced obstruents are subject to the processes associated with nasality. Another aspect to be noted is that we do not seem to find any apparent triggering property for prenasalisation and nasalisation because, on the face of it, nasality for the purposes of this process is not lexically present in the target (voiced obstruents, are normally considered to be specified for voicing but not nasality) or the given environment.

In response to the nasal-voice paradox in Yamato Japanese, Itô and Mester (1986) propose a rule-ordered analysis based on representationally-oriented Underspecification Theory (UT: Kiparsky 1982, Archangeli 1984, 1988, Pulleyblank 1986), while Itô, Mester and Padgett (1995) discard the rule-based multistratal approach and utilise a theory of universal constraint interaction following Optimality Theory (OT: Prince and Smolensky 1993, McCarthy and Prince 1993). As for voiced-velar-obstruent nasalisation and voiced obstruent prenasalisation, they are generally analysed by a nasality insertion rule at a certain level of derivation (Kanai 1982 *et passim*). Voiced-velar-obstruent nasalisation is analysed in Itô and Mester (1997) within the context of OT, but, to my knowledge, no OT-based analysis of voiced obstruent prenasalisation has yet been provided in the literature.

In a break from previous approaches, I will present a phonological principles-and-parameters analysis which does not call for arbitrary language-specific rules and multistratal levels of representation. Within such a framework, this research sets two goals: (i) to incorporate directly into phonological representation the relatedness of nasality and voicing; and (ii) to provide a representation which can encode not only the interactive aspects of the two properties, but also the distinct facets of behaviour which the two properties present.

To begin, I shall review the relevant data and discuss the correlation between nasal and voice in §1.2. In the final part of this chapter (§1.3) I shall provide an overview of this whole work.

1.2. The relation between nasal and voice

1.2.1. *Nasal-voice paradox*

1.2.1.1. *Voice in nasals*

A nasal is sometimes — but significantly, not always — identified as a segment specified for voice. The choice is determined by the relevant phonological phenomena and the system of a given language. In this subsection, I shall review these two different types of behaviour, beginning with a consideration of nasal-obstruent clusters. In many languages, a nasal-obstruent cluster shows categorial voicing assimilation. For example, Campa (Arawak), spoken in southern Mexico (Dirks 1953, Herbert 1986), has a distributional restriction whereby an onset obstruent following a coda

nasal must share voice with the nasal, as shown in (1).

- (1)
- | | | |
|------------------|---------------|--------------------|
| Campa | | |
| <i>kombiróši</i> | ‘palm leaf’ | * <i>kompiróši</i> |
| <i>nišindʰo</i> | ‘my daughter’ | * <i>nišintʰo</i> |
| <i>kirĩga</i> | ‘downstream’ | * <i>kirĩka</i> |

In the same way, a nasal-obstruent cluster must be voiced in Yamato Japanese.

- (2)
- | | | |
|-----------------|--------------------------|------------------|
| Yamato Japanese | | |
| <i>šombori</i> | ‘discouraged’ | * <i>šompori</i> |
| <i>šindoi</i> | ‘tired’ | * <i>šintoi</i> |
| <i>kaŋgae</i> | ‘thought’ | * <i>kaŋkae</i> |
| <i>koŋgari</i> | ‘done to a golden brown’ | * <i>koŋkari</i> |

This phenomenon is found not only within lexical items, but also across a morpheme boundary. For example, verbal suffixes such as *-te*, *-ta*, *-tari*, and *-tara*, when attached to a stem ending with a nasal, show voicing assimilation, as illustrated in (3).

- (3)
- | | | | | |
|----|--|---|----------------|----------------------|
| a. | <i>šin</i> + <i>te</i> (gerundive) | → | <i>šinde</i> | ‘die’ (gerundive) |
| | <i>kam</i> + <i>te</i> | → | <i>kande</i> | ‘chew’ (gerundive) |
| b. | <i>šin</i> + <i>ta</i> (past indic.) | → | <i>šinda</i> | ‘died’ |
| | <i>kam</i> + <i>ta</i> | → | <i>kanda</i> | ‘chewed’ |
| c. | <i>šin</i> + <i>tari</i> (alternative) | → | <i>šindari</i> | ‘die’ (alternative) |
| | <i>kam</i> + <i>tari</i> | → | <i>kandari</i> | ‘chew’ (alternative) |
| d. | <i>šin</i> + <i>tara</i> (subjunctive) | → | <i>šindara</i> | ‘die’ (subjunctive) |
| | <i>kam</i> + <i>tara</i> | → | <i>kandara</i> | ‘chew’ (subjunctive) |

Inflexion involving verbal stems in (3) is subject to systematic voicing if the stem-final consonant is nasal.

This kind of dynamic voicing alternation is widely attested in the world’s languages. Some further examples are given below.¹

- (4) a. Quichua
wakin-da ‘others-*ta/da* (object suffix)’
kan-ǰu ‘you-*ču/ǰu* (question suffix)’
kam-ba ‘you-*pa/ba* (genitive suffix)’
hatum-bi ‘big one-*pi/bi* (locative suffix)’
- b. Zoque
min-pa → *mimba* ‘he comes’
min-ta → *mindama* ‘compel (pl.)’
pʌn-čʌki → *pʌŋʃʌki* ‘figure of a man’
pʌn-ksi → *pʌŋgʌsi* ‘on a man’
N-pama → *mbama* ‘my clothing’
N-tatah → *ndatah* ‘my father’
N-čoʔngoya → *ŋʃoʔngoya* ‘my rabbit’
- c. Kpelle
N + polu → *mbolu* ‘my back’
N + tia → *ndia* ‘my taboo’
N + kɔɔ → *ŋgɔɔ* ‘my foot’
N + fela → *mvela* ‘my wages’
N + sua → *nʃua* ‘my nose’

All the above examples indicate that nasals act as a trigger for the assimilation of voicing to the immediately following obstruent. This has led many phonologists to posit the presence of a voicing feature in the internal structure of nasals, which spreads, whenever possible, onto the following obstruents.

1.2.1.2. *Nasals without voice*

In contrast to the voice specification in nasals in the context of postnasal voicing assimilation, Yamato Japanese also displays a complementary type of nasal which is apparently unspecified for voice. The existence of this kind of nasal is confirmed by the fact that nasals are invisible for Lyman’s Law, which places an upper limit of one voiced obstruent on any lexical form (i.e. any single free morpheme). Some examples are given below.

- (5) a. *sabi* 'rust' **zabi*
sabaki 'judgement' **zabaki*, **sabagi*, **zabagi*
tsubasa 'wing' **dzubasa*, **tsubaza*, **dzubaza*
saži 'spoon' **zaži*
kazari 'decoration' **gazari*
toge 'thorn' **doge*
tokage 'lizard' **dokage*, **togage*, **dogage*
- b. *beni* 'rouge'
niži 'rainbow'
tsubame 'swallow'
nagisa 'beach, shore'
mikado 'emperor, emperor's palace'
nezumi 'rat, mouse'
nokogiri 'saw'

The items in (5a) show that only a single voiced obstruent is allowed to appear in a morpheme. However, (5b) shows that nasal consonants are not regarded as voiced obstruents; in other words, they are invisible to the constraint.

Lyman's Law also functions in compounding, where the independent process of Rendaku is observed. Under Rendaku, an initial voiceless consonant of the second member of a compound is realised as its voiced counterpart, as shown in (6).

- (6) *oo* + *taiko* → *oodaiko* 'big drum'
onna + *kokoro* → *onnagokoro* 'woman's heart'
take + *sao* → *takezao* 'bamboo pole'

However, Lyman's Law blocks Rendaku if the second member of a compound includes a voiced obstruent in its lexical form, as seen in (7).

- (7) *maru* + *hadaka* → *maruhadaka* 'completely naked'
 (**marubadaka*)
kami + *kaze* → *kamikaze* 'divine wind'
 (**kamigaze*)
onna + *kotoba* → *onnakotoba* 'feminine speech'
 (**onnagotoba*)