# Reduplication in Malagasy

Edward L. Keenan
UCLA

Jean Paulin Razafimamonjy
DIFP, Université d'Antananrivo

Our purpose here is to provide a descriptively adequate characterization of Reduplication in Malagasy. Our primary concern is precision and comprehensiveness. We intend that our description will serve as an adequacy test for the various theoretical approaches to reduplication and to Malagasy morphology that we only touch upon here. We do conclude with some challenges Malagasy poses for an Optimality Theoretic account.

**Introduction** Malagasy, like many Austronesian languages, uses reduplicated forms extensively in everyday discourse. It is not surprising to hear sentences in which essentially every content word is reduplicated.

The primary meaning of reduplication is one of attenuation: *fotsy* 'white', *fotsifotsy* 'whitish'; *maro* 'many', *maromaro* 'somewhat many'. In some cases reduplication is frequentative: *miteny* 'speaks', *miteniteny* 'jabbers'. Used with nouns it often has a derogatory implication: *latabatra* 'table', *latabatabatra* 'sort of a table'. It is also used optionally in forming comparative adjectives (with no weakening, frequentative, or derogatory interpretation).

## I. Defining Malagasy Reduplication

***Given***: the set of roots of Malagasy (Abinal & Malzac 1888).
***Define***: the relation "x ***redup*** y", read as "x reduplicates as y". ***redup*** is properly a relation as a few forms have two reduplications, but usually just one, given by a function ***Dup***. Our definition takes the form:

x ***redup*** y iff y = ***Dup***(x) or y satisfies one of four special cases given adhocly later.

**Def 1 a.** The domain of ***Dup*** is the set PPW of *possible prosodic words*

**b.** ***Dup***(σ) = ***Basic***(σ, $\sigma_i$,...,$\sigma_n$), where $\sigma_i$ carries primary stress in σ.

We must, obviously, define PPW, *stress marked syllable* and ***Basic***, which we now do.
The **vowels** of Malagasy in standard orthography are *a, e, i, o* = [u], with diphthongs *ai/ay, ao, oy*. Vowel length is not phonemic. Word final *i* is *y*. The Malagasy **consonants** are given by the table on the next page. Malagasy **syllables** are all of the form *cv*, *c* a consonant or the empty string, v a vowel. So all syllables are open and (excluding recent borrowings) there are no consonant clusters. **stress marked syllables** are represented as pairs (*cv*,k) where k = 0,1, or 2. (*cv*,2) or *primary* stressed syllables, are abbreviated *cv́*. *Secondary* stressed syllables, (*cv*,1), are abbreviated *cv̀*, and unstressed syllables, (*cv*,0), are abbreviated *cv*. For example, the sequence of stress marked syllables in the word *elatra* 'wing' is <(*e*,2),(*la*,0),(*tra*,0)>, which abbreviates to *élatra*, just the standard orthography with stress marked. A **possible prosodic word** is a finite

non-empty sequence of stressed marked syllables exactly one of which has primary stress. PPW is the set of possible prosodic words.

**consonants:** the phoneme *dz* is orthographic *j*. It is the voiced counterpart of *ts*. *tr* and *dr* are single affricates articulated with the blade of the tongue against the alveolar ridge.
$^{n}$C or $^{m}$C, a prenasalized C, = orthographic *nC* or *mC*, even when separated by a hyphen indicating a morpheme boundary, as in *n-tr* and *n-dr*. The C vs $^{n}$C/$^{m}$C distinction is phonemic in all cases. Here is a complete set of minimal pairs: *dóbo* 'pond' vs *dómbo* 'dull'; *tápoka* 'cut/dilute' vs *támpoka* 'suddenly'; *màndodóna* 'urge (imp)' vs *màndondóna* 'knocks (at a door)'; *éto* 'here' vs *énto* 'carry (imp)'; *majájana* 'completely separated' vs *majánjana* 'strikes hard'; *átsy* 'there' vs *ántsy* 'knife'; *sédra* 'a challenge' vs *séndra* 'meet (by accident)'; *atráno* 'be prepared (imp)' vs *antráno* 'at home'; *sóga* 'cotton cloth' vs *sónga* 'pulled back, cleft'; and *máika* 'rushed' vs *máinka* 'so much the more'.

| | nasals | stops | | affricates | | fricatives | | liquids |
|---|---|---|---|---|---|---|---|---|
| labial | m | b | p | | | | | |
| | | $^{m}$b | $^{m}$p | | | | | |
| labio-dental | | | | | | v | f | |
| dental-alveolar | n | d | t | | | | | l |
| | | $^{n}$d | $^{n}$t | | | | | |
| alveolar tongue tip | | | | j | ts | z | s | r |
| | | | | $^{n}$j | $^{n}$ts | | | |
| tongue blade | | | | dr | tr | | | |
| | | | | $^{n}$dr | $^{n}$tr | | | |
| velar | | g | k | | | | h | |
| | | $^{n}$g | $^{n}$k | | | | | |

***Basic*** is a function which combines two possible prosodic words (ppw) to form a single ppw. ***Basic*** is used in many morphological derivational processes (MDPs), including ***incorporation*** of Ns into As and Vs; of As into Ns; ***noun compounding***; ***genitive constructions*** (Paul 1996): $V_{[-act]}$+Agent, N+Possessor, Prep+NP (most Preps). Three changes take place under ***Basic***:

1. nasalization of onsets (***nset***) of certain syllables, defined by: For all c,v as above,

| | | | |
|---|---|---|---|
| | n+v | if c is empty | (Here and later + is strict concatenation) |
| | mc+v | if c = b or p | |
| ***nset***(c+v) = | nc+v | if c = d,t,j,ts,dr,tr,g, or k | |
| | c+v | otherwise | |

2. ***Basic*** shifts each ***continuant*** consonant *f, v, s, z, h, l, r* to its homorganic stop or affricate, defined by the function ***stop***:

| x | | ***stop***(x) | x | | ***stop***(x) |
|---|---|---|---|---|---|
| ***stop*** | | | ***stop*** | | |
| f | ——> | p | h | ——> | k |
| v | ——> | b | l | ——> | d |
| s | ——> | ts | r | ——> | dr |
| z | ——> | j | c | ——> | c, all other consonants c |

*Naturalness*: voice is invariant under ***stop***: VOICE(c) = VOICE(***stop***(c)), VOICE(x)∈{+,–}.

3. ***Basic*** reduces (ˇ) primary stresses to secondary ones, defined by ˇ:

$$\text{For all stress marked syllables } \sigma = (cv,k),\ \check{\sigma} = \begin{cases} (cv,k) \text{ if } k < 2 \\ (cv,1) \text{ if } k = 2 \end{cases}$$

Of course ˇ extends to sequences of stress marked syllables by product lifting. That is,

if $\sigma = \langle\sigma_1,...,\sigma_n\rangle$ is a sequence of stress marked syllables then $\check{\sigma} = \langle\check{\sigma}_1,...,\check{\sigma}_n\rangle$. □

The value of ***Basic*** at $\langle\sigma,\tau\rangle$ depends on whether σ is *weak* or *pseudoweak*:

**Def 2. a** A possible prosodic word σ is *weak* iff σ has primary stress on the

antepenultimate syllable and the last syllable of σ is weak (= *-na, -ka, -tra*).

Some roots with weak endings are treated as weak by MDPs even though stress is not antepenultimate. We call these roots *pseudo-weak*. Almost all cases are two syllable roots.

**Def 2. b** r is *pseudo-weak* iff r =

*tanána* 'village', *lalána* 'law' *héna* 'diminish', *fóka* 'absorb', *zátra* 'accustomed', *trátra* 'caught', *poka* 'blow', *dóna* 'knock', *sáina* 'mind', *léna* 'wet, fresh', *fétra* 'limit', *dítra* 'naughty', *táitra* 'startled', *tsóka* 'blow', *rítra* 'dried up', *píka* 'snap', *tratra* 'caught'...

The pseudo-weaks are roots+their meanings, defined by listing; membership in this class is not predictable solely on the basis of phonological and prosodic identity. Several pseudo-weaks have homophones which are not treated as weak by MDPs (and so are not in the list of pseudo-weaks). E.g. *héna* 'meat', *fóka* 'idiotic', *sáina* 'flag' (<Fr. *enseigne*) and *trátra* 'chest'. Some other roots with weak endings but not pseudoweak are *rehétra* 'all', *dáka* 'a kick', *lóka* 'bet', *téna* 'body', *sétra* 'brutal', *pítra* 'sad look'. We now define ***Basic***:

**Def 3** Dom(***Basic***) = {<σ,τ>|σ,τ ∈ PPW}. Let $\sigma = \sigma_1...\sigma_n$ and $\tau = \tau_1...\tau_m$ be possible prosodic words: ***Basic***(σ,τ) is given by cases:

*Case 1* (***Vowel Elison***) $\sigma_n$ = (cv,k) and $\tau_1$ = (v',k')

| σ | τ | | ***Basic***(σ,τ) |
|---|---|---|---|
| | | ⇒ | |
| $\sigma_1,...,\sigma_{n-1}$,(cv,k) | (v',k'),$\tau_2,...,\tau_m$ | | |

*Case 1.1* k = 2 (i.e. $\sigma_n$ carries primary stress). Then ***Basic***(σ,τ) = σ̆+τ.

| σ | τ | | ***Basic***(σ,τ) | |
|---|---|---|---|---|
| mandá 'refuses' | ázy 'him' | ⇒ | mandà ázy | (= /mandàázy/) |
| mandá " | ólona 'people' | | mandà ólona | |
| bé 'many' | élatra 'wing' | | bè élatra | |
| mànomé 'give' | ity 'this' | | mànomè ity | |
| mànkafý 'delect in' | ity 'this' | | mànkafỳ ity | |
| mànkató 'obey' | ólona 'people' | | mànkatò ólona | |
| mandoká 'Praise! (imp)' | andríana 'nobles' | | mandokà andríana | |

Malagasy accepts hiatus here. Vowel coalescence here is ungrammatical. */mandázy/

*Case 1.2* k < 2 (and $\sigma_n$ = (cv,k) and $\tau_1$ = (v',k'))

*case 1.2.1* v = v' or v = *a*. Then ***Basic***(σ,τ) = $\breve{\sigma}_1,...,\breve{\sigma}_{n-1}$, (cv',k'),$\tau_2,...,\tau_m$

So the final vowel of σ elides if it is unstressed *a* or it is the same as the initial vowel of τ. Except for reduplication, Vowel Elision is not registered in the orthography of MDPs .

| σ | τ | | ***Basic***(σ,τ) | |
|---|---|---|---|---|
| tápaka | élatra | ⇒ | /tàpakélatra/ | (orth: tapaka elatra) |
| *broken* | *wing* | | *has a broken wing* | |
| ólona | éfatra | ⇒ | /òlonéfatra/ | (orth: olona efatra) |
| *person* | *four* | | *four people* | |
| mamíta | íraka | ⇒ | /mamìtíraka/ | (orth: mamita iraka) |
| *accomplish* | *mission* | | | |
| áloka | áloka | ⇒ | àlokáloka | |
| *shade* | | | *a bit of shade* | |

| | | | |
|---|---|---|---|
| ívy | ívy | ⇒ | ìvívy |
| *spit* | | | *spittle* |
| óva | óva | ⇒ | òvóva |
| *change* | | | *little changes* |

Vowel Elision is normal in ordinary speech but failure to elide in careful speech is fully intelligible. Note also that several of the derived forms present secondary stresses adjacent to primary ones, not an attested stress pattern at the level of (affixed) roots.

*Case 1.2.2* v ≠ v' and v ≠ *a*. Then ***Basic***(σ,τ) = σ̆+τ (as in Case 1.1)

So the final vowel in σ remains (final /i/ may reduce a bit), but stress reduction still applies:

| σ | τ | | ***Basic***(σ,τ) | |
|---|---|---|---|---|
| ántso 'call' | ántso | ⇒ | àntsoántso | */àntsántso/ |
| mijéry 'sees | ólona 'people' | | mijèry ólona | */mijerólona/ |

*Case 2* ***Consonant Mutation*** $\tau_1$ = (cv',k') for some consonant c.

| σ | τ | | ***Basic***(σ,τ) |
|---|---|---|---|
| $\sigma_1,...,\sigma_{n-1},$(cv,k) | (cv',k'),$\tau_2,...,\tau_m$ | ⇒ | |

*Case 2.1* σ is neither weak nor pseudo-weak. Then ***Basic***(σ,τ) = σ̆+τ (as in Case 1.1)

| σ | τ | | ***Basic***(σ,τ) | |
|---|---|---|---|---|
| mànontány | závatra | ⇒ | mànontàny závatra | (*mànontànin- jávatra) |
| *asks* | *something* | | | |
| mikápa | házo | | mikàpa házo | (*mikàpa-kázo) |
| *cuts* | *wood* | | | |
| máro | ánaka | | marò ánaka | (*/maránaka/) |
| *many* | *children* | | | |
| mandá | vóla | | mandà vóla | (*/mandàm-bóla/) |
| *refuse* | *money* | | | |

*Case 2.2* σ = $\sigma_1...\sigma_n$ is weak or pseudo-weak (and τ = (cv',k'),$\tau_2,...,\tau_m$)

*Case 2.2.1* $\sigma_n$ = (*ka*,k) or (*tra*,k). Then ***Basic***(σ,τ) = $\breve{\sigma}_1,...,\breve{\sigma}_{n-1}$,(***stop***(c)+v',k'),$\tau_2,...,\tau_m$

Thus we reduce stress on σ, elide $\sigma_n$ and replace the initial consonant *c* of τ by ***stop***(*c*). We exemplify by deriving *mpivàro-kéna* 'meat seller' from *mpivárotra* 'seller' and *héna* 'meat'.

| | | | |
|---|---|---|---|
| (1) | ***Basic***(mpivárotra, héna) | = mpivàro + ***stop***(h) + é +na | Case 2.2.1 |
| | | = mpivàro +k + é + na | Def ***stop*** |
| | | = mpivàro-kéna | orthography (stress marked) |

Further examples, the first three illustrating non-trivial consonant mutation (***stop***):

| σ | τ | ***Basic***(σ,τ) |
|---|---|---|
| fántatra 'known' | Rakóto 'Rakoto' | fànta-dRakóto 'known by Rakoto' |
| sátroka 'hat' | fótsy 'white' | sàtro-pótsy 'white hat' |
| matáhotra 'fears' | tódy 'retribution' | matàho-tódy 'fears retribution' |
| závatra 'thing' | nisého 'happened' | zàva-nisého 'event' |
| miáraka 'be together' | mandéha 'goes' | miàra-mandéha 'go together' |

*Case 2.2.2* $\sigma_n = na$.

Then ***Basic***(σ,τ) = $\breve{\sigma}_1,...,\breve{\sigma}_{n-1}$, + (***nset***(***stop***(*c*) + v'), k') + $\tau_2...\tau_m$

So in this case the final *-na* of σ drops, nasalizing the onset of the initial syllable of the word built from τ by replacing its initial consonant by its corresponding stop or affricate. Thus,

| | | | | |
|---|---|---|---|---|
| (2) | ***Basic***(mánana, vády) | = | màna + ***nset***(***stop***(v) + á) + dy | case 2.2.2 |
| | | = | màna + ***nset***(b + á) + dy | def ***stop*** |
| | | = | màna + mbá +dy | def ***nset*** |
| | | = | mànam-bády | orthography ☺ |

Some further examples: the first six illustrate the other non-trivial consonant mutations (***stop***). The last 4 show the application of ***nset*** when the consonant is not weak.

| σ | τ | ***Basic***(σ,τ) |
|---|---|---|
| mánana<br>*has* | zánaka<br>*offspring* | mànan-jánaka<br>*has children* |
| mihínana<br>*eats* | fáry<br>*sugar cane* | mihìnam-páry<br>*eats sugar cane* |

| | | |
|---|---|---|
| án(a) | sáha | an-tsáha |
| *at* | *fields* | *in (the) fields* |
| " | hády | an-kády |
| | *ditch* | *in (the) ditch* |
| " | ráno | an-dráno |
| | *water* | *in (the) water* |
| " | lamósina | an-damósina |
| | *back* | *in (the) back* |
| mánana | pératra | mànam-pératra |
| *has* | *ring* | *has a ring* |
| mánana | námana | màna-námana |
| *has* | *friend* | *has friends* |
| fitiávana | téna | fitiàvan-téna |
| *love* | *self* | *love of oneself* |
| mánana | dídy | mànan-dídy |
| *has* | *rules* | *has rules* |

Lastly contrast the pseudoweak a-examples with their non-pseudoweak homonyms (b):

| | σ | τ | ***Basic***(σ,τ) | |
|---|---|---|---|---|
| a. | sáina 'mind' | záza 'child' | sàin-jáza | |
| b. | sáina 'flag' | fotsy 'white' | saina fotsy | *saim-potsy |
| a. | (mi)héna 'decrease' | vídy 'price' | mihèm-bídy | |
| b. | héna 'meat | léna 'fresh' | héna léna | *hèn-déna |
| a. | (mi)fóka 'absorb' | ráno 'water' | mifò-dráno | |
| b. | fóka 'idiotic' | fóka 'idiotic' | fòkafóka | *fòpóka |

This completes the definition and illustration of ***Basic***. ☺☺

**An historical explanation for the behavior of weak words** While synchronically arbitrary, this behavior of weak roots receives an historical explanation first presented and supported empirically by Dahl (1951, esp. pp 105 – 115). The languages to which Malagasy is most closely related, specifically Maanjan of the S.E. Barito group in Kalimantan (S. Borneo), present a variety of closed syllables. Dahl supports that the shift to open syllables in Malagasy took place under Bantu influence when the Malagasy began settling Madagascar (0 – 400ad). Certain

word final consonants, such as *h*, *s*, and *l* were generally dropped, but words ending in *k*, *tr*, *n*, and *r* added an *a* in conformity with the open syllable pattern of Eastern Bantu. The synchronic dropping of these sounds under MDPs then is historically illusory: the derived forms existed before the *-a* was added and simply did not change (see Keenan 1996 for the role of *Inertia* in language change). That morphological derivational processes are conservative in this sense is supported elsewhere. Erwin 1996 treats weak roots underlyingly as consonant final forms and derives our roots by a rule of *-a* epenthesis, thus, roughly, reflecting the history of these forms.

### *Examples of Reduplication*

***Roots stressed on the last syllable*** (Oxytones)

| | σ | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|---|
| bé | 'big, many' | bé | bèbé 'fairly big, fairly many' |
| váo | 'new' | váo | vàováo 'somewhat new; the news' |
| fý | 'delicious' | fý | fifý 'fairly good' |
| ré | 'heard' | ré | rèré 'heard a bit' |
| pý | 'blink' | pý | pìpý 'blinks a little' (= mipìpý) |
| omé | 'give' | mé | omèmé (mànomé 'gives'; mànomèmé 'gives a bit') |
| teté | 'drip' | té | tetèté (mitetèté 'drips, drop by drop) |
| vovó | 'bark' | vó | vovòvó (mivovòvó 'barks some') |
| ampó | 'in the heart' | mpó | ampòmpó 'often in the heart' |
| indráy | 'again' | ndráy | indràindráy 'sometimes' |
| lèhibé | 'big' | bé | lèhibèbé 'biggish' |

To see e.g. that (3) yields *omèmé* as the reduplicated form of *omé* 'give', observe:

(3) ***Dup***(omé) = ***Basic***(omé,mé) Def ***Dup***; *me* has primary stress
= omèmé Def ***Basic***, Case 2.1.

□

***Roots stressed on the penultimate syllable*** (Paroxytones)

***two syllable roots***

| σ | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|
| máro 'many' | máro | màromáro 'somewhat many' |
| fótsy 'white' | fótsy | fòtsifótsy 'somewhat white' |
| háfa 'different' | háfa | hàfaháfa 'somewhat different' |
| máinty 'black' | máinty | màintimáinty 'somewhat black' |
| máitso 'green' | máitso | màitsomáitso 'somewhat green' |
| máimbo 'stinky' | máimbo | màimbomáimbo 'somewhat stinky' |

***Dup***(*máro*) = ***Basic***(*máro,máro*) = *màromáro* by the definition of ***Basic***, Case 2.1.

***roots of three or more syllables***

| σ | | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|---|
| hadíno | 'forget' | díno | hadìnodíno (mànadìnodíno 'forgets a bit') |
| ontány | 'ask' | ntány | ontànintány (mànontànintány 'asks a bit') |
| safáry | 'feel out' | fáry | safàrifáry 'feel someone out indirectly' |
| salóndo | 'cloudy' | lóndo | salòndolóndo 'to be a bit cloudy' |
| haríva | 'evening' | ríva | harìvaríva 'early in the evening' |
| àlahélo | 'sadness' | hélo | àlahèlohélo 'little sadness' |
| pàtalóha | 'pants' | lóha | (mi)pàtalòhalóha 'wear as pants' |
| saláma | 'healthy' | láma | salàmaláma 'somewhat healthy' |
| tanóra | 'young' | nóra | tanòranóra 'somewhat young' |

***Weak words (antepenultimate stress)*** (Proparoxytones)

σ is always treated as weak. We illustrate all the consonant mutations:

| | σ | | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|---|---|
| h ⇒ k | háingana | 'quickly' | háingana | hàingankáingana 'somewhat quickly' |
| l ⇒ d | lávitra | 'far' | lávitra | làvidávitra 'somewhat far' |
| f ⇒ p | fántatra | 'known' | fántatra | fàntapántatra 'known a bit' |
| z ⇒ j | závatra | 'thing' | závatra | zàvajávatra 'sth of little value' |
| s ⇒ ts | sítrana | 'cured' | sítrana | sìtrantsítrana 'a bit cured' |
| v ⇒ b | vélona | 'alive' | vélona | vèlombélona 'more or less alive' |
| r ⇒ dr | résaka | 'conversation' | résaka | rèsadrésaka 'chit-chat' |

| | | |
|---|---|---|
| Observe: ***Dup***(vélona) | = ***Basic***(vélona,vélona) | Def ***Dup*** |
| (4) | = vèlo + ***nset***(***stop***(v) +é) + lona | Def ***Basic***, Case 2.2.2 |
| | = vèlo + ***nset***(b+é) + lona | Def ***stop*** |
| | = vèlo + mb+é + lona | Def ***nset*** |
| | = vèlombélona. | orthography (+stress) |

***Weak roots of four or more syllables***

| σ | | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|---|
| latábatra | 'table' | tábatra | latàbatábatra |
| làvarángana | 'verandah' | rángana | làvaràngandrángana |
| karátsaka | 'rustling (leaves) | rátsaka | karàtsadrátsaka |
| karétoka | 'seize with teeth' | rétoka | karètodrétoka |
| potsíatra | 'spurt suddenly' | tsíatra | potsìatsíatra |

| | | | |
|---|---|---|---|
| satrótroka | 'swelling of face' | trótroka | satròtrotrótroka |
| sòmarítaka | 'preoccupied' | rítaka | sòmarìtadrítaka |

Equally ***Dup*** yields correct results when the copied portion begins with a vowel:

| σ | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) |
|---|---|---|
| áloka 'shade' | áloka | àlokáloka 'a bit of shade' |
| ívy 'spit' | ívy | ìvívy 'spittle' |
| óva 'change | óva | òvóva 'little changes' |
| ólika 'twisting route' | ólika | òlikólika 'go indirectly' |
| ádana 'peace, slowness' | ádana | àdanádana 'a bit peacefully' |
| órotra 'pull up' | órotra | òrotrórotra 'pull up a bit' |

Thus ***Dup***(óva) = ***Basic***(óva,óva) = òvóva by Def ***Basic***, Case 1.2.1.

Finally observe that the pseudo-weak roots behave as weak under reduplication.

| σ | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) | |
|---|---|---|---|
| héna 'diminish' | héna | hènkéna | *hènahéna |
| fóka 'absorb' | fóka | fòpóka | *fòkafóka |
| zátra 'accustomed' | zátra | zàjátra | *zàtrazátra |
| trátra 'caught', | trátra | tràtrátra | *trátratrátra |
| póka 'blow' | póka | pòpóka | *pòkapóka |
| dóna 'knock' | dóna | dòdóna | *dònadóna |
| sáina 'mind' | sáina | sàintsáina | *sàinasáina |
| léna 'wet, fresh' | léna | lèndéna | *lènaléna |
| fétra 'limit' | fétra | fèpétra | *fètrafétra |
| dítra 'naughty' | dítra | dìdítra | *dìtradítra |
| táitra 'startled' | táitra | tàitáitra | *tàitratáitra |
| rítra 'dried up' | rítra | rìdrítra | *rìtrarítra |
| tsóka 'blow' | tsóka | tsòtsóka | *tsòkatsóka |

Note the adjacent stresses: <1,2,0> (= secondary + primary + unstressed).

The following roots with weak endings are not in the list of pseudo-weaks:

| σ | $\sigma_i...\sigma_n$ | ***Dup***(σ ) = ***Basic***(σ ,$\sigma_i...\sigma_n$) | |
|---|---|---|---|
| dáka 'a kick' | dáka | dàkadáka | *dàdáka |
| lóka 'bet' | lóka | lòkalóka | *lòdóka |
| fóka 'idiotic' | fóka | fòkafóka | *fòpóka |

| | | | | |
|---|---|---|---|---|
| téna | 'body' | téna | tènaténa | *tènténa |
| ména | 'red' | ména | mènaména | *mèména |
| sáina | 'flag' | sáina | sàinasáina | *sàintsáina |
| sétra | 'brutal' | sétra | sètrasétra | *sésétra |
| pítra | 'sad look' | pítra | pìtrapítra | *pìpítra |
| trátra | 'chest' | trátra | tràtratrátra | *tràtrátra |

**Three special cases and an instance of reanalysis** Here we note three cases of reduplication, all of limited extent, which yield forms in addition to those predicated by ***Dup***.

**1. Problems with *h-* initial roots** Under ***Basic***, a root initial *h* only mutates to *k*. And this is also the most common mutation in reduplication, (5a). But h ⇒ g, (5b), and h ⇒ ∅, (5c), and possibly h ⇒ tr), (5d), are also attested.

(5) a. h ⇒ k

| | | | |
|---|---|---|---|
| 1. | háingana 'quickly' | ⇒ | hàingankáingana |
| | hénjana 'stiff, tense' | ⇒ | hènjankénjana |
| | hínana 'eat' | ⇒ | hìnankínana |
| | híntsana 'fall (leaves, hair)' | ⇒ | hìntsankíntsana |
| | hávana 'relative' | ⇒ | hàvankávana |
| 2. | hántsika 'arched' | ⇒ | hàntsikántsika |
| | hítrika 'penetrate' | ⇒ | hìtrikítrika |
| | hítsaka 'fouler aux pieds' | ⇒ | hìtsakítsaka |
| 3. | hévitra 'thought' | ⇒ | hèvi-kévitra (one speaker) |

b. h ⇒ g (only with *-na* final roots)

| | | |
|---|---|---|
| hírana 'ray of light' | ⇒ | hìrangírana |
| hílana 'oscillate' | ⇒ | hìlangílana |
| hívina 'shaking of head' | ⇒ | hìvingívina |

A few roots – *hírina* 'blink' and *hélina* 'sudden appearance' and *hórona* 'a rolling up' accept both *h* ⇒ *k* and *h* ⇒ *g* : *hìrinkírina/hìringírina*, *hèlinkélina/hèlingélina* and *hòronkórona/hòrongórona*.

c. h ⇒ ∅

| | | | |
|---|---|---|---|
| hévitra | 'thought | ⇒ | hèvitrévitra |
| héndratra | 'startled' | ⇒ | hèndratréndratra |
| hóditra | 'skin' | ⇒ | hòditróditra |
| hóndratra | 'tremble' | ⇒ | hòdratróndratra |

d. ? h ⇒ tr

| | | | |
|---|---|---|---|
| hébina | 'agitation' | ⇒ | hèbintrébina |
| hálona | 'sparkling' | ⇒ | hàlontrálona |
| hílona | 'oscillations' | ⇒ | hìlontrílona |
| hólana | 'being difficult' | ⇒ | hòlantrólana |

The cases in (5a.2) and (5c) could also be analyzed as h ⇒ ∅. The forms in (5d) cannot be analyzed this way, but they exhaust the cases of this sort in Abinal & Malzac and they are all listed as frozen (the left hand forms above not being separately listed).

Note that *h* is typically not sounded but we cannot treat even the *h*- words in (5c) as vowel initial with orthographic *h*- a relic since other applications of ***Basic*** show the *h* ⇒ *k* shift:

| | | |
|---|---|---|
| filazána 'saying' + hévitra 'thought' | ⇒ | filazàn-kévitra 'advertizing' |
| an(a)- 'on, at' + hóditra 'skin' | ⇒ | an-kóditra 'on the skin' |

The *h*/*g* and *h*/∅ alternations are independently attested in official Malagasy with (*m*)*aN* prefixation (with *h*/∅ more common; Paul 1996):

| (6) root r | maN(r) | |
|---|---|---|
| hálatra 'stolen goods' | mangálatra 'steals' | |
| hátaka 'ask' | mangátaka 'asks' | h ⇒ g |
| hètahéta 'thirst' | mangètahéta 'is thirsty' | |
| héty 'cut hair' | manéty 'cuts hair' | |
| hátona 'approach' | manátona 'approachs' | h ⇒ ∅ |
| hídy 'lock' | manídy 'locks' | |

The *h*/*tr* alternation is not otherwise attested in official Malagasy, but it is attested in various regional varieties. Thus where official Malagasy has *ravin-kazo* (*ravina 'leaf'* + *hazo* 'tree') Northern Betsileo has *ravin-trazo*. This dialect variation suggests an historical basis for the *h*/*tr* alternation, but we have not pursued this point.

**2. *k*-insertion** A few vowel initial weak roots ending in *-na* accept optionally a *k* inserted initially in the reduplicant (Rahajarizafy 1960;88).

(7) σ ***Dup***(σ )

| | | | |
|---|---|---|---|
| ádana 'slowness' | àdanádana | and | àdankádana |
| ómana 'preparer' | omanómana | | omankómana |
| óndana 'pillow' | òndanóndana | | òndankóndana |
| ídina 'descend' | ìdinidína | | ìdinkídina |
| ádina 'exam' | àdinádina | | àdinkádina |

This variation would receive an historical explanation if it was found that these roots began historically with *h*. Then the *k* forms are expected from the application of ***Basic***, Case 2.2.1, to the historical root, and those without the *k* result from application of ***Basic*** once the vowel initial form is taken as the root. So as with the weak roots, reduplication here also would be built on the historically earlier forms.

3. **final vowel retention** In some cases of two syllable vowel initial roots with penultimate stress whose final syllable is not weak, the elision of the final vowel is optional. Thus both *òvóva* (already given) and *òvaóva* are acceptable reduplications of *óva* 'change' and *ìvívy* (already cited) and *ìvivívy* are acceptable reduplications of *ívy* 'spit'.

**4. a case of reanalysis** A few Ns have been relexicalized with their third person genitive ending *-ny* (which does not attract stress to the right), resulting in a form reanalyzed as underlyingly ending in *-na*. E.g. from *sásaka* 'half' we form the regular *sásany* 'its half', now relexicalized as a quantifier meaning 'some'. It reduplicates to *sàsantsásany* 'some, a few'. Similarly from *rámbo* 'tail' we have *rámbony* 'its tail' and the reduplicated form *ràmbondrámbony* 'in the last ranks, towards the end'; again a regular form if we analyze *rámbony* as *rambona+ny*. And building ultimately from *lóha* 'head' we have *vòalóhany* 'at first', which reduplicates to *vòalòhandóhany*, as though the underlying form were *vòalóhana*. To handle these cases we shall include *-ny* among the weak endings.

**Domain of reduplication**

Dom(***Dup***) includes almost all contentful roots (including contentful Preps: *lavitra* 'far' ⇒ *lavidavitra* 'somewhat far', *akaiky* 'near' ⇒ *akaikikaiky* 'somewhat near', *tandrify* 'opposite' ⇒ *tandrifindrify* 'more or less opposite') and excludes in general grammatical morphemes, number names, demonstratives, and proper names.

(8) a. Tsy faly ve izy? "Is he not happy?"
not happy ? he

b. *Tsitsy faly ve izy? *Tsy faly veve izy? *Tsy faly ve izizy?

Number names and demonstrative do enter other sorts of copying structures: distributive numeral formation is illustrated here for *telo* 'three' ⇒ *tsitelotelo* 'in threes, three by three'. Demonstratives like *eo* 'here, visible, non-past' form adverbials like *eo ho eo* 'approximately' and *eo no ho eo* 'shortly'. Demonstrative adjectives occur as framing expressions: *ity tranon-dRabe ity* 'this house of Rabe's this' for "this house of Rabe's".

Another class of unreduplicatable roots in Abinal and Malzac (1888) are those of the form ὸτότ, such as *tàbatába* 'noise', *sàlasála* 'hesitation', *vèzivézy* 'run around'; *sèraséra* 'go back and forth, communication'. These forms are obviously frozen reduplications whose base no longer exists as an independent root. All frozen reduplications are of the form ὸτότ, there being none of the sort ὸτόττ, e.g. *tàho-táhotra*.

These remarks come close to defining Dom(***Dup***). There are just two cases where morphemically complex forms reduplicate.

1. Most active verbs prefixed with *aN-* (forms given with the present tense *m-* prefix) apply *aN-* to reduplicated roots:

| (9) σ | *maN*(σ ) | ***Red***(σ) | *maN*(***Red***(σ)) | ****Red***(*maN*(σ)) |
|---|---|---|---|---|
| váky 'cut, read' | mamáky | vàkiváky | mamàkiváky | *mamàkimáky |
| váha 'untie' | mamáha | vàhaváha | mamàhaváha | *mamàhamáha |
| fótotra 'basis' | mamótotra | fòtopótotra | mamòtopótotra | *mamòtomótotra |
| vádika 'other side' | mamádika | vàdibádika | mamàdibádika | *mamàdimádika |
| vélona 'living' | mamélona | vèlombélona | mamèlombélona | *mamèlomélona |
| sóratra 'writing' | manóratra | sòratsóratra | manòratsóratra | *manòranóratra |
| vángy 'visit' | mamángy | vàngivángy | mamàngivángy | *mamàngimángy |

Crucially we see that when *maN* applies to the roots above, or their reduplicated forms, the initial consonant is lost or modified (Paul, 1996). But that consonant appears in the reduplicant. In the case of the weak *soratra, fotototra, vadika* and *velona* it is replaced by its value under ***stop***, exactly the changes predicted by reduplicating the root. Had we reduplicated the *maN* prefixed form this consonant would not appear, an incorrect result.

But there are other cases where ***Dup*** visibly applies to *maN* prefixed forms. Corresponding cases in Indonesian have motivated analyses of "overapplication" (for which, in Malagasy, we provide an original, if prosaic, analysis). First some examples:

| (10) root σ | *maN*(σ ) | $\sigma_i...\sigma_n$ | ***Dup***(*maN*(σ )) | *maN*(***Dup***(σ)) |
|---|---|---|---|---|
| hóvitra 'shiver' | mangóvitra | ngóvitra | mangòvingóvitra | *mangòvikóvitra |
| lá 'refusal' | mandá | ndá | mandàndá | *mandàlá |
| léha 'go' | mandéha | ndéha | mandèhandéha | *mandèhaléha |
| lóa 'pay, vomit' | mandóa | ndóa | mandòandóha | *mandòalóa |

Clearly the copied part includes the prenasalization induced by *maN*. So ***Dup*** applies to some affixed roots which themselves must be exluded from Dom(***redup***). The *action* of ***Dup*** is as given: it copies to the right beginning with the stressed syllable, and then applies ***Basic***, modified with the *h* alternations specific to reduplication. All that is at issue is the identity of the set of forms that the copying function applies to. And clearly this set must include some derived forms in addition to roots. As we find no conditioning factor we can do no better than list those *man-* verbs that lie in the domain of the reduplication function.

In some cases both the root and the derived *man-* verb are in the Dom(***Dup***). So both ***Dup***(*maN*(σ)) and *maN*(***Dup***(σ)) are attested:

| (11) root σ | *maN*(σ ) | ***Dup***(*maN*(σ )) | *maN*(***Dup***(σ)) |
|---|---|---|---|
| vóno 'hit, kill' | mamóno | mamònomóno | mamònovóno |
| láinga 'lie' | mandáinga | mandàingandáinga | mandàingaláinga |
| táo 'do' | manáo | manàonáo | manàotáo |

***caught in the act!*** We are witnessing historical change in progress. In (11), children and teenagers are more likely to use the form that reduplicates after *maN* prefixation, and older generation speakers are more likely to use the form that reduplicates the root first and then applies *maN* prefixation. Once we think of reduplication as a function (or relation) it is easy to see that what is changing is its domain. Verbs built by *maN-* are being added to that domain, and in some cases their roots are being removed, in others the roots remain, yielding doublets as in (11). Wrt ***redup*** some *maN-* forms are being reinterpreted as roots. This is not too surprising: *maN* prefixation is partially non-transparent, often destroying the initial consonant of the root making retrieval of the root difficult. Thus while *manoratra* 'writes' is in fact derived from the root *soratra*, on purely phonological grounds it could also have been derived from *horatra*, *toratra*, *foratra* and *oratra*.

Commonly historical changes take the form A ⇒ A,B ⇒ B. See Keenan (1996) for the period in English in which both *him* and *himself* occurred locally bound.

2. The second case of verbs entering the domain of ***redup*** is the 20 odd ∅-prefix roots which exceptionally prefixe tense markers (*m- / n- / h-* ) directly to form active verbs. These roots (Rahajarizafy, p.47-48) are never independent words and lack a suffix passive distinct from the circumstantial form. Some examples:

| (12) root σ | *act*(σ ) | ***Red***(*act*(σ)) | *act*(***Red***(σ)) |
|---|---|---|---|
| éty | méty 'ok, agrees' | mètiméty | *mètiéty |
| ísy | mísy 'there exists' | mìsimísy | *mìsísy |
| ódy | módy 'go home' | mòdimódy | *mòdiódy |
| ónina | mónina 'reside' | mònimónina | *mòninónina |
| ánana | mánana 'has' | mànamánana | *mànanánana |
| ínona | mínona 'drink a certain ritual poison' | mìnomínona | *mìnonínona |

So the roots in (12) must be excluded from Dom(***redup***). Rather more often however both the root and the derived verb lie in Dom(***redup***).

| (13) root σ | *act*(σ ) | ***Red***(*act*(σ)) | *act*(***Red***(σ)) |
|---|---|---|---|
| áka | máka 'takes' | màkamáka | màkáka |
| ídina | mídina 'descends' | mìdimídina | mìdinídina |
| íditra | míditra 'enters' | mìdimíditra | mìditríditra |
| íla | míla 'needs' | mìlamíla | mìlaíla |

| | | | |
|---|---|---|---|
| íno | míno 'believes' | mìnomíno | mìnoíno |
| índrana | míndrana 'borrows' | mìndramíndrana | mìndraníndrana |
| íta | míta 'cross (water)' | mìtamíta | mìtaíta |

This full verb reduplication applies also in past and future tense. Thus alongside *màkamáka* 'takes a bit' we have *nàkanáka* 'took a bit' and *hàkaháka* 'will take a little'.

**Syntactic Distribution of Reduplicated Forms**

In general if x ***redup*** y then y has the same possibilities of occurrence as x except that it cannot undergo reduplication. More formally,

x ***redup*** y ⇒ (1) $\neg\exists$z y ***redup*** z and

(2) for all generating functions (relations) R ≠ ***redup***,

(...x...) ∈ Dom(R) iff (...y...) ∈ Dom(R)

So if x reduplicates as y and x has an *-ina* or an *a-* passive so does y. If x forms active verbs with *(m)i-* or *(m)aN-*, so does y; is x accepts reciprocal or causative affixation so does y; if x forms imperatives so does y. In general then a reduplicated form has the same distribution as its unreduplicated counterpart, save that it cannot further reduplicate[1].

And as most items that undergo reduplication are roots, which may fail to be words, it might seem reasonable to think that Reduplication in Malagasy is a lexical process, one that "takes place" in the lexicon. In support of this is the fact that some reduplications have idiosyncratic meanings compared to forms they are reduplications of: Thus from *tsangana* 'erect (adj)' we form the simple active verb *mitsangana* 'stands up'. But the reduplicated root *mitsangantsangana* means 'walks around'. From the root *tamby* 'salary, payment' we form the active *manamby* 'hires', but the reduplicated active *manambitamby* means 'caress, cajole'. Similarly *faka* 'cause, root' yields the reduplicated passive *fakafakaina* 'is examined'. And from the root *fana* 'heat' we have both *mafampana* 'lukewarm' and *mafanafana* 'lively'.
On the other hand the fact that tense markers and the active prefix *aN-* are sometimes included in the forms that undergo Reduplication argues against this. At the moment then we must just

---

[1] [1]Keenan & Polinsky (1998) note one exception (in addition to reduplication itself). Namely, *tafa-* prefixation. Thus (i) below is natural, but its phonologically well formed reduplication in (ii) is not.

i. Tafiditro (tafa+iditra+o) ny omby
pass+enter+1sg.gen the cow(s)
*I got the cows in* (or *The cows were gotten in by me*)

ii. *Tafidi(k)iditro ny omby

acknowledge that the place of Reduplication in standard organizations of grammar is unclear.

This completes our descriptive account of reduplication in Malagasy. We close with a brief and tentative consideration of an Optimality Theoretic (McCarthy & Prince 1995, henceforth M&P95) account of reduplication in Malagasy. To this end we note the following constraints on prosodic words in Malagasy:

(14) A ***prosodic word*** in Malagasy is a sequence $\sigma = \sigma_1,...,\sigma_n$ of stress marked syllables satisfying the following ***PrWd*** Constraints:

1. Exactly one $\sigma_i$ has primary stress
2. If $\sigma_i$ has primary stress then $i+2 \geq n$.
   (= the primary stressed syllable in σ is not farther left than antepenultimate position)
3. If primary stress in σ is antepenultimate then $\sigma_n$ = *-na*, *-ka*, *-tra*, *-ny*, or *-ko*, where *-ny* and *-ko* are the 1sg and 3 person genitive suffixes (which do not shift stress rightward). E.g. lámba 'clothes' ⇒ lámbako 'my clothes', lámbany 'his/their clothes'
4. The rightmost *e* or diphthong *ao*, *ai/ay* or *oi/oy* has primary stress (dominated by ***PrWd***(3))
5. $\sigma_1 \neq {}^{n}cv$, *c* voiceless. E.g. * ⁿk, ⁿt, ⁿts, ⁿtr or ᵐp root or word initially
   (The common agentive prefix *mp-* is heard as */p/*. Exceptionally one word does begin with ⁿt: *ntaolo* 'the ancients').
6. for v≠o, *e+v tautomorphemically (Erwin 1996); also *a+a
7. No subsequence of four contiguous $\sigma_i$ lack consonants

□

M&P95 represent Reduplication as a pair <X,Y> where X is a pair $<RED_i,stem>$ and Y is the reduplicated form of *stem* assumed deconcatenated(!!!) into a pair consisting of a *Base* (B) and a *Reduplicant* (R). Crucially Y is an expression in the language, an "output" form, not some sort of noumenal creature underlying the phenomenal world of audible delights. Important constraints on Reduplication are given in terms of identity conditions holding of B and R, S (*stem*) and R, and S and B, as well as language particular conditions on R, e.g. R = PrWd or R = σ, etc.

Distinguishing B and R is crucial for M&P, but no criteria for making the distinction are offered. They do say that in total Reduplication one can't tell which part is B and which is R, so by implicature one can tell in partial Reduplication. They do at times suggest that B+R corresponds to "base + affix" or "base + copy" on more derivationally oriented theories. Most consistent with their treatment then is the following: when one part of Y is identical to S and the rest is a proper substring of S then the identical part is the B and the substring is R.

The Malagasy order is then presumably Base+Reduplicant, since the most usual pattern with partial reduplication puts the best approximation to a full copy of the Stem leftmost:

(15) teté 'drip' ⇒ tetè + té (mitetèté 'drips, drop by drop)
vovó 'bark' ⇒ vovò + vó (mivovòvó 'barks some')
ampó 'in the heart' ⇒ ampò + mpó 'often in the heart' [= a.mpò.mpó]
indráy 'again' ⇒ indràì + ndráy 'sometimes' [= i.ndràì.ndráy]
lèhibé 'big' ⇒ lèhibè + bé 'biggish'

ontány 'ask' ⇒ ontàni + ntány (mà.no.ntà.ni.ntá.ny 'asks a bit')
haríva 'evening' ⇒ harìva + ríva 'early in the evening'
àlahélo 'sadness' ⇒ àlahèlo + hélo 'little sadness'
pàtalóha 'pants' ⇒ (mi)pàtalòha + lóha 'wear as pants'
saláma 'healthy' ⇒ salàma + láma 'somewhat healthy'
tanóra 'young' ⇒ tanòra + nóra 'somewhat young'

But notice that even analyzing e.g. salàmaláma 'somewhat healthy'as $[salàma]_B[láma]_R$ the Base is not quite identical to the Stem, since it carries no main stress whereas the Stem does. And since a main stress in the Base reduces to secondary stress in the reduplicated form we will get cases (indeed many of them) where a syllable $\sigma_i$ has greater stress than some $\sigma_j$ in the Base but they have equal (secondary) stress in the reduplicated form. This is the case with *àlahélo* and *pàtalóha* above.

Note also that if we analyze reduplication as Reduplicant + Base then for the basic cases cited above the Base will never be identical to the Stem. We thus adopt (16):

(16) In OT terms, then, if x ***redup*** y then y = Base + Reduplicant

Moreover, thinking of the Reduplicant as the "copy" we see that Malagasy falls into the usual pattern that it copies to the side it copies from. Specifically it copies from the righthand side of the Stem and it copies it to the right. Perhaps Reduplication in Malagasy is slightly unusual in that it is suffixal not prefixal, as appears to be the case both for most languages and in particular for most languages genetically related to Malagasy.

(17) ***Applying some OT generalizations on Reduplication to Malagasy***

1. ***the Reduplicant may be phonologically less marked than the Base or than expressions in the language generally.***

This is non-trivially supported: R is never more marked than B or S, and in one case the Reduplicant assumes a less marked form. Namely, in the ∅-prefix verbs we may apply ***Dup*** to the consonant initial derived form rather than the root: *mísy* ⇒ *mìsi+mísy*, **mìsiísy*, **mìsísy*

2. a. ***General constraints in "Input-Output" relationships apply in Reduplication***
   b. ***Identity constraints applicable in Reduplication apply elsewhere (ideally)***

(17.2b) The morphophonological alternations used in ***Dup*** (except the marginal h ⇒ tr) all occur in other MDPs e.g. ones that use ***Basic*** or the h ⇒ g, h ⇒ ∅ alternations in *maN* prefixation.

(17.2a) There are phonological changes used outside of Red that do not occur in Red. E.g. under *maN* prefixation root initial *f*-may delete: *maN+fótotra = mamótotra*; but only *fòtopótotra* exists as a reduplicated form. Also (below) affixing induces stress patterns unknown to reduplicated forms.

3. ***the Reduplicant bears an affix-like relationship to the Base***

This seems not to hold. I don't see much similarity between ***Basic*** and the suffixing processes discussed by Erwin (1996). Specifically,

1. Affixing induces stress gaps, ***Basic*** does not:

fináritra 'is pleased' ⇒ (m)àhafináritra 'is pleasing' ⇒ fàhafinarétina 'circ.nom.'
<0,2,0,0> ⇒ <1,0,0,2,0,0> ⇒ <1,0,0,0,2,0,0>

2. ***Basic*** induces weak stress clashes, affixing does not

filána + hévitra = filàn-kévitra 'Advisory board'
<0,2,0> + <2,0,0> = <0,1,2,0,0>

fialána + sásatra = fialàn-tsásatra 'a rest period, "removal of tiredness"'
<0,0,2,0> + <2,0,0> = <0,0,1,2,0,0>

fétra + fétra = fèpétra <2,0> + <2,0> = <1,2,0>

jamóka + móka ⇒ jamòmóka 'old name for cattle'
<0,2,0> + <2,0> = <0,1,2,0>

3. Suffixing (passive, circumstantial, imperative all voices)

a. triggers epenthetic consonant insertion (and some vowel changes), ***Basic*** MDPs do not

ex: the passive suffix -ana/-ina:

| root | passive | |
|---|---|---|
| àmpy 'help' | àmpíana | (regular) |
| àndry 'wait' | àndrásana | insert [s] |
| ély 'disperse' | èlézana | insert [z] |

a'. alternatively, adopting Erwin's (op cit) in which weak roots are consonant final and epenthetic *-a* is inserted late, we see that ***Basic*** triggers final consonant deletion for

weak words, suffixing does not.

4. There are no similarities between ***Basic*** MDPs and prefixing or infixing.

4. ***the Reduplicant is characterized templatically in prosodic terms:***

(core)(light)(heavy) ***syllable, foot, prosodic word.***

But the Reduplicant does not seem to satisfy a template of any sort:

a. Were the template just a CV sequence template we would then not get the simple *moramora, salamalama*, etc. If it is CVCV we get wrong results for *lehibe* (**lehibehibe* instead of the correct *lehibebe*) and also for e.g. *sarotra* (**sarorotra* instead of *sarotsarotra*). If CVCVCV then get wrong results for all words with final stress and all with penultimate stress.

b. Replacing CV by σ (a syllable) in (a) above we see that R = σ, R = σσ, and R = σσσ all yield wrong results.

c. R = foot? Feet are minimally and maximally binary (M&P). Given the absence of long vowels and closed syllables one expects feet in Malagasy to be disyllabic. But we can with Erwin count "moras" and accept that *cv* is bimoraic when v is a diphthong. This gives

correct results for *indray* ⇒ *indraindray* and *jay* ⇒ *jaijay*, as well as *salama* ⇒ *salamalama* and *ontany* ⇒ *ontanintany* assuming that non-diphthongs are short.

But then we fail to predict the existence of reduplicated forms for final stress words: *py* ⇒ *pipy*, *ome* ⇒ *omeme*, *ampo* ⇒ *ampompo* (as well as those ending in stressed *e*: *be* ⇒ *bebe*, *lehibe* ⇒ *lehibebe*). Also the n≥3 syllable weak words are not cleanly generated: *tahotra* ⇒ *taho-tahotra*, *rafitra* ⇒ *rafi-drafitra*, where we seem to have copied three syllables. (But Erwin would derive the final *a* by an epenthesis rule which applies after moraification and so doesn't count for weight, so e.g. *rafitra* is "really" just the two syllable = one foot *rafet*).

d. R = PrWd? This seems the most plausible. Crucially R must begin with a (primary) stressed syllable and thus satisfy a major condition **PrWd**(1) for being a prosodic word. It also satisfies **PrWd**(2) – **PrWd**(4).

**BUT** 1.The Reduplicant clearly fails **PrWd**(5): voiceless prenasalized consonants can initiate R.

(18)

| | | |
|---|---|---|
| ampo | ⇒ | ampo + mpo; |
| ampirina 'sub. order' | ⇒ | ampiri + mpirina 'be put in order' |
| fona 'ask forgiveness' | ⇒ | fo + mpona |
| hantona 'suspension' | ⇒ | hanto + nkantona |
| man[ontany] | ⇒ | man[ontani + ntany] |
| antara 'glacial' | ⇒ | antara + ntara |
| antonina 'suitable' | ⇒ | antoni + ntonina |
| antsambotra (< sambotra) 'a leap' | ⇒ | antsambo + ntsambotra |

| | | |
|---|---|---|
| hatsikana 'farce, plaisanterie' | ⇒ | hatsika + ntsikana |
| havana | ⇒ | hava + nkavana |
| hinana | ⇒ | hina + nkinana |
| sasany | ⇒ | sasa + ntsasany |

2. When R is just one syllable, is it a PrWd? Erwin claims Malagasy bans degenerate feet, but I am doubtful. Here are my counts for one syllable words, based on A&M. Grammatical words are in (19), content words in (20).

(19) *sa* 'or (in questions)'; *fa* 'that (complementizer), but'; *na*' whether', *i* and *ry* 'proper noun articles'; *sy* 'and (phrasal)'; *ny* 'definite article', *no* 'focus particle', *ho* 'future', *ka* 'and so', *ve*, *va* 'question particle', *tsy* 'not', *mba* 'in order to', *ao* 'there+non -visible', *tao* 'there+non-visible+past', *sao* 'lest', *háy/káy* 'exclamation'

(20) *fe* 'thigh'; *fy* 'delicious'; *fo* 'heart'; *be* 'big, many, very'; *ra* 'blood'; *lo* 'rotten, spoiled'; *la* 'refusal', *mby* 'arrived'; *re* 'heard'; *ro* 'sauce'; *to* 'true, just'; *vy* 'metal'; *zo* 'rights'; *tsy* 'steel', *py* 'a blink', *ráy* 'father', *ráy* 'received', *fóy* abandoned', *vóy* 'action of rowing', *hóy* 'is said', *tóy* 'like', *ndre/ndry* 'interjection of surprise or pain', *táy* 'execrement', *máy* 'burnt, hurried', *láy* 'tent', *mbáy* 'step aside', *váy* 'a boil', *ndáo* 'let's go', *jáy* 'pride', *jáo* 'big; a big steer with long horns'

Thus Malagasy presents 48 = 18 + 30 one syllable words out of 175 possible ones (7 of the form V: 4 vowels, 3 diphthongs; the latter in need of further study) and 24×7 = 168 of the form CV (24 = 29 consonants less 5 prenasalized ones which do not begin words). So 27.4% of the possible one syllable words are actual. So let's ban the ban.

Actually these data just show that there are real words that do not contain a foot. If we assume the Prosodic Hierarchy (but see Erwin) then many of the single syllable Rs are not feet and so a fortiori not PrWds, even if they are in some other (ordinary) sense words. If we don't require PrWds to be feet then the monoyllabic Rs are not at least immediately a counterexample to the claim that R = PrWd.

But ignoring our first objection above, even if Rs are PrWds they are not minimal ones, since they can be two or more syllables long and a minimal PrWds can be just one syllable long. So *lama* in *salama-lama* is not a minimal PrWd, nor is *tahotra* in *taho-tahotra*. Whence a requirement that R be a PrWd leaves a lot of room open. (But it does commit us to something). Thus it will not distinguish the following:

(21) (a) salàma + láma (b) salà + maláma (c) sa + làmaláma

Note that these forms are the same string, they just differ wrt which parts are the Base and Reduplicant. In general,

5. ***A reduplicated form deconcatenates into a part which matches the Stem and a partial copy of the Stem.***

This generalization holds for the examples in (22) where R matches the Stem in the first four cases and the Base matches it in the last case (modulo stress mismatch):

(22) táhotra 'fear' ⇒ tàho + táhotra
(mi)pétraka 'sits' ⇒ (mi)pètra + pétraka
tápaka 'broken' ⇒ tàpa + tápaka
námana 'friend' ⇒ nàma + námana
salàma 'healthy' ⇒ salàma + láma

But in (23) and (24) neither B nor R match S mod stress (syllabification marked)

(23) hái.nga.na ⇒ hài.nga.+ nkái.nga.na
lá.vi.tra ⇒ là.vi. + dá.vi.tra
fá.nta.tra ⇒ fà.nta.+ pá.nta.tra
zá.va.tra ⇒ zà.va. + já.va.tra
sí.tra.na ⇒ sì.tra. + ntsí.tra.na
vé.lo.na ⇒ vè.lo. + mbé.lo.na
ré.sa.ka ⇒ rè.sa. + dré.sa.ka

(24) latábatra 'table' ⇒ latàba + tábatra
làvarángana 'verandah' ⇒ làvaràngа + ndrángana
karátsaka 'rustling (leaves)' ⇒ karàtsa + drátsaka
satrótroka 'swelling of face' ⇒ satròtro + trótroka
sòmarítaka 'preoccupied' ⇒ sòmarìta + drítaka

In short, a reduplicated form cannot in general be deconcatenated into a part that matches the Stem and another (partial) copy of itself.

6. ***Stem-Base identity universally outranks Base-Reduplicant and Stem-Reduplicant identity: I(S,B) > I(B,R), I(S,R)***

This generalization correctly picks (21a) over (21b) and (21c) above. But the reduplication of 3 syllable weak roots whose initial consonant is invariant under ***stop*** yield forms as in (22) in which R is an exact copy of Stem, Base being truncated. Also problematic here is finding what prevents reduplications like

táhotra ⇒ tàhotra-táho

The primacy of I(S,B) would seem to favor the righthand side above over the correct *tàho-táhotra*. One is inclined to say that RightAnchor(S,R) > RightAnchor(S,B), but this is just a particular case of the violation of (6). Another natural reaction based on knowledge of the language is that adjacent unstressed syllables are unacceptable in the output of reduplications. But they are not otherwise bad. Indeed suffixing creates such stress gaps in reduplicated forms:

(m)ipètrapétraka + CIRC ⇒ ipètrapetráhana

Worth emphasizing here is that there is nothing independently bad about weak syllables occurring word internally:

-ka- alàkamísy 'Thursday'; takálo 'exchange; akánjo 'clothes
-na- (m)ánana 'has'; ánatra 'moral, lesson'
-tra- fátratra 'exceedingly'; (m)ipétraka 'sits'

***Interim conclusion*** A convincing OT analysis of Red in Malagasy remains to be given.

## References

Abinal et Malzac. 1888. *Dictionnaire malgache-français* Editions Maritime et D'outre-mer. Paris. edition of 1963.

Carrier-Duncan, J. 1984. Some Problems with ProsodicAccounts of Reduplication. Ch. 13 in M. Aronoff and R. Oehrle eds. *Language Sound Structure.*

Dahl, O. C. 1951.*Malgache et Maanjan* Edege-Instituttet, Oslo

Erwin, S. 1996. Quantity and moras: an amicable separation. in M. Pearson and I. Paul (eds) *UCLA Occasional Papers in Linguistics* No. 17. pp.2 –31.

Finer, D. 1986-87. Reduplication and verbal morphology in Palauan. in *The Linguistic Review* 6. pp. 99–130.

French, K. 1988. *Insights into Tagalog Reduplication, Infixation, and Stress from Nonlinear Phonology* Summer Institute of Linguistics and the University of Texas at Arlington.

Gonda, J. 1950. The Functions of Word Duplication in Indonesian Languages. in *Lingua* Vol. II.2 pp. 170 – 197

Hayes, B. and M. Abad. 1989. Reduplication and syllabification in Ilokano. in *Lingua* 77. pp. 331–374.

Keenan, E.L. 1996. Creating Anaphors. ms. UCLA

Keenan, E.L. and J.P. Razafimamonjy. 1996. Malagasy Morphology: Basic Rules. in M. Pearson and I. Paul (eds) *UCLA Occasional Papers in Linguistics* No. 17. pp.31–49.

Marantz, A. 1982. Re Reduplication. in *Linguistic Inquiry* 13.3 pp. 435–482.

Moravcsik, E. 1978. Reduplicative Constructions. in J. Greenberg, ed. *Universals of Human language*, Stanford University Press.

Paul, I. 1996. The active marker and nasals in Malagasy. in M. Pearson and I. Paul (eds) *UCLA Occasional Papers in Linguistics* No. 17. pp 49 - 58.

McCarthy, J. and A. Prince. 1995. Faithfulness and Dupuplicative Identity. in *Papers in Optimality Theory* U. Mass. Occasional Papers 18, J. Beckman, L. Walsh Dickey & S. Urbanczyk (eds) GLSA UMass, Amherst

Moravcsik, E. 1978 . Reduplicative Constructions. in *Universals of Human Language* J. Greenberg (ed) Stanford University Press.

Rahajarizafy, A. 1960. *Essai sur la Grammaire Malgache* Imprimerie catholique, Antanimena Tananarive, Madagascar

Rajaona, S. 1977. *Problemes de Morphologie Malgache* Librairie Ambozontany, Fianarantsoa,
Madagascar.

—. 1985. Le Redoublement par suffixation en malgache' in *Hiratra* No. 4, pp. 17 – 48. Département de langue, littérature et civilisation malgache, Université de Madagascar, Antananarivo.

Rajemisa-Raolison, R. 1971. *Grammaire Malgache*, Librairie Ambozontany, Fianarantsoa, Madagascar

Rajaona, S. 1980. L'Alternance en Malgache in *Hiratra* No. 2, Université de Madagascar, Antananarivo. pp. 12 – 92

Rahajarizafy, A. 1960. *Essai de Grammaire Malgache. Imprimerie Catholique, Antanimena Tananarive.*

Razafimamony, J. P. 1988. *Tsipelin-Teny: Fitsipika sy Olana.* Dingana Voalohany. Dika 10 Centre d'Etudes et de Recherches de Malagasy. Université de Madagascar, Antananarivo

— 1988 Ny Verin-droa (Reduplication). ms DIFP, Université de Madagascar, Antananarivo.

Schlindwein, D. 1991. Reduplication in lexical phonology: Javanese plural reduplication. in *The Linguistic Review* 8. pp.97–106

Steriade, D. 1988. Reduplication and syllable transfer in Sanskrit and elsewhere. in *Phonology* 5 pp. 73 - 155.

Uhrbach, A. J. 1987. *A Formal Analysis of Reduplication and its Interaction with Phonological and Morphological Processes* PhD Diss. Univ. of Texas at Austin

Wilbur, R.B. 1973. *The Phonology of Reduplication* PhD Thesis, University of Illinois.