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Marking and the Free Beat Condition in Manam Stress*

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Buckley (1998), "Alignment in Manam Stress", makes a convincing case that the RBG (rule-based grammar) analysis of Halle and Kenstowicz (1991) is defective in various ways and works out an OT (Optimality Theory) analysis which addresses the defects in that work. It is offered as evidence of the superiority of OT grammar. The point of this article is to give an RBG analysis of Manam word stress and to point out some inadequacies in Buckley's analysis which the RBG analysis overcomes. There may be an argument that OT grammar is superior to RBG, but the Manam stress system does not provide that argument.

Keywords: Manam, rule-based phonology, RBG, OT, transformational phonology, focused delimiter insertion

Buckley (1998), henceforth B98, titled 'Alignment in Manam Stress', presents a thorough OT analysis of Manam word prosody. He notes that edge-marking rules in Idsardi's (1992) theory of footing play much the same role that alignment constraints in OT play. Halle and Idsardi (1995) (henceforth H&I) showed that various instances of what had been analyzed as final beat extrametricality could be analyzed as effects of what they called edge-marking. Buckley (2000) showed that this analysis does not extend to Manam. This paper will show that marking rules, combined with a key modification of Idsardi's theory, give a full account of Manam word prosody.[1] This note is a reply to Buckley's claim that the complex interactions involved in Manam stress are beyond the explanatory powers of RBG (Rule Based Grammar) phonology. Not only is an RBG account possible, but it is fairly straightforward. It is not 'simple', but the prosodic system is not simple.

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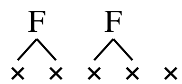
1. There are various lexical exceptions and some exceptional word classes which are not considered in this note or in B98. But the availability of morphologically triggered rules provides an architecture in which they can be readily expressed.

Section 1. Focused delimiter insertion rules

I retain most of the Halle-Idsardi framework. Footing is the result of a sequence of operations which insert one-sided delimiters. The insertion operations are carried out by two kinds of rules; non-iterative rules called marking rules and (optionally) an iterative rule which fills in the framework created by marking rules. The major change here in the H&I framework is to alter the format of delimiter insertion rules (DIRs).

Up until Idsardi (1992) a form like (××)(××)×, with the × metrical beats, was taken to be a representation of

(1) 

The parentheses were regarded as diacritics signaling the boundaries of *actual foot objects*.

In Idsardi's theory, foot delimiters are not diacritics associated with a foot, but *beat line objects*. That is what allows, for example, for there to be left delimiters without a matching right delimiters. (2a–d) all induce the foot groups in (1).

(2) a. ⟨× ×⟩× ×⟩× b. × ×⟩× ×⟩× c. × ×⟩⟨× ×⟩× d. ⟨× ×⟩⟨× ×⟩×

Delimiter insertion is prior to grouping into feet.

H&I recognize two kinds of rules, marking rules and iterative rules. They might, for example, analyze (2) as the marking rule (3.1) followed by the iterative rule (3.2).

(3) 1. Insert a left delimiter to the left of the leftmost beat.

2. Insert a right delimiter for each pair of elements. Iterate from left to right.

These rules produce (2a).

The marking rule, (3.1), is focused on a particular beat, the leftmost beat. The iterative rule, (3.2), is not so clearly focused since 'pair of elements' is not an object in the phonology, certainly not before delimiter insertion has gathered them into a foot. Instead of (3), the footing can be carried out by rules focused on beats. The system (4) also produces (2a).

(4) $\times \rightarrow \langle \times \;/\; \#\_\_$ ($GF_{\#}$)

$\left[\, \times \rightarrow \times \rangle \,\right]_{LR}$; *Uny (GB)

$[\;\;]_{LR}$ is taken to mean directional iteration in the direction indicated by the subscript. The semicolon introduces a derivational constraint. The constraint *Uny disallows the creation of unary feet, ones which contain a single beat.

Rule names are given at the right in (4) to facilitate discussion. *The names are local to the system under discussion*. Rule names in this paper are always GB or GF with perhaps a subscript to give information about where the rule applies. GB rules always (G)roup beats (B)ack towards the edge at which iteration starts. GF rules always (G)roup beats (F)orward away from the starting edge. Names are always given in conjunction with the formulas that define them. The reader is not expected to interpret the meaning of the rule names.

GF$_\#$ applies first, then GB is iterated, applying at each stage to the leftmost beat to which it is applicable. GB is not applicable to beats if a *Uny violation would result; so, for example, #×⟩ and ⟩×⟩ are excluded. It is assumed, as a well-formedness condition on the beat line, that there are no empty feet. Therefore, ××⟩ → ××⟩⟩ is disallowed because delimiter insertion is required to produce a well-formed beat line. Foot delimiters are grouping operators which are meaningless if they do not group anything.

At each step, the iterative rule in (4) has a *focus*, the beat which is targeted. If it can apply, it makes that beat the final beat of a foot. The fact that binary feet are constructed is not built into the rule. It is a consequence of the directionality of iteration and the derivational constraint on rule application. Some derivations which the footing system (4) generates are given below.

(5) a.		×	b.	× ×	c.	× × ×	d.	× × × ×
	GF$_\#$	⟨×	GF$_\#$	⟨× ×	GF$_\#$	⟨× × ×	GF$_\#$	⟨× × × ×
			GB	⟨× ×⟩	GB	⟨× ×⟩×	GB	⟨× ×⟩× ×
							GB	⟨× ×⟩× ×⟩

GF$_\#$ is not constrained by *Uny in (4), so (5a) is allowed.

The change from (3) to (4), from H&I's conception of a delimiter insertion rule (DIR) system to focused delimiter insertion seems almost trivial, a terminological or purely formal matter. But it has major consequences. In simple systems, nothing particularly noteworthy is gained by this view of delimiter insertion. But in more complex systems, there are several important advantages to be gained by restricting DIRs to focused DIRs.

(6)
1. It allows multiple DIRs to combine in a rule scheme and vie for application at a given beat. This allows more adequate accounts of ternary systems than is possible in the 'unfocused' H&I theory. It also gives a more satisfactory account of the disruption of regular binary footing caused by beats with special properties; heaviness in particular.
2. It gives a framework for imposing natural locality conditions on delimiter insertion rules which has the effect of limiting rhythmic stress to either binary or ternary (gapped binary) stress, without compromising empirical adequacy.
3. It gives a natural way to adapt Prince's (1985) Free Element Condition (FEC) to footing by delimiter insertion. The adaptation is called the Free Beat Condition (FBC).

See Frampton (2023, p. 14) for a proof that only binary or ternary footing occurs in strings of featureless beats (i.e. light) under very general locality conditions. The FBC will be discussed later in this paper in Section 2.2. It is called the 'Once and Done' principle in

Frampton (2023). See Frampton (2023, pp. 28–29) for the argument that, in some cases, heavy syllable marking must be included in the iterative footing scheme.

Section 2. Footing systems and the derivations they generate

A footing system is a list of delimiter insertion rules (DIRs). All except the final DIR are non-iterative.[2] The final DIR can also be non-iterative, but is more commonly applied as a directional iterative rule. A footing system generates derivations by applying the rules in order. Several examples are given below. (4) was a footing system. In this section, several more systems will be discussed.

2.1 Heavy beats

The beats in (4) were propertyless. Heavy syllable effects are perturbations of simpler systems designed to promote the alignment of metrical stress and inherent heavy syllable stress. The examples below have both light and heavy beats and rules which are sensitive to the distinction. L denotes a light beat, H a heavy one, and X one whose weight is not specified.

Example 1. If stress is trochaic, the simplest possible modification of (4) to promote this alignment is (7). A subrule is added to the iterative rule which makes a heavy syllable foot initial whenever it can do so without violating *Uny.

(7)
$$\left.\begin{array}{l} \mathsf{X} \rightarrow \langle \mathsf{X} \;/\; \#\_\_ \\ \begin{bmatrix} \mathsf{H} \rightarrow \langle \mathsf{H} \\ \mathsf{X} \rightarrow \mathsf{X}\rangle \end{bmatrix}_{LR} \end{array}\right\} ;\ {*}\textsc{Uny} \qquad \begin{array}{l} (\mathrm{GF}_{\#}) \\ (\mathrm{GF}_{\mathrm{H}}) \\ (\mathrm{GB}) \end{array}$$

H&I make extensive use of GF_{H} as a marking rule. Here I include it as a subrule of the directional iterative rule.

Some illustrative derivations are given in (8) and (9).

(8)

	a.		b.		c.		d.
	X X		X X X		X X H X		X X L X
$\mathrm{GF}_{\#}$	⟨X X	$\mathrm{GF}_{\#}$	⟨X X X	$\mathrm{GF}_{\#}$	⟨X X H X	$\mathrm{GF}_{\#}$	⟨X X L X
GB	⟨X X⟩	GB	⟨X X⟩ X	GB	⟨X X⟩ H X	GB	⟨X X⟩ L X
				GF_{H}	⟨X X⟩⟨H X	GB	⟨X X⟩ L X⟩
				GB	⟨X X⟩⟨H X⟩		
	X̀ X		X̀ X X		X́ X H́ X		X́ X Ĺ X

If there are less than 5 syllables, as above, there is some difference in where delimiters are inserted, but there is no difference in the foot groups which result and, therefore, no difference in which beats are stressed. Monosyllabic words are not footed since *Uny is imposed on all the footing rules.

2. This is more restrictive than what H&I assume. They allow multiple iterative rules.

It is typographically more efficient and usually equally informative to give highly annotated final representations which show crucial aspects of the derivational history. Foot delimiters inserted by marking rules are doubled. If a DIR has applied to a beat, a pointer is placed beneath the beat pointing to the delimiter which was inserted. Beneath the pointer is the name of the rule which was applied. I call these annotated final representations *derivation summaries*.

(9)
a. ⟪ X́ X ⟩ — X́: < GF$_{\#}$; X: > GB
b. ⟪ X́ X ⟩ X — X́: < GF$_{\#}$; X: > GB
c. ⟪ X́ X ⟩⟨ H́ X ⟩ — X́: < GF$_{\#}$; X: > GB; H́: < GF$_{H}$; X: > GB
d. ⟪ X́ X ⟩ Ĺ X ⟩ — X́: < GF$_{\#}$; X: > GB; X: > GB

The annotations are for the reader, not the grammar. The only aspect of the annotations which the grammar sees is the existence of a pointer (not its direction) associated with a beat. We will soon see that at each stage in the derivation the grammar needs to know which beats a DIR has already applied to.

In words of 5 or more syllables, ternary intervals can appear between stressed syllables.

(10)
a. ⟪ X́ X ⟩ L ⟨ H X ⟩ — X́: < GF$_{\#}$; X: > GB; H: GF$_{H}$; X: > GB
b. ⟪ X́ X ⟩ Ĺ L ⟩ X — X́: < GF$_{\#}$; X: > GB; L: > GB
c. ⟪ X́ X ⟩⟨ H́ X ⟩ X — X́: < GF$_{\#}$; X: > GB; H́: < GF$_{H}$; X: > GB

(7) is the core of the Finnish footing system. It accounts efficiently for all of the examples in Karttunen (2006).

Example 2. Another strategy for aligning inherent stress and metrical stress is to weaken the *Uny constraint on iterative footing to allow unary feet consisting of a single heavy beat but disallow only unary feet which consist of a single light beat. Call that constraint *Deg (not degenerate). Unary feet consisting of a single light beat are often called degenerate feet.

(11)
X → ⟩X / __# ; *Deg (GF$_{\#}$)[2]
[X → ⟨X]$_{RL}$ (GB)

If the final beat is light, footing is straightforward.

(12)
a. ··· ⟨ L L ⟫ L — L: < GB; L: < GF$_{\#}$
b. ··· L ⟨ H ⟫ L — H: < GB; L: < GF$_{\#}$
c. ··· ⟨ H L ⟫ L — H: < GB; L: < GF$_{\#}$

If the final beat is heavy, there is a subtlety. We expect (13).

(13) L L H → L L⟫H (H: < GF$_{\#}$) → ··· L L⟫⟨H (H: < GF$_{\#}$, < GB) → ··· ⟨ L L ⟫⟨ H (L: < GB; H: < GF$_{\#}$, < GB)

But this is not what happens in stress systems of this type. Beats which have already been the focus of delimiter insertion are not targeted again. We will return to finish Example 2 after the next section.

2 As we said above, rule names are local to the system in which they are defined. GF$_{\#}$ here is quite different than GF$_{\#}$ in system (7).

2.2 The Free Beat Condition (FBC)

The Free Element Condition (FEC) proposed by Prince (1985) was adopted in work that viewed footing as iterative grouping of beats by inserting balanced brackets. It proposed that grouping into feet only applied to groups of 'free beats' and that grouping itself rendered the beats which were grouped 'unfree'. This is seriously violated in the Halle-Idsardi framework. In each of the examples in (8b,c,d), the marking rule creates a foot containing all the beats. Then the first iteration of the iterative footing rule creates a foot inside that foot. Already constructed metrical structure is not left intact, as the FEC would demand.

The computational role that the FEC plays is to narrow the range of possible continuations at each step by making previously processed material unavailable for further structure building. The analog of this in the present framework is to make beats to which a delimiter insertion rule has applied unavailable as targets of further delimiter insertion. A beat becomes 'unfree' (which I call *inactive*) after a DIR has applied to it.

(14) *Free Beat Condition (FBC)*: A beat to which a DIR has applied becomes *inactive* and is no longer free to be targeted by another DIR.

Example 2 continued. If we reconsider (13), informed by the FBC, we obtain (15).

(15) $\text{L L H} \rightarrow \text{L L}\rangle\!\rangle\underset{GF_\#}{\text{H}} \rightarrow \langle\underset{GB}{\text{L}}\ \text{L}\rangle\!\rangle\underset{GF_\#}{\text{H}}$

GB cannot target the heavy final beat because $GF_\#$ has already applied to it.

The 3 examples in (12) and the one in (13) can be combined into the more compact and illuminating (16).

(16) a. $\cdots\langle\underset{GB}{\text{H}}\rangle\!\rangle\underset{GF_\#}{\text{X}}$ b. $\cdots\langle\underset{GB}{\text{X}}\ \text{L}\rangle\!\rangle\underset{GF_\#}{\text{X}}$

With trochaic stress, this is the well-known Latin stress system.

Section 3. Manam, the basics

Manam is an Austronesian language of Papua New Guinea. The source of the Manam data is Lichtenberk (1983), henceforth L83. References to examples give the page number in L83. Lichtenberk gave a comprehensive account of the stress system couched in the then available theory, the footless analysis of English stress developed in SPE, with separate rules placing secondary stress and primary stress. Given the theory then available, Lichtenberk's analysis is impressively precise and thorough. Halle and Kenstowicz (1991), and Buckley (1998, 2000) are important more modern studies. Earlier studies include Chaski 1985, Ito 1989, and Halle 1990. Although this paper is to a large extent a rejoinder to the claim in B98 that the phenomena of Manam stress cannot be successfully analyzed with a rule-based grammar. Nevertheless his work was excellent in formulating a clear view of what a rule system had to accomplish. I could not have proceeded without it.

I assume syllables in Manam are (C)V or (C)VN, with N a nasal. In this I follow Lichtenberk, “in vowel sequences, each vowel belongs to a separate syllable, since any of the vowels can be stressed under appropriate circumstances” (p. 21). Buckley (1998) makes a different assumption, with the alternation between vowel sequences and diphthongs playing a crucial role in the OT theory he proposed. The basic Manam word stress pattern of words is illustrated in (17); final stress if the final syllable is CVC, otherwise penultimate stress if the word is polysyllabic, otherwise final stress. I assume that there is a heavy/light weight property that delimiter insertion rules can be sensitive to, with (C)VN syllables heavy and others light.

(17)	a.	*pá.tu*	‘stone’	51
	b.	*si.ŋá.ba*	‘bush’	51
	c.	*so.ʔá.i*	‘tobacco’	51
	d.	*ta.né.pwa*	‘chief’	51
	e.	*ta.nè.pwa-tí.na*	‘real chief’	63
	f.	*dám.wa*	‘forehead’	51
	g.	*ma.la.bóŋ*	‘flying fox’	52
	h.	*máŋ*	‘bird’	52
	i.	*i-dàn-dàn-la-lá.ʔo*	‘he keeps crawling away’	64

The iterative rule (18) makes the correct predictions for all the examples in (17), assuming that stress is trochaic and main stress is right. Lichtenberk does not usually indicate secondary stress in examples. Most of the examples in which secondary stress is marked are used to verify the rules for assigning secondary stress which he formulates. The footing rule (18) predicts *mà.la.bón* in (17g). I take *ma.la.bóŋ* to validate this prediction. All we can hope for is to predict the position of main stress, and the positions of any secondary stresses which Lichtenberk did choose to indicate.

(18) $\left[\mathsf{X} \;\rightarrow\; \langle\, \mathsf{X} \right]_{RL}$; *DEG (GB)

This rule groups beats into what are sometimes called ‘uneven trochees’. Feet can have either 1 or 2 syllables, or either 2 or 3 moras. *i(dàn)(dàn.la)(lá.ʔo)* illustrates all the possibilities.

As noted above, heaviness effects are the result of features of the footing system which favor the alignment of metrical stress with the inherent phonetic stress of heavy syllables. Rule (18) makes every heavy syllable the initial syllable of a foot, producing complete alignment.

(19)	a. *so.ʔá.i*	b. *i-dàn-dàn-la-lá.ʔo*	c. *u-ʔàn-dó.i*	d. *mà.la.bóŋ*
	L ⟨ L L	L ⟨ H ⟨ H L ⟨ L L	L ⟨ H ⟨ L L	⟨ L L ⟨ H
	GB	GB GB GB	GB GB	GB GB

* * * * *

There are a number of contexts in which there are systematic deviations from the basic pattern. Substantial enhancements of (18) will be required.

1. There are stressed monomoraic words.
2. Certain suffixes (called AP suffixes) shift the stress one beat to the left.
3. Stress shifts to the left in roots under some conditions.
4. There are clitics. They behave almost like AP suffixes, but not entirely.

We proceed by considering the phenomena in turn.

Section 4. Monomoraic morphemes

I assume that iterative rules never create degenerate feet, those consisting of a single monomoraic syllable. This was crucial in Frampton (2023) in proving that in sequences of light syllables, only binary and ternary footing is possible. Consequentially, a marking rule must be responsible for (20).

(20) a. *ú* ‘kind of fish trap’ 52

b. *gá* ‘medicinal plant’ 52

E will be used to denote a beat projected from a monomoraic morpheme. The footing system (21) accounts for all of the examples in (17) and (20).

(21) $\mathsf{E} \rightarrow \mathsf{E}\rangle\ /\ \_\_\#$ (GF_E)

$\left[\mathsf{X} \rightarrow \langle\mathsf{X}\right]$; *Deg (GB)

Some examples are given in (22).

(22) a. *ú* b. *gá*

L⟫ L⟫

GF_E GF_E

The marking rule is not simply a way to account for stressed monomoraic words. Later, we will see that GF_E has an important effect on the stress pattern of some words with final monomoraic suffixes. It will, for example, account for why *ro.á-gu* ‘my wife’ and *mó.a.si* ‘song’ have different stress patterns. See p. 12 for the account.

Section 5. AP suffixes

There is a class of suffixes which shift stress to the left. They are called AP-suffixes, since they usually result in antepenultimate stress. I will always underline AP suffixes to spare the reader from having to consult the list of AP suffixes, which is given below in a footnote.[3] AP suffixes have either a monomoraic exponent or a null exponent.

(23)

				suffix gloss
a.	*tína-ma*	‘our mother’	55	1st exclusive adnominal
b.	*ròa-dí-a-ru*	‘the two husbands’	269	dual
c.	*tàmoáta-di*	‘people’	279	3pl. ad.
d.	*i-zàmpósaʔ-i*	‘he broke it’	382	3sg. obj.
e.	*aúta-lo*	‘(towards) inland’	573	‘general’ suffix
f.	*tamóata-∅*	‘person’	472	3sg. ad.
g.	*dá-ʔaŋ-∅*	‘they will eat it’	95	3sg. obj.
h.	*róa-∅*	‘his wife’	102	3sg. ad.

The most plausible footing which yields the stress pattern in (23) is (24).

(24)
a. *⟨ti.na⟩ma*
b. *⟨ro.a⟨di.a⟩ru*
c. *⟨ta.mo⟨a.ta⟩di*
d. *i⟨zam⟨po.sa⟩ʔi*
e. *a⟨u.ta⟩lo*
f. *ta⟨mo.a⟩ta*
g. *da⟩ʔaŋ*
h. *ro⟩a*

Both the linguist and the language learner can easily formulate an appropriate rule, (25) below.

(25) X → ⟩X / __# if an AP suffix is inserted in the context __# (GF_{AP})

Note that if the AP suffix is null, the X in (25) is the the beat associated with the final syllable of the stem. There is no beat associated with the suffix.

It is less clear how this rule should be integrated into the system of footing rules (21) which has been developed to this point. The rules in (21) are sensitive only to the phonological shape of the vocabulary entries involved. No reference is made to any particular vocabulary entries. The simplest assumption is that (25) is not part of the phonology at all but is a word formation rule with phonological effects.

3. Lichtenberk (p. 54) gives the list: -a ‘1sg object’, -∅/-*i* ‘3sg object’, -∅ ‘3sg adnominal’, -di ‘3pl object (Class III or higher animal)’, -di ‘3pl adnominal’, -ma ‘1st exclusive adnominal’, -lo ‘general’ suffix, -o ‘on’, -ru ‘dual’, -to ‘paucal’, -re ‘assertive’, -la ‘limiter’, -ra ‘assumption’, -ra ‘thematizer’, -ra ‘quotative’, -ra ‘distal’.

I assume words are constructed from the inside out. Morphemes are progressively realized, each realization extending the stem to which the realization of the next morpheme is attached. In this word building process, when an AP suffix is realized, the rule (25) is applied to the phonological suffixation of the exponent of the lexical item which realizes the morpheme. That lexical item can also trigger a readjustment rule, (25) in this case. I assume that readjustment rules have the same general form as phonological rules. Crucially, I assume that if a readjustment rule is a delimiter insertion rule, it deactivates its target.

The FBC explains why neither GF_E nor GB can apply to the unfooted syllable which GF_{AP} leaves in the context ⟩ __ #. A DIR has already applied to it. All of the examples in (23) are accounted for. Derivation summaries of (23c), (23f), and (23g) are given below.

(26)	a.	*to.mo.a.ta* + *di* → *to.mo.a.ta⟫di* → *⟨to.mo⟨a.ta⟫di* → *⟨tò.mo⟨á.ta⟫di*
		GF_{AP} ; GB GB GF_{AP} ; GB GB GF_{AP}
	b.	*to.mo.a.ta* + ∅ → *to.mo.a⟫ta* → *to⟨mó.a⟫ta*
		GF_{AP} ; GB GF_{AP}
	c.	*da.ʔaŋ* + ∅ → *dá⟫ʔaŋ*
		GF_{AP}

GF_{AP} in (25) is not subject to *Uny, so (26c) is allowed.

Section 6. Stress shift[4]

AP-suffixes disrupt the basic stress pattern in Manam words, leading to a skipped beat at the right word edge. There are other configurations in which a beat is skipped over. We examine two of them here.

4. I use 'stress shift' to mean only that the stressed syllable appears in an unexpected position, shifted from the expected position. There is no 'stress entity' which moves.

6.1 VV shift

In some contexts, V́V appears when VV́ is predicted by the analysis to this point. We start with some examples.

(27)	a. *mó.a.si*	**mo.á.si*	‘song’	24
	b. *ta.mó.a.ta*	**tà.mo.á.ta*	‘man’	294
	c. *á.u.ta*	**a.ú.ta*	‘inland’	572
	d. *rò.a-∅-na-tí.na*	**ro.à-∅-na-tí.na*	‘her real husband’	82
	e. *gó.a.i*	*go.á.i*	‘star’	51
	f. *gò.a.i-tí.na*	**go.à.i-tí.na*	‘real star’	63

V will denote a beat projected from a bare V syllable. Since Manam does not have long vowels or diphthongs, V beats are common. There are 4 different beat properties considered to this point: L, H, E, and now V. In some contexts, ĹV appears when LV́ is predicted by the analysis to this point, or L̀V appears when LV̀ is predicted.

It must be that under some conditions, (28a) applies instead of the expected (28b).

(28) a. $\mathsf{X}\,\underset{\blacktriangle}{\mathsf{V}}\,\mathsf{X} \rightarrow \underset{\blacktriangle}{\mathsf{X}}\,\mathsf{V}\,\rangle\,\mathsf{X}$

b. $\mathsf{X}\,\underset{\blacktriangle}{\mathsf{V}}\,\mathsf{X} \rightarrow \underset{\blacktriangle}{\mathsf{X}}\,\langle\,\mathsf{V}\,\mathsf{X}$

The rule (29), ordered before GB, follows Lichtenberk.[5]

(29) GF_{VV} : V → V ⟩ / L__X ; *Uny if LV is morpheme internal

In the derivations summarized below, from (27a.b,f) above, GF_{VV} bleeds GB.[6]

(30) a. *mo.a.ti* → $\underset{\text{GB}}{\langle}$*mó . a*$\underset{GF_{VV}}{\rangle}$*ti* *mo$\underset{\text{GB}}{\langle}$*á.ti*

b. *ta.mo.a.ta* → *ta*$\underset{\text{GB}}{\langle}$*mó . a*$\underset{GF_{VV}}{\rangle}$*ta* *$\underset{\text{GB}}{\langle}$*tà.mo*$\underset{\text{GB}}{\langle}$*á.ta*

c. *go.a.i-ti.na* → $\underset{\text{GB}}{\langle}$*gò . a*$\underset{GF_{VV}}{\rangle}$*i*$\underset{\text{GB}}{\langle}$*tí.na* *go$\underset{\text{GB}}{\langle}$*à.i*$\underset{\text{GB}}{\langle}$*tí.na*

(30c) also shows why the structural condition for GF_{VV} application requires a syllable immediately to the right of the focus. Otherwise, we would predict

(31) *go.a.i-ti.na* → *go$\underset{\text{GB}}{\langle}$*a . i*$\underset{GF_{VV}}{\rangle}$$\underset{\text{GB}}{\langle}$*tí.na*

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5. See Rules 18 and 26 on p. 78.
6. R_1 *bleeds* R_2 means that R_1 applies before R_2, destroying the conditions for applying R_2.

(32) Examples which show that there is no VV shift across a morpheme boundary.

a.	*rù.a-ó.ti*	**ru.á-o.ti*	'both'	82
b.	*go.dò.ʔ-i-ó.ti*	**gò.do.ʔ-í-o.ti*	'take them seaward'	51
c.	*è.ta-ù.ta-tí.na-lo*	**e.tà-u.ta-tí.na-lo*	'far away inland'	64

Derivation summaries are given below. GF_{VV} cannot apply because the LV morpheme internal condition is not satisfied.

(33) a. *ru.a-o.ti* → *⟨ru.a⟨o.ti* (GB GB) *ru⟨a - o⟩ti* (GB GF_{VV})

b. *go.do.ʔ-i-o.ti* → *go⟨dò.ʔ-i⟨ó.ti* (GB GB) *⟨*go.do⟨ʔi - o⟩ti* (GB GB GF_{VV})

c. *e.ta-u.ta-ti.na-lo* → *⟨è.ta⟨ù.ta⟨tí.na⟫lo* (GB GB GB GF_{AP}) **e⟨ta - u⟩ta⟨ti.na⟫lo* (GB GF_{VV} GB GF_{AP})

(34) The amended iterative rule

$$\left[\begin{array}{l} \mathsf{V} \rightarrow \mathsf{V}\,\rangle \;/\; \mathsf{L}\_\_ \text{ if LV is morpheme internal} \\ \mathsf{X} \rightarrow \langle\,\mathsf{X} \end{array}\right]_{RL} ;\ {}^{*}\text{DEG} \qquad \begin{array}{l}(GF_{VV})\\(GB)\end{array}$$

Aside from the LV internal structural condition, there are contexts in which VV-shift is blocked by the derivational constraint *UNY.

(35) a.	*ro.á-gu*	**ró.a-gu*	'my wife'	357
b.	*ta.mo.á.ta-di*	**ta.mó.a.ta-di*	'people'	279

Derivation summaries are given below.

(36) a. **ro.a-gu* → *ro⟨á-gu⟫* (GB GF_E) *⟨*ro . a⟩ gu⟫* (GB GF_{VV} GF_E)

b. **ta.mo.a.ta-di* → *⟨tà.mo⟨á.ta⟫di* (GB GB GF_{AP}) **ta⟨mo . a⟩ta⟫di* (GB GF_{VV} GF_{AP})

6.2 HL-shift

In some contexts, L is unstressed in HLX when the analysis to this point predicts that it would be stressed. We start with the most straightforward case; if HLL is internal to the root and at the right edge, main stress is antepenultimate, not the expected penultimate.

(37) a. *ém.be.ʔi* **èm.bé.ʔi* ‘sacred flute’ 52

b. *úŋ.gu.ma* **ùŋ.gú.ma* ‘person from a village other than one’s own’ 52

c. *si.líŋ.gi.si* **si.lìŋ.gí.si* ‘T-shirt’ 454

d. *ʔa.ún.so.lo* **ʔa.ùn.só.lo* ‘elected village leader’ 620

e. *èm.be.ʔi-tí.na* **èm.bè.ʔi-tí.na* ‘real sacred flute’ 52

It must be that L → L⟩ applies instead of GB under some conditions. Following Lichtenberk, what is needed is the rule $\mathrm{GF}_{\mathrm{HL}}$, defined in (38).[7]

(38) $\mathrm{GF}_{\mathrm{HL}}$: L → L⟩ / H__X, if HLX is morpheme internal.

$\mathrm{GF}_{\mathrm{HL}}$ must be ordered before GB. Consequently, X must be light. (39) shows how it applies. (40) will illustrate how it is restricted to apply morpheme internally.

(39) a. *em.be.ʔi* → *⟨ém.be⟩ʔi* (GB $\mathrm{GF}_{\mathrm{HL}}$) **em⟨bé.ʔi* (GB)

b. *si.liŋ.gi.si* → *si⟨líŋ.gi⟩si* (GB $\mathrm{GF}_{\mathrm{HL}}$) **⟨sì.liŋ⟨gí.si* (GB GB)

c. *em.be.ʔi-ti.na* → *⟨èm.be⟩ʔi⟨tí.na* (GB $\mathrm{GF}_{\mathrm{VV}}$ GB) **em⟨bè.ʔi⟨tí.na* (GB GB)

Below are some example to show that HLL must be morpheme internal.

(40) a. *u-ʔan-dó.i* **u.ʔán.do.i* ‘I have eaten some’ 208

b. *sa.go.de-n.-tína* **sa.go.dén.ti.na* ‘you are really well-mannered’ 319

c. *i-zuŋ.ʔà.ʔ-i-ú.ya* **i.zùŋ.ʔà.ʔi.u.ya* ‘he hid them well’ 64

(41) a. *u-ʔan-do.i* → *u-⟨ʔan⟨do.i* (GB GB) **u⟨ʔan-do⟩i* (GB $\mathrm{GF}_{\mathrm{HL}}$)

b. *sa.go.de-n-ti.na* → *⟨sà.go⟨dèn⟨tí.na* (GB GB GB) **⟨sà.go⟨dén-ti⟩na* (GB GB $\mathrm{GF}_{\mathrm{HL}}$)

c. *i-zuŋ.ʔa.ʔ-i-u.ya* → *i-⟨zùŋ⟨ʔà.ʔ-i⟨ú.ya* (GB GB GB) **i⟨zùŋ.ʔa⟨ʔí-u⟩ya* (GB GB $\mathrm{GF}_{\mathrm{VV}}$)

**i-⟨zùŋ.ʔa⟩ʔ-i⟨ú.ya* (GB $\mathrm{GF}_{\mathrm{HL}}$ GB)

In (41a,b), neither of the HLL sequences *ʔan-do.i* or *de-n.ti.na* is morpheme internal, which accounts for the absence of HL shift. (41c) is more complex to analyze since both LV and HL shift fail to occur.

The further amended iterative rule is (42).

7. See Rules 17 and 25 on p. 78.

(42)
$$\left[\begin{array}{l} \mathsf{L} \rightarrow \mathsf{L}\,\rangle \;/\; \mathsf{H}\,\_\_\,\mathsf{X} \text{ if } \mathsf{HLX} \text{ is morpheme internal} \\ \mathsf{V} \rightarrow \mathsf{V}\,\rangle \;/\; \mathsf{L}\,\_\_\,\mathsf{X} \text{ if } \mathsf{LV} \text{ is morpheme internal} \\ \mathsf{X} \rightarrow \langle\,\mathsf{X} \end{array}\right]_{RL} ;\ {}^{*}\text{DEG} \quad \begin{array}{l} (GF_{HL}) \\ (GF_{VV}) \\ (GB) \end{array}$$

Note that (41c) shows that the entire HLX sequence must be tautomorphemic, unlike GF_{VV} which requires only that the LV sequence be tautomorphemic, not the entire LVX sequence. I do not have anything enlightening to say about why this is the case.

6.2.1. The Buckley (1998) analysis of HL shift. B98 accounts for the contrasts in (43) and (44) by assuming that there is a high ranked constraint which forces the right edge of the rightmost foot to align with the right edge of a suffix, except in the case of AP suffixes and clitics which have even more highly ranked constraints enforcing ‘anti-alignment’. This will force a binary foot at the right edge in (43b) and (44b).

(43)	a.	*èm.be.ʔi*	**em.bé.ʔi*	‘sacred flute’	64
	b.	**i-zúŋ.ʔa.ʔ-i*	*i-zuŋ.ʔá.ʔ-i*	‘he hid them’	64
(44)	a.	*mò.a.si*	**mo.á.si*	‘song’	24
	b.	**ró.a-gu*	*ro.á-gu*	‘my wife’	357

The problem for B98 is that the same contrasts as those in (43) and (44) hold for secondary stress away from the right edge.

(45)	a.	*èm.be.ʔi-tí.na*	**em.bé.ʔi-tí.na*	‘real sacred flute’	64
	b.	**i-zúŋ.ʔa.ʔ-i-tí.na*	*i-zuŋ.ʔá.ʔ-i-tí.na*	‘he hid them well’	64
(46)	a.	*i-pò.a.sa.gé.na*	**i-po.à.sa.gé.na*	‘he is tired’	24
	b.	**e.tà-u.ta-tí.na-<u>lo</u>*	*è.ta-ù.ta-tí.na-<u>lo</u>*	‘far away inland’	64

B98 has no account of the contrasts above.

The contrast below poses an even more serious problem for the B98 analysis. Perhaps the foot-suffix alignment constraint can be modified to apply away from the right edge in a way that accounts for the contrasts above. But foot-suffix alignment cannot account for the contrast in (47). HL shift is blocked in (47a), but VV shift is not blocked in (47b). If the right edge of the null object suffix is visible, Buckley expects both HL shift and VV shift to be blocked. If not, Buckley expects neither to be blocked. But HL shift is blocked and VV shift is not,

(47)	a.	*u-ʔin-tó.ba-∅*	1sg-with fingers-pierce-3pl	214
	b.	*i-du.a-pó.a.to-∅*	3sg-with feet-break-3pl	215

The RBG analysis worked out in this note is largely just a translation of Lichtenberk’s ‘old-fashioned’ SPE style analysis into the focused delimiter insertion reworking of the Halle-Idsardi framework. The predictions it makes agree with the predictions that L83 makes. HL shift fails in (47a) because *ʔin-to.ba* is not morpheme internal. But VV shift takes place in (47) because *po.a* is morpheme internal.

There is a related problem with B98's analysis of AP shift in (23g), *dá-ʔaŋ-*<u>∅</u>, with a null AP suffix. For B98, the result *(dá)ʔaŋ* is a consequence of an anti-alignment constraint, which disallows alignment of the rightmost foot with the right edge of an AP suffix. The morpheme boundary of the null suffix must be visible so that anti-alignment can come into play. But the null suffix in (47a) must not produce a visible morpheme boundary, otherwise B98's analysis would force the right edge of the rightmost foot to be aligned with the right edge of the word. It seems that it is necessary to stipulate that the morpheme boundaries of AP-suffixes are visible, even if the suffix has a null exponent, but morpheme boundaries of other null suffixes are not visible.

In the RBG analysis proposed above, null affixes, either AP or not, introduce no morpheme boundaries. What would they bound, after all? What is different about the AP suffixes, null or not, is that they trigger a readjustment rule. GF_{AP} makes no mention of morpheme boundaries.

6.2.2. AP suffixes block stress shift. Neither of the stress shift rules can apply in the context X__X⟩ because XX⟩X⟩ would be produced, with a *Uny violation. In the four examples below, stress shift is blocked for this reason.

(48) HL shift does not apply if the HLL sequence is followed by an AP suffix

a.	*i-zam.pó.sa.ʔ-<u>i</u>*	**i-zám.po.sa.ʔ-<u>i</u>*	'he broke it'	82
b.	*di-mam.bú.a.ʔ-<u>i</u>*	**di-mám.bu.a.ʔ-<u>i</u>*	'they finished it'	B98, 28a

VV shift does not apply if the LVL sequence is followed by an AP suffix

c.	*ŋa.í-a-<u>la</u>*	**ŋá.i-a-<u>la</u>*	'only he'	70
d.	*ta.mo.á.ta-<u>di</u>*	**ta.mó.a.ta-<u>di</u>*	'people'	279

Section 7. Clitics

There is another class of suffixes which behave in many ways like the AP suffixes. There are 4 such suffixes. Lichtenberk identifies them as clitics. He makes various arguments for this. Most convincing for me is that 3 of them can occur as independent words.

I suppose words are structured either as $[\cdots]_{\mathrm{M}}$ or $[[\cdots]_M \cdots]_P$, with a (M)orphological word and a (P)honological word. A single clitic can appear outside the M-word. A deeper analysis would explain how a word can come to be structured $[[\,\alpha\,]_M \beta\,]_P$, but that is really an issue for morphology that would be a big detour from what I am trying to accomplish in this paper.

(49) The full footing system

$\mathsf{X} \rightarrow \rangle\, \mathsf{X}$ / __$]_M$ if a clitic is inserted in the context $]_M$__		(GF_{CL})
$\mathsf{X} \rightarrow \rangle\, \mathsf{X}$ / __$]_M$ if an AP suffix is inserted in the context __$]_M$		(GF_{AP})
$\mathsf{X} \rightarrow \mathsf{X}\,\rangle$ / __$]_M$ if a monomoraic morpheme is inserted in the context __$]_M$		(GF_E)
[$\mathsf{V} \rightarrow \mathsf{V}\,\rangle$ / L__X if LV is morpheme internal		(GF_{VV})
$\mathsf{L} \rightarrow \mathsf{L}\,\rangle$ / H__X if HLX is morpheme internal	; * DEG	(GF_{HL})
$\mathsf{X} \rightarrow \langle\, \mathsf{X}$ $]_{RL}$		(GB)

(50) Words with a clitic, but no AP suffix

a. *a.ma-so.a.ʔi* $]_M$》*be* (GF$_{CL}$) → *a*⟨*mà.so*⟨*á.ʔi* $]_M$》*be* (GB, GB, GF$_{CL}$) ‘you will sit and . . . ’ 82

b. *ru-o.ti* $]_M$》*be* (GF$_{CL}$) → ru⟨*ó*.ti $]_M$》*be* (GB, GF$_{CL}$) ‘both (two-all-focus)’ 484

c. *ʔa.i.ʔo* $]_M$》*ʔa* (GF$_{CL}$) → *ʔa*⟨*í.ʔo* $]_M$》*ʔa* (GB, GF$_{CL}$) ‘you (2sg. focus)’ 271

(51) Words with both an M-final AP suffix and a clitic. (51d), with no clitic, is included for comparison.

a. *baga*》<u>*lo*</u> $]_M$》*ʔa* (GF$_{AP}$, GF$_{CL}$) → ⟨*bà.ga*》<u>*ló*</u> $]_M$》*ʔa* (GB, GF$_{AP}$, GF$_{CL}$) ‘mainland’ 478

b. *i-pi.le*》<u>*la*</u> $]_M$》*be* (GF$_{AP}$, GF$_{CL}$) → *i*⟨*pì.le*》<u>*lá*</u> $]_M$》*be* (GB, GF$_{AP}$, GF$_{CL}$) ‘he kept talking and . . . ’ 98

c. *mo.a.ga.ru⟫ŋa* $]_M$⟫*be* → ⟨*mò.a*⟨*gà.ru*⟫*ŋá* $]_M$⟫*be* ‘his nose and : : : ’ 68

$\overleftarrow{\mathrm{GF}}_{\mathrm{AP}}$ $\overleftarrow{\mathrm{GF}}_{\mathrm{CL}}$ $\overleftarrow{\mathrm{GB}}$ $\overleftarrow{\mathrm{GB}}$ $\overleftarrow{\mathrm{GF}}_{\mathrm{AP}}$ $\overleftarrow{\mathrm{GF}}_{\mathrm{CL}}$

d. *mo.a.ga.ru.ŋa-∅* → *mo.a.ga.ru⟫ŋa* → ⟨*mò.a*⟨*gá.ru*⟫*ŋa* ‘his nose’ 98

$\overleftarrow{\mathrm{GF}}_{\mathrm{AP}}$ $\overleftarrow{\mathrm{GB}}$ $\overleftarrow{\mathrm{GB}}$ $\overleftarrow{\mathrm{GF}}_{\mathrm{AP}}$

Note that the effect of adding a clitic to a stem with a final AP suffix is to preserve all of the foot level stress of the stem, but add stress to the stem final syllable. The account here closely follows Halle and Idsardi’s 1995 account (p. 426–30) of the effect of enclitics on the stress pattern of the stem in Latin. See also Frampton (2024, p. 6).

Section 8. Conclusion

One way that RBG and OT can be compared is their empirical adequacy. If, as B98 argues, an OT analysis of Manam stress is possible but a RBG analysis is not, that would be good evidence against RBG. The main thrust of this paper was to show that the argument fails. In fact, careful attention to the morphological effects which Lichtenberk discovered reveal empirical inadequacies in the B98 analysis.

There has been a long list of phenomena that have been claimed to be out of the reach of RBG but, on further analysis, have proved to be explicable in a RBG framework. The intricacies of Manam stress joins that list. Of course, the phenomena that provoke the claim that they cannot be explained in a RBG framework often lead to refinements and development in that framework. Although there are several other reasons to refine the Halle and Idsardi framework by narrowing the class of possible delimiter insertion rules to focused delimiter insertion rules, the analysis of Manam word prosody in this note provides good evidence for this refinement.

One final note on the difference to between the OT approach to explanatory adequacy and RBG’s approach is perhaps clarifying. In OT, derivations consist of the sequential filtering of the full range of possibilities by preference relations. This virtual identification of the rules which generate the derivation with preference relations, violable well-formedness conditions, is part of OT’s appeal. It is taken to be a strong argument against RBG that “the separation between rules and the well-formedness principles they enforce — is a characteristic difficulty of rule-based approaches,” McCarthy and Cohn (1998). But an argument cannot be built on the supposition that what rules do is enforce well-formedness conditions. That is the issue, not the starting point of an argument. From the standpoint of RBG, a ranked list of preference relations is a description of the regularities in the output of a rule system; the failure of OT is a separation between the rules which generate the outputs which OT describes and the well-formedness conditions used to describe the outputs.

Cohn and McCarthy assume without discussion that there should not be a separation between rules and preferences. This is an extraordinary claim. There is a separation between the phenomena of visual perception and the mental computations which are carried out in order to produce those perceptions. Is that a surprise? There is a separation between the chemical computations done by the liver and their effects on liver function. Again, no surprise.

RBG is not troubled by the separation of the rules and the description of the data. In fact, it insists on the separation between any systems of conditions on surface forms which might describe the data and the rule systems which produce the data. One is a description of the data, the other a theory of the system which generates that data.

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