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NONSYLLABIC VOCOIDS*

John M. Clifton

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1 Introduction

It has long been recognized that syllabic [i u] and nonsyllabic [y w] are related. In discussing Saussure's Mémoire sur le système primitif des voyelles dans les langues indo-européennes, Anderson (1985) notes that:

"The most famous aspect of this system was the theory of 'coefficients sonantiques'; these were the elements, like the liquids and nasals and the high vowels/semivowels (i/y, u/w), which could be realized either as vowels (when surrounded by consonants) or as consonants (when preceded by a vowel)." (p. 20)

Anderson also discusses Saussure's idea that a universal inventory of phonetic segments, called 'phonetic species', have various manifestations, called 'phonemes', depending on their position within the syllable.

"Specific phonemes are the positional realizations of phonetic species, where the variations among them are due primarily to general phonetic, rather than language-particular, principles. Fundamentally, it is syllabic organization that is being idealized away from here... For example, one of the recurring examples of different phonemes belonging to the same species is Saussure's description of (prevocalic, onglide) [y], (vowel) [i], and (postvocalic offglide, or second element of a diphthong) [i̥] as members of the same species [I]." (Anderson 1985:39)

Working within a framework in which segments are interpreted on a language specific basis, Pike (1947:129) arrives at similar conclusions.

"The sound types just listed [high vocoids, retroflexed central vocoids, voiceless vocoids, lenis voiced velar fricatives - JMC] will function as consonants or vowels according to the place in which they occur in basic phonological and grammatical units of the particular language under consideration, and according to the structural pressure exerted upon them in these positions by structural analogies."

Chomsky and Halle (1968:408), on the other hand, attempt to characterize the universally preferred consonant positions.

"...in word initial position the conventions select true consonants as the unmarked segments, vowels as the fully marked segments, and glides and liquids as intermediate in complexity. After a consonant, vowels are fully unmarked and glides fully marked. After a vowel, true consonants are fully unmarked and vowels fully marked. We might easily extend these rules to distinguish additional cases."

Working within a nonlinear theory of syllable structure, Mohanan (1986:29-31) proposes an analysis of syllabic consonants and semivowels in English following Kiparsky's (1982) suggestion to return to the position in Chomsky and Halle (1968) in which all redundant information is eliminated from underlying representations. Mohanan's analysis of semivowels is that:

"the nonsyllabic /i/ and /u/ in words like yam and wet are marked in the underlying representations as nonheads [i.e. [-syll]¹ - JMC], and all other segments are unspecified for syllabicity..." (1986:30)

The unspecified segments that are vocalic ([+son, -cons]) are then marked as heads, that is, [+syll]. In other words, Mohanan claims (at least for English) that the unmarked state for high vocoids is [+syll].

In this paper, I will examine a number of New Guinean languages in an attempt to show that this analysis is too simplistic. When determining the markedness of a given segment, it is necessary to examine both paradigmatic and syntagmatic relationships. Paradigmatically, it is undoubtedly true that a nonconsonantal sonorant (i.e. vocoid) unmarked for syllabicity is [+syll]. Syntagmatically, however, there are a number of environments in which a vocoid unmarked for syllabicity is [-syll]. In section 2, I discuss a number of environments in which the unmarked status of a vocoid is [-syll]. Then in section 3, I outline factors which interact with these environments, resulting in syllabic segments where nonsyllabic vocoids are more natural.

2 Factors resulting in nonsyllabic vocoids

2.1 Unmarked consonant position

It is commonly asserted that certain positions within a phonological string are generally filled by consonants, while others are generally filled by vowels. If vowels are [+syll], while glides are [-syll], Chomsky and Halle's observations referred to in the Introduction involve the claims that the unmarked feature for high vocoids is [+syll] after a consonant, but [-syll] in word initial position and after a vowel. These observations capture the distinctions evident in the following data from Kope (Clifton 1987a:4).

(1)	[idi <u>ɪ</u> so]	'to drink'
(2)	[me <u>ə</u> sa]	'good'
(3)	[¹ amaga <u>u</u> ri] ²	'to jump'
(4)	[ma <u>ʊ</u> sa]	'sibling'

The underlined vocoids in (1-2) are syllabic since they follow consonants. In (3) the [¹] is nonsyllabic since it is word initial, and in (4) the [ʊ] is nonsyllabic since it follows a vowel.

The phenomenon illustrated in the above discussion can be accounted for by the following processes.³

Word Initial Nonsyllabification (WIN)⁴

A word initial high vowel is [-syll] before another vowel.

Post Vowel Nonsyllabification (PVN)

An intervocalic high vowel is [-syll].

The term 'nonsyllabification' indicates that an unmarked vocoid does not receive the default specification [+syll]. It is important to note that neither WIN nor PVN refer to syllable structure. Mohanan (1986), following Clements and Keyser (1983), argues that syllable structure is predictable given that each segment is marked for the feature [syll]. Obviously, the value for the feature [syll] cannot be determined for a given segment in relation to the syllable structure if this syllable structure is dependent on the value for [+syll] for each segment.

It is also interesting to re-examine the English words wet and yam, as opposed to Iago. As mentioned in the Introduction, Mohanan (1986) claims the initial glide in wet and yam must be marked in the lexicon as [-syll] on the assumption that the unmarked state for vocoids is always [+syll]. The syllabic [i] in Iago, on the other hand, is

unmarked for Mohanan. These claims seem to be counterintuitive - Iago, not yam, seems to be the aberrant form in English. These intuitions are predicted by WIN since it claims word initial vocoids are naturally non-syllabic.

One other situation not accounted for by WIN or PVN is found in languages in which closed syllables are allowed. Because there are no closed syllables in Kope, the unmarked value for a vocoid after a consonant is [+syll]. The following data from Mianmin (Smith and Weston 1974) illustrates the situation is different in a language which allows closed syllables.⁵

(5)	/w <u>as</u> /	'drum'
(6)	/awitn <u>in</u> /	'star'
(7)	/ikamw <u>al</u> /	'married couple'
(8)	/am <u>un</u> /	'stomach'

The nonsyllabic nature of the /w/ in (5-6) is predictable from WIN and PVN, respectively. The nonsyllabic /w/ in (7), on the other hand, cannot be accounted for by either process. Since, however, closed syllables are allowed in Mianmin both in word final position, as in (5-8), and in word medial position, as in (6), the nonsyllabic nature of the /w/ in (7) is to be expected. The /u/ in (8), on the other hand, must be syllabic since there is no vocoid following it to become the peak of the syllable. This situation is accounted for by the following process.

Post Consonant Nonsyllabification (PCN)

A high vocoid is [-syll] when following a consonant and preceding a vowel.

Just as WIN and PVN do not refer to syllable structure, PCN does not refer to syllable structure. PCN will only be found, however, in languages in which closed syllables are permissible. This is because the nonsyllabic /w/ in a form like (7) means that the preceding consonant must either close the preceding syllable, or be part of a syllable initial consonant cluster. Since in Kope neither syllable type is possible, a form like (7) would be impossible. In a language allowing closed syllables, on the other hand, the application of PCN is not only possible, but expected.⁶

In summary, then, the unmarked value for vocoids is nonsyllabic before another vocoid in the following positions: word initial; after a vocoid; and, in languages with closed syllables, after a consonant.

2.2 Relative vowel height

McElhanon (1967) shows that in Selepet syllabification of vocoid sequences is determined by the relative articulatory position of the members of the sequence. Selepet has six vowels as indicated in (9).

- (9)
i	u
e	o
a	ɔ

These six vowels can pattern in sequences with few restrictions. Representative examples involving /a/ and /e/ are shown in (10-16).

- (10) /ie ei/ a. [si\$ep si\$ep] 'kind of bird'
b. [mem kepe¹] 'hold it and twist it!'
- (11) /ia ai/ a. [si\$ap] 'it burned'
b. [ka¹de] 'kind of weed'
- (12) /ue eu/ a. [lu\$e lu\$e ¹ap] 'it howled'
b. [ge^una^o] man's name
- (13) /ua au/ a. [huhu\$aksap] 'he smashed himself'
b. [ba^u] 'pig'
- (14) /ea ae/ a. [he\$ak] 'breath'
b. [ga^ek] 'let him come!'
- (15) /oa ao/ a. [go\$aksom] 'bending over'
b. [ka^ok] 'white'
- (16) /eo oe/ a. [gore\$ok] 'let her sew!'
b. [soho^ek] 'let him tie it!'

In (10a-16a) the sequence syllabifies as two syllables, in line with the claim that vocoids unmarked for syllabicity should be syllabic. In (10b-16b), however, the sequence consistently syllabifies as one syllable. The difference between the (a) and (b) forms is that the first vowel is higher than the second in (a) but lower than the second in (b).

One way to account for this data is to claim that the second vocoid in sequences like /au ao/ is nonsyllabic. This would involve a process that was essentially the opposite from those proposed in section 2.1 in which the first vocoid in the sequence was nonsyllabic. A second way to account for this data is by the following process of Low-High Syllabification.

Low-High Syllabification (LHS)

The sequence V_1V_2 syllabifies as one syllable if V_1 is lower than V_2 .

This process does not claim that V_1 is syllabic while V_2 is nonsyllabic. Instead, it claims that the sequence V_1V_2 makes up a single syllabic segment, similar to [ᵐb] being a single prenasalized stop. I will assume the second analysis since there are some basic differences between the situation in Selepet and the situations presented in section 2.1.

First, in the examples in section 2.1, the nonsyllabic vocoid always occurred in positions which could also be filled by a consonantal segment. This is not the case here. The nonsyllabic [ʊ] in [baʊ] 'pig' presents no problem since there are syllable final consonants in Selepet. The nonsyllabic [o] in [kaʰk] 'white', however, does present problems since there are no instances of consonant clusters in syllable final position. A similar situation arises in Kope (Clifton 1987a). Although there are no syllables closed by consonants in Kope, there are sequences similar to those seen in Selepet as illustrated in (17-18).

(17) [me¹ʂve¹] 'pineapple'

(18) [miʂhaʰ] 'rain'

Pike (1947:130) notes a similar problem in English.

"...a difficulty occurs in English, with nonsyllabic, postsyllabic [ɪ] or [ʊ] in [aɪ], [aʊ], [ɔɪ]. It is difficult to determine whether the second element of one of these sequences is a consonant or a vowel. One might affirm that [raɪ] 'rye' is analogous to [raʊ] 'rot', and so the [-ɪ] is phonemically /-y/; but one also finds [raɪt] 'write' in which one sees that the [-ɪ] does not actually parallel the [-t], after all, since one does not find *[raɪt]."

Later, he suggests this may be an instance of a 'close-knit nucleus':

"A syllable may have a CLOSE-KNIT nucleus composed of two vocoids... which acts in distribution (in the syllable) like a single simple nuclear phoneme." (p. 148, emphasis in original)

Whether these sequences are analyzed as VS or as VV which act as a single syllable nucleus, a structure must be set up which has no independent motivation.⁷ For the remainder of this section, I will refer to the phenomena outlined in section 2.1 as an SV pattern and the phenomena outlined in this section as a VV pattern.

A second characteristic differentiating the SV pattern from the VV pattern relates to the merger of phonological contrasts. In Selepet, the basic contrast between /e/ and /i/, and between /o/ and /u/ was maintained even in the VV patterns, as seen in (14b) vs. (11b) and in (15b) vs. (13b). Similar contrasts are maintained in Kope (Clifton, in progress) and Mengen (Rath 1981).

In none of these languages, however, are similar contrasts maintained in SV patterns. Instead, the S is always high. Moreover, Lichtenberk (1980) claims that in Manam /o/ raises to [w] in the environment for WIN, as shown in (19), or PVN, as shown in (19-20).

(19) /oaoa=oa/ [wawa=wa] 'white'

(20) /eoa/ [ewa] 'fire'

Turner (1986:21) makes the following observations about Manam.

"The 'front' vowels, i and e change to sound like an English 'y' and the back vowels, u and o change to sound like an English w. Of course, Manams can usually tell the difference between i and e when they sound like 'y' and between u and o when they sound like 'w'..."

Similar claims have been made for Mergen by Rath (1981). Contrasts between /u/ and /o/ are merged when they are nonsyllabic due to WIN or Lab (to be discussed in section 2.3), but not when they are nonsyllabic due to LHS.⁸

Finally, D. James (personal communication) has indicated that in the SV pattern, the S is definitely shorter in duration than the V, which is perceptually clearly the core of the syllable. In the VV pattern, on the other hand, neither V is clearly shorter than the other, and neither is clearly the core of the syllable.⁹ It seems, then, that the phenomena accounted for by LHS is different from the phenomena accounted for by WIN, PVN, and PCN.

LHS is evident in a wide variety of languages. In Indonesian, while the sequences /ia ua/ represent two syllables, the sequences /ai au/ represent one syllable. Gasaway and Sims (1977:24) state that in Girawa:

"...those clusters with a high vowel /i,u/ as second member have a single beat of prominence, while those with a high vowel as first member have two beats of prominence."

Similarly, in Numanggang (Hynum 1987:4-5) /ie ia io ue ua uo/ occur with two mora of timing, while /ei ai oi eu au ou/ occur with "slightly more than one mora of timing."

LHS applies in a large number of New Guinean languages, although there also seem to be languages like Buin (Griffin 1986) in which it does not apply. In these languages all vowels in a sequence are separate morae.¹⁰

LHS and PVN can both apply in forms such as (4) from above, repeated here as (21).

- (21) [ma\$^ua] 'sibling'

According to PVN the [^u] should be nonsyllabic because it is intervocalic. This results in the [^u] being syllable initial as shown in (21). At the same time, LHS predicts the sequence [a^u] should be a single syllable nucleus. Clifton (1987b) claims that both processes apply, resulting in an ambisyllabic [^u]. That is, the [^u] is part of the syllable nucleus of the first syllable, and simultaneously the onset of second syllable.

R. Steinbring (personal communication) provides evidence from the Yale (or Kosarek) language which indicates that in cases like (21) the application of PVN bleeds LHS. The phonetic sequences [e¹ a^e a^o o^u] are found as single syllable nuclei in Yale. The sequences [a¹ a^u], however, are not found in any form. As shown in (22), when a sequence of /a+u/ arises across morpheme boundaries it becomes [o^u].

- (22) /ia+ukap/ [io^u\$kap] 'we will come'

At the same time, sequences of [a\$^uV] arise as shown in (23).

- (23) [a\$^ue] 'garden'

Both PVN and LHS generally apply in Yale. If LHS applied in (23), however, the initial [a] should be raised to [o]. Since it is not, PVN must first apply making the [^u] nonsyllabic and bleeding LHS.¹¹ It is an empirical question as to whether in other languages both processes apply, resulting in ambisyllabic high vocoids. I have no evidence of such an application being necessary in any language, however.

A process related to LHS may apply to vowels of the same height. McElhanon gives the following examples in which both vowels are the same height.

- (24) /iu ui/ a. [pi\$^u pi\$^u] 'kind of bird'
b. [pu¹] 'chicken'

- (25) /eo oe/ a. [gore\$on] 'you sewed it'
b. [to^en] 'in the water'

Once again, in (24a-25a) each vowel in the sequence represents a separate syllable, while in (24b-25b) the two vowels syllabify together. In this case, the first vowel is front in the (a) forms but back in the (b) forms. This data can be accounted for by the following process of Back-Front Syllabification.

Back-Front Syllabification (BFS)

The sequence V₁V₂ syllabifies as one syllable if the two vocoids are the same height and V₁ is articulatorily farther back than V₂.

Variation can be seen between languages with regard to V_1V_2 sequences of equal height. In Girawa (Gasaway and Sims 1977:24) all V_1V_2 sequences syllabify as single syllables regardless of the backness of the two. The syllabification in forms like [ti^u] 'pandanas type' and [si^ur] 'mosquito' provides motivation for the following process of Front-Back Syllabification.

Front-Back Syllabification (FBS)

The sequence V_1V_2 syllabifies as one syllable if the vocoids are the same height and V_1 is farther front than V_2 .

Both BFS and FBS apply in Girawa, while just BFS applies in Selepet. Neither applies in Numanggang (Hynum 1987:5) where /iu/ and /ui/ both syllabify as two syllables as shown in [ki\$ut] 'join' and [dobu\$ɪ] 'cut a trail'. There do not seem to be any languages in which FBS but not BFS applies, however. That is, there do not seem to be languages in which a sequence of front vowel followed by back vowel is generally syllabified as a single syllable, while the reverse sequence is syllabified as two syllables.

The sequences which routinely syllabify as single syllables sometimes coalesce into a single phone. In Kope (Clifton, in progress), the final word in a noun phrase takes /-i/ suffix. Thus, [geema] 'large' becomes [geemai] when phrase final. The word [pɛ] 'canoe', however, becomes [pe], not *[pɛⁱ]. In general, /e/ is realized as [ɛ], while /ei/ is realized as [e].

Rath (1981) states that in Mengen,

"In some words the phone [o] is heard alternating with the sequence [au] in rapid speech.... This phone [o] will then be interpreted as an optional portmanteau phone of the sequence /a/ + /u/."

Rath (personal communication) also indicates that the phones [æ] and [ɔ] come from /ae/ and /ao/, respectively. This analysis is based on several factors. First, while vocoid clusters are common, there are no clusters of /ae/ or /ao/ within morphemes. Second, [æ] and [ɔ] do not cluster with other vowels. Third, there is morphophonemic evidence from reduplication, as shown in (26-28).

- (26) a. [la^u\$na] 'its leaf'
 b. [la\$la^u\$na] 'its leaves'
- (27) a. [kⁱu] 'to call'
 b. [ki\$kⁱu] 'calling'
- (28) a. [tɔ] 'to walk'
 b. [ta\$tɔ] 'walking'

Reduplication is used for pluralization and continuous tense in Mengen. As shown in (26-27), only the first part of a sequence of vocoids is reduplicated.¹² The fact that [ɔ] in (28) is reduplicated as [a] indicates it is a diphthong beginning with /a/.

To summarize, sequences of V_1V_2 generally syllabify as one syllable when V_1 is lower than V_2 , or, if they are the same height, when V_1 is farther back than V_2 . Sequences that syllabify as one syllable may further coalesce to form a single phonetic segment.

2.3 Labialization and palatalization

In many languages /u/ and /i/ coalesce with a preceding consonant when followed by another vocoid, resulting in labialized and palatalized consonants, respectively. In a sense, these high vocoids are naturally nonsyllabic in these environments. In Imonda (Seiler 1985:15) all non-final labial and velar consonants are labialized when adjacent to back vowels. Before front vowels, however, there are contrasts between labialized and nonlabialized labial and velar consonants as seen in (29-30).

- (29) a. [pete] 'coffee'
 b. [p^ueta] 'silent'
- (30) a. [xe] 'cut'
 b. [x^uef] EMPHATIC

Alveolar consonants are never labialized, but they do occur before sequences of /uV/ as shown in (31-32).

- (31) [sue] 'fire'
- (32) [tui] 'butterfly'

Labial and velar consonants, on the other hand, never occur before sequences of /uV/. From this, we can conclude that labialized consonants arise from sequences of /CuV/ where the consonant is labial or velar. The phonemic forms of (29b) and (30b) are /pueta/ and /xuef/, respectively.¹³

In Mai Brat, Brown (1987) outlines a similar process of palatalization affecting /i/. Brown describes the process as follows.

"...in the sequence C V1 V2 where C is either a non-continuant consonantal or a strident /b, t, k, m, n, s/ and V1 is /i/ and unstressed, C V1 becomes C."

Examples of this are given in (33-34).

- (33) /nió/ [ñó] 'you'

- (34) /sióx/ [s¹óx] 'fish'

In Mengen (Rath 1981), all sequences of V₁V₂ are syllabified as one syllable as shown in (35-39).

- (35) [ba\$ba¹] 'to think'
 (36) [g¹a^u] 'my name'
 (37) [k^oa¹] 'this'
 (38) [m^ue] 'snake'
 (39) [s^oa\$re] 'spirit'

LHS can account for the syllabification of [a¹ a^u] in (35-37). It cannot account for the syllabification of [i¹a^oa^ue] in (36-39), however. This syllabification is accounted for by Rath in terms of labialization and palatalization of the preceding consonant.

The labialization and palatalization illustrated above are accounted for by the following processes.

Labialization (Lab)

The vocoid /u/ (and possibly /o/) coalesces with a preceding consonant when followed by another vocoid, resulting in a labialized consonant.

Palatalization (Pal)

The vocoid /i/ (and possibly /e/) coalesces with a preceding consonant when followed by another vocoid, resulting in a palatalized consonant.

The actual class of consonants referred to by Lab and Pal will be defined on a language specific basis. They are formulated as two separate processes since they seem to occur independently in languages. Imonda exhibits only Lab, Mai Brat exhibits only Pal, and Mengen exhibits both.

3 Factors blocking nonsyllabification of vocoids

There are at least two specific factors which can block the non-syllabification of vocoids: stress and morpheme breaks. In addition, the presence of long vowels in a language can result in apparent violations of the processes outlined above, so this will also be outlined in a separate section.

3.1 Stress

A stressed vocoid will generally not be nonsyllabic even if in an environment which would normally result in nonsyllabification. For example, it was mentioned in section 2.3 that palatalized consonants were created in Mai Brat only if the /i/ was unstressed. Stress is contrastive in Mai Brat, as shown by (40-41) from Brown (1987).

- (40) a. [násom] 'you carry'
 b. [nasóm] 'your name is'
- (41) a. [máru] 'she cuts'
 b. [marú] 'lake'

The Mai Brat forms with palatalized consonants given above as (33-34) are repeated here as (42a-43a), along with minimal pairs with stressed /i/ and no palatalization.

- (42) a. /nió/ [ñó] 'you'
 b. /nío/ [ní¹o]¹⁴ 'you are tall'
- (43) a. /sióx/ [s¹óx] 'fish'
 b. /síox/ [sí¹ox] 'deceive'

The stress in (42b-43b) blocks Pal from applying.

Similar examples can be found in Mengen showing stress blocking LHS as well as Lab and Pal. Rath (1981:24) indicates stress is non-phonemic, although the following minimal pair differentiated only by stress is noted.

- (44) a. /ílo/ 'fish species'
 b. /iló/ 'type of dance'

More recently, Rath (personal communication) has found more extensive stress differences, and so now analyses stress as contrastive. This contrastive stress differentiates syllabic from nonsyllabic vocoids in (45-46).

- (45) a. /mué/ [m^ué] 'snake'
 b. /soáli/ [s^uáli] 'bad'
 c. /gúa/ [gú\$á] 'ginger'
 d. /bóalala/ [bó\$alala] 'taro species'
- (46) a. /táina/ [tá¹\$na] 'banana species'
 b. /taína/ [ta\$í\$N^] 'taro species'

Lab applies in (45a-b), resulting in the initial consonant coalescing with the following back vowel. Stress blocks Lab in (45c-d), however, so the back vowels remain syllabic and form a separate syllable. Similarly, LHS applies in (46a), resulting in the diphthong [a¹]. Once again,

stress on the high vowel in (46b) blocks LHS so the /i/ forms a separate syllable.

The forms in (46) are relevant to the arguments presented in section 2.2 regarding the status of diphthongs such as [a¹]. It was argued there that the two parts of the diphthong were in some sense equal. They are not, however, equal in regard to stress. While stress on the high vocoid will block LHS, stress on the low vocoid will not. This suggests that in some way it may be the high vocoid that is made nonsyllabic by LHS.

In summary, a stressed vocoid will be syllabic even if it occurs in an environment in which the unmarked value for the vocoid is [-syll]. It should be noted that no instances have been found of stress blocking WIN or PVN. Whether this is significant or accidental is not clear.

3.2 Morpheme breaks

In many instances, sequences across morpheme boundaries syllabify in the same way as do sequences within a morpheme. Seiler (1985:18) uses this fact in Imonda to justify his analysis of diphthongs as phonemic vowel sequences. Notice the following examples.

- (47) /kau/ 'chin'
- (48) /sue la-u/ 'light a fire!'
 fire light-IMP
- (49) /ka-m fa-ai-h-u/ 'give me!'
 l-GL CL-give-REC-IMP

Seiler notes that while the /u/ in (48-49) represents the same morpheme, it is syllabic in (49), but nonsyllabic in (48) just as it is nonsyllabic in (47). It is clear that in Imonda LHS applies both within morphemes and across morpheme boundaries.

In other instances, however, a morpheme boundary does seem to block nonsyllabification. Lichtenberk (1980:14-15) formalizes three rules in which vowels are desyllabified word initially or postvocally when before another vowel. All three, then, are language specific realizations of the processes of WIN and PVN. In each case there is a condition that "no morpheme boundary intervenes between the focus [the vowel to be nonsyllabified - JMC] and the following (vowel)." Clifton (1987:8) notes a similar constraint on WIN in Kope.

The interplay between morpheme boundaries and the nonsyllabification processes raises interesting questions in the analysis of Selepet vocoid sequences. As noted in section 2.2, the syllabification of most vocoid sequences is predictable in Selepet in terms of LHS and BFS. McElhanon (1967) does, however, find contrasts in syllabification for certain sequences as shown in (50-51).

- (50) a. [i^hek] 'look at them!'
 b. [si\$ep si\$ep] 'kind of bird'
- (51) a. [i^hok] 'he'
 b. [i\$ok] 'let him sleep!'

In McElhanon's analysis, forms (50b-51b) are the expected forms since he assumes all sequences of V_1V_2 should syllabify as two syllables when V_1 is higher than V_2 . Therefore, McElhanon claims the nonsyllabic vocoids in (50a-51a) are entered into the lexicon as semivowels.

If, however, WIN and PVN also apply in Selepet, (50a-51a) are natural forms since the high vowel is in word initial position. Form (50b) is also natural, since the high vowel is not in word initial position and, as noted above, V_1 is higher than V_2 . It is form (51b) that is apparently problematic since the word initial high vocoid is syllabic. It may be possible, however, to account for this form in terms of morpheme boundaries. According to McElhanon (1970:21), /+ok/ is the morpheme for the 'inchoative future' ('let him ...!'). If we assume WIN is blocked in Selepet by a morpheme boundary, an underlying morphemic structure of /i+ok/ would result in (51b).

The claim that a morpheme boundary blocks WIN does not mean it blocks all the nonsyllabification processes outlined above. In particular, forms like (52) indicate that boundaries do not block LHS.

- (52) [ga^hek] 'let him come!'

McElhanon (1970:21) indicates that the 'inchoative future' is /+ok/ following high and mid vowels, but /+ek/ following low vowels. In (52) the sequence /a+e/ is realized as a single syllable even though it occurs across a morpheme boundary.

The discussion of Selepet points out a difference between stress and morpheme boundaries. As noted in section 3.1, stress seems to block LHS, Lab, and Pal, but not WIN or PVN. Morpheme boundaries, on the other hand, seem to block WIN and PVN but not LHS, Lab, or Pal. Once again, it is unclear whether this difference is accidental or not.

3.3 Long vowels

Long vowels do not actually block nonsyllabification. They may, however, set up surface contrasts in syllabification. Clifton (1987a:8) gives the following forms from Kope which seem to show contrastive syllabification.

- (53) a. [u^he] 'arrow type'
 b. [u.e] 'sugar cane'

As the vast majority of syllabification is predictable, however, these contrasts are suspect. In accounting for the contrasts Clifton

(1987a:10) gives the following examples showing vowel length is contrastive in Kope.

- (54) a. [abea] 'father'
 b. [abeea] 'sago squeezing bag'
- (55) a. [obo] 'water'
 b. [oobo] 'woman'
- (56) a. [tutu] 'handle'
 b. [tutuu] 'long'

Given this contrast between long and short vowels, Clifton (1987a:13) analyses the contrasts in (53) in terms of vowel length as shown in (57).

- (57) a. /ue/ [u^ue] 'arrow type'
 b. /uue/ [u\$^ue] 'sugar cane'

In (57a) the initial /u/ is nonsyllabic due to WIN, resulting in a monosyllabic form. In (57b), on the other hand, the second /u/ is nonsyllabic due to PVN. This, in turn, blocks WIN from applying to the initial /u/. Thus, a surface contrast in syllabification can be attributed to an underlying contrast in vowel length.

4 Conclusion

Mohanan's claim that the unmarked state for all vocoids is [+syll], that is, syllable peaks can best be viewed as a paradigmatic condition. That is, in the absence of environmental conditioning, a vocoid will be syllabic. In the case of sequences of vocoids, however, it seems syntagmatic factors frequently dictate that they are syllabified as less than the maximum number of syllable peaks. In these environments the paradigmatically preferred state is seen only when the 'nonsyllabification' of vocoids is blocked by various conditions such as stress or morpheme breaks.

NOTES

* Many of the ideas for this paper were first presented in Clifton (1987b), and were further developed in workshops in the Papua New Guinea branch and the Irian Jaya program of the Summer Institute of Linguistics. Special thanks go to Dottie James, Eileen Gasaway, and Duane Clouse for input.

1. I will use the feature [-syll] to refer to segments which Clements and Keyser (1983) would have attached to a C node, and the feature [+syll] to refer to segments which they would have attached to a V node.

2. In phonetic transcription, raised vowel symbols will generally be used to indicate nonsyllabic vocoids. In phonemic transcription, nonsyllabic vocoids will generally be represented by the semivowels y and w before another vocoid, and by normal vowel symbols after another vocoid. Syllable boundaries will only be shown when relevant to the discussion.

3. The term 'process' is not used here as a theoretical concept. What is referred to as a process may be a morpheme structure constraint, a lexical rule that fills in unspecified features (Kiparsky 1982:59-65), or part of some 'principles of headship' (Mohan 1986:30).
4. WIN and PVN are combined as a single process in Clifton (1987a:8).
5. Tone has been omitted from the examples as it is not relevant to the discussion.
6. In a language with closed syllables, we would also expect high vocoids to be nonsyllabic before a consonant following a vocoid. As will be shown in section 2.2, however, high vocoids following another vocoid are generally nonsyllabic even in languages which do not permit closed syllables. Thus, there is no need for a separate process to account for the nonsyllabicity in this environment.
7. McElhanon (1967:9) makes it clear that the claim that the sequence [a^u] in [ba^u] 'pig' is a complex (i.e. close-knit) nucleus does not mean the syllable structure is simply CV. Instead, McElhanon's inventory of syllables includes VV, VVC, CVV, and CVVC. If LHS is formalized within CV phonology (Clements and Keyser 1983), the new structure would be a branching V node.
8. The situation regarding front vowels is unclear. Examples like /eala/ 'that one' and /lea/ 'fish' are given in which it is unclear whether or not the /e/ is syllabic, and whether or not it merges with /i/.
9. Strictly speaking, these claims imply that the phonetic transcriptions above are incorrect since they show the second vowel as nonsyllabic. In section 3.1, however, evidence is presented that the high vowel is in some way subordinate.
10. There is some question as to whether each vowel is a separate mora phonetically or whether each vocoid must be counted for processes like stress assignment whether or not they are separate mora. If it is the second, it simply means LHS may in fact apply in Buin.
11. This implies that LHS must be sensitive to syllable structure created by PVN.
12. It will be shown in section 2.3 that the /i/ in [kⁱu] is realized as palatalization on the /k/. In a reduplicated prefix, however, it is syllabic.
13. Seiler gives the phonemic form of (30) as /huef/, but indicates that /h/ generally represents a velar fricative.
14. The [ʰ] in (42b-43b) is transitional according to Brown.

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