

The Tonophobic Process of Coronal Neutralization in Malagasy

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1. Introduction

There are certain words in Malagasy that exhibit an alternation between [tr] and [r] and [tr] and [t]. For example, the word *manúratra* 'to write' has imperatives *manuráta* and *surátu*; *mangálatra* 'to steal' has imperatives *mangalára* and *angaláru*. The alternation of [tr]~[r] and [tr]~[t] in similar environments---suggests that [t] and [r] are specified in the underlying representations and that [tr] appears as a neutralized surface variant of the other two. A salient feature of the afore-mentioned alternations is the shifting of the stress. In this squib, I show how stress patterns determine the phoneme inventory near the end of the word.

2. The Evidence

2. 1. Alternations

So far, I have found only the two types of alternation in the data from Noro: [tr] alternating with [r] and [tr] alternating with [t]. In addition to the forms in the introduction, there is also *mahafántatra* 'to know' / *famantára* 'instrument used to make know'.

2. 2. Loan words

The French word for table was borrowed with its article: *la table*. The Malagasy have adapted this word to their phonology. Looking at the alignment below, it seems the Malagasy speakers endeavored to keep the stress in the same place, but broke up the consonant cluster. The substitution of [tr] for [l] mirrors the alternations already seen.

French la . tá . b lə

Malagasy la . tá . ba . tra

Table 1: borrowing of [latablə]

2. 3. Comparative Austronesian

Languages closely related to Malagasy have a word **lanit* which has the Malagasy reflex *lánitra*.

Again the [t]~[tr] correspondence mirrors the the evidence from the alternations and loanwords.

2. 4. Dictionary Searches

The common environment where all of these changes take place is $\acute{V}C_iV_V\#$. An exhaustive search of an 8000 word dictionary shows that only [m], [n], [tr], and [k] can appear in this context. The [m] may be an accident, as it occurs only in one listed form: *mikárama* 'to work for wages' (derived from *karáma* 'wages'). Also, the dictionary shows another pattern of alternation in this environment, [k]~[h], as seen in the pair *áfaka* 'free' / *afáhana* 'to be set free'.

3. The Analysis

3. 1. Why This Environment?

In my analysis, I adopt the view that consonants in a weak position have difficulty maintaining their features. In optimality theoretic terms, faithfulness to consonant features in weak positions is low ranked. Markedness concerns reduce the consonant inventory in these weak positions as much as possible. The key ingredient for the analysis, then, is to characterize the relevant positions.

From the formulation of the environment ($\acute{V}C_iV_V\#$), it looks possible that adjacency to a stressed vowel may be important as C_i can cover the full range of Malagasy consonants (with the possible exception of [g] and the voiced affricates). Indeed, looking at the range of C_j in $\acute{V}C_iC_jVCV\#$ shows that it is restricted (in the dictionary, at least) to the plain stops and three of

the four affricates, as shown in Table 2¹. This restriction is probably epiphenomenal, however, as these pairs indicate a strong requirement for consonant clusters to be a nasal-homorganic-stop pair². A similar context is #_VCV́, where the full range of Malagasy consonants is found, but this range is also suspect: it contains segments that only appear word-initially such as [f] and [kʰ]. Dictionary searches for other stress-distant consonants earlier in the word are not an option as secondary stresses are not marked (I am assuming that the primary stress is the rightmost in the majority of the cases).

mp	nt	nk	nts	
mb	nd	ng	ndz	ndʰ

Table 2: possible C_iC_j pairs in the context V́C_iC_jVCV#

Another possibility suggests itself, namely one related to the fact that these final vowels are often voiceless and very quiet. Many of the consonant cues relying on release features, therefore, are much less salient in these cases. The vowels that transition into these consonants are also in a prosodically weak position, so they are less perceptually cued from both sides. This double-sided disadvantage results in a position with low ranking faithfulness and allows markedness constraints to limit the number of contrasts that can be maintained there. Alternations happen, then, either when the stress shifts or the word is suffixed. In the first case, the segment in question now immediately follows a stressed vowel: *mangálatra* -> *mangalára*. In the latter case, the consonant is now immediately followed by a “better” (i.e., non-word-final, less likely to be voiceless, etc.) vowel. These new situations place the segment in a position of greater faithfulness.

3. 2. Why This Group of Segments?

The remaining question is: “Why is it that [k], [tʰ], and [n] (and possibly [m]) are the only

1 The sequence V́ntVCV# never appears in the dictionary; the sub-sequence V́ntʰ appears only in the form *ántra* ‘compassionate.’

2 This is likely the motivation for the /nz/ -> [ndz] and [nr] -> [ndʰ] processes seen in Malagasy.

segments found in this environment? These segments do not form a natural class, but --- with the exception of [tʰ] --- they do share one thing in common. They are good defaults given just a few feature specifications, specifically coronality and nasality.

	<i>Nasal</i>	
<i>Coronal</i>	+	-
+	n	tʰ
-	m	k

Table 3: a two-feature analysis of segments in $\acute{V}C_iV_V\#$

The choice of [n] as the default coronal nasal is quite uncontroversial. For the non-coronal non-nasal consonant, [k] is arguably the best choice as obstruents are less marked than sonorants, stops less marked than fricatives, voiceless stops less marked than voiced stops, and [k] is a better voiceless stop than [p] for aerodynamic reasons (and perhaps perceptual reasons as well --- the velar pinch, etc.). [m] is better than [ŋ], for reasons that I'm not quite clear on, but see *Patterned Exceptions in Phonology* (Zuraw, 2000, UCLA dissertation) pp. 59--61 for an indirect example and a discussion of nasal goodness (unfortunately root-initial nasals). Additionally, [ŋ] pokes its head up quite rarely in Malagasy.

So the remaining question has been further reduced to "Why [tʰ]?" It fits the bill as coronal and non-nasal, certainly, but [tʰ] seems like it ought to be quite a marked segment. One aspect in which it is nice is that its noisy release gives a venue for the following voiceless vowel to express itself as co-articulation. It is odd, on the one hand, that there would be a process working to preserve contrasts in this environment where so many contrasts are being neutralized. On the other hand, within Table 3 there is a space for [tʰ] but not for [kʰ] or [ndʰ] or [mgʰ] as none of the latter are purely (non-)coronal or (non-) nasal. Another possible explanation is that the voiceless vowels all exert a (articulatory) backing influence on a preceding, which [tʰ] (perhaps [tʰ])

preserves.

3. 3. Constraints

I do not offer here an actual OT analysis, but rather the skeleton of what a real analysis might be like. In a real analysis one would perhaps want a better formulation of the relevant environments and more explicit faithfulness and markedness constraints as well as inputs that don't have underlying stress, although there seem to be cases of lexical stress (tánana 'hand' vs. tanána 'town')

- (1) **IDENT V̇_V** : a consonant in the input whose correspondent in the output is between a stressed vowel and a (voiced or voiceless) vowel are specified exactly the same for every feature.
- (2) **IDENT V_V̇** : a consonant in the input whose correspondent in the output is between a non-stressed vowel and a voiceless vowel are specified exactly the same for every feature.
- (3) ***NON-DEFAULT C** : this is shorthand for a hierarchy of constraints each penalize a single segment; a partial hierarchy might include *p » *k, *g » *b, and *ŋ » *m.
- (4) **FAITH-{COR, NAS}** : a segment in the output is coronal (nasal) if and only if its correspondent in the input is also coronal (nasal).
- (5) **FAITH-X** : the constraint that favors [ʔ] over silence in the environment {t,k}_V̇.

Example optimizations:

input: /manúrata/	IDENT V̇_V	FAITH-{COR, NAS}	FAITH-X	*NON-DEFAULT C	IDENT V_V̇
a. manúrata			*!	(*t)	
b. [↗] manúrat [↘] a				(*t)	*
c. manúraka		*!		(*k)	

input: /surátu/	IDENT \acute{V} _V	FAITH-{COR, NAS}	FAITH-X	*NON-DEFAULT C	IDENT V_ \grave{V}
a. $\text{surát}\grave{u}$			*	(*t)	
b. $\text{surát}^r\grave{u}$	*!			(*t)	
c. $\text{surák}\grave{u}$	*!			(*k)	

input: /latábala/	IDENT \acute{V} _V	FAITH-{COR, NAS}	FAITH-X	*NON-DEFAULT C	IDENT V_ \grave{V}
a. $\text{latábal}\grave{a}$				(*l)!	
b. $\text{latábat}^r\grave{a}$				(*t)	*
c. $\text{latábata}\grave{a}$			*!	(*t)	*

input: /áfaha/	IDENT \acute{V} _V	FAITH-{COR, NAS}	FAITH-X	*NON-DEFAULT C	IDENT V_ \grave{V}
a. $\text{áfah}\grave{a}$				(*h)!	
b. $\text{áfah}^r\grave{a}$		*!		(*t)	*
c. $\text{áfak}\grave{a}$			*	(*k)	*

4. Conclusions

The range of consonants that can occur in the context $\acute{V}C_1V_V\#$ is very small, and does not form a natural class. In this squib I have explored reasons why this context might be one in which only a few contrasts are allowed. I have also shown how the allowable set of consonants can be seen as preserving a minimal number of features in the least marked way possible.