MALAGASY PHONOLOGY AND MORPHOLOGY

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Introduction

This paper discusses some of the phonological and morphological processes of Malagasy. Malagasy is an Austronesian language spoken on the island of Madagascar, located off the coast of south-east Africa. Unlike other Austronesian languages it has been relatively little-studied by linguists. Edward Keenan (1972), (1976) and Charles Randriamasimanana (1986) have written about its syntax, but there are very few works dealing with Malagasy phonology and morphology. The purpose of this paper is then to provide a detailed description and an atheoretical analysis, of a part of this unexplored area: Malagasy verbal morphophonology.

The paper is organized into two parts. Part I contains an exposition of Malagasy phonology and suggests a general typology of phonotactic constraints and phonological rules used to implement them. Part II presents a detailed description of Malagasy verbal morphology, introduces the concepts of root and stem, and proposes a set of root- and stem-based word formation rules. The distinction among different types of Malagasy affixes is discussed in both parts and shown to be relevant for both phonology and morphology. All of the data cited here come from my fieldwork with Mr. Aurelien Rajoharison. Mr. Rajoharison is a native speaker of the Mierna dialect which is the basis of standard Malagasy.

PART I: MALAGASY PHONOLOGY

1. The Segments

Malagasy has the following set of phonemes.

(1)

Consonants

	Bilab	LaDent	Dent	DentAlv	Palat	Retro	Velar	Glott
Stops	p,b		t,d				k,g	
Affricates				ts,dz		t^r,d^r		
Fricatives		f, v		s,z				h
Nasal	m			n				
Lateral				l				
Trill				r				

Vowels

i u

e

a

Diphthongs

Falling	Rising
aw	wa
ay	ya
uy	yu
ew	we

Many phonemes have different allophones in specific contexts but for the most part I will not be concerned with allophonic variation here. Consequently, in the following discussion I will use a broad phonetic transcription which omits details introduced by low level phonetic rules. For typographical convenience, I represent the retroflex affricates as tr and dr. It should be kept in mind, however, that these digraphs represent single sounds as do the affricate symbols ts and dz.

2. Syllable Structure

2.1 Syllable Types

Phonologically, there are four types of syllables in Malagasy:[1]

(2) V: i.zi 'he'
VN: an.ki.zi 'child'
CV: ta.na.na 'hand' (the most common type)
CVN: kin.ta.na 'star', nen.du 'grease'

In (2) C stands for any consonantal sound, and N for nasal consonants exclusively. Phonetically, many more combinations occur due to deletion of unstressed vowels (cf. 2.1 above), but the fact that in more careful/slower pronunciation the missing vowels always emerge indicates that they are underlyingly present.[2]

Thus, in Malagasy no clusters are allowed in syllable margins; the onset and the coda can contain at most one element. The coda position is further restricted since it can only be occupied by a nasal consonant.

2.2 Diphthongs and Syllable Structure

In a recent article, Kenstowicz and Rubach (1987) argue that a language can underlyingly have either rising or falling diphthongs, but not both. That is, if a language has underlying falling diphthongs, what looks like rising diphthongs must be sequences of a consonantal glide and a vowel, and vice versa. They support their proposal with evidence from Slovak, which they claim has only rising diphthongs. In Slovak, rising diphthongs, but not falling diphthongs, behave like long vowels with respect to shortening rules and the rhythmic law. Furthermore, the fact that Slovak has only three rising diphthongs but many supposed falling diphthongs leads Kenstowicz and Rubach to believe that the alledged falling diphthongs are in fact "fake diphthongs", i.e., sequences of a vowel and a consonantal glide. This claim, which follows from Kenstowicz and Rubach's formal and theoretical assumptions, cannot be substantiated in Malagasy.

Since Malagasy does not have long vowels, tests based on length alternations are not applicable here. As the number of falling and rising diphthongs is the same (see (1)), the "free combination" criterion also cannot be used to distinguish between "fake" and "true" diphthongs in Malagasy. The canons of Malagasy syllable structure, however, provide evidence that the syllabic and nonsyllabic parts of both types of diphthongs must belong to the syllable nuclei. This is demonstrated by the fact that falling diphthongs can occur in closed syllables, as in (3a), and a syllable containing a rising diphthong can have an onset, as in (3b).

(3a) mayn.ti 'green'
kayn.ga.na 'fast'
rawn.drya.na 'sir/madam'

b) kyan.dza 'courtyard'
vwa.su.lu 'changed (perf)'
mya.ra.mi.la 'soldier'

The claim that one of the two types of diphthongs is a sequence of C and V (or V and C) would mean that y and w must either be part of the coda in (3a), or the onset in (3b). Consequently, words like those in (3) would constitute the only examples of clusters in the syllable margins (i.e., CVCC or CCV(N)) in Malagasy. The analysis which treats both syllabic and nonsyllabic parts of both types of Malagasy diphthongs as internal to the syllable nucleus avoids postulating further, otherwise unmotivated, syllable types. Malagasy syllable structure also provides another argument that falling diphthongs cannot be VC sequences. Since syllables and words can end in a falling diphthong, syllable and word final y and w cannot be consonantal since that would violate the syllable structure canon in (2) and the *C# constraint discussed below. Thus Malagasy syllable structure facts show quite clearly that both rising and falling diphthongs are phonemic in this language, and invalidate Kenstowicz and Rubach's universal claim.

3. Phonotactic Constraints and Syllable Structure

Phonotactic constraints define possible sequences of segments in a language. The question of how big a role the syllable plays in determining these constraints is addressed in this section. In a language like Malagasy, whose syllable structure is very simple, one might expect the majority of phonotactic constraints to follow from the types of syllables it allows, yet this is not the case. Syllable structure by itself accounts only for some of the phonotactic constraints in Malagasy.

3.1 Syllable-Driven Phonotactic Constraints

One phonotactic constraint which directly follows from the syllable structure of Malagasy is the fact that, since only nasal consonants are allowed in the coda, non-nasal/non-nasal and non-nasal/nasal consonant clusters do not exist in Malagasy surface forms. This constraint can be seen in nativization patterns, e.g., dukutera 'doctor', lakilasi 'class'. Phonotactic constraints are, of course, surface constraints, and the underlying forms of morphemes or the results of morpheme concatenation often deviate from the surface canon. The cluster constraint can potentially be violated by a set of verbal roots which underlyingly end in a consonant. When these roots are followed by vowel-initial suffixes, the root-final consonant is syllabified as the onset of the following syllable. When they are followed by consonant-initial suffixes, however, such syllabification is not possible and the root-final consonant is deleted to prevent violations of the cluster constraint.[3] In order to have these structures conform to the general canon, a rule of C deletion is evoked, whereby a consonant deletes preceding another consonant. (The root-final consonant also deletes word-finally to satisfy a phonotactic constraint discussed in section 3.3).

(4) $$\begin{bmatrix} C \\ [-nasal] \end{bmatrix} \longrightarrow \emptyset \; / \; \_\_\_\_ \left\{ \begin{matrix} \# \\ [+cons] \end{matrix} \right\}$$

The application of this rule is illustrated in (5) by the paradigm of manuhi 'to tie' whose root is tuhiz. A Malagasy transitive verb has several forms : active, passive, relative (oblique passive) , perfective, active imperative, passive imperative, relative imperative and two deverbal nominals: actor noun and gerund. The morphological makeup of these forms will be discussed in detail in Part II. Here, a sample paradigm illustrates the main points. Note that root final z disappears in unaffixed forms and the perfective form, where obstruent or nasal initial person/number agentive suffixes (here, 1sg /-ku/ and 2sg /-nau/) attach directly to the consonant-final perfective stem. (The deletion of root-initial t is due to Nasal Substitution, a common Austronesian process which deletes voiceless obstruents following the prefix an-. SFP stands for stem-forming prefix.)

(5a) active	m- an- tuhiz pres-SFP- root	manuhi (z-->ø/___#)	tie
b) passive	tuhiz - i - ku root-pass-1sg	tuhiziku	tied by me
c) relative	an- tuhiz - a- ku SFP- root-rel-1sg	anuhizaku	tied by me
d) active imp	m- an -tuhiz-a pres-SFP-root-imp	manuhiza!	Tie!
e) passive imp	tuhiz-u root -imp	tuhizu!	Tie!
f) relat. imp	an- tuhiz-u SFP-root-imp	anuhizu!	
g) perfective	vwa-tuhiz-ku perf-root-1sg	vwatuhiku (z-->ø/___C)	tied by me
	vwa-tuhiz-nau perf-root-1sg	vwatuhinaw (z-->ø/___C)	tied by you
h) actor N	p- an-tuhiz actN-SFP-root	panuhi (z-->ø/___#)	tier
i) gerund	f- an- tuhiz- a -na nom-SFP-root-rel-nom	fanuhizana	the tying

Thus surface constraints on syllable structure motivate the alternations in verbs with consonant final roots, and the absence of

non-nasal/non-nasal and non-nasal/nasal clusters in Malagasy is a direct consequence of permitted syllable types.

3.2 Phonetic Phonotactic Constraints

The type of phonotactic constraint which I refer to as phonetic is not directly derivable from syllable structure. These constraints do not refer so much to major class features of contiguous segments, but rather impose restrictions on voicing, manner and place of articulation features, etc., of permissible combinations. In Malagasy, phonetic phonotactic constraints determine the features of segments in nasal/non-nasal consonant clusters.

An examination of Malagasy monomorphemic words reveals that the nasal/non-nasal clusters (the only type allowed in the language) must satisfy two further requirements:

i) All clusters are homorganic, e.g., mañka 'mango', umpi 'cattle', tenda 'neck', etc. The homorganic canon conditions the nasal assimilation rule which adjusts clusters created by morpheme concatenation.

(6) $\begin{bmatrix} C \\ +\text{nasal} \end{bmatrix} \longrightarrow \alpha\text{place} \;/\; \underline{\quad} \begin{bmatrix} C \\ \alpha\text{place} \end{bmatrix}$

mandiha /m-an-diha/ 'dance' vs mambuli /m-an-vuli/ 'grow'[4]

ii) The clusters must also be homogeneous in manner of articulation, e.g., monomorphemic andru 'day', undana 'pillow', mamundzi 'help', etc. This requirement motivates the manner assimilation rule (7) in morphologically complex words.

(7) [+ continuant] ----> [- continuant] / N ____

h ---> k	harena 'wealth'	mana karena	'rich'
s ---> ts	isika 'we'	antsika	'us'
z ---> dz	zavuna 'cloud'	mandzavuna	'(be) cloudy'
r ---> dr	rifutra 'wind'	mandrifutra	'(be) windy'
l ---> d	vulu 'hair' (ny) luha 'head'		
		vulunduha	'head hair'

Phonetic phonotactic constraints follow from the physical nature of the articulatory tract and the phonetically motivated tendency for coarticulation of adjacent sounds; they are not directly motivated by syllable structure.[5]

3.3 Distributional Phonotactic Constraints

Distributional phonotactic constraints determine the position and the linear order of syllable types within a lexical item. Malagasy has the following distributional constraints:

(8)a) only open syllables (mainly Ca, Ci, Cu) can end a word, thus *C#

b) nasal clusters do not occur

c) onsetless syllables (V and VN) occur mainly word (root) initially , thus VV (hiatus) sequences are not found on the surface

The prohibition on final obstruents is accounted for by Malagasy syllable structure, since no syllables end in obstruents. Word final nasal consonants, however, are also not allowed, even though they qualify as codas, thus this constraint cannot be derived from Malagasy syllable structure. (Note that borrowings conform to the "final vowel requirement", e.g., dukutera 'doctor', buki 'book'.)

The next two constraints in (8) also do not in any way follow from the syllable structure of Malagasy. If free combination of Malagasy syllables was allowed, (C)VN and NV syllables could be adjacent and result in NN sequences, and V and VN syllables could combine to produce VV sequences. Although logically possible, these combinations do not occur.

The prohibition on VV sequences motivates rules of hiatus resolution when such combinations occur as a result of morphological concatenation. Malagasy employs different strategies in hiatus resolution depending on the vowels involved and on the type of morphological entities whose concatenation produces the VV sequence. All the strategies can be found in the verbal paradigm. The Malagasy verb is a morphologically complex entity (see Part II); but basically it includes the root and a number of affixes. The affixes which are relevant for the following discussion are root prefixes (R-prefixes), syntagmatic suffixes (S-suffixes) and paradigmatic suffixes (P-suffixes).[6] R-prefixes attach directly to the root and include stem-forming prefixes, e.g. an- in manuhi /m-an-tuhiz/ 'tie', and the perfective prefix vwa-, e.g. vwatuhi /vwa-tuhiz/ 'tied'. S-suffixes attach to roots and basic stems and include passive (passive and relative), e.g., -i in tuhiziku /tuhiz-i-ku/ 'tied by me', and imperative (active imperative, passive imperative, and relative imperative) suffixes, e.g., -u in tuhizu! /tuhiz-u/ 'tie!' . They are called syntagmatic since they create different forms of the same verb. P-suffixes are person/number suffixes which mark possession in nouns and agents in passive verbal forms, e.g. -ku in tuhiziku. They are referred to as paradigmatic, since they create different variants of the same verbal form. The contrast in hiatus resolution concerns the combination of R-prefix and root versus root and S-suffix.

S-suffixes involved in the composition of different verbal forms of Malagasy verbs are usually vocalic. Since most verbal roots end in a vowel, addition of a vowel suffix to a root often creates hiatus. Because VV sequences are not allowed in Malagasy, morphological concatenation of root (or stem) and S-suffix is followed by a phonological process of hiatus resolution. The paradigm of manulu 'to change' in (9) illustrates different resolution strategies.

(9a) active	m- an- sulu pres-SFP- root	manúlu	change
b) passive	sulu - i - ku root-pass-1sg	sulúyku	changed by me
c) relative	an- sulu- a- ku SFP- root-rel-1sg	anulúku	changed by me
d) active imp	m- an -sulu -a pres-SFP-root-imp	manulú!	Change!
e) passive imp	sulu -i root -imp	sulúy!	Change!
f) relat imp	an- sulu -i SFP-root-imp	anulúy!	
g) perfective	vwa- sulu perf-root	vwasúlu	changed
h) actor N	p- an-sulu actN-SFP-root	panúlu	changer
i) gerund	f- an- sulu- a -na nom-SFP-root-rel-nom	fanulúna	the changing

In the underlying forms for (9) b), c), d), e), f) and i) the addition of a S-suffix violates the *VV constraint and two different strategies are used to resolve these sequences. The choice of strategy depends on the specific vowel of the S-suffix. In (17) b), e) and f), where the second vowel in the VV sequence is -i, a diphthongization procedure is adopted to resolve the hiatus, whereby the second vowel is incorporated into the nucleus of the preceding syllable. (Recall that both parts of diphthongs are internal to syllabic nuclei in Malagasy.)

(10) i---->y /V ___

The diphthongization process is in fact more general than presented above. In Malagasy the passive imperative suffix has two allomorphs: /i/ when the preceding syllable contains /u/ (e.g., sulu-i in (9e)) and /u/ elsewhere (e.g., tuhiz-u in (5)). These u's also diphthongize following vowel final roots. The diphthongization rule is restated in (11).

(11) Falling Diphthongization: $\begin{bmatrix} V \\ +hi \end{bmatrix}$ -----> [-voc] / V ____

sulu-i ---> suluy passive imperative: 'Change!'

sasa-u ---> sasaw passive imperative: 'Wash!'

The second strategy is elision; if the vowel of the S-suffix is a, it deletes following another vowel. This can be seen in (9) c), d) and i).

(12) Elision: a----> ∅/ V _____

an-sulu-a-ku = anuluku

Hiatus can also occur as the result of concatenating a vowel-final R-prefix with a vowel-initial root. Such VV sequences, however, are resolved by different means than those resulting from root and suffix combination. Specifically, the elision rule (12) does not apply to delete root-initial a's. Verbs like m-i-anatra 'to study' and m-i-aru 'to protect' are pronounced as myanatra and myaru and not *minatra and *miru. (Note the contrast with vakiku /vaki-a-ku/ 'read by me', the passive form of mamaki /m-an-vaki/ 'to read' in (16).) Thus the same segmental sequence ia is resolved differently depending on the types of morphological entities to which the two vowels belong. In the case of root-suffix elision applies, in the prefix-root combination a diphthongization process in (13) takes place.

(13) Rising Diphthongization: i ----> y / ____ V

m-i-asa ---> myasa 'work'

Note that rule (12) must be restricted to root-suffix, and rule (13) to prefix-root environments, since without such restrictions no ordering could ensure the correct result in both cases. The two rules are restated in (14) and (15).

(14) Elision: a ----> ∅ / V _____
[S-suffix]

(15) Rising Diphthongization: i ----> [-voc] / _____ V
[R-prefix]

(16) illustrates the mutually exclusive application of Elision and Rising Diphthongization.

(16a)	vaki-a-ku	'read by me'	m-i-asa	'work'
rule (14)	vakiku		------	
rule (15)	------		myasa	
b)	vaki-a-ku	'read by me'	m-i-asa	'work'
rule (14)	------		myasa	
rule (15)	vakiku		------	

The hiatus resolution facts demonstrate that Malagasy R-prefixes and S-suffixes behave differently with respect to phonological processes which implement a distributional phonotactic constraint of Malagasy.

Of the three types of phonotactic constraints discussed above, only syllable-driven constraints are directly motivated by Malagasy syllable structure, while phonetic and distributional constraints pertain to linear order of segments and syllables within a word. The

typology of phonotactic constraints suggested here correlates to some degree with a typology of phonological processes which enforce them. Syllable-driven constraints are most likely to be implemented by rules of insertion and deletion which "fix" ill-formed syllables. Phonetic phonotactic constraints affect adjacent segments (across syllable boundaries in Malagasy) and are executed by assimilations and dissimilations. Distributional constraints determine which syllables can and cannot occur next to each other and invoke rules of both types (cf. Elision as an example of deletion and both diphthongization rules as examples of disssimilation).

4. Stress

4.1 General Stress Rule

Main stress is penultimate for most of the Malagasy unaffixed vocabulary. Words of four or more syllables also have initial secondary stress.

(17) kíbu 'stomach'
dími 'five'
runúnu 'milk'
myàramíla 'soldier'
sàribakúli 'doll'

The position of main stress influences the vowels, which in turn influence the consonants. Penultimate stress within a word causes the final (unstressed) vowel to devoice e.g. [vávḁ] 'mouth', [múfu̥] 'bread', [vávi̥] 'female'. Other unstressed vowels are frequently dropped, e.g. [mténi̥] 'speak' /miteni/. A voiceless final vowel affects the quality of the preceding consonant by devoicing it when it is originally voiced, or causing aspiration/palatalization when it is originally voiceless. This serves to preserve (and accentuate) the voicing contrast in the post-stress position. Thus because of the close ties between stress and devoicing, devoicing and deletion, etc., stress placement is indirectly the cause of much allophonic variation in Malagasy.

4.2 Weak Syllables

Many words ending in tra#, ka#, and na# (the so-called weak syllables) are the only exceptions to the penultimate stress rule in the unaffixed vocabulary. In final position these syllables often seem to be invisible to the stress rule and consequently words which end in them are antepenultimately stressed.

(18)a) weak-syllable words		versus	b) penultimately stressed words in tra, ka, na	
túngutra	'leg'		mandzáytra	'sew'
lálitra	'fly'			
kíntana	'star'		tanána	'village'
úndana	'pillow'			
kátsaka	'corn'		alíka	'dog'
sátruka	'hat'			

The contrast between the forms in (18a) and (18b) suggests that weak syllables were affixes historically, though synchronically their presence does not correlate with any discernible meaning or grammatical function. There are at least two ways to formalize the exceptional behavior of weak syllables with respect to stress. One is to assume that they are extrametrical and that the general penultimate stress rule "skips" them in its application. An alternative is to postulate that words ending in weak syllables are underlyingly disyllabic, i.e., end in a consonant (tr, k, n). They undergo the penultimate stress rule, and subsequently the vowel a is inserted word-finally to prevent the violation of the *C# phonotactic constraint. The choice of the vowel could be motivated by the fact that a is the most neutral of the three vowels (a, i, u) allowed in word final position (does not involve major secondary articulation features), and has the least phonetic effect on the preceding consonant. (Recall that final vowels are voiceless in Malagasy.) The latter solution simplifies the account of segmental alternations in affixed weak-syllable words (not discussed in detail in this paper, but see note 11), and I will adopt this analysis here. I assume that Malagasy grammar includes rule (19) which, like other segmental rules (see 4.3.2), is ordered after the stress rule.

(19) Weak Syllable a Insertion

$$\emptyset \longrightarrow a \;/\; \left\{ \begin{matrix} k \\ tr \\ n \end{matrix} \right\} \_\_\_ \;\#$$

e.g.,	tungutr	zanak	undan	vs	alika
penult.stress	túngutr	zának	úndan		alíka
a insertion	túngutra	zánaka	úndana		———

4.3 Affixed Forms

The three types of Malagasy affixes introduced above behave differently with respect to stress.

4.3.1 R-Prefixes

R-prefixes in morphologically complex words are not a part of the domain of the main stress rule. For example, monosyllabic roots ray and ti are the bases of the verbs mandráy 'to take/receive' /m-an-ray/ and mití 'to love' /m-i-ti/. Stress in these verbs falls on the root (mandráy, mití), though if the whole word were its domain it should fall on the R-prefix, which constitutes the penultimate syllable. R-prefixes can bear secondary stress in longer words, e.g., màŋkahála /m-aŋka-hala/ 'to hate'.

4.3.2 S-Suffixes

Unlike R-prefixes, S-suffixes are very much a part of the domain of main stress rule, i.e., they count in the process of stress assignment. Recall the paradigm of manúhi 'to tie' in (7). In the active (unsuffixed) form manúhi /m-an-tuhiz/ stress falls on u (the penultimate vowel). In the passive imperative tuhízu! /tuhiz-u/, the stress falls on i, since it, counting the suffix, is the penultimate vowel. That is, stress shifts rightward to i, in accordance with the main stress rule, since the root together with the S-suffix constitutes the domain of its application. S-suffixes which elide or diphthongize also count in stress assignment (see (20)-(21)), which shows that Elision (14) and Falling Diphthongization (11) follow the main stress rule.

(20)	m-an-sulu-a	
penult. stress	manulúa	
elision	manulú	active imperative: 'Change!'
(21)	sasa-u	
penult. stress	sasáu	
diphthongization	sasáw	passive imperative: 'Wash!'

4.3.3 P-Suffixes

The paradigms in (22) illustrate stress patterns of words affixed with possessive/agentive P-suffixes. (In Malagasy, as in many other languages (see Radic (1982)), the same set of suffixes is used to mark person/number of the possessor in nouns and of the agent in passive and relative verbal forms.)

(22)a)	saka 'cat'	
ni sákaku	my cat	(1sg P-suffix /-ku/)
ni sakanáw	your cat	(2sg P-suffix /-nau/)
ni sákani	his/her/their cat	(3sg/pl P-suffix /-ni/)

ni sàkantsíka	our cat	(1pl ex P-suffix /-ntsika/)[7]
ni sakanáy	our cat	(1pl inc P-suffix /-nai/)
ni sàkanarew	your(pl) cat	(2pl P-suffix /-na-re-u/)

b) manuhi 'tie', root: tuhiz, passive S-suffix i

tuhíziku	/tuhiz-i-ku/	tied by me
tùhizináw	/tuhiz-i-nau/	tied by you
tuhízini	/tuhiz-i-ni/	tied by him/her/them
tùhizintsíka	/tuhiz-i-ntsika/	tied by us (ex)
tùhizináy	/tuhiz-i-nai/	tied by us (inc)
tùhizinarew	/tuhiz-i-na-re-u/	tied by you (pl)

Monosyllabic P-suffixes are stressless and do not count in stress assignment; i.e., addition of a monosyllabic P-suffix does not cause a change in the stress pattern of a penultimately stressed word, and produces a large number of antepenultimately stressed bimorphemic words (cf., sáka and sákaku). P-suffixes which are (underlyingly) disyllabic always bear stress; i.e., addition of a disyllabic P-suffix moves the main stress to the P-suffix (cf., sáka and sàkantsíka). Thus monosyllabic P-suffixes are extrametrical while disyllabic ones count in stress assignment.[8]

5. Conclusions

The exposition of Malagasy phonological processes presented above does not constitute an exhaustive description, but it highlights the importance of phonotactic constraints and morphological identity in Malagasy phonology. Phonotactic constraints are important as a motivating force in phonology. They were shown to condition a variety of phonological processses and it has been suggested that the type of a phonological rule is correlated with the type of constraint it serves to enforce. The typology of phonotactic constraints proposed here is not meant for Malagasy alone but should hold across languages. It is interesting to note that the three-tiered representations of utterances in CV Phonology (Clements and Keyser (1981) and others) can provide a basis for a formalization of this typology. Phonetic constraints can be said to apply at the segmental tier. Distributional constraints are concerned mainly with the arrangement of units on the CV tier. Syllable-driven constraints are most general, i.e., most directly derivable from syllable types allowed in a given language, and refer to all three tiers, but mainly to the syllable tier, as they determine what can and cannot be syllabified.

The identity/type of a morpheme is also important in Malagasy phonology. Different types of affixes were shown to behave differently with respect to the stress rule. It was also shown that the implementation of a particular phonotactic constraint can depend on the

type of morphological entity involved in its violation. In Malagasy there is evidence that violations of a distributional constraint on VV sequences are resolved differently depending on whether hiatus is a result of R-prefix+root or root+S-suffix combination. Malagasy ablaut verbs discussed in Part II show that the distinction between R-prefixes and S-suffixes has some interesting morphological consequences as well.

PART II: MALAGASY VERBAL MORPHOLOGY

6. Introduction

6.1 Lexical Entries of Malagasy Verbs

Across languages, verbs are usually morphologically complex entities. Malagasy is no exception, since all its verbal forms are composed of more than one morpheme. The character of the Malagasy verb is perhaps best understood when it is compared to verbs in modern Indo-European languages. In most I-E languages verbal forms consist of a stem and one or more affixes (thematic vowels, person, number, gender, tense, infinitival affixes, etc.) For example, the Polish verb stem biega- has a variety of forms: biega-ć 'to run' (infin), biega-m 'I run'(1sg pres), biega-ją 'they run' (3pl pres), biega-ł 'he ran' (masc sg past), etc. The stem carries the conceptual meaning of the verb while the affixes contribute grammatical information (agreement, tense, mood, etc.). In the lexicons of these languages, the verbal entry consists of a stem (plus idiosyncratic grammatical information, such as conjugation class, thematic vowel, etc.), its meaning and its argument structure.

The composition of a Malagasy verb is quite different. It is a much more complex entity, both morphologically and semantically. Every Malagasy verbal form contains a root, which is the innermost and most basic part of the verb. Often, more than one verb can be formed from the same root. For example, verina is the root of mamerina /m-an-verina/ 'to repeat' and miverina /m-i-verina/ 'to return'; petraka is the root of mametraka /m-an-petraka/ 'to deposit' and mipetraka /m-i-petraka/ 'to sit/live'; araka is the root of manaraka /m-an-araka/ 'to follow' and myaraka /m-i-araka/ 'to go together', etc. Roots have only highly general meanings (e.g. verina has something to do with recurring, petraka with placing and araka with movement), and the same root can be used to form semantically diverse verbs. It is only the combination of the root and the stem-forming prefix which can be said to have a specific conceptual meaning and a particular argument structure (the prefix m- contributes the present tense information). Thus, unlike in the I-E languages, where the meaning of the verb is is carried by the (monomorphemic) verbal stem, in Malagasy the meaning of the verb is a function of the meanings of the root and the stem-forming prefix. Furthermore, it is usually not possible to predict the verbal meaning from the meanings of prefixes and roots.

There are, of course, morphologically complex verbs in I-E languages. The Polish example above can be the basis of many other verbs, e.g., odbiegać 'to run from somewhere', dobiegać 'to run to somewhere', przebiegać 'to run through somewhere', etc. The difference between Polish and Malagasy lies in the fact that while some Polish

verbal stems contain more than one morpheme, all Malagasy verbs are morphologically complex. (The other contrast is that the meaning of a prefixed Polish verb is usually entirely compositional, e.g., od- means 'from', do- 'to' and prze(z)- 'through'.) In English, the "-fer verbs" (confer, refer, defer, infer, prefer, etc.) most approximate the Malagasy verbal structure, though the English prefixes con-, re-, de-, etc., have some independent meaning, while most Malagasy stem-forming prefixes do not. Malagasy dictionaries (e.g., Richardson (1885), Korneev (1966)) do not include verbs as main entries, but rather contain roots and a list of verbs formed from them. Meanings and argument structures are associated with the verbs' entries but not with the main root entry, e.g., verina - the root of the following: mamerina - v.t., 'to repeat' and miverina - v.i., 'to return', etc.

6.2 Malagasy Active Verb

The active form of any Malagasy verb is formed from the root by addition of one of a limited class of R-prefixes, referred to as stem-forming prefixes. Such a prefix-and-root combination is the basic verbal stem. The stem by itself is never a free-standing word. To form the active verb a tense prefix (m- present, n- past and h- future) must be added to the stem[9]. This two-step process is illustrated in (23).

(23)	root:	ume		sutru		hala
	stem:	anume		isutru		aŋkahala
	verb:	manume	'gives'	nisutru	'drank'	haŋkahala 'will hate'

It is difficult to find a traditional name for the prefixes like an-, i-, anka-, etc. They cannot be called 'active' since they also occur in the oblique passive (relative) form of the verb (see below). They are not 'verbal' since they occur in a variety of nominal forms, e.g., fisotro 'a drink', fankahalana 'hate (N)', panume ' giver', etc. For the lack of a better term I refer to them as "stem-forming prefixes" (abbreviated as SF prefixes or SFPs). Only one SF prefix can attach to a root at a time (i.e. combinations like i-aŋka, an-i, an-aŋka, etc., do not exist), but as mentioned above, a given root can be the basis for different verbs, i.e., can occur with different SF prefixes, e.g., root laza: milaza 'say', mandaza 'tell on someone', maŋkalaza 'celebrate', mahalaza 'be able to say'. SF prefixes have a general semantic content but their meaning often depends on the meaning of the root. Most transitive verbs are formed by means of the SF prefixes an- and i-, which are by far the most common in the language. (In my database of 200 verbs 98 have the prefix an- and 70 the prefix i-. An- is most common with transitive verbs (87 out of 98), while 36 of the i- verbs are transitive and 34 intransitive.)

The composition of the active form, i.e., tense-SFP-root, is the same for transitive and intransitive verbs. In the following discussion I will be concerned mainly with transitive verbs, since they have a richer set of forms. Furthermore, I will limit the discussion to the morphology of "class 1 " transitive verbs. The classification of Malagasy verbs used here is based on the way they form their passives. Malagasy transitive verbs do not belong to conjugational classes in the I-E sense, and cannot be meaningfully classified according to their SF prefixes, but fall into distinct categories based on the form of the

passive. Class 1 is by far the largest class of Malagasy verbs. Its members are distinguished from verbs of other classes by the fact that their passive form is based on the unprefixed root. (Class 2 verbs form passive from the root prefixed with a- and do not use the passive S-suffix, class 3 verbs form passives from the basic stem, i.e., SF prefix-root, with the passive S-suffix.) The following is an exposition of the different forms of Class 1 verbs.

7. Malagasy Verbal Forms

7.1 Root-Based (Unprefixed) Forms

Passive

Class 1 verbs form passives from the root by adding a passive S-suffix -i or -a followed by P-suffixes marking the person and number of the agent and the general "unspecified agent" suffix -na which does not occur with possessed nouns.[10] The P-suffixes, which are phonologically similar to personal pronouns, are not agreement markers in the traditional sense, since they do not refer to any nominal in the sentence (e.g., Sasaku ni lamba. 'The cloth was washed by me.' versus *Sasaku ni lamba aw. , where aw means 'I'). The passive S-suffix -a is deleted and the passive S-suffix -i is diphthongized following vowel-final roots in accordance with the Elision and Diphthongization rules (14) and (11).

(24)a) root: sulu
passive stem: suluy /sulu-i/
passive form: suluyna /sulu-i-na/ 'changed'

b) Active: Passive:

mamafa	/m-an-fafa/	sweep	fafana	/fafa-a-na/	be swept
misutru	/m-i-sutru/	drink	sutruyna	/sutru-i-na/	be drunk
mizara	/m-i-zara/	share	zarayna	/zara-i-na/	be shared

c) Consonant final roots:

Active:			Passive:		
miaru	/m-i-aruv/	protect	aruvana	/aruv-a-na/	be protected
mandray	/m-an-rays/	receive	raysina	/rays-i-na/	be received
manuhi	/m-an-tuhiz/	forge	tuhizina	/tuhiz-i-na/	be forged

Note that passive formation is again a two-step process, as illustrated in (24a). Passive verbs are marked for tense by means of the following prefixes: Ø- present, n- past, h- future for vowel-initial roots; and Ø- present, nu- past, hu- future for consonant-initial roots. The choice of the pasive S-suffix (-i or -a) is not predictable and must be listed as an idiosyncratic characteristic in the lexical entry for each verb.

Passive Imperative

The passive imperative does not have the passive meaning "be verbed!". It bears that name because it is always formed from the same entity as the passive. This form is a less immediate and less forceful command than an active imperative. Class 1 verbs form the passive

imperative , like the passive, from the root. The form of the passive imperative is predictable from the shape of the root (it involves the dissimilatory process in (25)). The rule of passive imperative formation is phonologically motivated and holds across all verbal classes. The passive imperative S-suffix, added to the the root (with Class 1 verbs), has two allomorphs: /i/, when the preceding syllable (the final syllable of the passive stem) contains /u/; and /u/ elsewhere.

(25) Passive Imperative Formation

a) passive imp ---> i / u C_0] ____ #
passive stem

b) passive imp ---> u /] ____ #
passive stem

(25a) and (25b) are disjunctively ordered. The suffixes /i/ and /u/ diphthongize following vowel final roots. Examples of passive imperatives are given below.

(26)	Active:			Passive Imperative:	
	mamunu	/m-an-vunu/	'kill'	vunuy!	/vunu-i/
	manasa	/m-an-sasa/	'wash'	sasaw!	/sasa-u/

7.2 Stem-based (R-prefixed) Forms

7.2.1 Unsuffixed Forms

Active Verb

Active verb formation was described in section 1 (tense prefix-SF prefix-root). Malagasy active verbs do not show agreement with any nominal in the clause and are not inflected for any of the traditional categories of person, number, gender, etc. The only grammatical category relevant to the active verb is tense (marked by a prefix). Consequently, the active form never receives any suffixes.

Actor Noun

Malagasy forms actor nouns by means of the prefix p-, which is added to the basic stem (SF prefix-root). Except for the initial consonant, the pronunciation and the stress pattern of the actor noun is identical to that of the active verb. Like the active verb, this form does not receive any S-suffixes. Even though it is a noun it usually cannot enter into the possessive paradigm, since cultural/semantic factors make expressing possession of people impossible (i.e. concepts like "my lawyer", "my student", etc., have to be expressed as "the lawyer who works for me", etc.).

(27)a) root: vaki
stem: amaki /an-vaki/
actor N: pamaki /p-an-vaki/ 'reader'

b) Active Verb:			Actor Noun:		
mamunu	/m-an-vunu/	kill	pamunu	/p-an-vunu/	killer
myanatra	/m-i-anatra/	study	pyanatra	/p-i-anatra/	student
manasa	/m-an-sasa/	wash	panasa	/p-an-sasa/	laundress

Perfective Participle

The meaning and function of this verbal form is not entirely clear. It does not appear to be as productive as other verbal forms (it cannot be formed from all transitive verbs). It is associated with a perfective/passive sense of recently completed action. It is formed from the root by the addition of the R-prefix vwa- on the left and personal agentive P-suffixes on the right. It never receives any S-suffixes. As is the case with possessed nouns, the morpheme -na is not used here, vwa-root alone expresses the unspecified agency (cf., note 10). This form is not marked for tense and always refers to the past.

(28)a) root:		fafa		
perf.stem:		vwafafa	/vwa-fafa/	'just swept'
personal forms:		vwafafaku	/vwa-fafa-ku/	'just swept by me'
		vwafafani	/vwa-fafa-ni/	'just swept by him'

b) Passive:		Perfective:		
suluyna	/sulu-i-na/	vwasulu	/vwa-sulu/	'replaced'
vakiku	/vaki-a-ku/	vwavakiku	/vwa-vaki-ku/	'read by me'

7.2.2 S-suffixed Forms

Active Imperative

The active imperative is formed from the stem by the addition of a S-suffix -a and the present tense prefix m-. This form is illustrated in (29) with verbs with consonant-final roots.

(29) Active:			Active Imperative:	
myaru	/m-i-aruv/	'protect'	myaruva!	/m-i-aruv-a/
manuhi	/m-an-tuhiz/	'tie'	manuhiza!	/m-an-tuhiz-a/

Since most roots end in a vowel and the active imperative S-suffix -a is subject to deletion by Elision, the imperative form often seems to be just a stress-shifted variant of the active verb, as in (30). (Recall that the stress rule applies prior to Elision.)

(30)a) root:		sasa	
stem:		anasa	/an-sasa/
act.imper. stem:		anasaa	/an-sasa-a/
	Stress	anasáa	
	Elision	anasá	
active imp:		manasá	/m-an-sasa-a/

b) Active:			Active Imperative:	
manásа	/m-an-sasa/	'wash'	manasá!	/m-an-sasa-a/
mamúnu	/m-an-vunu/	'kill'	mamunú!	/m-an-vunu-a/

Relative

The relative is the traditional name (Richardson (1885)) for the oblique passive form of the verb. It is used when an Instrumental, Locative, or other oblique nominal is the (surface) subject of the sentence. This form, like the passive, marks the agent by means of P-suffixes and the unspecified agent marker -na. The relative is formed from the stem by addition of the relative S-suffix -a (subject to deletion by Elision) and one of the agentive P-suffixes.

(31)a) root: sasa
stem: anasa /an-sasa/
relative stem: anasaa /an-sasa-a/
Elision ansasa
relative form: anasana /an-sasa-a-na/

b) Active: Relative:

manasa	/m-an-sasa/	'wash'	anasana	/an-sasa-a-na/
manulu	/m-an-sulu/	'change'	anuluna	/an-sulu-a-na/
mamaki	/m-an-vaki/	'read'	amakina	/an-vaki-a-na/

c) Consonant final roots:

Active:			Relative:	
milalaw	/m-i-lalauv/	'play'	ilalawvana	/i-lalauv-a-na/
manuhi	/m-an-tuhiz/	'tie'	anuhizana	/an-tuhiz-a-na/
mandray	/m-an-rays/	'receive'	andraysana	/an-rays-a-na/

Like passive, the relative is marked for tense by prefixes 0- present, n- past, h- future.

Relative Imperative

The relative imperative is formed from the stem by the same imperative formation rule ((25)) which is used to form the passive imperative (referred to henceforth as non-active imperative formation), and has the meaning of "use the X to do Y!", e.g., Amundzew ni sambu! 'Use the boat to rescue (someone)!'.

(32)a) root: vundze
stem: amundze /an-vundze/
rel.imp: amundzew /an-vundze-u/

b) Active:	Passive:	Pass.imp:	Relative:	Relat.imp:	
manulu	suluyna	suluy!	anuluna	anuluy!	change
mizara	zarayna	zaraw!	izarana	izaraw!	share
manefi	tefena	tefew!	anefena	anefew!	forge

Verbal Noun/Gerund

The gerund or verbal noun form of a Malagasy verb is formed by adding the nominalizing prefix f- to the present tense relative form in -na (the unspecified agent form). Personal P-suffixes can be used instead of -na to express possessed gerunds, i.e., "my/his/etc. washing".

(33)a) root: tuhiz
stem: anuhiz /an-tuhiz/
relat. stem: anuhiza /an-tuhiz-a/
relat. form: anuhizana /an-tuhiz-a-na/
gerund: fanuhizana /f-an-tuhiz-a-na/ 'the tying'

b)Active: Relative: Gerund:
mizara izarana fizarana /f-i-zara-a-na/ sharing (N)
manasa anasana fanasana /f-an-sasa-a-na/ washing (N)
maŋkahala aŋkahalana faŋkahalana /f-aŋka-hala-a-na/ hate (N)

7.3 Summary of Verbal Forms

As we have seen, the Malagasy Class 1 verb has the nine basic forms presented above. Two (passive and passive imperative) are unprefixed and seven (active, actor noun, perfective, relative, relative imperative, gerund and active imperative) involve R-prefixes. Three (active, perfective and actor noun) are unsuffixed; the rest include S-suffixes in their composition. The different verbal forms are illustrated here in summary form by the paradigms of misutru 'drink' and manasa 'wash' in (34) and their S-suffix/R-prefix features are summarized in table (35).

(34) root: sasa sutru

unprefixed forms:

passive	sasana	/sasa-a-na/	sutruyna	/sutru-i-na/
pass. imp	sasaw!	/sasa-u/	sutruy!	/sutru-i/

R-prefixed forms:

active	manasa	/m-an-sasa/	misutru	/m-i-sutru/
actor N	panasa	/p-an-sasa/	pisutru	/p-i-sutru/
active imp	manasa!	/m-an-sasa-a/	misutru!	/m-i-sutru-a/
relative	anasana	/an-sasa-a-na/	isutruna	/i-sutru-a-na/
relat. imp	anasaw!	/an-sasa-u/	isutruy!	/i-sutru-i/
gerund	fanasana	/f-an-sasa-a-na/	fisutruna	/f-i-sutru-a-na/
perfective	vwasasa	/vwa-sasa/	vwasutru	/vwa-sutru/

(35)

	R-prefix	No R-prefix
S-suffix	relative relative imp. active imp. gerund	passive passive imp.
No S-suffix	active actor N perfective	(root)

8. Ablaut Verbs

Class 1 contains several subclasses of "irregular" verbs. They are irregular in that they have alternate roots which they employ in different verbal forms. The two subclasses discussed here are called ablaut verbs because their roots involve phonologically unpredictable vowel alternations. What is particularly interesting about these verbs is the fact that root suppletion is not random, but seems to be related to the cross-categorization of R-prefixed and S-suffixed forms in table (35).

In the "Ablaut 1" group, alternative roots are chosen based on the presence of R-prefixes (all stem-based forms and the perfective form choose one variant while the unprefixed passive and passive imperative choose another), i.e. the vertical axis in (35) is the criterion of root variant selection.[11]

(36) ABLAUT 1 VERBS

root 1	simba	anatr
active verb	manimba 'ruin'	myanatra 'study'
actor noun	panimba	pyanatra
perfective	vwasimba	---------[12]
relative	animbana	yanarana
relative imp	animbaw!	yanaru!
gerund	fanimbana	fyanarana
active imp	manimba!	myanara!
root 2	sumba	enatr
passive	sumbayna	enarina
pasive imp	sumbaw!	enaru!

The choice of the root variant in "Ablaut 2" verbs depends on whether a particular verbal form has a S-suffix or not, i.e. the selection of the root is made along the horizontal axis in (35).

(37) ABLAUT 2 VERBS

root 1	husitr	kaykitr
active verb	manusitra 'fire'	manaykitra 'bite'
actor noun	panusitra	panaykitra
perfective	vwahusitra	vwakaykitra
root 2	hesutr	kaketr
relative	anesurana	anakerana
relative imp	--------	anakeru
gerund	fanesurana	fanakerana
active imp	----------	manakera!
passive	hesurina	kakerina
pasive imp	hesuri!	kakeru!

The facts presented above show that the distinction between R-prefixes and S-suffixes is important in Malagasy morphology as well as phonology. (Recall that in hiatus situations the difference between R-prefixes and S-suffixes influenced the choice of phonological rule

implementing hiatus resolution.) In ablaut verbs the presence/absence of R-prefixes and S-suffixes influences a purely morphological process of root variant selection.

9. Malagasy Word Formation Rules

Since the lexical entries of Malagasy verbs differ from I-E (e.g. Polish) verb entries, it is not surprising that other Malagasy lexical phenomena, namely, word formation rules (WFRs) are also different. The morphological composition of verb forms presented above suggests that Malagasy WFRs, i.e. rules which spell out the affixation processes and thus create different verbal forms, should be formulated with reference to entities such as roots and stems. Let us briefly consider the alternatives. English affixation processes are often categorized into morpheme-based (+ boundary) affixation and word-based (# boundary) affixation (cf. Chomsky and Halle (1968), Kiparsky (1982), etc.). The discussion in 6.1 shows that such classification cannot apply to Malagasy verbal paradigms, where all affixation is morpheme-based. That is, due to the complex character of Malagasy verbal forms, the affixation processes in fact create words out of the root and the set of bound morphemes. The only possible candidates for # affixes are P-suffixes, which can attach to surface words (nouns and perfective participles). However, they also attach to stems (in passive and relative forms), and stems are not free-standing words in Malagasy. This undermines the rationale for the distinction between affixes which attach to morphemes and those which attach to words, as it requires P-suffixes to be classified as + and # affixes simultaneously. In other words, since P-suffixes attach to free-standing words in perfective and possessive forms, they must be # suffixes. Since they also attach to passive and relative stems, these entities must be words. As stems are not surface words, Malagasy WFRs cannot refer to the +/# distinction.[13]

English WFRs are also often stated with reference to the grammatical category of the base (e.g., the affix -ic attaches to Nouns, -ity to Adjectives, etc.). Again, it seems that such a formulation cannot adequately represent the Malagasy word formation facts. First, it is not clear that roots have a grammatical category at all. Those roots which can occur by themselves, i.e. are possible surface words, do not belong to a single category; some function as nouns, some as verbs or adjectives. Furthermore, roots and stems participate in noun and adjective, as well as verb formation processes, and cannot be classified as purely verbal, nominal, etc. (see note 6). It is, of course, possible to assign a V^{-2} category to a root, V^{-1} to a stem, and V^{0} to a surface verbal form (cf., Selkirk (1983) for a similar treatment of English WFRs), but there is no decisive evidence that roots and stems are in fact uniquely verbal. (For a discussion of grammatical categories in Malagasy see Thyme, this volume.) Since it is not possible to definitely establish that roots and stems have a syntactic category or what their category might be, Malagasy WFRs should not be formulated in these terms.

Stating Malagasy WFRs in terms of root and stem affixation does not involve any claims about the types of boundaries, nor does it assign a grammatical category to entities which cannot be convincingly

shown to have one. Such formulation has the consequence of allowing Malagasy WFRs to refer to intermediate morphological forms. That is, roots and stems, rather than fully formed words, constitute the output and input of WFRs. Though it strongly undermines Aronoff's (1976) claim that "words are formed from words" and the concept of word-based morphology in general, this step seems inevitable given the character of Malagasy verbal forms. Root- and stem-based WFRs are illustrated in (38) and (39).

(38)a) R-prefixation:

SF prefix is inserted in the frame

$[\ \_\_\ [_{root}\ ]\ ]_{stem}$

perfective prefix vwa- is inserted in the frame

$[\ \_\_\ [_{root}\ ]\ ]_{perfective\ stem}$

b) S-suffixation:

passive S-suffix -i/-a is inserted in the frame

$[[_{root}\ ]\ \_\_\ ]_{passive\ stem}$

relative S-suffix -a is inserted in the frame

$[[_{stem}\ ]\ \_\_\ ]_{relative\ stem}$

non-active imperative S-suffix -i/-u is inserted into

$[[_{root}\ ]\ \_\_\ ]_{passive\ imperative}$

$[[_{relative\ stem}\ ]\ \_\_\_\ ]_{relative\ imperative}$

active imperative S-suffix -a is inserted in the frame

$[[_{stem}\ ]\ \_\_\ ]_{active\ imperative\ stem}$

Forms created by the rules in (38) are inputs to further morphological processes, i.e., tense prefixation, nominal prefixation and P-suffixation.

(39) tense prefixes are inserted in the frames

$[\ \_\_\ [_{stem}\ ]]$

$[\ \_\_\ [_{passive\ stem}\ ]]$

$[\ \_\_\ [_{relative\ stem}\ ]]$

$[\ \_\_\ [_{active\ imperative\ stem}\ ]]$

nominal prefixes are inserted in the frames

$[\ \_\_\ [_{\text{stem}}\ ]]_{\text{actor N}}$

$[\ \_\_\ [_{\text{relative stem}}\ ]]_{\text{gerund}}$

agentive P-suffixes are inserted in the frames

$[[_{\text{perfective stem}}\ ]\ \_\_\ ]$

$[[_{\text{relative stem}}\ ]\ \_\_\ ]$

$[[_{\text{passive stem}}\ ]\ \_\_\ ]$

The three-step formulation of the word formation processes in (38) and (39) reflects the three stages in the composition of Malagasy verbal forms (root, stem, word). This organization of Malagasy morphology also captures the distinction between R-prefixation (first stage) and S-suffixation (second stage) and provides a way to represent the principles of root selection in ablaut verbs.

The principles of root variant selection in ablaut verb forms are based in one case on the difference between R-prefixed and unprefixed forms, and in the other on the difference between S-suffixed and unsuffixed forms. Whether the forms also have a P-suffix is irrelevant for the choice of the root. In the case of Ablaut 1 verbs, where the choice of the root depends on the presence of an R-prefix, one root variant (e.g. simba) undergoes WFRs of all stages, while the other variant (e.g. sumba) only the second and third stage WFRs and thus escapes R-prefixation, while participating in S-suffixation and stage 3 processes.

(40) stage 1 input: simba

output: animba, vwasimba

stage 2 input: animba, sumba

output: animbaw (rel.imp),
sumbaw (pass.imp), etc.

Lexical entries for these roots must include special information specifying that they belong to the Ablaut 1 subclass of Class 1 verbs and which of the two variants does not participate in stage 1 WFRs.

(41) simba Class 1, Ablaut 1

sumba Class 1, Ablaut 1, [-stage 1 (= R-prefixation)]

In the case of Ablaut 2 verbs both roots receive R-prefixes but one variant skips the S-suffixation stage, i.e., one variant undergoes WFRs at all stages and the other only R-prefixation and stage 3 processes, hence the contrast between S-suffixed and S-unsuffixed forms.

(42) stage 1 input: kaykitr, kaketr

output: anaykitr, anaketr, ...

stage 2 input: kaketr, anaketr

stage 3 input: S-suffixed kaketr and anaketr plus anaykitr from stage 1

A sample lexical entry for Ablaut 2 roots is given in (43).

(43) kaketr Class 1, Ablaut 2

kaykitr Class 1, Ablaut 2 [-stage 2 (= S-suffixation)]

The contrast between R-prefixed forms and S-suffixed forms is crucial for the two classes of ablaut verbs. This distinction cannot be captured in terms of differences between morpheme boundary and word boundary affixation or inflection and derivation. Both R-prefixes and S-suffixes are + boundary affixes, and as to inflection/derivation categorization, S-suffixes include both passive suffixes, traditionally considered derivational, and imperative suffixes, usually classified as inflectional. The Malagasy WFRs proposed here provide a way to account for the principles of root selection in both classes of ablaut verbs.

5. Conclusions

The description of Malagasy morphology presented in this part of the paper shows that the concepts of root, stem and word play an important role in the composition of Malagasy verbal forms. I have suggested that this three-way distinction can be represented as three successive stages of word formation. Such representation allows for a principled categorization of Malagasy affixes into root-based, stem-based and word-based, which was shown to capture the differences among Malagasy affixes better than notions of inflection/derivation or +/# boundaries, and to provide a way to represent the principles of root selection in Malagasy ablaut verbs.

NOTES

1. A few African borrowings exhibit a fifth type, namely NCV, e.g., mba 'please', but this pattern is quite rare.

2. One could claim that there are in fact more phonemic syllable types and that the speaker is influenced by the writing system when he pronounces the missing vowels in slower speech. Evidence that this is not the case comes from nasal assimilation facts, discussed in section 3.2, e.g., /ni tranuku/ 'my house' is pronounced [ni tranku] not [ni traŋku], the dropped vowel preventing the nasal assimilation. Thus, "missing" vowels are a "real" part of the phonological representation of Malagasy words.

3. Or, alternatively, the root final consonant is not syllabified at all and deleted by a general rule which deletes all unsyllabified material.

4. The examples below show that Nasal Assimilation must precede the rule which deletes root-initial voiceless obstruents following the prefix an- (Nasal Substitution.

i)	n-->m, f-->∅	mamana	/m-an-fana/	warm up
	n-->m, p-->∅	mametraka	/m-an-petraka/	deposit

5. In languages which allow clusters within syllable margins, phonetic phonotactic constraints are more directly dependent on the syllable, since the sonority hierarchy, i.e., the order of segments in syllable margins as 'the closer to the peak the more sonorant' is formulated with reference to the syllable, but what seems most relevant for this type of constraint is linear adjacency of segments.

6. The terminology is mine and reflects the difficulty in applying to Malagasy the traditional classification of affixes into inflectional and derivational. Anderson (1982) characterizes inflection as morphology which is relevant to syntax. He cites tense as an inflectional category in English since it is germane to the syntactic Tensed S Constraint. Scalise (1986) lists several criteria for distinguishing between inflection and derivation. Among them is the claim that derivational processes may change the syntactic category of a word, while inflectional processes may not.

The Malagasy tense marker serves as an example of the fact that Anderson's and Scalise's criteria do not appropriately distinguish among Malagasy affixes. The tense prefixes, m- present, n- past and h- future, are added to a stem (the combination of a stem-forming prefix and root) to form an active verb. The tense of the verb is relevant for other parts of the Malagasy sentence, namely complex prepositions, which must agree in tense with the verb, as shown in i).

i) a) M -an -uratra ni taratasi amini penina aw.
pres-SFP-root the letter with pen I
'I am writing the letter with a pen.'

b) N -an-uratra ni taratasi t-amini penina aw.
pst-SFP-root the letter pst-with pen I
'I wrote the letter with a pen.'

In i) the verbal tense marker determines the form of the preposition, i.e, has consequences in the syntax. It should thus be considered inflectional according to Anderson's (1982) definition of inflection.

The presence of the tense prefix also identifies the morphological entity to which it is attached as a verb. That is, the tense marker determines the grammatical category of the word it creates. In Malagasy the same stem is a verb when prefixed with tense affixes m-, n- or h-, and a noun when prefixed with nominal affixes p- or f-.

ii) m -i -sutru 'drink' (V, pres)
pres-SFP-root

n -i -sutru 'drank' (V, pst)
pst-SFP-root

h -i -sutru 'will drink' (V, fut)
fut-SFP-root

f -i -sutru '(a) drink' (N)
nom-SFP-root

p -i -sutru 'drinker' (N)
nom-SFP-root

The examples in ii) show that the addition of the tense prefix to a stem actually "makes" the stem into a verb, i.e., affects the grammatical category of the resultant word. Such morphological entities are defined as derivational by Scalise and many other linguists. The fact that the Malagasy tense marker can simultaneously satisfy the criteria of derivation and inflection indicates that this distinction, or its definitions considered here, is not appropriate for characterizing Malagasy affixes.

7. Actually, there is some evidence that the underlying form of ntsika is sika and that the n (which causes manner assimilation of s to ts) is an epenthetic, "linking" nasal commonly found in Austronesian languages.

8. Note that 2sg, 1pl-inc and 2pl P-suffixes /-nau/ : [-naw], /-nai/: [-nay], /-nareu/: [-narew] must contain two vowels underlyingly to receive penultimate stress but are realized on the surface as diphthongs (see the paradigms in (22) and the forms below).

i)	saka -nau	saka-nai
penult. stress	sakanáu	sakanái
diphthongization	sakanáw	sakanáy

These forms are a potential problem for the definition of strict cyclicity in Lexical Phonology (Rubach (1985)) since Diphthongization as a lexical rule should not be able to apply in these underived environments (unless stress is considered a rule which creates derived environments).

9. Initial h's are often deleted by a low level phonetic rule.

10. Alternatively, the passive and relative suffixes can be analyzed as -in(a)/-an(a) and -an(a) respectively, with the final n(a) falling out as a weak syllable when followed by a personal P-suffix.

11. The consonant alternations in the roots of 'study' in (36) and 'fire' and 'bite' in (37) are not unique to ablaut verbs, but occur regularly in S-suffixed forms of verbs with weak syllable roots (recall

that word-final -tra is a weak syllable). They are illustrated in i) and ii) with passive paradigms.

i) passive forms of manuratra 'to write', root suratr

surataku	/suratr-a-ku/	written by me
suratanaw	/suratr-a-nau/	written by you
suratani	/suratr-a-ni/	written by him/her/them
suratantsika	/suratr-a-ntsika/	written by us (inc)
suratanay	/suratr-a-nai/	written by us (ex)
suratanarew	/suratr-a-nareu/	written by you (pl)

ii) passive forms of misambutra 'to catch', root sambutr

samburiku	/sambutr-i-ku/	caught by me
samburinaw	/sambutr-i-nau/	caught by you
samburini	/sambutr-i-ni/	caught by him/her/them
samburintsika	/sambutr-i-ntsika/	caught by us (inc)
samburinay	/sambutr-i-nai/	caught by us (ex)
samburinarew	/sambutr-i-nareu/	caught by you (pl)

These alternations involve dissimilatory consonant mutations, represented as two disjunctively ordered rules in iii) and iv) and illustrated in v).

iii) tr ---> t / rV ___ [S-suffix]

iv) tr ---> r / V ___ [S-suffix]

v)	suratr-a-ku	suratr-a-nau	suratr-a-ni	suratr-a-nai
tr-->t iii)	surataku	suratanau	suratani	suratanai
Diphth (11)	--------	suratanaw	--------	suratanay

	sambutr-i-ku	sambutr-i-nau	sambutr-i-ntsika
tr-->r iii)	samburiku	samburinau	samburintsika
Diphth (11)	---------	samburinaw	----------

12. The empty spaces in (36) and (37) indicate that these forms are not used by my consultant.

13. Note that in English the contradiction is exactly reversed. While in Malagasy one would have to claim that an affix is simultaneously + and # type, in English, the same base is often claimed to be both a morpheme and a word to account for its ability to attract both level 1 (+) and level 2 (#) affixes (e.g., cycl+ic vs cycl#ing).

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