

Syllable reduction and mora preservation in Kari'ña

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Introduction

Jorge Mosonyi's works (1978, 1982, 1983, 1986) on Kari'ña, a Cariban language spoken by some 10,000 people in Eastern Venezuela, are of obligatory reference when studying this language, mainly in the areas of the lexicon and the verbal morphology, and in a much smaller proportion in the area of the syntax. In connection with the phonology, although in Mosonyi (1982) a capital importance is granted to the presentation of the allomorphy in the verbal system, there is not in this work (neither in the other ones) a systematic description of the phonological processes that originate such allomorphy. In more recent literature (Álvarez 1997, 1998, 1999, Socorro 1998, Socorro & Álvarez 1998), such processes have begun to be examined in more detail. However, they have been presented in an independent manner or, in the best of cases, showing some interaction. The purpose of this paper is to demonstrate that certain phonological processes, seemingly unrelated to each other, can be described unitarily in terms of the notion of mora preservation (Hayes 1989, Broselow 1995, Perlmutter 1995). We try to demonstrate that the notion of mora is crucial to an understanding of foot optimization, opaque gemination, and syllable reduction, all of them prominent phonological processes in Kari'ña, since they involve strategies designed to augment or preserve the original moraic

make-up¹. We shall show how the same moraic processes are at work in foot optimization and syllable reduction. This paper is organised as follows. In Section 1 we present the notion of mora and discuss how the goal of optimal iambic feet is achieved through various strategies involving cases of mora augmentation (vowel lengthening, consonant gemination, and glottal insertion), which are also used in loanword nativisation. In Section 2 we examine cases of opacity and discuss how they involve mora preservation. In Section 3 we review the notion of syllable reduction in Cariban languages and propose to interpret it as yet another case of mora preservation. Finally, the conclusions are presented.

1. Mora augmentation and foot optimization

In linguistic theory the mora has been understood as a unit of phonological weight. This notion allows us, among other things, to model the opposition between heavy syllables (bimoraic) and light syllables (monomoraic), as well as to account for the equivalence among different types of heavy syllables. Although the notion of mora was used in an informal manner, only in the eighties it has been used formally as an explicit level of representation, which also allowed, additionally, the explanation of diverse phenomena which had been receiving an explanation in terms of skeletal units (Broselow 1995:188).

In the case of languages that treat all heavy syllables in a uniform manner, as is the case in Kari'ña, each unit of the syllabic rime (the first vowel and the following segments) contributes one mora to syllabic weight, whereas the onset does not contribute at all to that weight: $V = \mu$, $CV = \mu$, $VV = \mu\mu$, $CVV = \mu\mu$, $VC = \mu\mu$, $CVC = \mu\mu$, $CCVC = \mu\mu$. The fact that a given consonant in the coda contributes one mora to syllabic weight is called *weight by position*. However, there may exist variation in the moraic structure of syllabic rimes, thus in other languages a CVC syllable = μ , while a CVV syllable = $\mu\mu$. In a moraic framework, vowel length is generally represented as the mapping of features to two moras. Geminate

¹ This paper presents partial results of the research project **Descripción de Lenguas Caribes Venezolanas**, funded by the Consejo de Desarrollo Científico, Humanístico y Tecnológico, University of Zulia, Maracaibo, Venezuela. A first version of this paper was presented at the Annual Meeting of the Society for the Study of the Indigenous Languages of the Americas, Chicago, USA., January 7-8, 2000. I wish to express my gratitude to my main language informant, the remarkable Kari'ña teacher Pablo Elías Carreño, from Cachama, Anzoátegui State, Venezuela, for the diligence and dedication with which he has accompanied me in this research work.

consonants, on the other hand, are controversial in terms of representation. The nonuniversal character of *weight by position* is a basic justification that moraic structure cannot be automatically derived from syllable structure. Other arguments in favour of the mora include the asymmetries onset/rime evidenced in templatic morphology, the cases of compensatory lengthening, as well as the cases of vowel shortening in checked syllables.

The principle of moraic consistency states that there must be a connection among the various areas of grammar (stress, templatic morphology, restrictions on minimality, compensatory lengthening, vowel shortening, etc.) so that if a given configuration has a particular weight for an aspect of the grammar, it must have the same weight for all the other aspects of grammar (Broselow 1995:198).

In recent work on Kari'ña (Álvarez 1997, 1998, 1999, Socorro 1998, Socorro & Álvarez 1998), cases have been shown which can be considered obvious instances of moraic *augmentation*. These include the various options used to create optimal iambic feet (vowel lengthening, consonant gemination, and glottal insertion), which can be easily observed in alternations in which an allomorph exhibits a short vowel, while another allomorph exhibits a long vowel. This type of allomorphy is one of those characteristics of Kari'ña that reveal that we are in the presence of metrical phenomena requiring an appropriate framework for their treatment. One such framework is Metrical Stress Theory (MST), developed in a comprehensive version in Hayes (1995). One of the most important characteristics of MST is the fact that it is parametric in the sense that a system of rules is conceived as a particular selection from a limited list of options or parameters. In Hayes (1995) we find what he calls the Iambic/Trochaic Law. A trochaic foot is a disyllabic foot with initial prominence (**x .**), while an iambic foot is a disyllabic foot with final prominence (**. x**). An analysis of the Kari'ña stress pattern using Metrical Stress Theory (Hayes 1995) is presented below. Our analysis has drawn its main inspiration from the one Hayes (1995:205-208) made of Hixkaryana (another Cariban language) using data presented by Derbyshire (1985). For Kari'ña the distribution of short and long vowels is predicted by the operation of the following values for such parameters:

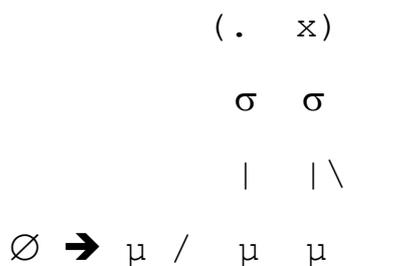
- THERE IS FINAL SYLLABLE EXTRAMETRICALITY: The last syllable does not participate in metrical structure. This will be indicated by enclosing this syllable with angled brackets <σ>.
- THERE IS CONSTRUCTION OF IAMBIC FEET FROM LEFT TO RIGHT: Syllables will be grouped in pairs (σ.σ) in combinations light-light (L.L), light-heavy (L.H), but not heavy-light *(H.L), the syllable on the right being the head of the foot.
- (C)VC SYLLABLES ARE HEAVY: A checked syllable can be the only constituent of a foot (H).
- THE HEAD OF THE IAMBIC FOOT MUST BE HEAVY (= FOOT OPTIMIZATION): The head of the iambic foot must be associated with two moras. If originally it is associated with just one mora, an extra mora will be added to achieve this effect.
- DEGENERATE FEET ARE STRONGLY FORBIDDEN: A legitimate foot cannot be exhaustively formed with just one light syllable *(L).
- THE MINIMAL PHONOLOGICAL WORD HAS ONE METRICAL FOOT: As the last syllable is extrametrical, in disyllables with an initial open (light) syllable as the only footable syllable, a repair strategy will take place in order to make that syllable heavy.
- END RULE: Main word stress falls on the head of the right-most foot.

The combination of extrametricality and the prohibition of degenerate feet can lead to the existence of two unfooted syllables, the final being extrametrical, and the penult having insufficient material to form a foot. This being the case, the End Rule only allows the creation of paroxytones (1 unfooted syllable) and preparoxytones (2 unfooted syllables), while banning oxytones altogether². In this way, the distribution of short and long vowels in Kari'ña becomes relatively transparent (see Álvarez 1998, 1999 for further details). The majority of those vowels with greater duration are instances of the phenomenon known in the literature as *iambic lengthening*. An iamb of the form (μ.μ) with a light syllable acting

² However, the same effect can be obtained if we allow degenerate feet, while having final extrametricality referring to the foot instead of the syllable, as pointed out to me by Daniel Everett in personal communication.

as head violates the Iambic/Trochaic Law, because the syllables that form it have an even duration, but final prominence. Because of this, it has to be adjusted so as to allow the head of the iamb to become heavy ($\mu.\mu\mu$). This process is formalized in (1).

(1) Optimization of Iambic Feet:



Languages differ as to how they achieve the featural content of this additional mora. Cross-linguistically, this is usually performed by lengthening the vowel. Hayes claims that the extended occurrence of rules of lengthening in iambic languages is a consequence of the enforcement of the optimal structure of the iambic foot (1995:82,83). The vowels are lengthened just because they happen to be in a structural position that requires two moras. But if vowels cannot be lengthened due to language-particular restrictions, other options may be available, like geminating the onset of the next syllable. In both cases, we are facing the same process of assigning featural content to the extra mora resulting from moraic augmentation. In the case of Pemón and other Cariban languages close to Kari'ña, the strategy of vowel lengthening seems to be the only available option. In Kari'ña, on the other hand, more varied strategies are used, as we shall presently see.

In (2) we give examples which illustrate this phenomenon with what we shall call Option A, that is, the optimization of iambic feet through vowel lengthening. Notice that the last four examples also illustrate the fact that the minimal phonological word has one metrical foot. In disyllables with an initial open (light) syllable, this is the only footable syllable, the last syllable being extrametrical, but vowel lengthening does take place as a repair strategy³.

³ With the exception of **h** representing the glottal fricative, in this paper use is made of the practical writing system developed for this language, which is not completely phonemic, as several predictable properties are incorporated. The *phonetic* inventory of Kari'ña is relatively simple, as the

(2) Optimization of iambic feet through vowel lengthening:

Option A: (CV.CV) → (CV.CV:)

/ampotü-rü/	(am).(po.tüü).<rü>	‘to break’
/s-epema-po-da/	(se.pee).(ma.poo).<da>	‘I sell it’
/etapurunnaka-rü/	(e.taa).(pu.run).(na.kaa).<rü>	‘to open’
/s-akononto-da/	(sa.koo).(non).to.<da>	‘I accompany him’
/v-at-akama-no/	(va.taa).(ka.maa).<no>	‘to separate’
/v-entakororo-ka-no/	(ven).(ta.koo).(ro.roo).ka.<no>	‘to gargle’
/s-epo-da/	(se.poo).<da>	‘I find him’
/vare-ta-no/	(va.ree).ta.<no>	‘to sing’
/m-aro-tu/	(ma.roo).<tu>	‘you carried them’
/apo-rü/	(a.poo).<rü>	‘to touch’
/vena-ta-no/	(ve.naa).ta.<no>	‘to vomit’
/vare/	(vaa).<re>	‘song’
/m-aro-i/	(maa).<roi>	‘you carried him’
/s-apo-i/	(saa).<poi>	‘I touched him’
/vena/	(vee).<na>	‘vomit’

In (3) we give examples which illustrate foot optimization through what we shall call Option B, that is, the one that operates when a high vowel is the rime of the syllable which is the head of the foot. In this case, iambic lengthening takes the form of gemination of the onset of the following syllable, creating a coda that checks the syllable.

transparent spelling (based on Latin American Spanish) shows. VOWELS: **a, e, i, o, u, ü** = [i]; CONSONANTS: Full IPA equivalents are given below:

	Bilabial	Dental	Alveolar	Palatal	Velar	Glottal
Stops & Affricate	p [p]	t [t]		ch [tʃ]	k [k]	' [ʔ]
Fricatives	v [β]	d [ð]	s [s]	sh [ʃ]		h [h]
Nasals	m [m]		n [n]	ñ [ɲ]		
Lateral			r [r]			
Glides	w [w]			y [j]		

Notes: **n** = [ŋ] before velars and word-finally, doubled vowels represent lengthened vowels, double consonants are hetero-syllabic geminates (**tch** represents a geminated **ch** = [t.tʃ]). In sequences **Vi/iV** and **Vu/uV**, **i** and **u** represent the glides [j] and [w] respectively. [β] and [ð] are in complementary distribution with [w] and [j] respectively. [tʃ], [ʃ], and [ɲ] appear in contexts of palatalisation only. The glottal phones do not seem to have a phonemic status, as we shall presently see. All phonemic obstruents are voiceless, and all phonemic sonorants are voiced. Thus voicing is not phonological. The phonemic inventory is /a, e, i, o, u, ü, p, t, k, s, m, n, r, w, y/.

(3) Optimization of iambic feet through syllable checking by gemination:

Option B: (CV.CV).C_iV → (CV.CVC_i).C_iV

/adu-ko/	(a.duk).<ko>	'fry it'
/adu-to-ko/	(a.dut).to.<ko>	'fry them'
/adu-to-rü=poko/	(a.dut).(to.rüp).puo.<ko>	'frying them'
/a-eta-rü-kon/	(a.dee).(ta.rük).<kon>	'to hear you (PL)'
/a-utapüi-i/	(a.dut).ta.<pi>	'you got lost'
/enepü-rü=poko/	(e.nee).(pü.rüp).puo.<ko>	'bringing it'
/s-adu-da/	(sa.dud).<da>	'I fry it'
/s-upi-da/	(su.piy).<ya>	'I look for it'

It is a well-known fact that cross-linguistically codas tend to be very restricted, the number of segments appearing in coda position being highly limited. In fact, it is our contention that in Kari'ña the only segment which occupies a coda position is a nasal sharing the place features of a following obstruent. However, the optimization of iambic feet through syllable checking by gemination creates a large number of checked syllables with all types of consonants acting as codas. Nevertheless, this checking of syllables through gemination obeys a condition that bars obstruents from the coda unless they are geminate (although in Kari'ña this applies to most consonants, not only obstruents). Gemination in Kari'ña is possible with all consonants and glides, except **s**, **sh**, **h**, **'**, **r** (Mosonyi 1982:5). As gemination is not possible when the onset of the following syllable is **r**, vowel lengthening (Option A) takes place instead of ***r.r**, as illustrated in (4).

(4) Optimization of iambic feet through vowel lengthening before **r**:

/adu-rü/	(a.duu).<rü>	'to fry'
/adu-rü=poko/	(a.duu).(ru.puoo).<ko>	'frying it'
/eku-rü/	(e.kuu).<rü>	'to violate, rape'
/k-upi-rü/	(ku.pii).<rü>	'to look for both of us'
/mü-rü/	(müü).<rü>	'to tie'

An interesting situation arises when the onset of the syllable following the head of the iambic foot is **s** or **sh** (resulting from **s** or **k** by palatalisation): the vowel, be it high or nonhigh, cannot be lengthened ***V:s** (Option A), but Option B is also unavailable for foot optimization, as the following onset cannot be geminated to create a coda ***s.s** (Option B). In these cases, illustrated in (5), in order to check the syllable a glottal fricative is inserted as the coda of the syllable in need of weight. We shall call this repair strategy of inserting a glottal stop/fricative, that is, a

minimal consonant, Option C. At this point we should stress that the glottal is *inserted*, that is, it obviously lacks a counterpart in underlying representation.

(5) Optimization of iambic feet through glottal insertion:

Option C: (CV.CV).sV → (CV.CV_h).sV

/k-upi-ko/	(ku.pi _h).<sho>	‘look for me’
/kVs-kupi-i/	(ki.shi _h).shu.<pi>	‘don’t wash him’
/s-eta-sen/	(se.ta _h).<sen>	‘I hear them’

Another interesting situation arises when the onset of the syllable following the head of the foot is a glottal fricative: the vowel, be it high or nonhigh, cannot be lengthened (Option A). Option B is also unavailable for foot optimization, as the following onset cannot be geminated. Option C, the insertion of a glottal cannot be used either, as it would create a geminate ***h.h**. Thus, a fourth option that is implemented in the optimization of feet in Kari’ña is Option D, which is simply no optimization at all, as the examples in (6) illustrate.

(6) Optimization of iambic feet fails when following syllable has **h** as onset:

Option D: (CV.CV).hV → (CV.CV).hV

/an-atoka-potü-ha/	(a.naa).(to.kaa).(po.ti _ü).<ha>	‘not perforating’
/an-emepa-ha/	(a.nee).(me.pa).<ha>	‘not teaching’
/an-ene-po-ha/	(a.nee).(ne.po).<ha>	‘not showing’
/an-emepa-ha/	(a.nee).(me.pa).<ha>	‘not teaching’
/an-etoka-ha/	(a.nee).(to.ka).<ha>	‘not roasting’
/an-edato-ha/	(a.nee).(da.to).<ha>	‘not naming’
/at-anoka-ha/	(a.taa).(no.ka).<ha>	‘not drying’
/an-epema-ha/	(a.nee).(pe.ma).<ha>	‘not buying’
/maha/	(ma).<ha>	‘vegetable garden’
/kü-ho/	(kü).<ho>	‘grated’

Notice that above in (a.naa).(to.kaa).(po.ti_ü).<ha> /an-atoka-potü-ha/ ‘not perforating’, there are three feet: the first and the second ones have open syllables as heads, and foot optimization takes the form of vowel lengthening. However, the third foot also has an open syllable as its head, but there is no vowel lengthening, or any other of the foot optimization processes examined thus far. But we know that the offending heads in the

final feet are indeed such heads, because they are also the heads of the word, bearing main word stress, as predicted by the algorithm.

While the examples in (6) have in common the fact that the last foot is followed by an extrametrical syllable whose onset is the glottal fricative [ŋ], the last two examples are particularly important because they are disyllables with an initial open (light) syllable which happens to be the only footable syllable, the last syllable being extrametrical. As in Kari'ña the minimal phonological word must have one metrical foot, we would expect a repair strategy to create an optimal foot, as was the case in /vare/ (vaa).<re> 'song' in (2) above. However, vowel lengthening does not take place here as a repair strategy: *(maa).<ha>.

This strange non-application of vowel lengthening if the vowel is followed by the glottal fricative deserves some comments. Firstly, although we still lack acoustic evidence that those vowels are really short or just a little less longer than the others which result from iambic lengthening, our general impression is that they are in fact short. Secondly, a restriction on lengthening is also at work in the case of the glottal stop [ʔ]: (ve).<'i> 'I was', and not *(vee).<'i>; (sa.po).<'i> 'I grabbed him', and not *(sa.poo).<'i>; (ke.te).<'i> 'don't be', and not *(ke.tee).<'i>. A common process is obviously at work. Our guess is that this common process may involve the *ambisyllabicity of glottals*, acting simultaneously as coda of one syllable and as onset of the other. If this is the case, the syllables in question would be checked and thus heavy, with vowel lengthening being unnecessary.

Glottals in Kari'ña have a very restricted distribution: they do not occur word-finally or word-initially, in fact, loanwords from Spanish having a word-initial glottal fricative in the source, are adapted without such glottal in the same position: *jabón* > (ka.voo).<no> 'soap'), while glottals in intervocalic position are very marked, as they occur almost only in the negative form and in the past participle. As seems to be the case for all glottals, intervocalic glottals may be recent developments in Kari'ña. Comparative evidence points in this direction, as in the languages which are genetically closest to Kari'ña, Galibi of French Guiana (Renault-Lescure 1985:75,76) and Carib of Surinam (Hoff 1968:140,225), such intervocalic glottals are totally absent, and the cognates exhibit either a **p** or a **xp** sequence: GAL *oni:ki-pa*, KAR *o'nikü-ha* 'not sleeping'; GAL *an-e:ne-pa*, KAR *an-eene-ha* 'not seeing'; CAR *uwa-xpa*, KAR *wa-ha* 'not dancing'. Even within Kari'ña, we encounter cases where there is variation

between a form with intervocalic **h** and a form with a **hp** sequence: *mashiipü* ‘long’, *mashihpie* ~ *mashihe* /masipü-pe/ ‘(is) long’. Further research will determine the status of these glottals.

As is usually the case, loanword phonology is an excellent window into the productivity of phonological processes⁴. In (7) we present loanwords grouped according to the strategies for foot optimization discussed above. In (7a) Option A is at work; in (7b) foot optimization is achieved through Option B; the loanwords in group (7c) implement Option C and show that the double prohibition of vowel lengthening before **s** and **s**-gemination ***s.s** is enforced so strictly, that loanwords from Spanish sources having the sequence **Vs** are systematically rendered with a glottal, whenever the vowel in question is the rime of the syllable in need of weight; Option D is at work in (7d). Notice that vowels in stressed syllables in the Spanish source (all these words are paroxytones) are rendered as long if it is possible, otherwise the syllables are checked through glottal insertion or consonant gemination.

(7) Optimization of iambic feet in loanword adaptation:

(a)

plata	(pü.rü aa).<ta>	‘money’
enagua	(naa).<va>	‘skirt’
guayuco	(va.d uu).<ko>	‘loincloth’
pavo	(paa).<vo>	‘turkey’
hierro	(dee).<ro>	‘iron’
calle	(kaa).<da>	‘street’
quaker	(waa).<ke>	‘oatmeal’

(b)

azúcar	(a.s uk).<ka>	‘sugar’
plomo	(pu.r um).<mua>	‘lead, bullet’
cepillo	(se.p iy).<yo>	‘brush’
lima	(rim).<mia>	‘file’
chivo	(sh iv).<vio>	‘goat’
tubo	(tu w).<wo>	‘water pipe, tap’

(c)

⁴ The doctoral dissertation by Odile Renault-Lescure (1981), *Evolution Lexicale du Galibi, Langue Caribe de la Guyane Française*, is the first thorough treatment of the phonology of loanwords in a Cariban language.

plaza	(pü.rüah).<sa>	‘square’
vaso	(vah).<so>	‘glass’
moriche	(mü.rih).<shü>	‘palm tree (type)’
mañoso	(mañ).(ñoh).<so>	‘unruly, maroon’
camaza	(ka.mah).<sa>	‘bowl (type)’
mesa	(meh).<sa>	‘table’
misa	(mih).<sa>	‘mass’
mocho	(moh).<sho>	‘one-handed’
picha	(pih).<sha>	‘marble’
bicho	(vih).<sho>	‘intestinal worm’
chicha	(shih).<sha>	‘chicha drink’
aposento	(a.poh).(sen).<to>	‘bedroom’
camisa	(ka.mih).<sha>	‘shirt’
caucho	(ka.vuh).<sho>	‘(car) tire’
(d)		
navajita	(ma.va).(hit).<cha>	‘knife, razor’

The examples in (8) illustrate the fate of loanwords with an oxytone word as source. They are of particular interest because they remind us that the combination of extrametricality and the prohibition of degenerate feet can lead to the existence of two unfooted syllables, the final being extrametrical, and the penult having insufficient material to form a foot. This being the case, the End Rule only allows the creation of paroxytones (1 unfooted syllable) and preparoxytones (2 unfooted syllables), while banning oxytones altogether.

(8) Nativisation of oxytones in loanword phonology:

guaral	(wa.raa).<rü>	‘string’
camión	(ka.mioo).<nu>	‘truck, lorry’
jabón	(ka.voo).<no>	‘soap’
arroz	(a.roh).<shī>	‘rice’
café	(kah).<pe>	‘coffee’
manatí	(ma.naa).<ti>	‘manatee’
pan	(paa).<nü>	‘bread’
cruz	(ku.ruh).<su>	‘cross’
zinc	(sii).<nü>	‘zinc’
Dios	(yoh).<sq>	‘hello, God’

Where the source word is an illicit oxytone, the loanword avoids it in one of two ways: usually by creating an additional syllable (by adding an extra vowel), but sometimes by making the penultimate syllable heavy

(for example, by glottal insertion) to create a foot which may attract word stress, or by a combination of both, particularly if the source word is monosyllabic⁵.

2. Mora preservation and opacity in glide copy

In Kari'ña there is a phonological process whereby a stem-final high vowel is copied as a glide after the onset of the first syllable of the following morpheme. Almost a century ago this process was partially described by De Goeje (1909) with the name of *l'infection vocalique*, by which "le i peut dégager un autre i (y) dans la syllabe suivante" (79, quoted in Renault-Lescure 1985:65). More recently, Mosonyi has described this process, which he labelled *reflejo vocálico*, in the following way:

Es un proceso morfofonológico muy característico del kariña, consistente en la repetición de la vocal alta de una sílaba, con carácter semivocálico, en la sílaba siguiente, cuando esta última constituye un morfema aparte que en su forma pura no contiene dicha vocal. Por ejemplo, aamumua ['a:mumua] (algo es o algo está) se descompone en los morfemas aamu+ma, pero la u del primero se refleja como semivocal en el segundo, dando la sílaba mua. Asimismo, voorimia ['bo:limia] (es una mujer) se descompone en voori+ma, pero la i se refleja en el morfema ma, dando mia. (Mosonyi 1982:5)

This brief characterization of the process is not enough to cover all the intricacies involved⁶, but due to space limitations we will not try to do

⁵ In this paper we do not address the issue of *mora reduction*. As we saw above, in the case of languages that treat all heavy syllables in a unified manner, as in Kari'ña, each unit of the syllable rime (first vowel and following segments) contribute one mora to syllable weight (thus, coda consonants are moraic by *weight-by-position*). In this way, V = μ, CV = μ, VV = μμ, CVV = μμ, VC = μμ, CVC = μμ. Thus, in a moraic framework, long vowels are generally represented as features mapped to two moras. One of the arguments used in favour of the mora are the cases of vowel shortening in closed syllables. As a coda consonant in the rime contributes syllabic weight, a CVVC combination would be trimoraic (μμμ). But many languages, among them Kari'ña, have a bimoraic limit. In Kari'ña only open syllables can contain long vowels, and thus a closed syllable must have a short vowel. If due to morphological concatenation or to the operation of diverse processes there arises a sequence of a long vowel followed by a consonant that checks the syllable, such vowel is shortened. Due to this very restriction, any sequence VVV which results from the deletion of a consonant separating a short vowel from a long vowel (VCVV) must simplify to VV. One such process involving the deletion of consonants is the loss of **t** when surrounded by **o**'s, as exemplified in a derivational format: /v-et-empaka-no/ → *vetompakaano* → *votompakano* → *voŋompakano* → (*vom*).(*pa.kaa*).<*no*> 'to wake up'. The problem of the limits to moraic integrity is treated in some detail in Álvarez (2003).

it here either. However, it is important to highlight the differences between Waw Copy and Yod Copy. The first one copies a *waw* after a consonant if it is preceded in the previous morpheme by a vowel with the features [+high, +post], that is, **u-CV** → **u-CuV** (where the inserted **u** represents a *waw*). The second one copies a *yod* after a consonant if it is preceded in the previous morpheme by a vowel with the features [+high, -post], that is, **i-CV** → **i-CiV** (where the inserted **i** represents a *yod*).

One important difference between these two processes is that, while Waw Copy has always the same output, that is, **u-CuV**, Yod Copy can have two types of results according to the consonant involved: (a) for some consonants it is realized as a *yod* following the consonant, that is, as sequences of the type **i-CiV**, thus : /i-ma/ → *imia*, /i-pa/ → *ipia*, /i-va/ → *ivia*; (b) for other consonants, those which can be characterized as [+coronal], the *yod* and the consonant merge into a single palatal segment: /i-ta/ → *icha*, /i-ka/ → *isha*, /i-sa/ → *isha*, /i-na/ → *iña*, /i-ra/ → *iya*, i-da → *iya*. In either case, the consonant in such sequences can show up as geminate, if metrically required: /ivoi/ *ivvioi* ‘boa constrictor’, /i-no/ *iñño* ‘her husband’, /i-ta/ *itcha* ‘inside it’.

This process of Glide Copy is *transparent* whenever we encounter surface configurations of the types **uCuV** or **iCiV**, that is, when the triggering high vowel **u** or **i** shows up before the consonant that receives the glide. This process of Glide Copy is *opaque* whenever we encounter surface configurations of the types **CuV** or **CiV**, where the triggering high vowel **u** or **i** is absent. Of course, if we assume that all **CuV** and **CiV** surface sequences result from Glide Copy, then we must be prepared to

⁶ In all fairness, it must be said that Mosonyi sometimes tries to establish some restrictions on Glide Copy. For example, he points out that the reflex of **ü** is limited to the labial consonants **p, m, v**. “En el verbo *kaapürü* (como en todos los verbos en *k-*) se omite la *ü* característica de primera persona. Por otra parte, en las formas duales de ambos verbos [he is referring also to *saapakariü* ‘mojar’ JA] se nota la ausencia del reflejo vocálico. En efecto, el reflejo vocálico de la *ü* se da solo en los verbos cuyo tema comienza en consonante labial (*p, m, v*).” (1982:68). Let us assume that the phonemic inventory of Kari'ña comprises the following surface consonants: **p, t, j, k, ' , d, v, s, sh, ch, m, n, ñ, r, w, y**. We have the following classes of segments in Kar'ña: [+labial] = **p, v, m, w**, [-labial] = **t, k, d, s, n, r, y**, [+coronal] = **t, d, s, n, r, y**. Only [+labial] consonants allow both Yod Copy and Waw Copy. But [-labial] consonants only allow Yod Copy (with full palatalization if [+coronal]: **t>ch, s>sh, k>sh, n>ñ, d>y, r>y**). Notice that the class of [-labial] consonants is identical to the class of [+coronal] consonants with the exception of **k**. Thus, if we want to say that only [+coronal] consonants undergo full palatalization, an intermediate process like Velar Softening must change **k** to **s** before palatalization: **k>s>sh**.

demonstrate that an underlying high vowel is present in all cases where we find such surface sequences (even if it is deleted by some other process after triggering Glide Copy). By the same reasoning, if we assume that all surface palatal consonants are the result of Yod Copy (recall that Yod Copy may lead to palatalization with certain consonants), we must be prepared to show that an underlying high vowel is present in all cases where we find such palatals (even if it is deleted by some other process after triggering the palatalization case of Yod Copy).

As stated above, the surface geminates are always ‘derived’ in Kari’ña, as the only underlying segment that can occupy a coda position is a nasal sharing the place features of a following obstruent. However, we saw that Option B of foot optimization creates a large number of checked syllables with all types of consonants acting as codas. Nevertheless, these geminates obey a condition that bars consonants, except nasals, from the coda unless they are geminate. But there is a large number of cases where gemination does not seem to be related to foot optimization where the *additional* mora is given its featural content from the onset of the next syllable. We are thus in the presence of *opaque gemination*. The interesting thing is that *opaque Glide Copy* is related to *opaque gemination* in the sense that the latter is always accompanied by the former (but not necessarily the other way around). This dual opacity receives a straightforward explanation in terms of moraic preservation.

In Kari’ña, opening diphthongs **uV** or **iV** are the result of Glide Copy, where the first segment is not present in underlying representation, and carries no weight, being part of the onset. There are, however, closing diphthongs **Vu** or **Vi** where both segments are present as vowels in underlying representation, each associated with a mora. These **Vi** diphthongs only surface word-finally, as shown in (9), but notice that **üi** is simplified to **i**.

(9) Word-final closing diphthongs:

/s-aro-i/	saar oi	‘I carried it’
/s-eduku-i/	seduuk ui	‘I answered it’
/m-ene-i/	meene ei	‘you saw it’
/aravai/	araav ai	‘back basket’
/pirai/	piir ai	‘piranha fish’
/püdai/	püdd ai	‘wizard’
/irui/	iir ui	‘younger brother’
/ivo/	ivv ioi	‘boa constrictor’

/kürüsai/	kürühsai	‘cricket’
/poroi/	pooroi	‘hump’
/kovai/	koovai	‘fish-hook’
/m-ekamü-i/	mekaami	‘you distributed it’

But these **Vi** diphthongs are disfavoured word-medially simply because when an additional morpheme is attached, the **i** element of the diphthong will trigger Glide Copy. However, the resulting sequence **ViCiV**, that is, a consonant surrounded by two like palatal glides, is not allowed and the first glide, the one linked to a mora, should go: from /poroi + pe/ ‘hump-backed’ we might expect **pooroipie* as a result of Glide Copy, but because of the loss of the first, mora-linked glide, we can expect **pooro_pie*. But this loss creates a situation in which the mora originally linked to the vowel is left without association. However, the way to salvage the mora is through consonant gemination: *pooroppie*. The loss of the mora-linked palatal glide that triggers Glide Copy, as well as the ensuing gemination to preserve the mora, take place even if the result of Glide Copy (=Yod Copy) is full palatalization of the consonant. Of course, the **i** is not lost when it is not the second element of a diphthong, even though it may trigger Yod Copy (even with full palatalization): *meerorü* ‘to scratch’ - *mimieeroda* ‘you scratch it’, *tankariü* ‘to nail’ - *michankaae* ‘you nail it’, *nontariü* ‘to release’ - *miñontaae* ‘you release him’. We can thus generalize this by saying that a coda palatal glide will be lost whenever there is a palatal segment in the following onset: ***Vi.PalatalOnset**. A similar, though less categorical situation seems to obtain in Galibi:

Tous les phonèmes consonantiques, sauf /l, y, h/ présentent un allophone palatalisé lorsqu'ils suivent /i, i:/ ou une diphtongue en -i (...) La palatalisation peut entraîner des modifications de la voyelle impliquée: - /i/ ou /i:/ initial peut disparaître: /itu:pu/ “herbe” se réalisera [cu:pu], - l'élément -i de la diphtongue peut disparaître: /na:na aiku:lu “jus d'ananas” se réalisera [na:na acu:lu]” (Renault-Lescure 1985:55, 56, emphasis added).

The *categorical* loss of the word-medial yod in Kari'ña, when it is the second element of the diphthong, must be a recent development in this language. In the following old sources, all quoted in Renault-Lescure (1985), cognates of Kari'ña words are given showing the full diphthong, which is missing in Kari'ña: Pelleprat (1654): *caycouchy* ‘tigre’ [KAR *kahshushi* ‘tiger’], *eigna* ‘les mains’ [KAR *añña* ‘hand’], *coignalo* ‘hier’ [KAR *kuññaaro* ‘yesterday’], *mayna* ‘jardin’ (61-62) [KAR *mañña* ‘vegetable garden’]; Sagot (1882): *ainatone* ‘cinq’ [KAR *aññaatoone*

‘five’]. In (10) we illustrate gemination being used in order to preserve the mora associated with a lost *i* in opaque Yod Copy⁷.

(10) Examples of mora preservation with opaque Yod Copy:

/an-apoi-pü/	anaapoppiü	‘he who does not grab it’
/apoi-po-rü/	apoppiorü	‘to make someone grab’
/apoi-potü-rü/	apoppiotürü	‘to grab several times’
/t-apoi-mü/	tapommiü	‘what is grabbed’
/apoi-to’me/	apotchome	‘in order to grab’
/apoi-to-ko/	apotchoko	‘grab them’
/apoi-topo/	apotchopo	‘grabbing instrument’
/kVs-apoi-tu/	kasaapotchu	‘do not grab them’
/m-ai-tu/	matchu	‘you (PL) were’
/kvt-ai-tu/	katatchu	‘we two were’
/ai-to-ko/	atchoko	‘be (PL)’
/m-ai-ne/	maññe	‘that you may be’
/apoi-ne/	apoññe	‘he who grabs it’
/v-ai-no/	vañño	‘to be’
/n-apoi-ne/	napoññe	‘let him grab it’
/apoi-rü/	apoyyü	‘to grab’
/m-ai-da/	mayya	‘you come to be’

A partially similar situation arises when the next syllable has an onset *s*, realized as **sh** due to the palatalization effect of Yod Copy. This onset cannot be geminated to create a weight-carrying coda, as in (3) above. Again, as in (5) above, in these cases a glottal fricative is inserted as the coda of the syllable to salvage the mora, as (11) below illustrates.

⁷ The importance of understanding this connection between preservation of the mora through gemination and opacity in Glide Copy can be seen in the derivation of intransitive verbs from transitive verbs. What follows is a list of transitive verbs and their corresponding intransitive counterparts with a common detransitivizing prefix /ai-/ (transitive, intransitive, transitive gloss): *de’nüntorü*, *vayye’nüntono*, ‘to wrap’; *deenanoopürü*, *vayyeenano’no*, ‘to hate’; *deerojtorü*, *vayyeerojtono*, ‘to shoe horses’; *dejtorü*, *vayyejtono*, ‘to sharpen’; *dookorü*, *vayyokoono*, ‘to cut’; *maanemparü*, *vammiaanempano*, ‘to bother’; *meerorü*, *vammieroono*, ‘to scratch’; *mo’mojkorü*, *vammio’mojkono*, ‘to emboss’; *mookürü*, *vammio’no*, ‘to throw’; *moomariü*, *vammio’maano*, ‘to expel’; *moonajtorü*, *vammionajtono*, ‘to steal’; *moomoküürü*, *vammio’no*, ‘to wait for someone’; *mooriikaariü*, *vammioriikkano*, ‘to hit’; *müürü*, *vammiiüno*, ‘to tie’; *nontariü*, *vaññontano*, ‘to release’; *pi’miejtorü*, *vappi’miejtono*, ‘to reject’; *po’norü*, *vappio’nono*, ‘to season’; *pookariü*, *vappiookano*, ‘to dart’; *pu’nukuuru*, *vappiu’nu’no*, ‘to smell’; *püjtorü*, *vappiüjtono*, ‘to marry a man’; *taariikaariü*, *vatchaariikaano*, ‘to empty’; *tankariü*, *vatchankano*, ‘to nail’; *toopo’mankariü*, *atchoopo’mankano*, ‘to tense, stretch’; *voovorü*, *vavviovoono*, ‘to wash’. The opacity is massive.

(11) Mora preservation though glottal insertion:

/ai-ko/	ahsho	‘be’
/apoi-kepü-ka-rü/	apohshehkarü	‘to stop grabbing it’
/apoi-ko/	apohsho	‘grab it’
/n-apoi-sen/	napohshen	‘let them grab it’

Again, loanword phonology lends support to this analysis. Notice that when the Spanish source has a palatal **ñ**, this consonant is rendered as geminate, as it is assumed that it is the product of the palatalization of an **n** due to the influence of a preceding **i**, which is absorbed in the process, with gemination taking care of the unassociated mora: *mañoso* → *maññohso* ‘unruly, maroon’. On the other hand, the palatal affricate present in the source of loanwords from Spanish is normally rendered as **sh**, as seen in (7) above.

Finally, in the words in (12) a glottal stop is inserted in order to preserve the mora that would be lost if the sequence **Vi-i** were reduced to **Vi** word-finally.

(12) Glottal stop insertion and mora preservation:

/kVs-apoi-i/	kasaapo’i	‘do not grab it’
/m-ai-i/	me’i	‘you were’
/s-apoi-i/	sapo’i	‘I grabbed it’
/v-ai-i/	ve’i	‘I was’

3. Mora preservation and syllable reduction

In the literature on Cariban languages, crucial mention is made of *syllable reduction* (SR), a phenomenon creating huge allomorphy mostly in verbs and nouns, whereby certain stem-final CV syllables are lost in suffixation, and thus verb and noun stems that undergo it show two allomorphs, one of which is shorter by one syllable than the other (Mattéi-Muller 1981, Gildea 1995, Derbyshire 1999). In his recent overview of Cariban languages, Derbyshire (1999) surveys the various morpho-phonological processes common to many of these languages (palatalization, vowel harmony, etc.), dedicating most of the space to the presentation of this phenomenon:

In some [Carib] dialects there has been loss of word-medial syllables which has resulted in breathiness of the vowel in the preceding syllable, which sometimes takes the form of a velar or glottal fricative in syllable-final position. [...] High vowels, especially *i* and *u*, are deleted in several Carib languages when they

occur morpheme-finally following a non-clustered C and preceding a morpheme-initial V or unclustered C, provided that the resulting CC is a permitted one. This process is reported for [Wai Wai, Hixkaryana, Waimiri-Atroari, Makushi and Apalaí]. Whole syllables containing these weak vowels can delete in some languages [Carib, Makushi].” [...] In [Makushi], certain *Cɨ* syllables (*pɨ, tɨ, kɨ, sɨ*) are weak, and when certain affixes are added the whole syllable may be deleted or be reduced to *h*.” Derbyshire (1999:30).

However, the most extensive discussion of syllable reduction is found in a paper by Gildea (1995). He addresses syllable reduction in five Cariban languages from a comparative point of view. He claims that in four of these languages (Apalaí, Carib, Makushi, and Panare) this process has basically the same conditioning factors. The reduced forms of these stems may vary, but the range they exhibit “represents a case study of compensatory lengthening” (63). He further insists that his findings partially support typological claims made by de Chene and Anderson (1979) in the sense that there is an intermediate glide stage in compensatory lengthening. Understanding syllable reduction as a unified evolutionary process which begins with vowel syncope will allow us to “have a window into otherwise opaque process of historical segment creation, as well as a means to identify cognates which have different segmental templates” (101).

Syllable reduction has normally been interpreted as involving two processes: (a) a process of vowel syncope, which takes place when certain conditions are met; and (b) a process of consonant-cluster simplification. These two processes are conceptually different aspects, and they deserve separate considerations. The latter, according to Gildea, has various manifestations:

In Cariban languages, the first consonant of the cluster is the one that changes in the simplification process. The various synchronic patterns which are attested are: (1) no simplification at all; (2) assimilation to place of the following consonant; (3) debuccalization (that is, the loss of supralaryngeal features, with the consonant dropping back and down in the oral cavity) in which the first obstruent becomes either a velar fricative [χ], pharyngeal/glottal fricative [h], or glottal stop [ʔ] and the nasal becomes velar [ŋ]; (4) deletion of the consonant, with compensatory length found on the preceding vowel (i.e., the loss of all consonantal features, such that all melodic segmental features are simply mapped from the preceding vowel) – if the deleted consonant was nasal, the resulting long vowel retains nasality. Gildea (1995:84).

In what follows, we shall discuss syllable reduction in Kari’ña, and then we shall point out those aspects which may have some consequences

for a unified treatment of syllable reduction in Cariban languages as a whole. Consider the Kari'ña data given in (13), organized as follows: in the left-hand column there are verbs in the infinitive (suffixes *-rü* and *-no*) or in the negative form (suffix *-ha*), with their corresponding imperative singular forms (suffix *-ko* ~ *-sho*) in the central column, while in the right-hand column the corresponding glosses are given in the infinitive. Notice that there are three groups, each having a different behaviour (morpheme cuts are given only for the last suffix).

(13) Syllable reduction exemplified with the imperative of verbs:

(a)

enaarü	enaako	'to have'
eva'marü	eva'mako	'to kiss'
aroorü	arooko	'to carry'
onoorü	onooko	'to eat meat'
ataaroha	ataaroko	'not hunting'
eneerü	eneeko	'to look'
voone-no	ooneko	'to believe o.s.'
shuupi-ha	shuupisho	'not bathed'

(b)

ekaamü-rü	ekanko	'to distribute'
ookamü-ha	ookanko	'not distributing o.s.'
avoomü-ha	adaavonko	'not standing up'
ameemü-ha	amenko	'to fasten'

(c)

atookü-rü	atohko	'to sew'
e'moküü-rü	e'mohko	'to introduce'
eduuku-ru	eduhko	'to answer'
o'nepü-ha	o'nehko	'not bringing'
eneepü-rü	enehko	'to bring'
atampotü-ha	atampohko	'not breaking o.s.'
ekaarichüü-rü	ekaarihsho	'to say'
avoonukuu-ru	avoonuhko	'to climb'

In group (13a) the addition of the imperative suffix does not create any changes in the stem to which it is attached. Notice that the stems in question have the final vowels **a, e, o, i**. In group (13b) the addition of the same suffix triggers the loss of the stem-final vowel **ü**, with the ensuing checking of the previous syllable by the (assimilated) nasal which was formerly the onset of the syllable that lost its rime. However, in (13c) the

consequences are more drastic, as not only the vowels **ü,u** are lost, but also the obstruent consonants **k,p,t,ch** seem to have vanished or, at least, been replaced by a glottal fricative. Thus, a temporary conclusion can be reached that the back, high vowels **ü,u** are syncopated when certain suffixes are added, with resyllabification and assimilation of the former onsets if they are nasal, or conversion into a glottal if they are obstruent.

A finer understanding of this phenomenon in Kari'ña can be achieved if we can pinpoint the exact properties of the suffixes triggering syllable reduction. With this purpose in mind, consider the additional data in (14), organized into two sets of forms with the same stem /*atokü-*/ 'sew', which exhibits a stem-final **ü**, in combination with various suffixes. In (14a) we illustrate contexts which trigger syllable reduction, while in (14b) we illustrate contexts which do not.

(14) Syllable reduction exemplified with different suffixes:

(a)

/atokü- po -rü/	ato h porü	'to cause to sew'
/atokü- potü -'ma-rü/	ato h potü'müarü	'to finish to sew it several times'
/atokü- potü -po-rü/	ato h pohporü	'to cause to sew it several times'
/atokü- potü -rü/	ato h potüürü	'to sew (it) several times'
/atokü- to '-me/	ato h to'me	'in order for me to sew it'
/atokü- to -ko/	ato h toko	'you (pl) sew it/them'
/atokü- to -ko'-me/	ato h tohko'mue	'in order for me to sew them'
/atokü- topo /	ato h topo	'place/tool for sewing'
/atokü- to -rü=poko/	ato h torüppuoko	'sewing them'
/s-atokü- to -hse/	sato h tohse	'in order for me to sew them'
/s-atokü- tu /	sato h tu	'I sewed them'
/atokü- kehka -po-rü/	ato h ke'kapoorü	'to cause to cease to sew it'
/atokü- kehka -potü-rü/	ato h kehkapootürü	'to cease to sew it several times'
/atokü- kehka -rü/	ato h kehkarü	'to cease to sew it'
/atokü- ko /	ato h ko	'you (sing) sew it'
/atokü- se /	ato h se	'in order to sew'
/s-atokü- sen /	sato h sen	'that I may sew them'
/t-atokü- se /	tato h se	'sewed'
/atokü- nan /	ato'nan	'those who sew it'
/atokü- nan -mpo/	ato'naanümpuo	'those who sewed it'
/atokü- ne /	ato'ne	'he who sews it'
/atokü- ne -mpo/	ato'nemppo	'he who sewed it'
/s-atokü- ne /	sato'ne	'that I may sew it'
/s-atokü- da /	sato h sa	'I sew it'

(b)

/atokü-rü/	atookürü	‘to sew’
/s-atokü-i/	satook(ü)i	‘I sewed it’
/an-atokü-ha/	anaatoküha	‘not sewing’
/a-n-atokü-ho/	anaatoküho	‘what you (sing) sewed’
/atokü-ha/	atooküha	‘not sewing’
/atokü-ho/	atooküho	‘have sewed it’
/atokü-hsanko/	atookühsanko	‘have sewed them’
/atokü-hse-ine-ma/	atookühseññema	‘he wants to sew them’
/atokü-hse-ma/	atookühsema	‘he wants to sew it’
/s-atokü-hse/	satookühse	‘in order for me to sew it’
/atokü-'ma-rü/	atookü'müarü	‘to finish to sew it’
/atokü-'ma-po-rü/	atookü'müapoorü	‘to finish to cause to sew it’

From the examination of these forms we can come to the conclusion that we have two groups of segments: the first comprises the consonants **p**, **t**, **ch**, **k**, **sh**, **s**, **n**, **d** (**sh** and **ch** are really palatalised allophones of **k** and **t**), the second comprises the vowels and the consonants **r**, **h**, **'**, **w**, **y**. Thus Syllable Reduction may be defined as a morpho-phonological process whereby a [+high, +back] vowel, that is **u** and **ü**, is deleted stem-finally when the following suffix begins with a [+cons, -lateral]: **p**, **t**, **k**, **s**, **n**, **d**, **sh**, **ch**. The morphological information is needed because the process does not seem to work morpheme-internally: *araamuku* ‘sweat’, *apuuku* ‘love’, *eerupuaariü* ‘to tell’, *amüüinü* ‘jealousy’, *epuuku* ‘bodily secretion’, *kutuupu* ‘termite’, *vereeekushi* ‘flute’. Notice that “stem-final” does not mean “root final”, as syllable reduction can affect both roots and suffixes, as in the case in /atokü-potü-po-rü/ *atohpohporü* ‘cause to sew it several times’.

It is also important to emphasize that no reference to stress seems to be necessary either, as even syllables which would be heads of iambic feet (with the right to undergo lengthening and eventually become heads of words) are victims of the process: /putu-ko/ *(pu.tuu).<ko> *puhko* ‘know’, /at-ampotü-ko/ *(a.tam).(po.tüü).<ko> *atampohko* ‘break (yourself)’, /s-ampotü-da/ *(sam).(po.tüü).<sa> *sampohsa* ‘I break it’, /s-amonopü-tu/ *(sa.moo).(no.püü).<tu> *samoonohu* ‘I failed them’, /kVs-atokü-tu/ *(ka.saa).(to.küü).<tu> *kasaatohtu* ‘don’t sew them’, /kVs-ekamü-tu/ *(ke.see).(ka.müü).<tu> *keseekantu* ‘don’t distribute them’.

As seems to be the case with other Cariban languages, there is complementary distribution of the two glottals, as we encounter the

sequences **glottal fricative + k, p, s, t** and **glottal stop + n, ñ, m, w, v, r**. Therefore, the glottal resulting from syllable reduction will be a stop if the next consonant is voiced and a fricative if the next consonant is voiceless, as illustrated in (15), where a stem-final **Cü/u** sequence (showing in the negative form), is absent in the present (where there is a glottal fricative) and in the infinitive (where there is a glottal stop).

(15) Complementary distribution of glottals:

Negative	Present 1s	Infinitive	Gloss
ahshopootüha	vahshopohsa	vahshopo'no	'to urinate'
a'ñukuha	va'ñuhsa	va'ñu'no	'to filter'
ohkapüha	vohkahsa	vohka'no	'to transform'
ohpotüha	vohpohsa	vohpo'no	'to observe'
o'napüha	vo'nahsa	vo'na'no	'to eat'

This phenomenon of syllable reduction has been traditionally treated as a process involving vowel syncope, followed by a process of resyllabification plus nasal assimilation, or by a process of resyllabification plus obstruent neutralization (debuccalization). In the case of Kari'ña, we prefer to understand it as a simple process of syncope of a morpheme-final high, back vowel when the initial segment of the following morpheme is nonlateral consonant. In order to avoid false counter-examples, it is important to stress that syllable reduction only operates within the *morphological* word, not necessarily within the *phonological* word. Thus, in /atokü-po-rü/ *atohporü* 'cause to sew' and /atokü-potü-po-rü/ *atohpohporü* 'cause to sew it several times' all the **p**'s are word-internal, while in /atokü-to-rü=poko/ *atohtorüppuoko* 'sewing them' the underlined element behaves more like a clitic and its **p** does not trigger syllable reduction.

As we saw above, the only underlying segment that can occupy a coda position is a nasal sharing the place features of a following obstruent. All the other consonants are barred from coda position unless they are geminate. When the high, back vowel is lost due to syllable reduction, whatever takes places follows from independent reasons. The consonant that was the onset of the syllable, if it is a nasal, can be syllabified as the coda of the preceding syllable, becoming also homorganic with the following consonant. But if it is an obstruent, it cannot be syllabified and simply disappears. In the former case, the mora is preserved by means of its association with the coda nasal. In the latter case, the mora associated with the vowel of the reduced syllable is left without melodic material, but

it is preserved by means of its association with a minimal (inserted) consonant. In favour of this glottal insertion which is not the reflex of the deleted “neutralized” or “debuccalized” obstruent, we can adduce the fact that such glottals also show up even when there is no justification to pose underlying obstruent consonants. Recall that in our moraic interpretation, foot optimization was enforced almost at all costs: when neither Option A (vowel lengthening) or Option B (consonant gemination) can operate for the creation of optimal feet, the additional mora needed to make the head of the foot heavy (and optimal), is associated with a minimal (inserted) consonant⁸.

There are cases which look like syllable reduction, in which the stem-final syllable is **rü** or **ru** and the infinitive marker *-rü* is added. We can tell that the stem ends with these sequences of an alveolar flap plus a high, back vowel because such is the shape of the stem in the past singular, where a suffix *-i* is added to the stem and no syllable reduction takes place (compare /eduku-rü/ *eduukuru* ‘to answer’ and /s-eduku-i/ *seduukui* ‘I answered it’ with /enürü-rü/ *enüürü* ‘to drink’ and /s-enürü-i/ *senüürüi* ‘I drank it’), as well as in the negative form, where a suffix *-ha* (again, not triggering syllable reduction) is added to the stem (compare /an-eduku-ha/ *aneedukuha* ‘not answering’ with /an-eporü-ha/ *aneeporüha* ‘not finding’). We claimed above that **r**-initial suffixes do not trigger syllable reduction (this was the reason for including the feature [lateral] in the characterization). For this reason, the cases illustrated in (16) must be treated as haplology, reducing sequences of like syllables **rü-rü** to **rü**. Notice that one of the clues we get is the fact that there are two long vowels in successive syllables (something unexpected in iambic configurations): one which is the product of Option A of foot optimization, and one which is the product of mora preservation.

(16) Haplology in stems ending in **rü/ru**:

/etapuru-rü/	etaapuuru	‘to cover’
/evapuru-rü/	evaapuuru	‘to help’

⁸ Related to this is the fact, mentioned in Mosonyi (1982:5), that four consonants of Kari'ña do not accept gemination: **s**, **sh**, **j**, and **'**, to which he adds that: "es conveniente aclarar que las dos primeras, s y sh, pueden combinarse con **j** constituyendo las secuencias js y jsh, las cuales desde un punto de vista funcional actúan como las versiones alargadas de las anteriores" ["It is important to make it clear that the first two, s and sh, can combine with **j** to constitute the sequences js and jsh, which from a functional point of view behave as the lengthened versions of the former"].

However, there are other cases of syllable reduction proper where a high, back vowel preceded by an alveolar flap is deleted stem-finally when the following suffix begins with a [+cons, -lateral] segment. Whatever the process at work, haplology or syllable reduction proper, the loss of the mora-carrying vowel sets in motion the various ways of achieving mora preservation: through vowel lengthening as we saw above in (16), through consonant gemination to create checked syllables (although they may not be needed for foot optimization) as in (17a) (again, with unexpected successive heavy syllables), through glottal insertion as in (17b), or through the conflation of the results of moraic augmentation and moraic preservation as in (17c), because there is a bimoraic limit in syllables (/enürü-rü/ *enüürü* **enüüürü* ‘to drink’, /eporu-rü/ *epoorü* **epoorü* ‘to find’).

(17) Syllable reduction in stems ending in **rü/ru**:

(a)

/an-etapuru-pü/	aneetap ppü	‘he who does not cover it’
/etapuru-ne/	etaap unne	‘he who covers it’
/etapuru-po-rü/	etaap ppuorü	‘to make someone cover’
/etapurü-potü-rü/	etaap ppuotüürü	‘to cover it several times’
/etapuru-to’me/	etaap utto ’me	‘in order to cover’
/etapuru-topo/	etaap uttoko	‘covering instrument’
/evapuru-ko/	evaap ukko	‘help him’
/evapuru-to-rü-poko/	evaap uttorüppuoko	‘helping them’
/kvn-enürü-da/	kene’nü dda	‘he drinks it’
/kvs-eporü-tu/	keseep ottu	‘do not find them’
/kvs-kürü-tu/	kishihsh üttu	‘do not make them’
/mürü-ne/	mün ne	‘he who ties’
/mürü-po-rü/	mü ppuorü	‘to make someone tie’
/mürü-potü-rü/	mü ppuotüürü	‘to tie it several times’
/mürü-topo/	mü ttopo	‘tying instrument’
/s-evapuru-da/	sevaap udda	‘I help him’

(b)

/n-etapuru-sen/	netaap hsen	‘let them cover it’
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(c)

/enürü-rü/	enü ürü	‘to drink’
/eporu-rü/	epo orü	‘to find’
/ürü-rü/	ü ürü	‘to give’

After this discussion of syllable reduction in Kari'ña, let us point out some aspects which may have some consequences for a unified treatment of syllable reduction in Cariban languages as a whole:

- It is clear that syllable reduction in Kari'ña is basically the same process discussed so far for other Cariban languages.
- Vowel syncope, rather than insertion, is the right way to predict the long allomorphs.
- One of the differences among languages involve the number of high vowels that undergo syncope: for example, while in Kari'ña it only affects high, back vowels, in Pemón (Álvarez 1996) it affects all high vowels.
- Vowel syncope in Kari'ña does not seem to be motivated by stress placement: it is a morpho-phonological process that includes information on morpheme boundaries (it takes place across a morpheme boundary, but within a morphological word) and on the segmental make-up of the suffix triggering it.
- As in Carib of Surinam, the segment **r** of the suffix *-rü* does not trigger vowel syncope, although haplology causes the simplification of **rü-rü**.
- The onset consonants which are left without their nuclei have different fates: resyllabification as coda of the preceding syllable if they are nasal, total loss due to their being unsyllabifiable if they are not nasal.
- It is not necessary to invoke debuccalization as a component of syllable reduction, as insertion of glottals is a strategy used elsewhere (in foot optimization and as a mora-preserving strategy) to create minimal mora-carrying consonants.
- It does not lend support for an intermediate glide stage in compensatory lengthening.
- Mora-filling strategies are the same in foot optimization, mora preservation, syllable reduction, as well as in loanword phonology.

Conclusions

We have described several phonological processes, which at first sight seemed unrelated, in a unitary fashion in terms of the notion of mora. In the first place, cases of obvious moraic augmentation were examined, which included various options used to create optimal iambic feet: vowel lengthening, consonant gemination, glottal insertion and a null option. In the second place, cases were examined in which there is an opaque Glide

Copy (the context for this process requiring a high vowel in the preceding syllable), as well as opaque gemination (not triggered by foot optimization). The underlying high vowel triggering the copy is deleted, but its associated mora is preserved through consonant gemination. In the third place, the very common phenomenon of syllable reduction, treated as obstruent neutralization in most accounts of Cariban languages, can be understood as a simple process of syncope of a high, back vowel in which the stranded onset becomes a coda if it is a nasal, thus preserving moraic structure, or disappears when it cannot syllabify. When the consonant disappears, the mora which was associated with the deleted vowel is preserved through its association with an inserted glottal. Finally, it is thus concluded that the notion of mora is crucial in order to understand these diverse phonological processes in Kari'ña, as they are all strategies to augment or preserve the original moraic structure.

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