Metathesis Effects in Tutukeian-Letinese

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1. Introduction

In this article we will present an analysis of two sets of data in Tutukeian-Letinese, *Leti* for short, which both appear to involve **metathesis**, i.e., a switch in the linear order of a vowel and consonant. The classification of our data into two sets already reflects one aspect of our analysis: we will come to the conclusion that there are two different situations which lead to metathesis alternations.

We will demonstrate that the data representing metathesis A (MA) can be adequately analyzed by making use of lexical representations in which vowels and consonants are not linearly ordered with respect to each other (cf. McCarthy 1989). This proposal will be combined with the idea that the prosodic template of Leti words is composed of a sequence of CV syllables, despite the surface appearance of initial and medial consonant clusters and long vowels. The words undergoing metathesis A are based on a **trisyllabic** template in which one vowel position remains empty. The metathesis effect results from the fact either the final or the penultimate V position is allowed to be empty depending on the position of the word in the phrase. In this analysis, then, there is no metathesis in the sense of a transformational rule, but simply two ways of linking the segments to the syllabic template.

Type B metathesis (MB) will be shown to depend on "vowel melody disassociation" in weak metrical position. We will propose that the vowel melody which is set afloat docks on the immediately following onset position, creating consonants with a secondary articulation. Here we crucially argue that a floating vowel which approaches a consonant "from the left" can show up as a secondary articulation (i.e. to the right) of the consonant as a matter of phonetic interpretation.

We start with presenting an analysis of syllable structure in Leti which will provide the basis for the analysis of the metathesis cases. In the syllable analysis we make use of some of the key principles which have been

developed within Government Phonology (Kaye, Lowenstamm & Vergnaud 1990; Charette 1988, 1990a, 1990b; Harris 1990; Harris & Kaye 1990; Kaye 1990, 1992; Yoshida 1990a, 1990b). One of the main points will be to show that the use of empty nuclei (or empty syllable heads), the distribution of which is controlled by licensing principles such as proper government (to be explained below) leads to an explanatory analysis of certain aspects of the metathesis A and B data.

The data which we analyze in this paper come from a grammar of the language which one of the authors is currently writing. Leti is spoken on the island Leti which is situated off the easternmost tip of Timor. There are about 600 Leti speakers, the majority of whom are around sixty to seventy years old.

The number of speakers rapidly decreases due to their age and the strong impact of (Indonesian) Malay and the nearby Tomra dialect on the younger inhabitants of Tutukei. Together with the varieties of Nuwewang (approx. 600 speakers), Tomra (approx. 2,000 speakers), Serwaru (approx. 1,000 speakers), Batumiau (approx. 600 speakers) and Tutuwaru (approx. 300 speakers) Tutukeian-Letinese forms the so-called Letinese Dialect in the Luangic Dialect Chain which extends from Leti up to Wetan Island 110 miles further east (van Engelenhoven 1987a).

2. Previous studies

Many Austronesian languages show an apparent inversion of vowels and consonants. The phenomenon was observed for the first time around 1900 by J. Jonker in the Helong and Dawanese dialects spoken on the islands of Semau and Timor and in the dialects spoken on Leti. His Leti data were posthumously published by Voorhoeve (1932). Drabbe (1926, 1932) attested a similar phenomenon in the Yamdena and Selaru languages which are spoken in the Tanimbar archipelago to the east of Leti. Churchward's (1940) description of the Rotuman language which is spoken on Rotuma island and the main islands of the oceanic republic of Fiji attracted the attention in wider circles to a similar phenomenon. Metathesis in this language refers to the inverse order in which vowels and consonants appear in 'completive' and 'incompletive' forms (e.g. *leka* 'go (completive)' versus *leak* 'go (incompletive)'); cf. Saito (1981), Besnier (1987), McCarthy (1989). Although Letinese metathesis was discussed by Mills & Grima (1980) from a diachronic point of view, based on Jonker's data mentioned above, metathesis in the eastern Indonesia area did not receive much attention until Laycock (1982) discussed the historical development of metathesis in the Ririo language (western Solomons); he also mentions a similar phenomenon

in Dawanese. During the last three years much more information on the Indonesian type of metathesis has become available from Selarunese (Coward 1990), Wetanese (de Josselin de Jong 1987), Dawanese (Steinhauer 1991, 1992), Yamdena (Mettler 1990) and Leti (van Engelenhoven 1987b, 1988, 1991, forthc.).

In this article we present our first explorations in the theoretical consequences of metathesis effects in Leti. It is quite clear that an analysis of these effects is dependent on a proper understanding of many aspects of the phonology of Leti, including syllable structure, stress, phonological phrasing, as well as grammatical factors like definiteness. We do not claim, at this point, to have a full understanding of the subtleties in all of these areas and focus here on the phonological and, more specifically, the syllabic aspects of the metathesis cases.

3. Phonology

We start with providing some basic facts about the phonological structure of Leti, taking, at this point, a fairly descriptive perspective. For a much more detailed description we refer to van Engelenhoven (forthc.).

3.1. Segmental inventory

The phoneme inventory (excluding a few loan phonemes) of Leti is displayed in (1):

(1) a. *consonants*

p		β	m		
t	d	s	n	l	r
k					

b. *vowels (all long and short)*

i				u
	e			o
		ɛ	ɔ	
			a	

The high vowels /i/ and /u/ occur as glides /y/ and /w/ if they do not form the syllable peak and precede a non-high vowel (cf. below).

3.2. Syllable structure

At a descriptive level we make a distinction between initial and non-initial syllables ("–" indicates the absence of a consonant):

(2)

initial			*non-initial*		
–	(G)V(ː)	–	–	(G)V(ː)	–
C		C	C		C
CC					

We will now investigate various aspects of Leti syllable structure in somewhat more detail and argue that Leti only has CV syllables.

3.2.1. Initial 2-C clusters

In (3), we list all attested #CC clusters (excluding a few marginal cases, but this does not affect the point we wish to make):

(3)

c1 \ c2	p	m	β	t	n	s	d	l	r	k
p	x			x	x	x	x	x	x	x
m	x	x	x	x	x	x	x	x	x	x
β					x			x	x	
t	x	x	x	x	x	x		x	x	x
n		x	x	x	x	x	x		x	x
s	x	x			x	x		x	x	x
d							x			
l	x			x				x		x
r	x	x	x	x	x	x	x	x	x	x
k	x	x	x	x	x	x	x	x	x	x

In a number of cases the clusters are nearly always morphologically derived:

(4)

mC	/m/ = 2nd ps sing./plur. morpheme	m-tutu	'you point'
nC	/n/ = 3rd ps sing. morpheme	n-tutu	'he points'
rC	/r/ = 3rd ps plur. morpheme	r-tutu	'they point'

Many of the combinations in (3) look "suspect" in the sense that they do not seem to have properties that onset cluster usually have, such as a rising

sonority slope with a certain minimal sonority distance between the two consonants. In the theory of Government Phonology such recurrent properties of "well-behaved" onsets have been taken to constitute the norm. In technical terms this means that the first consonant in an onset cluster must be able to govern the second, which (to put it roughly) is only possible in cases of obstruent-liquid combinations and not in cases like the following:

(5)

ptuna	'star'	pduklu	'to bubble'
pninu	'to be ignorant'	lpia	'sago palm'
mtaːtu	'afraid'	ppɔkra	'orange'

We refer to Kaye, Lowenstamm & Vergnaud (1985, 1990) for a more detailed discussion of the segmental properties which make certain consonants governors and others governees. If initial CC clusters cannot be complex onsets an analysis is dictated which postulates an empty nucleus in between the two consonants so that, in effect, the first C constitutes the onset of an empty headed syllable, whereas the second consonant is the onset of the syllable with the first filled nucleus. The nucleus of the initial syllable is **empty**, symbolized here by "v":

(6)

ptʊna 'star'

O N O N O N
| | | | | |
x x x x x x
| | | | | |
p v t u n a

If empty nuclei are postulated their distribution must be accounted for. In accordance with principles proposed in **Government Phonology**, we will assume that the occurrence of the empty nucleus is allowed if it is **licensed**. If no licensing takes place the empty nucleus violates the Empty Category Principle (ECP), which requires that unlicensed empty nuclei must be phonetically interpreted, i.e., they cannot remain "inaudible" in these cases. For us this will mean that such empty nuclei are either filled or that the form is marked as ill-formed (we return to this point in section 6). In Leti the option of filling in an empty nucleus is **not** available. Hence forms which contain unlicensed empty nuclei are ungrammatical.

The most usual kind of licensing is through **proper government**. An empty nucleus is properly governed if it is followed by a syllable with a filled nucleus. A more refined definition of proper government has been

proposed but we need not be concerned with that here (cf. Kaye, Lowenstamm & Vergnaud 1990; Charette 1990a,b).

In Government Phonology, other licensing possibilities have been proposed too. For example, some languages allow empty nuclei at the edge of a domain. In our analysis of the metathesis data it is crucial that Leti does not license empty nuclei in this way. This will be shown below.

Another possible analysis would involve postulating an empty nucleus in front of the cluster: **vp.tu.na.** This raises issues concerning the possibility of having proper government across a consonant cluster. We will not consider this option, however, since we will end up showing that Leti has no coda consonants.

It would be possible to maintain a complex onset analysis for obstruent-liquid clusters, since these are well-behaved, but the result of that will be that two analyses are available for such clusters, i.e., one as complex onset and one as two onsets with an intervening empty nucleus. Moreover, we will show below that all CC clusters show a particular kind of uniform behaviour in the conditioning environment of metathesis A and B which can be explained if we assume that they all involve an empty nucleus. This means that we can analyze Leti as a language having only simply onsets.

Historically, #CC... clusters derive from #CVC... by way of a process of pretonic vowel deletion, but we do not take this to be an argument for the synchronic analysis.

There are two supporting arguments for the analysis of #CC... as #CvC...:

I. Continuant + plosive

In the case where the first consonant is a fricative or sonorant, this consonant is phonetically syllabic:

(7)

βnutna	'iron'	mderi	'Mdery'	lkirkirna	'kind of game'
spou	'boat'	mtiɛtɛtna	'sitting'	rpoka	'they shoot'

II. Reduplication

Leti has a reduplication process which we will discuss elsewhere (van Engelenhoven & van der Hulst, in progress). What interests us here is that in these cases the first C is separated from the foot to which the reduplication morphemes (which may have various prosodic shapes available) is prefixed:

(8)

tmuela	→	t-muel mela	'dark'
mtaːtu	→	m-ta tuaːtu	'afraid, jumpy'
kpau	→	k-pa puau	'stick'
ptiali	→	p-tia tali	'easy going'

We are unaware of cases of reduplication in which non-suspect onsets are broken up in this way in other languages.

3.2.2. Medial 2-C clusters

We now turn to CC clusters in medial position. The possibilities are given in (9), where "(x)" indicates that the cluster only occurs heteromorphemically:

(9)

c1 \ c2	p	m	β	t	n	s	d	l	r	k
p				x		x		x	x	x
m				x	x	x		x	x	x
β				x	x	x		x	x	(x)
t	x	x			x			x	x	(x)
n		x	x	x	x					x
s					x			x	x	(x)
d	x	x								x
l	x	x	x			x		x		x
r	x			x	x	x				x
k	x				x	x		x	x	x

If, as we have proposed, there are no complex onsets, these clusters must be heterosyllabic. This does not automatically entail that Leti syllables allow codas, however, especially in view of the fact that the intervocalic CC clusters look suspect as sequences of coda and onset. In Vennemann (1988) it is argued that intervocalic CC clusters are more likely to constitute coda — onset sequences to the extent that the first C is relatively high in sonority and the second relatively low, e.g. **-lk-**. Again, Government Phonology takes this tendency to constitute the norm. This is formalized by assuming that in a coda-onset sequence the onset consonants must govern the coda consonant and that this can only be the case if both consonants have certain segmental properties which make one a good governee and the other a good governor.

This means that in Government Phonology it is proposed that medial CC may be the surface manifestation of either of two underlying representations:

(10) a. C V C v C V

b. C V C C V

We will refer to the government relation in (10b) as **interlude government**.

If C2 can govern C1 (10b) can obtain, otherwise (10a) must be assumed. It is clear that many cases in (9) are not well behaved coda-onset sequences:

(11)	trutnu	'blurr fish'	yadmu	'shed'	kɛkna	'k.o. pot'
	tivla	'k.o. drum'	pisku	'k.o. shell'	kamra	'room'
	kapla	'ship'	pɛnta	'grass'	βarta	'west'

We could assume that those CC clusters which are well-behaved (i.e. last two cases in the bottom row) are coda–onset sequences, whereas the others involve an empty nucleus. We prefer to generalize the empty nucleus representation, however, to avoid ambiguity and to simplify the analysis. Hence we adopt (10a), which means that we have now almost completely eliminated other syllable types than CV.

In the next section we turn to word-final closed syllables.

3.2.3. Closed syllables

Generally there are no word-final closed syllables. There is one systematic exception which is precisely where metathesis A steps in. Internal to the **phonological phrase** bisyllabic words may have a closed syllable: CV.CV$_i$C$_j$ or CVV.V$_i$C$_j$. Phrase finally, however, these same words appear as ...C$_j$V$_i$#, i.e., the "closing consonant" does not precede the vowel.

If the analysis in (10a) is assumed for the final manifestation, we can describe the alternation between CVCVC and CVCCV as follows (the cases with a long vowel will be discussed below):

(12)	a.	C V C v C V	phrase final
	b.	C V C V C v	phrase medial

The analysis of final "closed" syllables as involving a final empty nucleus would be forced by the principle of Coda Licensing (Kaye 1990). This essentially states that a coda consonant **must** be governed by a following onset. Hence word-final codas can never exist. This principle can be identified with **interlude government**, if we say that this kind of government is obligatory for coda consonants.

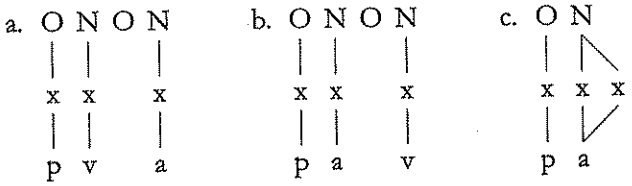
Words involved in the metathesis A alternation will be analyzed in terms of a template which contains an empty nucleus in either final or penultimate position. We propose that Leti does not have a form of domain final licensing which implies that the form in (12b) cannot be domain final. The form in (12b), on the other hand, can occur if there is a following filled

nucleus which can act as a proper governor. This implies that the domain of proper government must be something like the phonological phrase rather than the word. We return to the details of this analysis in section 4.1, but we do not discuss the exact determination of the relevant domain.

3.2.4. VV nuclei

Van Lit (in preparation) argues that surface long vowels may be the result of a sequence of two syllables, as in (13a) or (13b) or a branching nucleus, as in (13c):

(13)



Yoshida (1990) proposes the structure in (13b) for Japanese. If such an analysis can be adopted for Leti, we can remove branching nuclei from the syllabic inventory. We will show that (13b) is appropriate for Leti, but also that the empty nucleus in that case is licensed by **spreading** (henceforth indicated by ">>>"), i.e., we will show that the empty nucleus does not need government by a subsequent filled nucleus. Licensing through spreading can only take place if there is no intervening filled onset. (In fact, we will propose below that case (13a) is excluded because proper government cannot take place across an empty nucleus.)

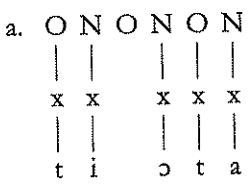
3.2.5. GV nuclei

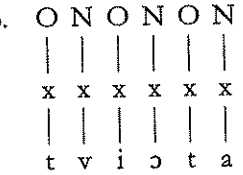
Consider the following examples:

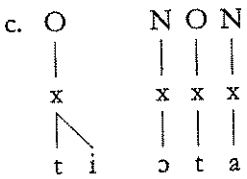
(14)

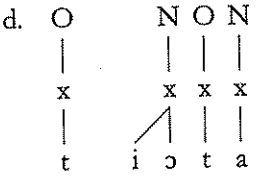
	tyɔta	'sticky rice'	pwɔrsa	'door'
	kyɛrà	'canary nut tree'	swɛıla	'love'
	kṣyɔa	'salt'	pwɔna	'nest'

Here we find apparent tautosyllabic glide vowel clusters (GV). If Leti syllable structure is strictly CV, we must analyse glides as separate nuclei or onsets or as part of a complex onset or nucleus segment:

(15) a. 

b. 

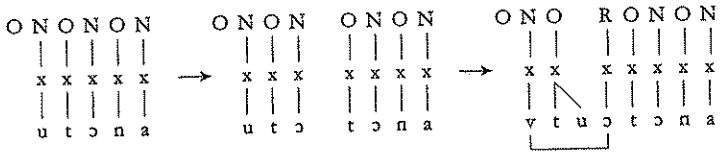
c. 

d. 

We will argue that (15c) is correct although this structure is "derived" from a representation in which the glide is actually a separate nucleus which precedes the consonant on which it ends up as a secondary articulation. This reason for this comes from reduplication facts:

(16) tuɔna 'to question' tuɔ-tɔna 'the questioned'

Here the glide shows up in the reduplication prefix and not in the base. This shows that the glide is not part of the first syllable of the base to begin with, but forms a separate syllable:

(17) 

In (17) the /u/ is set afloat and docks on the same segmental position that is occupied by the /t/. We assume that a complex segment like this is universally interpreted as a consonant with a secondary articulation. We therefore have represented the glide **after** the consonant. Confirmation for this analysis is found in cases where palatalised consonants result in contexts where the are **preceded** by a front vowel. This happens, for example, in Carib (cf. Hoff 1968). Note that the empty nucleus that is left behind is properly governed.

The phenomenon in (17) is in fact an instance of metathesis B, which we discuss more completely in section 4.2.

However, in cases like **tyɔta** where there is no alternation other representations are theoretically possible, such as (18a) and (18b):

(18) a. tv.yɔ.ta
b. ti.ɔ.ta.
c. i.tɔ.ta

We cannot exclude that glides are in fact onset consonants in view of the fact that there are glide initial words which behave just like words starting with a true consonant (**yatni** 'bad', **wanna** 'Banda'). Empty onsets are also allowed. Thus both representations are well-formed.

To represent such cases with an underlying complex consonant and no empty nucleus would be inadequate, however. In the analysis of metathesis we provide synchronic evidence for the presence of the initial empty nucleus in words like **tyɔta.**

The type of representation in (18c) is analogous to the one in (17), where the analogues of (18a) and (18b) are not possible. We will assume that (18c) is to be preferred because it is independently motivated.

3.3. Stress

Stress falls on the penultimate syllable. In a phonological phrase all stresses except the last one are reduced or removed under clash. We will now show that the stress system involves trochees assigned to pairs of light syllables (CVCV).

A trochaic analysis predicts that words consisting of a single CV syllables do not exist in Leti. This prediction is borne out. /CV/ morphemes are always clitics.

/CVː/ is tolerated because the bimoraic requirement is met. In our analysis, however, /CVː/ constitutes a bisyllabic sequence and not a monosyllabic foot (cf. section 3.2.4).

Apparent monosyllabic feet can also turn up in the surface in cases in which metathesis B takes place:

(19)

(x ·)	(x ·)		(x ·)	(x ·)
nβa li	tani	⟶	nβa lv	tya ni
'they turn'	'soil'			

In these cases too the foot over **nβal** is really bisyllabic as shown in (19). The stress rule is formulated in (20).

How do empty syllables behave under footing? In (19) we suggest that empty nuclei can be the dependent syllable in a foot. This is consistent with cases in which empty nuclei appear in penultimate position if we assume that the final syllable can be left unparsed:

(20) *Leti stress*

(x ·)

a. N N

b. from right to left

(21)

```
      ·    (x   ·)   ·
O N O N O N O N
| | | | | | | |
x x x x x x x x
| | | | | | | |
l a l a β v n a
```

4. Metathesis effects

4.1. Metathesis A

Consider the following data which involve metathesis A. This kind of metathesis is referred to as **internal metathesis**:

(22) *Metathesis A*

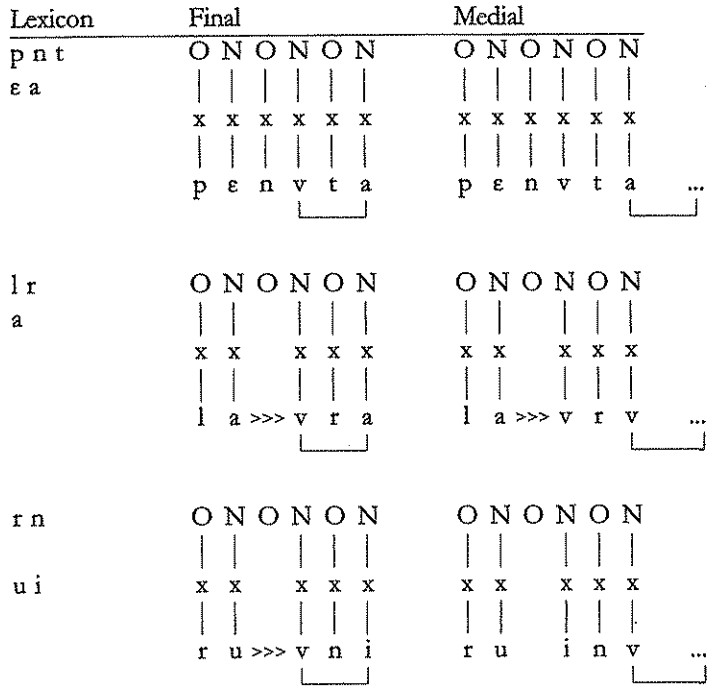
	Final	Medial	
i.	penta	penat	'grass'
	kuksi	kukis	'sandwich'
	βarnu	βarun	'(kind of) pigeon'
ii.	βuːra	βuar	'mountain'
	ruːni	ruin	'dugong'
	loːtu	lout	'servant'
	laːra	laːr	'Anona squamosa'
	nuːnu	nuːn	'banyan'

We propose an analysis which is based on the idea that Leti has only CV-syllables. We suggest that the template for stems that are involved in this type of alternation is fixed: /ONONON/ and that the alternation is the result of the fact that empty nuclei are not tolerated (or licensed) phrase finally.

In (23) we give the lexical and surface representation of the words that are involved in the metathesis A alternation.

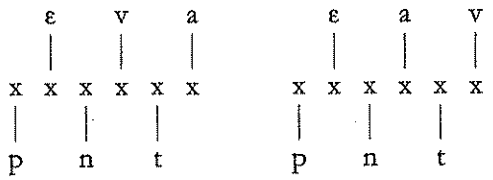
We thus claim that the alternation is caused by the fact that the number of vowel elements is smaller than the number of vowel positions in the template.

(23)



It is important to spell out how the surface representation is derived from the lexical representations with unordered vowel and consonant sets. The way melodies are associated to skeletal positions is, in our view, **not** autosegmental spreading and we do not assume that there is an intermediate level of representation which shows plane segregation (ON plane suppressed):

(24)



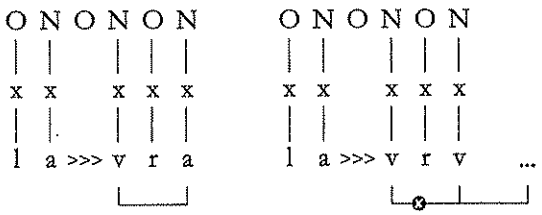
That is, we do not consider (24) to be a meaningful or necessary representation.

Rather, the mapping procedure is a form of **insertion**. We assume furthermore that **template satisfaction** is **minimal**. This implies that each melodic element is used just once, but also that if the template cannot be satisfied minimally a melodic element can be used twice. This is the case in the second form **lara**. Multiple use of a melodic element is **not** invoked, then, if the template can be satisfied without it. If we did not impose this

minimal satisfaction principle all positions in the trisyllabic templates would simply be filled.

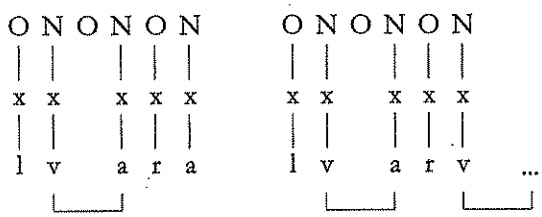
Returning to the issue of long vowels, we note that the representation of a form like **laɪr** seems to involve an ECP violation:

(25)



We propose that the medial form is "saved" due to the fact that the left-hand empty nucleus is licensed by spreading (indicated by ">>>"). The question could be raised why we make no use of representing long vowels as "right-headed":

(26)



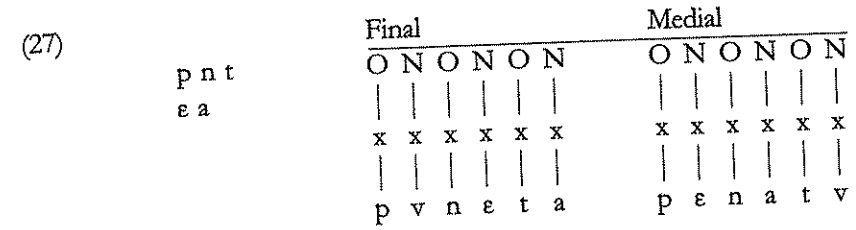
We will show, however, that forms like **laɪr** do not behave like words whose first nucleus is empty. Hence (25) **must** be adopted and therefore we also must assume that an empty nucleus can be licensed by **spreading** in case no filled onset intervenes. Note that in the left-hand form in (25) we then find two reasons why the empty nucleus is licensed (through spreading and through proper government). We assume that this "over"licensing is harmless.

In all cases the rightmost vowel is inserted in the rightmost position for the final form. This is forced by the fact that final empty nuclei are not licensed. All further insertion follows the unmarked left-to-right directionality. This excludes (27) as a possible alternating pair.

A form like **pnɛta** is a possible Leti word (cf. the forms in (5) above), but not, apparently, as an alternating form. We explain this by the LR-directionality of template satisfaction. For forms like **ptuna** (cf. (6) above) we must assume that all segments to be lexically associated.

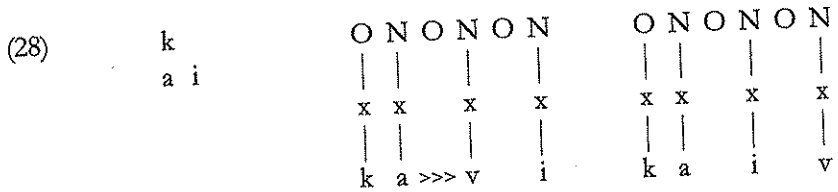
Lexical items with a [CVCV] structure (examples **ɾɔna** '(kind of) pot', **lopu** 'dolphin', **βeli** 'price') do **not** have this kind of allomorphy, because the difference between such forms and those in (22) is that the template of these forms is bisyllabic rather than trisyllabic.

(27)



Among the forms in (22) there is a gap which we would like to call systematic, i.e., there is also no alternation like: **kai** vs. **kai**, which would be formally represented as in (28):

(28)



The problem, we suggest, lies in the succession of empty onsets. We tentatively suggest that there empty onsets must be properly governed by filled onsets. If this is so forms like (28) can never be well-formed. Below in (31) we show that the assumption of onset government might help explaining another otherwise puzzling fact.

The problematic side of this suggestion lies in the fact that onsets are not adjacent. Nuclei are adjacent as syllable heads, but onsets cannot make appeal to similar structural level. We leave this point for further research.

We will now turn to a discussion of a number of cases in which we find the "final" allomorph in phrase medial position. We will show that the unexpected occurrence of the "final" form is caused by the fact that the medial form would in these positions create an ECP violation.

If the alternating word is followed by a word starting with a consonant cluster the final form occurs instead of the medial form.[1]

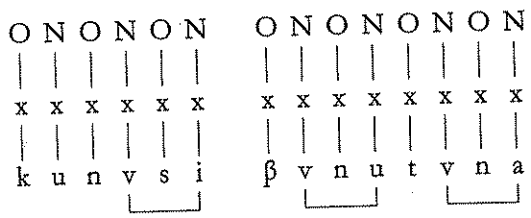
As can be seen in (29bii) the ill-formed **kunis βnutna** would involve an ECP violation: the final empty nucleus of the form **kunisv** is not properly governed if the following words starts with an empty nucleus, which is the case if the following word starts with a CC cluster (cf. (6)).

We have argued that a #CGV.. word also commences with an empty nucleus (cf. (18)). We therefore predict that such words are preceded by the "final" form.

[1] It must be explained why **kunsi βnutna** does not undergo metathesis B; we return to this point below.

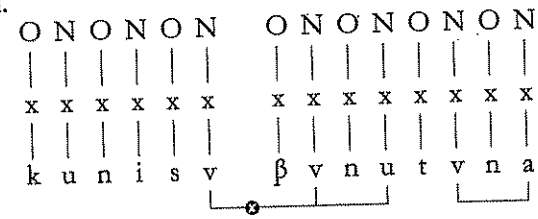
(29) a. ...kunsi βnutna... and not ...kunis βnutna... 'key iron'

b.i.



kunsi βnutna

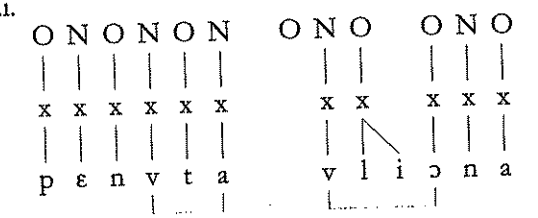
ii.



*kunis βnutna

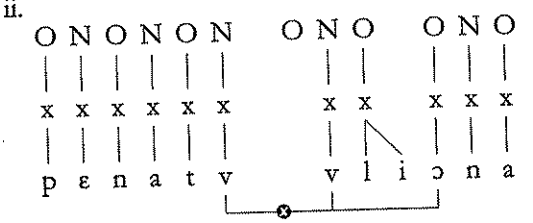
(30) a. ...pɛnta lyɔna... and not ...pɛnat lyɔna... 'luangese grass'

b.i.



pɛnta lyɔna

ii.



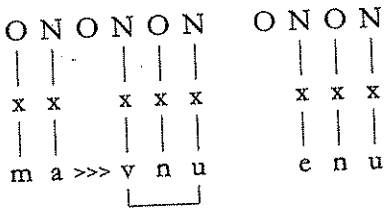
*pɛnat lyɔna

Again we see that the ill-formed sequence involves an ECP violation.

Let us now investigate the cases in which a following word starts with a vowel. Since no ECP violation arises in such cases we might expect to find the appropriate medial form (ending in an empty nucleus), as Jim Scobbie points out to us (pers. comm.). In actual fact, however, we find the final form:

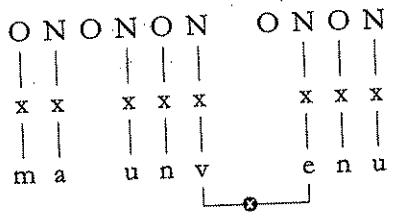
(31) a. ...maɪnu enu... and not ...maun enu ... 'bird tutle' (k.o. finch)

b.i.



maɪnw enu

ii.



*maun enu

The form in (31bii) does not involve an ECP violation. So what blocks it? We suggest that proper government does not take place across an empty onset, perhaps because this onset is involved in a government relation with the preceding onset. We tentatively propose that government relations cannot be in a "tangling" relation.

We may now also provide motivation for the representation of long vowels. Before a word like **laɪra/laɪr**, we will find **penat** and not **penta**. This shows that the first nucleus of **laɪra/laɪr** cannot be empty.

4.2. Metathesis B

We now turn to metathesis B or external metathesis, which is more like a liaison phenomenon. The following data illustrate the phenomenon:

(32) Metathesis B

koni 'grasshopper'	+ de	'once' →	kondie	kondye
pipi 'goat'	+ do	'then' →	pipdio	pipdyo
asu 'dog'	+ de	'once' →	asdue	asdwe
lopu 'dolphin'	+ do	'then' →	lopduo	lopdwo
lopu 'dolphin'	+ lalaβna	'big' →	loplwalaβna	
kai 'wages'	+ de	'once' →	kadie	kadye
rou 'motive'	+ de	'once' →	rodue	rodwe

The metathesized vowels must be high (/u/ or /i/). /u/ and /i/ are lost if the following vowel is high (again /u/ or /i/) so that in that case there is no metathesis effect (cf 33a). The vowel /a/ completely disappears, i.e., it does not leave a trace in the neighboring syllable (33b). If the following word starts with a vowel, the high vowel shows up and we might say that metathesis has taken place "vacuously" (33c):

(33)

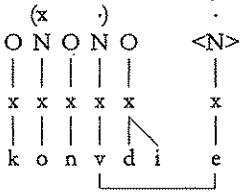
a.	koni	'grasshopper'	+	di	'now'	→	kondi	
	asu	'dog'	+	di		→	asdi	
	tβaːlu	'we (inc) throw it'	+	ti	'to'	→	tβaːlti	
b.	rɔna	'pot'	+	de	'once'	→	rɔnde	
c.	maːnu	'bird'	+	enu	'turtle'	→	maːnwenu	

(cf. 31)

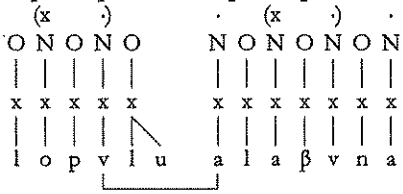
We will now show that this metathesis effect is the result of delinking a vowel melody from its V-position if this is metrically weak. In all preceding examples this concerns a **post-tonic** environment. In the analysis of CG clusters and reduplication, we have assumed that MB takes place not only post-tonically but also pretonically (in 17). We focus here further on the post-tonic cases.

In the following two examples we assign foot structure, as discussed in section 3.3. We suggest that clitics, like **di** in (34a), are extrametrical.

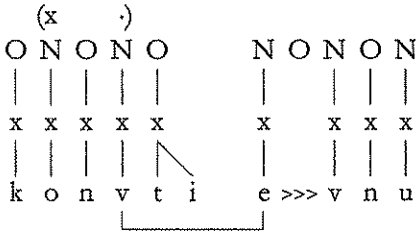
(34) a. konide → kondye



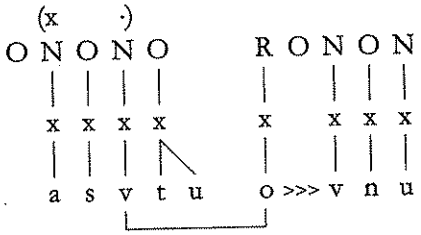
b. lopulalaβna → loplwalaβna



c. koni Teːnu → kon Tyeːnu 'Teunese grasshopper'



d. asu to:nu ⟶ as two:nu 'dog pool'



MB involves the detachment of a vowel from a weak metrical position and the subsequent docking of the vowel to a following consonant. The result is interpreted as a consonant with a secondary articulation. We also assume that the floating vowel leaves an empty nucleus behind.

Cases as in (33b) shows that /a/ cannot surface as a secondary articulation in Leti.

The syllable hosting the floating /i/ or /u/ can be extrametrical (as in 34a), pretonic (as in 34b) or itself a strong syllable as in a form like: **rai** 'king' + **leti** 'Leti' > ralyeti; the first syllable of **leti** is in strong metrical position.

As in the preceding section we will now investigate a number of cases in which MB unexpectedly does not apply and we will suggest that in these cases (as in the cases where MA behaved unexpectedly) the avoidance of an ECP violation is the cause for the non-application of metathesis. In the first context we look at cases where the vowel to be set afloat (represented by "H" for high vowel) is followed by an empty headed syllable:

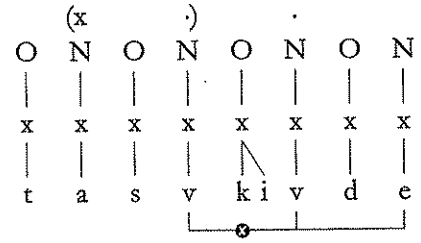
I. $\ldots \begin{Bmatrix} C \\ V \end{Bmatrix}$ H C v # C _ ...

(35)

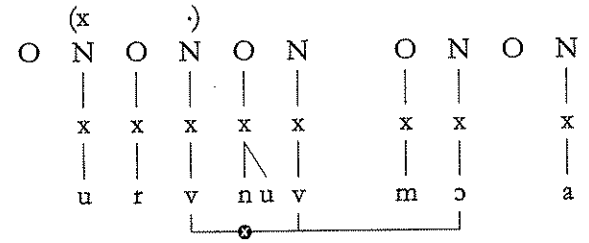
a.	tasik de	⟶ *taskyde	correct tasik de	'the sea (once)'
b.	urun mɔa	⟶ *urnwmɔa	correct urun mɔa	'Moanese breadfruit'
c.	aur mɔa	⟶ *arw mɔa	correct aur mɔa	'Moanese lime'
d.	lout de	⟶ *lotw de	correct lout de	'the servant (once)'
e.	nuːn de	⟶ *nunw de	correct nuːn de	'the banyan (once)'

A possible explanation for why metathesis does not take place is that a triconsonantal cluster is disallowed. This would be a rather unrevealing and descriptive kind of statement. We propose here a more principled answer: metathesis is blocked by the fact that a sequence of two empty nuclei is prohibited:

(36) a.



b.

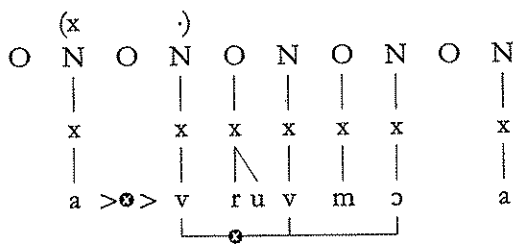


It must be borne in mind that forms like **tasik** and **urun** have a trisyllabic template.

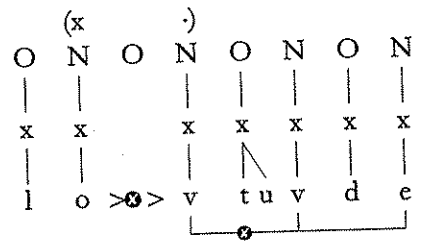
We note that the glides do not "move" on to the empty nuclei to save the representations. There is nothing that would urge them to do so.

The two following cases in (35) require extra comment. One might have the expectation that the representations could be "saved" by moving the vowels of the first syllable to the second, creating long vowels and outputs like **aːmwɔa** and **loːtdwe**. Apparently this does not happen. Elsewhere (in van Engelenhoven & van der Hulst, in progress) we discuss cases of compensatory lengthening in Leti which do involve such spreading: **rou** 'motive' - **roː+ku** 'my motive'. Here the stem-final /u/ is deleted before a CV suffix with concommittant lengthening of the stem /o/. The crucial difference, as we argue there, lies in the fact that the cases where compensatory lengthening occurs apply in the lexicon, while MB is a post-lexical process in our view. We stipulate that compensatory lengthening does not apply post-lexically. Hence licensing through spreading is **lexical** and not **post-lexical**.

(36) c.

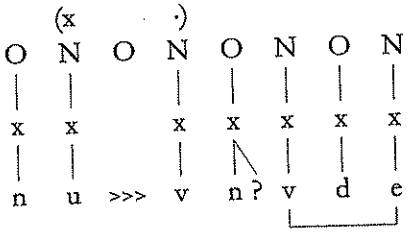


d.



Finally, case (35e) is different because the vowel that ought to move is not in the right position to begin with, i.e., the penultimate position is empty:

(36) e.



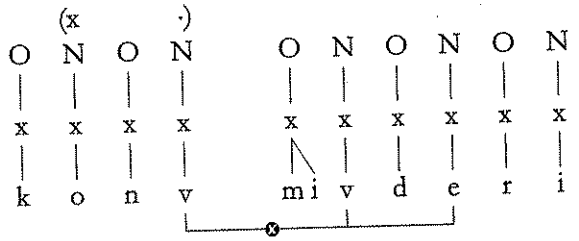
There is a second case where MB does not take place, viz. if the target syllable is preceded by a CC cluster, which in our analysis involves an empty nucleus:

II. ... C H # C v C _ ...

(37) a. koni mderi —⊗→ *kon myderi correct koni mderi
'Mderian grasshopper'

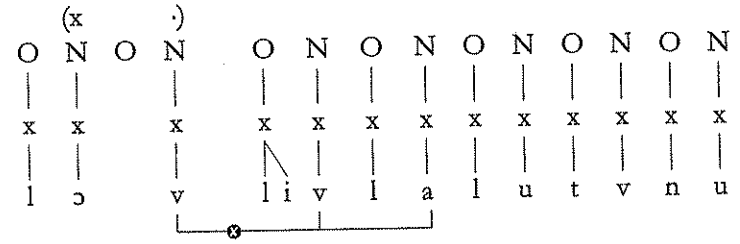
b. bi llatutnu —⊗→ *lo lytalutnu correct bi llatutnu[2]
'Laitutunese proa'

(38) a.



[2] There is a rule raising [ɔ] to [o] which we do not discuss here.

b.



The explanation for the non-applicability of MB is as before: MB would create a violation of the ECP.

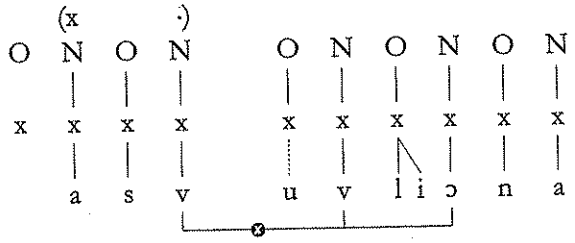
The third context involves words with a CG cluster, which in our analysis starts with an empty headed syllable:

III. ... C H # v C _ ...

As expected no MB takes place:

(39) asu lyɔna ⊗→ *as lywɔna/lwyɔna correct asu lyɔna
'Luangese dog'

(40)



(41) *Summary of environments*

I. ... C H C v # C _ ...
... V H C v # C _ ...
II. ... C H # C v C _ ...
III. ... C H # v C _ ...

In all cases movement of H leaves an empty nucleus behind, thus creating a sequence of two empty nuclei.

We must consider a final context (cf. 31):

(42) maɪnu enu ⟶ maɪnwenu 'bird turtle'

We predict that MB can take place and the data are consistent with this, although we might expect the /u/ turning into a glide anyway when followed by an onsetless syllable.

5. The interpretation of empty nuclei

Even though all cases of non-application of MA and MB have been attributed to a common factor, viz. the illformedness of a sequence of two empty nuclei, it might be argued that the ECP could be satisfied by giving a phonetic interpretation to the first of the two empty nuclei. After all, the ECP does not rule out sequences of empty nuclei, it just says that ungoverned empty nuclei must be phonetically interpreted. We will assume that phonetic interpretation **always** involve the addition of a component, i.e., we assume that unlicensed empty nuclei are not phonetically interpretable as such. The addition of a component to an empty nucleus, then, is one response to the occurrence of an ill-formed sequence of empty nuclei. Another response, the one we find in Leti, is to simply bar the ill-formed sequence. Thus, unlike other languages, Leti does not have a rule of insertion to save unlicensed empty nuclei.

6. Conclusion

We have considered two types of data which might be taken to argue that grammars can contain a formal operation of metathesis: AB $\longrightarrow$ BA. We have shown that in one of the cases metathesis is an artefact of the fact that the relevant words are lexically stored without having their vowels and consonants associated in a fixed way and inserted to a syllabic template. The second case of metathesis simply involves a local movement of a vowel melody.

An important result of our preliminary investigation is that a language which superficially has complex onsets, long vowels and closed syllables appears to be a consistent CV language.

We believe that an interesting line of inquiry may result from the hypothesis that CV is **the** structure of syllables in all languages, a suggestion also made by Jean Lowenstamm in unpublished work. An interesting consequence of such a "radical" CV-theory of the syllable (which is explored in van der Hulst, in preparation) will be that the distinction between the onset–rhyme theory and the mora theory ceases to exist, since all syllables would be monomoraic, so to speak.

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