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Iambic lengthening in Carib

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0. Introduction

In this paper we offer an analysis of the distribution of vowel length in Carib.¹ Carib is a member of the Cariban language family, spoken in the northern half of South America. All Carib data we present come from the comprehensive grammar by Hoff (1968), which describes a Carib dialect spoken in western Surinam. As far as we know only one metrical analysis of Carib, based on Hoff (1968), has appeared in the literature, namely Inkelas (1989). Our analysis differs from that of Inkelas in fundamental ways. Whereas Inkelas makes use of a quantity-insensitive trochaic foot type, the quantity-sensitive iambic foot forms the cornerstone of our analysis. In section 1 we will briefly present the data analyzed here, taken from Hoff (1968). In section 2 we will outline the basic ingredients of our analysis, ignoring for the moment certain classes of derived words, which will be discussed in section 3. A brief discussion of the analysis Inkelas proposes is offered in section 4. In section 5 we point out the advantages of our analysis as compared to that of Inkelas.

1. Basic patterns

According to Hoff (1968) each word in Carib contains an accent (manifested as high pitch), which is located on the second heavy syllable in the word (where V, VC and diphthong count as heavy). If there is only one heavy syllable, the accent is on the final syllable. A second characteristic, and one that we will focus on, is that the occurrence of vowel length is partly predictable. Some canonical patterns are provided in (1) (in the examples, we mark the accent with an acute accent):

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- (1)
- | | | | | |
|----------------|--------------|------------|----------------------------|-------------------|
| a. V V V | aka.mí | tono.ró | 'trumpeter bird' | 'large bird' |
| b. V: V V | o:ruwá | ta:kuwá | 'three' | 'polishing stone' |
| a. V V: V V | ara.marí | kuri.yará | 'mythical snake' | 'canoe' |
| b. V: V V: V | a:rawá:ta | ka:rawá:si | 'howling monkey' | 'rattle' |
| a. V V: V V: V | asa:pará:pi | | 'species of fish' | |
| | a+n+a:ro+rí: | +kong | 'being taken by you (pl.)' | |
| b. V: V V: V V | k+o:ka+pó: | +take | 'you will have me bitten' | |

There are two patterns: length is found on (a) even-numbered syllables (cf. *asa:pará:pi*) or (b) odd-numbered syllables (cf. *a:rawá:ta*). We will argue that words following the b-pattern must be marked with underlying length in the first syllable. This proposal is in agreement with Hoff's observation that the majority of underived forms show the a-pattern. Two further points concerning the distribution of long vowels are relevant. First, final syllables never contain a long vowel. Second, if length is due to alternation, the alternation never results in more than two long vowels. In the underived cases in (1) this cannot be seen since monomorphemic words contain maximally five syllables. Derived words, however, are easily long enough to show that one can find at most one length repetition or *echo*. A relevant example is *ipoká:+po-tí+rí+kong* 'the fact that I keep shaving them'. If length were 'echoed' more than once we would expect the vowel in the fifth syllable to be long. In this paper we offer no explanation for the fact that only two feet are assigned.²

2. Analysis

We will propose the following analysis:

- (2)
- Length is distinctive in the first syllable only
 - The foot is a quantity sensitive iamb
 - V, VC and V_iV_j count as heavy
 - The final syllable is extrametrical
 - Degenerate (i.e. monomoraic) feet are not allowed
 - Vowels in strong position are lengthened (but not in final syllables)

As was illustrated in (1) a long vowel can occur in the initial or second syllable. In an iambic analysis this is predictable, if we assume that vowel length is distinctive in the initial syllable only. This kind of restriction on vowel length distinctiveness has also been reported for other languages (e.g. in Wargamay; see Hayes 1991). If the first syllable contains a short vowel

(and is not closed) vowel length occurs in the second syllable. This is the case where the iambic foot can manifest itself (we will illustrate the extrametricality of the final syllable below):

- (3) (.) (*)(. *)
asa para <pi> = asa:pará:pi 'species of fish'

We assume that the length in these cases is the result of a rule which we will call *iambic lengthening*. This rule says that a vowel which is in the strong position of the foot must be long. Since the syllable in Carib has only two positions in the rime part of the syllable, diphthongs and vowels in closed syllables do not lengthen. If the first syllable has an underlying long vowel, we observe an 'odd-numbered' length pattern:

- (4) (*)(. *) = a:rawá:ta 'howling monkey'
a:rawa <ta>

Given underlying length, the first foot cannot be bisyllabic because the first syllable is heavy. Hence the weak part of it is 'suppressed' and the foot ends up being monosyllabic. The fact that this analysis captures the interaction of length distribution and foot assignment forms a strong argument in favor of the iambic analysis. According to Hayes (1991:71-72) the prototypical iamb expresses a contrast in duration: a short vowel (light syllable) as opposed to a heavy (long) syllable. Lengthening typically occurs in iambic languages and creates the 'ideal iamb': (V V):

Our argument in favor of extrametricality is based on the stress pattern of bisyllabic words. Bisyllabic stems do not show a contrast in vowel length: the initial vowel is always long and the second, since it is final, is short (and carries the accent). However, when a suffix is added, two patterns emerge:

- (5) Type I a:pi apiró 'red, ripe' 'to cause to ripen'
Type II ka:mí ka:miró 'pale red' 'to cause to become pale red'

Type I underlyingly has a short vowel in the initial syllable. This is clear from the suffixed form, to which we will return below. We need to explain why the unsuffixed form has initial vowel length. Let us suppose that the final syllable is extrametrical. Even though monomoraic feet are impossible, we will assume that a foot *must* be assigned to a word which would otherwise remain unfooted ('the unstressable word syndrome', cf. Hayes 1991:93):

- (6) (*)
a <pi> - a <pi> = a:pi

² In derived words other lengthening processes interfere, which we will not discuss.

The assigned foot will trigger iambic lengthening.

Type II must have an underlying long vowel since it retains its length when suffixed:

- (7) ka: <mi> - ka: <mi> = ka:mi
(*)

Extrametricity, then, neutralizes the two length patterns in bisyllabic stems. At first sight one might be inclined to attribute the absence of final long vowels in Carib to the device of extrametricity. The idea would be that final syllables fall outside the domain that is footed and that therefore final vowels are not lengthened:

- (8) (*) oru <wa> = o:ruwá 'three' kuriya <ra> = kuri:yará 'canoe'
(. *)

The prefinal syllable will not be footed since we assume that a monosyllabic foot cannot be built (unless this would be the only foot, cf. supra). However, we will argue that the absence of final lengthening cannot be attributed to extrametricity, even though we have just shown that the final syllable is indeed extrasyllabic. The argument involves the shape of monosyllabic words.

If the stress analysis indicates that monomoraic feet do not exist in Carib, we expect that the language does not allow monomoraic words either: only CVC or CV: monosyllables ought to be found, i.e. monosyllables which are closed or have underlying vowel length. In Carib we do find some examples which look like monomoraic CV words, however. Consider the verb *wo* 'to kill, beat, strike'. If this verb is really underlyingly monomoraic we expect to find length in the second syllable if we consider a word derived from *wo*, such as that in (9):

- (9) (*) wokepi = *woke:pi 'to stop beating'

However, in derivations of the verb *wo* length is systematically realized on the first vowel:

- (10) wo:kepi 'to stop beating' wo:poŋi 'to beat repeatedly'
wo:poŋáng 'he'll have him killed' wo:topó 'a means of killing'

We can derive the patterns in (10) only by assuming that monosyllables have underlying long vowels in accordance with the expected prohibition on monomoraic words. If a monosyllable is realized in isolation, its vowel is shortened, but this implies that the absence of final lengthening cannot be

attributed to extrametricity since monomoraic words cannot be subject to extrametricity (extrametricity is blocked if it makes the entire domain invisible).³

So far we have considered words without closed syllables or diphthongs. There is no doubt about the qualification of these as heavy with respect to accent (cf. *sa?rómbó* 'leaves', *tímbakáŋka* 'provided with laths', *weyáúne* 'I am continually', *auwaró:pono* 'causing laughter', *típosáike* 'with nails'). The rule for accent placement treats closed syllables on a par with those that have long vowels. We also expect that such syllables are able to influence the alternating length pattern, depending on the position they occupy in the word. The interesting cases are those with a closed syllable in initial position.⁴ The pattern of four-syllable words with initial CVC behave as expected with respect to our analysis, as we can see from words like *kangkasá:pa* 'lizard': CVC must be heavy, otherwise we would expect to find **kangkasa:pa*. However, the situation is more complicated. Whereas we find only one pattern in four-syllable words, there are two patterns found in three- or five-syllable words: *moxká:ro* 'they' vs. *tuksá* 'type of arrow' and *ma?mátakara* - the only monomorphemic case - vs. *oxkótó:poŋi* (derived from *ixkó:to* 'to cut' with *o-* and *-poŋi* and loss of *i*). The pattern with a long vowel in the second syllable is unexpected. Even worse, according to Hoff (1968), this pattern is the ordinary pattern for these words.⁵ We predict the pattern in (11a) for all these examples, whereas we seem to get the structures in (11b):

- (11) a (*) sambu <ra> ma?mata:ka <ra>
b (*) sambu: <ra> ma?mata:ka <ra> ma?mar:aka: <ra>

³ The absence of final lengthening appears to be a general phenomenon also found in other iambic languages (for instance in Hixkaryana and Pacific Yupik; see Hayes 1991). The fact that weak vowels in a language like Dutch fail to undergo reduction if final, is perhaps a related phenomenon: final syllables, for some reason, fail to undergo metrically determined processes. We have no formal explanation to offer in this paper, but this does not affect our claim that the absence of final lengthening cannot be attributed to extrametricity.

⁴ The expectation that a heavy syllable in second position does not disturb the pattern is borne out (cf. *iyandikápa*). Since length is only echoed once, the other relevant type is with a heavy syllable in third position. We expect V-V:VC-V-V... with a short vowel in fourth position. However, Carib does not seem to have relevant examples of this type (there are no underived forms with a closed syllable in third position).

⁵ There are only twelve cases without vowel length in the second syllable in three-syllable words: *warakáng* 'water jug' (loan), *pa:poró* 'all', *pa:potá* 'past', *i?muré* 'son', *pixpisi*, *toxkoró*, *pezokó* 'diff. species of birds', *pixkiri* 'species of very small fish', *pixtoróng* 'swish', *nixkast* 'type of arrow' *ixaró* 'cold' and *típoróné* 'being able to swim' (probably a reduced derived form).

3.2. *Prefixation*. Most prefixes in Carib are personal prefixes and can be added both to stems and suffixed forms. What we can observe is that prefixes respect previously assigned structure (or length) and therefore must be added after stress assignment. Consider the examples in (14):

- (14) a *tu:ru:po* 'heart' *i-tu:ru:po* 'his heart'
 b *a:ro* 'to take' *k-a:ro:ko* 'you must take me'
 c *kura:ma* 'look after' *ki-kura:ma:ko* 'you must look after me'

Both the first and the second vowel of the stem can be long in the prefixed forms. This is only compatible with a cyclic interpretation. Furthermore, the vowel of a prefix is always dropped before a V-initial stem (i.e. *kí-* and *k-* are the same prefix) and before stress is assigned. Consider the derivations in (15):

- (15) a $(. *) \quad (. *) \quad (. *) \quad (*)$
 $tu:ru < po > \rightarrow i+tu \text{ ru}po = i:tu:ru:po$
 b $(. *) \quad (. *) \quad (. *)$
 $aro+ko \rightarrow aro < ko > \rightarrow k+aro < ko > = karo:ko$
 c $(. *) \quad (. *) \quad (*) \quad (*)$
 $ku:rama+ko \rightarrow ku:rama < ko > \rightarrow ki+ku:rama < ko >$
 $= kiku:ra:mako$

Note that in the derivations given the iamb on the prefix cycle overwrites the weak daughter of the iamb created on the first cycle. This violates the Free Element Condition proposed in Prince (1985) and adopted in Halle and Kenstowicz (1991). We can avoid 'overwriting' the stem cycle foot, if we assume that prefixes erase all structure. This implies, however, that iambic lengthening must be applied before prefixation to preserve the length information assigned on the previous cycle.

Suffix vowels can also undergo iambic lengthening, as can be seen in (16):

- (16) a $(. *) \quad (. *) \quad (. *)$
 $ani?ma+ta < ke > \rightarrow si+ani?mata:ke \rightarrow s+ani?mata: < ke >$
 $= sani?matá:ke$ 'I will spoil it'
 b $(*) \quad (*) \quad (*)$
 $wo:+ta < ke > \rightarrow si+wo:ta < ke > \rightarrow siwo:ta < ke >$
 $= siwo:také$ 'I will kill him'

In the first form the suffix *-take* is in the appropriate environment for iambic lengthening.

As yet we have not found an explanation for the peculiar behavior of these words. In odd-numbered words CVC behaves initially as light with respect to iambic lengthening, but as heavy with respect to accent placement (*sambú:ra* not **sambu:rá* and *ma?má:takara* not **ma?ma:taká:ra*). It should be noted, however, that in the (presumably innovative) dialect of other speakers of Carib (Hoff (p.c.) and Peasgood 1972) the expected pattern is realized. Further research is to be carried out to shed more light on the metrical structure of odd-numbered words with an initial closed syllable. In isolation these cases perhaps point to a quantity-insensitive (trochaic) analysis (as proposed by Inkelas), but then the fact remains that a trochaic analysis is at odds with the phenomenon of lengthening as such (which is closely linked to iambic footing), with the pattern of even-numbered words (e.g. *kangkasá:pa*) and with the elimination of these cases in innovative dialects. We will return to these points in section 5.

3. *Derived words*

3.1. *Suffixation*. As already noted bisyllabic stems do not show a contrast in vowel length: the initial vowel is always long and the second, being final, is short. However, when a suffix is added two patterns emerge (cf. (5)). Obviously, stress assignment does not respect previously assigned structure, otherwise we predict **a:piró*, as illustrated in (12a). Derivations should run as in (12b) and (12c):

- (12) a $(*) \quad (*)$ b $(. *) \quad (. *)$
 $a < pi > \rightarrow a:pi < ro > = *a:piró$ / $a:pi+ro/$ / $a:pi < ro > = a:pi:ró$
 c $(*) \quad (*)$
 $/ka.mi+ro/$ / $ka.mi < ro > = ka.miró$

It seems that there are two options to derive the stress pattern of these derived words: (i) stress assignment is ordered after suffixation (i.e. there is no stem cycle) or (ii) the suffix erases structure. In both cases iambic lengthening may not be applied before the suffix is added. It is not possible to decide between these two since the result is always the same. In general we can say that the length pattern is only changed when a suffix is added to a bisyllabic stem. In longer words the length pattern of the stem appears in the suffixed form *kowa:ró* 'very small', *kowa:ronó* 'a very small one':

- (13) $(. *) \quad (*)$
 $/kowato+no/$ / $kowato < no > = kowa:ronó$

3.3. *The suffix -ri*. There is one suffix that can disturb the stress pattern of the stem completely: the suffix *-ri* which can be added to nouns, indicating possession. The suffixed form can be input to personal prefixation.

Hoff and Inkelas observe that stems beginning with C behave differently from stems beginning with V when *-ri* is attached:

- (17) a para:pi para:pi:ri 'bowl' 'bowl of ___'
 b are:pa ere:pa:ri 'cassava bread' 'cassava bread of ___'

In (17a) the V-V pattern is shifted to a V-V pattern in the derived form whereas the iambic pattern is retained in (17b). The suffix causes its base to behave as if there is an initial long vowel, provided that the base starts with a consonant. The key question is why V-initial words fail to be subject to this effect. To explain this difference we propose that the suffix *-ri* introduces a prefixal empty V-slot, which is (like all prefix vowels) deleted before an initial vowel, so that it only has an effect in C-initial words. The 'suffix' *-ri* in this analysis is a circumfix.

Now the question arises at what level of affixation this circumfix is added. If the circumfix is added at the level of prefixation, we have to assume that all previous structure is erased. But moreover, Iambic Lengthening may not be applied, since then we would expect to find **pa:ra:pi:ri*. Since prefixes normally preserve the length of the stem, this option must be rejected. The alternative is to assume that the circumfix is added at the level of suffixation before Iambic Lengthening is operative. Again, as was also the case with suffixation, it is not possible to decide whether stress assignment is cyclic at the suffix level or whether stress assignment is postponed until all suffixes are added. Both options give the same result, as long Iambic Lengthening is ordered after all suffixes have been added. Consider the following derivations:

- (18) a (.*) b (.*)
 parapi → para < pi > = para:pi arepa → are < pa > = are:pa

- (19) a (.*)(.*) b (.*)
 [v[para:pi]ri] → v parapi < ri > [v[arepa]ri] → φ-erepa < ri >
 = pa:ra:pi:ri = ere:pa:ri

There are several points which lend plausibility to this circumfix analysis. First, there are other (overt) discontinuous affixes in Carib. For instance: *i...-xpa* as in *i-rombi-xpa* 'not dying'.

Second, with respect to personal prefixing Hoff observes:

"Personal prefixing in nouns is not applied to the monomorphemic forms, but to the members of this syntactical *ri*-category; e.g. *kurɪyara* 'canoe', *a-kurɪyara-ri* 'your canoe'. As both the 1st person and that of the 3rd person have a zero-alternant, nouns with *-ri* permit a personal as well as a non-personal interpretation, e.g. *ku:riyara-ri* both 'canoe' and 'my canoe'" (Hoff 1968:75, fn. 14).

Hence other forms with *-ri* indeed have an overt prefixal vowel: *a ... ri* 'your...' and *Ø ... ri* 'my/his...'. Notice that the *a...ri* circumfix has the same effect on the stress pattern, cf. *a + sap:to + ri* - *asa:pa:to:ri* 'your shoe'.

Third, in Macushi, also a member of the Cariban language family, there is a discontinuous affix *u...ri*: indicating first person singular, alienable possession. Macushi can be analyzed as an iambic language with vowel deletion of the non-heads instead of vowel lengthening of heads (Visch 1991): /wanamari/ 'mirror' becomes [wanamri]. 'my mirror' is derived from /u-wanamari-ri/ which becomes [wanamari]; the prefix vowel is lost since it is a weak member of the iambic foot.

4. *Inkelas*' (1989) analysis

Inkelas (1989) claims that since length is predictable on the basis of the stress pattern, stress in Carib is quantity-insensitive. This decision determines the choice of the foot type: the syllabic trochee. Inkelas, then, proposes a rule of trochaic lengthening.

Assuming syllabic trochees, there is only one option to derive the two different patterns. The odd-numbered patterns are regular. To derive the even-numbered patterns the first syllable must be skipped somehow. Inkelas proposes to ignore the first mora. This means that the first syllable is completely left out of consideration if it is monomoraic. In the theory of Inkelas 'extrametricality' is one instance of a mismatch between a morphological domain and a prosodic domain to which, in this case, the stress rule applies:

$$(20) \quad \begin{array}{c} \wedge \\ s \quad w \quad s \quad w \\ \wedge \end{array} \rightarrow a[saparapi] = asa:para:pi$$

If the vowel of the first syllable is underlyingly long in the odd-numbered patterns, the second mora of the first syllable is still visible for the stress rule:

$$(21) \quad \begin{array}{c} \wedge \\ s \quad w \quad s \quad w \\ \wedge \end{array} \rightarrow a[arawata] = aa:rawa:ta \quad (aa: \text{reduces to } a:)$$

Inkelas does not give derivations for bisyllabic stems, but we assume that she will claim that the prosodic word domain may not be smaller than the morphological domain if the result is an unstressable unit. Hence a word like *api* will not lose its first mora:

$$(22) \quad a \quad \begin{array}{c} \bigwedge \\ s \quad w \\ [api] \end{array} \quad b \quad \begin{array}{c} \bigwedge \\ s \quad w \\ /ka:mi/ \rightarrow ka[ami] \end{array}$$

Derivations of derived words are quite similar:

$$(23) \quad \begin{array}{c} \bigwedge \\ s \quad w \\ /kowaro + no/ \end{array} \quad ko[warono] = kowa:rono$$

As in our analysis, prefixes must attach after stress assignment since length is found on the same syllable as in the stem, although we must add that the monosyllabic foot is somewhat peculiar in view of the template of the syllabic trochee, which is essentially bisyllabic:

$$(24) \quad \begin{array}{c} \bigwedge \\ s \quad w \end{array} \quad \begin{array}{c} | \\ s \quad w \\ k[ura:mako] \end{array} = kiku:ra:mako$$

For the special behavior of the suffix *-ri* Inkelas has a rather ingenious account. Recall that stems beginning with C behave differently from stems beginning with V when *-ri* is attached: *para:pi* - *para:piri*, but *are:pa* - *are:pari*. Since the stress pattern can be disturbed, Inkelas concludes that stress is assigned directly to the suffixed form. Furthermore, it seems that in C-stems the first mora is visible for the stress rule in the derived form whereas in V-stems it seems invisible. To explain this difference behavior Inkelas proposes to split up mora-invisibility into C-invisibility and V-invisibility. In derived words like *para:piri* the consonant must be visible, which blocks V-invisibility. V-invisibility can only arise if the C is also invisible. According to Inkelas suffixes like *-ri* (called strong) have a prosodic template which does not allow C-invisibility: [[]_p ri]_p. The derivations are as in (25):

$$(25) \quad a \quad \begin{array}{c} \bigwedge \\ s \quad w \quad s \quad w \\ [[para:pi]ri] \rightarrow para:piri \\ = pa:ra:pi:ri \end{array} \quad b \quad \begin{array}{c} \bigwedge \\ s \quad w \\ [[are:pa]ri] \rightarrow a:re:pa:ri \\ = ere:pa:ri \end{array}$$

In (25a) V-invisibility is blocked since the vowel is not peripheral. In (25b), however, V-invisibility can apply since there is no consonant which prevents this.

5. Comparison and conclusion

The foregoing presents the basic elements of Inkelas' analysis. Besides some empirical problems we encounter (cf. below), our main point of criticism is that Carib is qualified as quantity-insensitive. There are two problems here: the (role of) underlying length and the stressing (and influence on length patterns) of heavy syllables.

Although Inkelas claims that vowel length is predictable, she must still stipulate an underlying length contrast, which influences footing, to derive the two patterns. First, we do not expect such a length contrast in what is claimed to be a quantity-insensitive system. Second, it is suspect that Inkelas must postulate underlying long vowels for words with the trochaic pattern, which is basic according to Inkelas (cf. (21)). In a quantity-sensitive iambic analysis, on the other hand, it is expected that underlying length will influence footing, and moreover that a long vowel in the initial syllable will give rise to trochaic patterns. Finally, as noted before, lengthening of heads is a process that typically occurs in iambic languages, not in (syllabic) trochaic languages.

The fact that Inkelas ignores the weight of closed syllables has two more consequences. First, closed syllables can influence the length pattern, which is not predicted by Inkelas. And secondly, the analysis cannot form the basis of an analysis of accent placement. For the first point, consider an example we discussed earlier, *kangkasá:pa* 'lizard':

$$(26) \quad \begin{array}{l} \text{Inkelas} \\ \bigwedge \\ s \quad w \\ ka[ngkasapa] \\ = *kangka:sapa \end{array} \quad \begin{array}{l} \text{Iambic analysis} \\ (*) \quad (\cdot \quad *) \\ kangkasa < pa > \\ = kangkasa:pa \end{array}$$

Recall that this length pattern is the only available pattern for four-syllable words. Inkelas is not capable of deriving length correctly in (26) since the first mora is always ignored.

This has of course its consequences for accent placement. Although we did not present an analysis of accent placement (we just said that only two feet are assigned) a rule like 'head of second foot or final syllable' gives the right result. However, in Inkelas' analysis we cannot derive the accent on the basis of the foot structure. Consider the following example, *oxkatómbó*:

(27) $\overset{\wedge}{s \ w}$ [skatombo] = *oxka:tombo 'spirit of the dead'

In this example length is derived on the second syllable, which is incorrect for words of this type, but also the placement of accent is puzzling. A formulation like 'head of second foot or final syllable' cannot be used in her analysis.

By ignoring syllable weight Inkelas is capable of deriving the unexpected length found in the majority of odd-numbered words with initial CVC, which is puzzling for us. However, the only pattern of four-syllable words cannot be derived. Moreover, initial diphthongs seem to behave the same in odd-numbered words but are treated differently by Inkelas:

(28) a $\overset{\wedge}{s \ w}$ sa[mbura] = sambura b $\overset{\wedge}{s \ w}$ a[imara] = *aimara (aima.ra)

Inkelas is not capable of deriving the correct pattern in words with diphthongs.

We conclude that an analysis making use of the syllabic trochee is problematic in that syllable weight is neglected, which leads to empirical problems, but also because lengthening of vowels in strong position is more typical of iambic systems. Finally, this type of analysis is incapable to incorporate accent placement in a simple manner. The iambic analysis is better qualified to deal with these problems.

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