

## Stress and Floating Syllables in Malagasy: Architectural concerns

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A recent proposal regarding the architecture of the phonological module states that the metrical component cannot refer to sub-skeletal segmental/featural content: melody. Interestingly, there has been convergence to this viewpoint (Rasin 2017a, b; Ulfsbjorninn 2017). Rasin names it: *Stress Encapsulation*. The advantage of this worldview is its restrictiveness. It excludes crazy unattested phenomena such as ‘stress the leftmost [–round] vowel’, or ‘sonority determined stress’ that has been largely refuted (Shih 2016; Rasin 2017b). The proposed architecture does a good job in explaining the absence of a whole class of unattested phenomena, however, Malagasy appears to contradict the hypothesis.

Keenan & Polinsky (1998) (**K&P**) treat Malagasy stress as phonemic because there are some minimal pairs: *tánana* ‘hand’ vs. *tanána* ‘village’. However, Malagasy stress is largely predictable. My analysis of Ramik’s (2016) sound files confirms the reported pattern: (a) Malagasy has regular right-aligned penultimate stress: *mandéha* ‘go’, *mahita* ‘to see’, (b) secondary stress falls on every second syllable to the left of the main stress: *làndiházo* ‘cotton’, *bàraráta* ‘water bamboo spec’, and (c) word-final diphthongs bear stress: *manáo* ‘to do’, *indráy* ‘sometimes’. This much can be standardly analysed with right-aligned trochaic feet built on moras: *mah*(<sub>i<sub>μ</sub>ta<sub>μ</sub></sub>) ‘to see’ & *man*(<sub>á<sub>μ</sub>o<sub>μ</sub></sub>) ‘to do’ (Erwin 1996). In addition to these facts, there are the three melody-dependent aspects of the stress pattern. Firstly, word-final [e] acts as a regular stress attractor (Rasoloso & Rubino 2005 (**R&R**)): *lehibé* ‘big’ (K&P), *mandré* ‘to hear’, *manomé* ‘to give’ (Ramik 2016). Secondly, trisyllabic words ending in the syllables: -tra, -ka, -na regularly have antepenultimate stress. Collectively these are known as ‘weak syllables’ (Erwin 1996) or ‘weak roots’ (K&P): *vóhitra* ‘hill’, *tánana* ‘hand’, *tópaka* ‘broken’. Thirdly, weak roots have penultimate stress if the weak syllable is preceded by the stress attracting [e]: *pokétra* ‘purse/handbag’ (R&R).

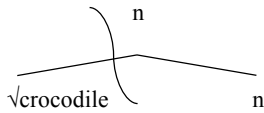
Malagasy stress is, therefore, relatively complex and seems to require access to the sub-skeletal melodic information, the featural identity of consonants and vowels. Moreover, some of this information has peculiar interactions with the morpho-syntax. Roots ending in weak syllables lose them in reduplication, compounding and enclisis: (a) *antánana* ‘fall into the hands of’ + *mámba* ‘crocodile’ > *antána-mámba* ‘fall into the hands of a cruel person’, (b) *fihina* ‘clutch’ + *mámba* ‘crocodile’ > *fihimámba* ‘refusal to let something go’, (c) *zánaka* ‘child’ + *ko* 1S.GEN *zánako* ‘my child’ (R&R).

Erwin (1996) discusses a morphological proposal for the weak syllables that avoids direct reference to melody: ‘weak syllables as ‘stem formatives’’. However, as Erwin notes, this is not correct because there is no way to know which roots receive them: *láva* ‘long’ vs. *lávaka* ‘hole’. Nonetheless, this analysis is similar to R&R, who refer to these as ‘extended roots’ without further explanation. Erwin (1996) lands on the hypothesis that weak roots are consonant-final and have an epenthetic, non-moraic ‘a’. This analysis can account for the stress assignment, but it is not clear how it predicts the deletion pattern of the weak syllables. In fact, a melodically-determined extrametricality analysis (with lexical exceptions) may actually be more insightful than the epenthesis account, because extrametricality is only possible at the margins of words. But this is far from an ideal solution, it is a complex analysis and it violates *Stress Encapsulation*.

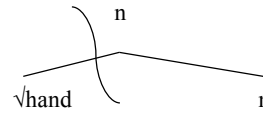
An ideal solution would minimally achieve the following: (1a) simplify the stress computation so that few if any (morphologically simplex) irregularities remained, (1b) eliminate the melody-dependent aspects of the stress system, and (1c) simultaneously explain the deletion pattern of weak syllables. The analysis presented here achieves these things in the Strict CV framework and constitutes a radical departure from previous accounts of Malagasy stress. I propose that the weak syllables of Malagasy are not extrametrical, they are extrasyllabic, that is floating. Although lexically part of their root, weak syllables have no syllable structure position inside their own morpheme. Consequently, their appearance is contingent on their surroundings. If the floating segmental content does not associate to a syllabic position, it is stray erased. As for the specifics, I propose that Malagasy little *n* is a phase head (cf. Embick and Marantz 2008), and that the *n* phase is phonologically marked with an empty CV in the phonological string (Scheer 2012) (shown in (2)). This empty CV provides the landing site for the floating weak syllable (shown in (3)). Once the string is prepared, stress is computed according to a 3-CV window. Stress falls on the leftmost V in the window: CV{CVVCV}, as is shown in (4)).

(2) Morpho-syntactic structure

(a) má<sup>m</sup>ba ‘crocodile’



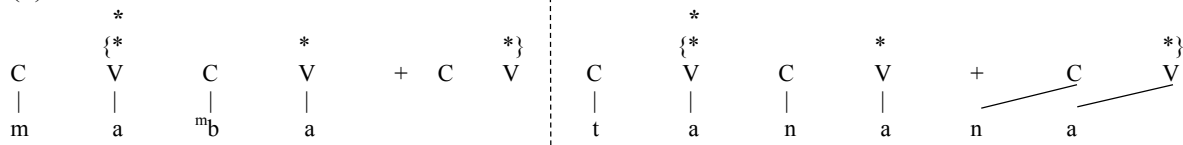
(b) tánana ‘hand’



(3) Phonological structure

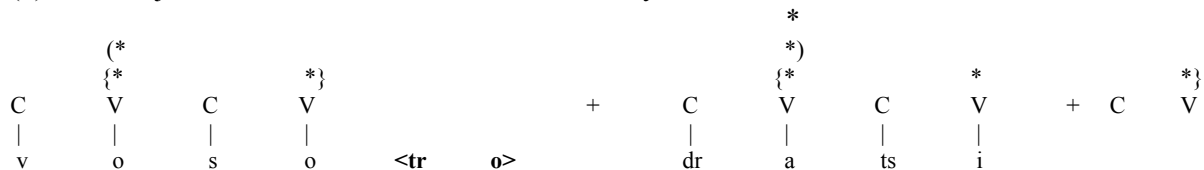


(4) Stress leftmost in window



Next, the diagram in (5) shows the outcome of the derivation of a weak Root<sup>1</sup> + Root<sup>2</sup> compound: [[√vosotro + √ratsi]<sub>n</sub>]. The empty CV of the n phase is local to Root<sup>2</sup>, so the weak syllable is stray erased: <tro>.

(5) vosotro ‘joke’ + ratsi ‘bad’ > vòsodràtsi ‘buffonery’



The analysis extends to the genitive and to reduplication, though they also involve intervening syntactic heads that introduce a nasal into the phonology, thereby triggering further mutations (cf. K&P).

The window analysis of stress is consistent with the stress attracting properties of ‘e’. The mid-vowel ‘e’ is underlying a diphthong, surfacing as [e]. Because it is complex, the ‘e’ is phonologically bipositional and will often coincide with the site of regular fixed stress: [ka{fē<sup>CVCV</sup>}] ‘coffee’ and [pu{ké<sup>CV</sup>tra}] ‘purse’. This behaviour is largely shared by the other mid-vowel of Malagasy: ‘o’. Though it is very rare and only occurs in some loanwords, it nevertheless creates the following structural contrast: [ma{náu<sup>CV</sup>}] manáo ‘to do’ vs. [kaka{ó<sup>CVCV</sup>}] kakaó ‘cocoa’ (soundfiles: Ramík 2016).

This analysis, based on floating melody and a tripartite metrical window, achieves the goals of an ‘ideal solution’ (1a-c) and crucially, given the architectural concerns, it conforms to *Stress Encapsulation*.

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