

# Word Minimality in Bella Coola as evidence for moraic onsets\*

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## 1. Introduction

In this paper, I explore Bella Coola Word Minimality which is satisfied by words such as VV, VC and surprisingly CV. V words on the other hand are banned. Standard moraic theory approaches cannot capture these facts since they cannot differentiate between V and CV words, both of which are considered light monomoraic (Hayes 1995). Other alternatives, such as approaches requiring bisegmental minimal words also fail for reasons that will be presented shortly. I will argue that Bella Coola provides evidence that onset moraicity needs to be admitted, although in a very restricted environment, namely whenever WDMIN would be put at risk. When WDMIN is not at stake, then moraic onsets fail to emerge, a fact confirmed by Root Maximality (RtMax) data [N.B: In what follows, I use WdMin and RtMax as shorthand to describe the set of relevant facts and WDMIN and RTMAX for the corresponding constraints].

## 2. Data and issue under examination

### 2.1 Basic Facts

I will first begin the discussion by presenting a few basic facts about Bella Coola (henceforth BC) based on Bagemihl (1991) and Bagemihl (1998) (B91 and B98 respectively). (1) lists the Bella Coola inventory.

(1) Bella Coola inventory [N.B: *c* is an alveolar affricate, *ʈ* is a lateral fricative]

p	t	c		k	k <sup>w</sup>	q	q <sup>w</sup>	
p'	t'	c'	ʃ'	k'	k' <sup>w</sup>	q'	q' <sup>w</sup>	ʔ
		s	ʈ	x	x <sup>w</sup>	ʒ	ʒ <sup>w</sup>	(h)
m	n		l	y	w			
m̥	n̥		l̥	i	u			
				a				

Syllables are maximally TRV:C, e.g. *c'wiiχ<sup>w</sup>* “having grey hair” (B91: 619), where T=obstruent, R=sonorant. Only vowels and syllabic sonorants can serve as nuclei in the language e.g. *k<sup>w</sup>it'* “to pry loose” (B98: 75) or *tʈq<sup>w</sup>* “to swallow something” (B98: 79). Singleton obstruents syllabify either as onsets or codas - in which case they are moraic - but extra obstruents remain unsyllabified as

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illustrated in (2). Importantly, a single V or C cannot form a word, because these fail WdMin. In contrast, in addition to VV, CV and VC words, words of the CC shape, i.e. with unsyllabified consonants, also satisfy WdMin.

- (2) *Sequences with unsyllabified consonants* [unsyllabified consonants indicated in bold]
- |    |                     |                         |            |
|----|---------------------|-------------------------|------------|
| a. | st̩                 | “tree”                  | (B91: 609) |
| b. | sq <sup>w</sup> cił | “ventral posterior fin” | (B91: 609) |
| c. | c’klakt             | “ten”                   | (B98: 78)  |
| d. | cipsx               | “fisher”                | (B98: 80)  |

Due to the lack of space, I will only briefly summarize the evidence B91 offers for unsyllabified segments. Detailed argumentation can be found in that work. First, obstruents cannot be nuclei. BC possesses a rich system of reduplication with lexically specified reduplicant templates: V, CV and CVC. Restricting ourselves to the CV case for illustration purposes, CV-reduplication applies when the first base nucleus is a vowel, e.g. *qayt* → *qaqayt-i* “hat → toadstool-diminutive” (B91: 598) or a sonorant, e.g. *tłk<sup>w</sup>* → *tłtłk<sup>w</sup>* “swallow → continuative” (B91: 599), but not if it is an obstruent, *kł-* → *\*kłkł-* “fall” (B91: 606). If the obstruent were a nucleus, then it should pattern among the other cases. The fact that it does not indicates that it is not a nucleus.

Reduplication also shows that obstruent clusters cannot be complex onsets either. TT clusters, as we have seen, usually resist reduplication. But whenever they undergo reduplication, a nucleus must be inserted, e.g. *łq’-* (base) → *łnq’* (n-insertion) → *łnłnq’-* (reduplication) “slap → continuative” (B91: 607). In contrast, TR-base initial clusters occur without any epenthesis, e.g. *x<sup>w</sup>nał* → *x<sup>w</sup>n<sup>w</sup>x<sup>w</sup>nał-i* “spring of water → diminutive” (B91: 615), suggesting that TT clusters pattern differently from complex onset TR ones. Furthermore, TR clusters respect sonority considerations, whereas TT ones show no similar restrictions, e.g. *sq<sup>w</sup>cił* (2b).

In cases where TT clusters are already followed by a nucleus, reduplication applies without any insertion, but again in a different fashion from that applicable to TR ones. While in TR clusters the reduplicant is placed before the base TR, in TT clusters it appears before the last member of the base TT cluster.

- (3) *Reduplication in TR initial sequences*
- |    |   |   |
|----|---|---|
| a. | <i>x<sup>w</sup>nał</i> → <i>x<sup>w</sup>n<sup>w</sup>x<sup>w</sup>nał-i</i> | “spring of water → diminutive” (B91: 615) |
|----|---|---|
- Reduplication in TT initial sequences*
- |    |  |  |
|----|--|--|
| b. | <i>p’ła-</i> → <i>p’ł<sup>w</sup>ł<sup>w</sup>a</i> <i>*p’łap’ł<sup>w</sup>a</i> | “wink, bat the eyes → continuative” (B91: 609) |
| c. | <i>tqnk-</i> → <i>tqn<sup>w</sup>qnk</i> <i>*tqntqnk</i>                         | “be under → underwear” (B91: 609)              |
- Reduplication in a combination of clusters*
- |    |   |                                 |
|----|---|---------------------------------|
| d. | <i>skma</i> → <i>skm<sup>w</sup>kma-y</i> <i>*skm<sup>w</sup>skma-y</i> | “moose → diminutive” (B91: 615) |
|----|---|---------------------------------|

Although such a distribution seems difficult to unify at a first glance, a simple generalization obtains, namely that the reduplicant is prefixed before the first base syllable. Similar effects can be shown for final TT clusters where again the final obstruent is not part of the syllable, e.g.  $\chi^w alx \rightarrow \underline{\chi^w al} \chi^w alx$  “to melt → solder” (B91: 617).

The implication of the facts above is that obstruent-only words will consist of no syllables at all, violating the Strict Layer Hypothesis (SLH), e.g.  $\mathbf{t}x^w$  “to wake somebody up”,  $c'kt$  “to arrive”,  $stx^w c'$  “cottonwood buds” (B98: 78, cf. Kiparsky 2000). Following a proposal of B91 (cf. Lin 1997 for a similar proposal in Piro), we will assume that the obstruents are licensed by the moras they carry along as well. The reason we have considered unsyllabified obstruents in some detail is because they become relevant to the RtMax facts, and these in their turn bear on the issue of moraic onsets.

## 2.2 Word Minimality

The Minimal Word facts are presented below.

### (4) Minimal word facts (B98: 87-89):

Word Shape	Examples
a. V	*
b. VV	ya “good”
c. VC	$\eta\lambda'$ “dark, night”
d. C	*
e. CV / CR	$\lambda'i$ “fast” / $c'm$ “index finger” (B98: 79)
f. CC	$tk'$ “sticky”
g. CCC	$s\chi p$ “to tie a knot”
h. CCCC	$p'\chi^w \dagger t$ “bunchberries”

Only V and C words are banned (4a, 4d), whereas anything larger than that is well formed. In accounting for these data, we can entertain two approaches: the first sees WdMin as a bisegmental requirement, the latter as a bimoraic requirement.

The first view has two possible advantages: first, it can easily account for CV words since these are evidently bisegmental; second, it can account for the potential lack of *true* long-voweled words. Observe that the example *ya* in (4b) is not one of a single long vowel, but of two separate root nodes. If one root node is understood as one segment, then words like (4b) are well-formed as they satisfy the bisegmental criterion. However, a long-voweled word includes just one root node, hence one segment. Consequently, it fails WdMin. Thus, under this approach, true long-voweled words are correctly predicted to be impermissible.

Nonetheless, there are numerous problems with this approach. For instance, the reduplication templates V, CV and CVC can all be expressed as one or two moras, but no similar generalization emerges under a segmental view. More importantly, root maximality, as we will see in section 5, is stated in moras, so it

would be desirable if WdMin and RtMax were both accounted for by the same means. This is possible by using moras, but not, as we will show, by using segments.

Finally, to my knowledge, there is no other language with purely segmental WdMin restrictions. One possible example is Yakima Sahaptin where the minimal word has been claimed to be CCV or CVC (Curtis 2003: 193-207). CVV words are nonexistent, despite the presence of CVV syllables generally in the language. One could be tempted to see this as a biconsonantal minimum, but an alternative is possible as has been pointed out to me by Moira Yip (p.c). Given that all initial clusters are invariably released (Curtis 2003: 196), that some codas are released (2003: 199) and that some illicit clusters are split by epenthetic or excrescent [i] (2003: 195), the CCV and CVC words would be more like C<sup>i</sup>CV and CVC<sup>i</sup> respectively, thus reinterpreting Word Minimality as disyllabic, therefore prosodic.

In the light of these arguments, I will discard a segment-based approach and argue that a bimoraic one is the only viable alternative. A similar proposal was taken up by Bagemihl (1998), who worked in a framework where moraic onsets were banned. To account for the existence of CV words, B98 had to make two crucial assumptions. First, all segments were considered underlyingly moraic (cf. Hyman 1985) and second, WdMin was treated as an input condition. These assumptions would permit CV words as the latter would satisfy WdMin in the input and then lose their initial mora in the surface syllabification.

But notice that these assumptions are only needed in a model where moraic onsets are absent. Instead, what I am proposing is that we need to admit moraic onsets, but only as a remedy for WdMin satisfaction. Then no underlying moraicity needs to be imposed that renders inputs unconstrained and an analysis is produced which is consistent with the Richness of the Base (Prince and Smolensky 1993/2004). Moreover, WdMin is seen as an output constraint, which buys us the fact that WdMin restrictions hold true in the output, not in the input.

Furthermore, due to the inherent violability of OT constraints, it is possible to express the fact that we will allow moraic onsets in CV-only words, but not anywhere else. Finally, and in a different vein, it seems that the presence of moraic onsets is not as costly as it would seem given that several other languages and data are consistent with or obligatorily require the use of moraic onsets. These include: Pirahã stress (Everett 1988, Gordon to appear, Topintzi 2005a), Arabela stress (Payne and Rich 1988, Topintzi 2005b), Pattani Malay initial geminates (Hajek and Goedemans 2003) and Samothraki Greek compensatory lengthening (Hayes 1989, Katsanis 1996, Kavitskaya 2002). As a result of the above, we are led to the following representations [N.B: On the significance of bracketed moras, see the next section].

(5)	Word Shape	Respects WdMin?	Prosodic Structure	
			Underlying	After Syllabification
a.	C	No	(μ)	μ

b.	CC	Yes	(μ)   C	(μ)   C	μ   C	μ   C
c.	V	No		μ		σ   μ
d.	CV	Yes	(μ)   C	μ   V		σ /    \ μ      μ          C      V

### 3. WdMin and /CV/ words - the core

The proposed analysis works irrespective of the presence of underlying moraicity. While underlying moras for vowels are assumed (cf. Hayes 1989, Rosenthal 1994, Morén 1999), for consonants I am considering cases where moras may or may not be included in the input. Note that in the tableaux that follow, the brackets surrounding the mora indicate that if they are considered, then the input is assumed to include a mora. Thus, in the case of a non-moraic input, violations of DEP-μ become relevant (although they do not alter the end result). These are also represented within brackets. The remaining violations are shared in both moraic and non-moraic inputs. This practice will be repeated again whenever it does not overburden the tableaux. I am also assuming that the ranking SonSeq >> \*Complex Onset holds that allows for TR onsets only. The constraints needed throughout are in (6). These will be justified as we proceed.

- (6) **WDMIN:** Words are minimally bimoraic  
**\*MORAIC ONSET:** Moraic onsets are banned  
**DEP-μ:** No moras are inserted in the output  
**MPARSE:** Morphemes are parsed into morphophonological constituents [Prince and Smolensky 1993/2004]  
**DEP-SEG:** No segment insertion  
**\*<sub>N</sub>BRANCHING:** Introducing new branching structures in the output is banned [cf. McCarthy 2003]

The core ranking (7) and corresponding tableau (8) for WdMin with respect to /CV/ words implement the idea that moraic onsets will only emerge so that WDMIN, a top priority in the language, is satisfied.

- (7) WDMIN >> DEP-μ, \*MORAIC ONSET

- (8) /C<sub>(μ)</sub>V<sub>μ</sub>/ --- [[C<sub>μ</sub>V<sub>μ</sub>]<sub>σ</sub>]<sub>PrWd</sub>  
WDMIN >> DEP-μ, \*MORAIC ONSET

	WDMIN	DEP-μ	*MORAIC ONSET
a. [[CV <sub>μ</sub> ] <sub>σ</sub> ] <sub>Wd</sub>	*!		
b. [[C <sub>μ</sub> V <sub>μ</sub> ] <sub>σ</sub> ] <sub>Wd</sub>		(*)	*

An extra DEP- $\mu$  violation arises when the input is /CV $\mu$ /, but this causes no change to the outcome since WDMIN >> DEP- $\mu$ .

#### 4. Larger roots

In larger roots, the idea is that WDMIN can be satisfied by other means, so although low-ranked, \*MORAIC ONSET favours candidates without moraic onsets due to \*MORAIC ONSET >> MAX- $\mu$ .

- (9) /C $\mu$ V $\mu$ C $\mu$ / --- [[CV $\mu$ C $\mu$ ] $\sigma$ ]<sub>PrWd</sub>  
 WDMIN >> \*MORAIC ONSET >> MAX- $\mu$

	WDMIN	*MORAIC ONSET	MAX- $\mu$
a. [[C $\mu$ V $\mu$ C $\mu$ ] $\sigma$ ] <sub>Wd</sub>		*!	
b. [[CV $\mu$ C $\mu$ ] $\sigma$ ] <sub>Wd</sub>			*

Of course, one may wonder how exactly we can tell that the winning candidate has no moraic onset, since empirically (a) and (b) are the same. I would like to argue that the Root Maximality facts provide such evidence.

#### 5. Root Maximality

Bella Coola roots consist of maximally 4 moras [i.e. two bimoraic feet], cf. Yoruba, Ponapean (Ola 1995). This restriction is a root restriction and does not hold on the word level, e.g. polymorphemic words such as *x<sup>h</sup>p'χ<sup>w</sup>tt<sup>h</sup>tt<sup>h</sup>s* ‘he had had in his possession a bunchberry plant’ (B98: 74) [*x<sup>h</sup>*- ‘to have, possess’; *p'χ<sup>w</sup>tt<sup>h</sup>* ‘bunchberry’; *-tt<sup>h</sup>* ‘tree, plant’; *-tt<sup>h</sup>* PLUPERFECT; *-s* POSSESSIVE). A root must be understood as a monomorphemic base to which affixes are added (B98: 91, fn. 8). Roots may occur as independent words without any affixes (B98: 93, note 18).

The pertinent question now is how we can establish that the maximality criterion is based on mora count. To argue that, I will consider alternative counting criteria and show that only mora-counting works.

- (10) Possible counting criteria applied to acceptable roots

	C-counting	V-counting	Seg-counting	$\mu$ -counting
a. c'klakt	<b>5</b>	1	6	4
b. p'χ <sup>w</sup> tt	4	0	4	4
c. p <sup>h</sup> tk <sup>h</sup> n	4	1	5	4
d. λ'iq'kt <sup>h</sup> n	4	2	6	4
e. k'anawit	4	3	7	4
f. λ'aq <sup>w</sup> akila	4	<b>4</b>	<b>8</b>	4
g. miank	3	2	5	4

N.B: Glosses for newly introduced words: *pltkn* “bark of bitter-cherry tree”(B98: 79), *Å’iqʷkŋ* “(low) dwarf blueberry” (B98: 79), *k’anawił* “bow of boat”(B98: 81) , *Å’aqʷakila* “a man’s name” (B98:78), *miank* “wide canoe” (B91:616).

The table above illustrates that the maximum of allowed consonants is 5, for vowels 4 and for segments 8. Now if it is the case that any of these criteria is the right one, then we should expect that any root that conforms to that criterion should also be attested in the language. However, although the roots below conform to the maxima above and thus should be attested, they are not. This is explained only if mora counting is considered, i.e. all of them exceed four moras<sup>1</sup>.

(11) *Unattested roots based on C-, V- or Seg- maxima*

	C-counting	V-counting	Seg-counting	μ-counting
CVCCCCV (B98: 75)	5	2	7	5
CCCCC (B98: 75)	5	0	5	5
CCCVCVCV (B98: 81)	5	3	8	5
CCVCCVC (B98: 80)	5	2	7	5

Let us now explore the effects of Root Maximality with respect to moraic onsets. First observe that roots such as **CCVCC** *sqʷatkʷ* “ashes” [B98: 76], **CVCCC** *muχʷt* “to cry huyp (a dance cry)” [B98: 75] or **CVCCCCV** *nuχʷski* “soapberries” [B98: 75] among others are admitted, because all are maximally quadrimoraic. Had the onsets counted moraicly, all these forms would either include 5 or 6 moras. Now given maximality, they should thus fail to surface. The fact that they surface, clearly suggests that onsets are not moraic with the exception of CV words.

An alternative however is available. Let us assume that onsets are consistently moraic, in which case we would merely need to revise the mora maximum to 5 or 6 moras to accommodate moraic onsets. Again this makes incorrect predictions. To illustrate, suppose we modified the limit to six moras, so that roots like CVCCCCV above are admitted [i.e. with all segments moraic]. The question would then be why roots such as **CCCCCV** or **CVCCCC** or **CCVCCC** [B98: 79-80] etc are not well-formed, although these comprise six moras too.

Evidently then **onsets are moraic only in CV roots** and the moraic limit should not be amended<sup>2</sup>. The latter is expressed with the following constraint (informally posited).

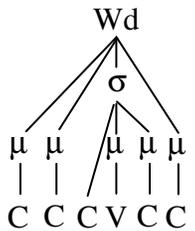
<sup>1</sup> Over 94% out of the 1169 monomorphemic roots listed in Nater (1977) conform to RtMax. Exceptions are either personal or geographic names, loanwords or possibly morphologically complex forms.

<sup>2</sup> Paul Smolensky (p.c) asks what would happen to roots that would reach the RtMax even if the onsets were considered moraic, e.g. CVCV. In principle the output could be [C<sub>μ</sub>V<sub>μ</sub>C<sub>μ</sub>V<sub>μ</sub>], but our grammar would favour [CV<sub>μ</sub>CV<sub>μ</sub>] as this would satisfy WDMIN without simultaneously incurring any violations of \*MORAIC ONSET. To my knowledge, there is no empirical evidence that would resolve this matter.

(12) *RtMAX*: No root may exceed four moras [B98: 77]

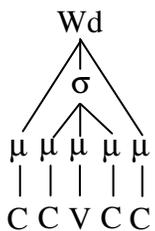
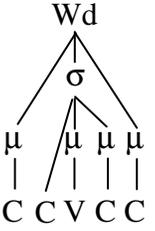
Roots that exceed the *RtMax* would not survive. Instead the null parse would win.

(13)  $/C_{(\mu)}C_{(\mu)}C_{(\mu)}V_{(\mu)}C_{(\mu)}C_{(\mu)}/ \text{--- } \emptyset$   
*RTMAX* >> *MPARSE*

	<i>RTMAX</i>	<i>MPARSE</i>
a. 	*!	
b. $\emptyset$		*

Minimally smaller roots would emerge as they would include 4 $\mu$  and no moraic onsets.

(14)  $/C_{\mu}C_{\mu}V_{\mu}C_{\mu}C_{\mu}/ \text{--- } [C_{\mu}[CV_{\mu}C_{\mu}]_{\sigma}C_{\mu}]_{PrWd}$ , e.g.  $sq^watk^w$   
*RTMAX*, \**MORAIC ONSET*

	<i>RTMAX</i>	* <i>MORAIC ONSET</i>
a. 	*!	*
b. 		

In fact *RTMAX* >> \**MORAIC ONSET* can also be established by implication since: *RTMAX* >> *MPARSE* (13), *MPARSE* >> *SLH* (18), *SLH* >> \**MORAIC ONSET* (23).

So far, we have shown that CV-only words are the only ones with a moraic onset. In larger roots, onsets in CV syllables are not moraic. *RtMax* facts

confirm this empirically. Now let us move on to the remaining cases of WdMin and see whether they can be accommodated in the analysis proposed.

### 6. WdMin - the remaining cases

The general idea is that Word Minimality has to be satisfied as much as possible; this is why moraic onsets can be admitted in CV words even at the expense of mora insertion. Nonetheless, such insertion can be obstructed if it creates new branching structures (i.e. long Cs or Vs), in which case the null parse is preferred.

As a start, BC bans C-only words, a fact consistent with the ranking (15):

- (15)  $/C_{(\mu)}/ \text{---} [\emptyset]$   
 WDMIN, DEP-SEG >> MPARSE

	WDMIN	DEP-SEG	MPARSE
a. $[C_{\mu}]_{wd}$	*!		
b. $[[C_{\mu}V_{\mu}]_{\sigma}]_{wd}$		*!	
c. $\emptyset$			*

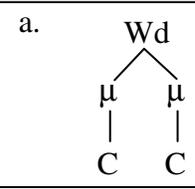
On the other hand, [TT] words satisfy WDMIN, despite having no nucleus at all:

- (16)  $*\text{NUC/OBSTR} \gg \text{NUC} \gg *\text{NUC/SON} \gg *\text{NUC/VOWEL}$

As is evident in (18), the winner (a) violates some version of the Strict Layer Hypothesis, informally stated in (17).

- (17) **SLH**: For every word, there is at least one mora dominated by a syllable

- (18)  $/C_{(\mu)}C_{(\mu)}/ \text{---} [C_{\mu}C_{\mu}]_{PrWd}$   
 MPARSE >> DEP- $\mu$ , SLH

	MPARSE	DEP- $\mu$	SLH
a. 		(*)(*)	*
b. $\emptyset$	*!		

The fact that (a) wins also supplies the ranking argument MPARSE >> SLH. We can now deal with vocalic forms, where as we have seen in (4a-b), V words are banned, but VV ones are fine. Facts here are a bit more complicated since an obvious remedy for a V word would be to lengthen and become VV. This would violate DEP- $\mu$ , so in order that the null parse wins, we would require the ranking DEP- $\mu$  >> MPARSE. Although, this would work in this instance, it would wrongly

favour the null parse on other occasions as in (18). Hence MPARSE >> DEP- $\mu$  is the ranking we really need.

Consequently, the solution lies elsewhere. One way out (but not the only way out; for instance an amendment of DEP- $\mu$  along the lines of Bermudez-Otero (2001) would bring the same result) is by means of old and new markedness (McCarthy 2003) and the use of \*<sub>O</sub>BRANCHING and \*<sub>N</sub>BRANCHING. The former penalizes branching structures that already exist in the input, while the latter militates against introduction of branching in the output.

(19) \*<sub>N</sub>BRANCHING >> MAX- $\mu$  >> \*<sub>O</sub>BRANCHING

(20) V inputs - monomoraic and bimoraic

MAX- $\mu$  >> \*<sub>O</sub>BRANCHING

	V $\mu$	* <sub>N</sub> BRANCHING	MAX- $\mu$	* <sub>O</sub> BRANCHING
☞ a.	V $\mu$			
b.	V $\mu\mu$	*!		
	V $\mu\mu$	* <sub>N</sub> BRANCHING	MAX- $\mu$	* <sub>O</sub> BRANCHING
c.	V $\mu$		*!	
☞ d.	V $\mu\mu$			*

The tableau above merely shows how the existence of phonemic length in BC can be accounted for. The rankings below are the ones relevant to WdMin.

(21) \*<sub>N</sub>BRANCHING >> MPARSE >> \*<sub>O</sub>BRANCHING

(22) V roots – monomoraic and bimoraic

\*<sub>N</sub>BRANCHING >> MPARSE >> DEP- $\mu$ , \*<sub>O</sub>BRANCHING

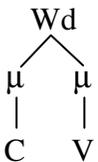
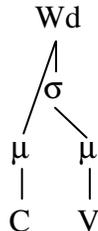
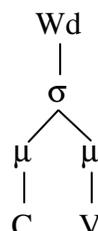
	/V $\mu$ /	* <sub>N</sub> BRANCHING	MPARSE	DEP- $\mu$	* <sub>O</sub> BRANCHING
a.	V $\mu\mu$	*!		*	
☞ b.	∅		*		
	/V $\mu\mu$ /	* <sub>N</sub> BRANCHING	MPARSE	DEP- $\mu$	* <sub>O</sub> BRANCHING
☞ c.	V $\mu\mu$				*
d.	∅		*!		

(22a) establishes the necessity of \*<sub>N</sub>BRANCHING, since MPARSE >> DEP- $\mu$  alone incorrectly favors the lengthened candidate. In the case of an underlying bimoraic input though, \*<sub>N</sub>BRANCHING is vacuously satisfied and thus the null output fails since it incurs a violation of MPARSE, while the bimoraic winning candidate only violates the lower ranked \*<sub>O</sub>BRANCHING.

Note that this grammar generates [VV] as minimal words provided the input is /VV/. If one rejects the existence of true VV words (cf. section 2.2), then this probably relates to the extreme rarity of long vowels in morpheme-final position (B98: fn. 20, p. 93).

The question now is whether these modifications alter anything in our analysis of the CV facts, which have been the focus of the discussion. The answer is that nothing changes provided SLH, ONSET >> \*MORAIC ONSET. (23) illustrates why.

(23) /C<sub>(μ)</sub>V<sub>μ</sub>/ --- [[C<sub>μ</sub>V<sub>μ</sub>]<sub>σ</sub>]<sub>PrWd</sub>  
 DEP-μ, SLH, ONSET >> \*MORAIC ONSET

	DEP-μ	SLH	ONSET	*MORAIC ONSET
a. 	(*)	*!		
b. 	(*)		*!	
c. 	(*)			*

(c) is the winner as it satisfies WDMIN by having full syllabification and assigning a mora to the onset (cf. reduplication facts in 2.1. for evidence of syllabification and Bagemihl 1991 for more details). Two other contenders are shown in (a) and (b). The former presents no syllabification and hence violates SLH, while the latter is syllabified but lacks an onset. Ranking SLH and ONSET over \*MORAIC ONSET straightforwardly accounts for their exclusion.

Finally, we have also seen that VC words satisfy WdMin considerations. Due to the lack of space, I will not draw the corresponding tableaux, but it should be obvious that the rankings below achieve this result.

(24) PARSE-SEG >> NO CODA

(25) MORAIC CODA >> MPARSE >> DEP-μ, SLH

The core constraint ranking thus required for the Word Minimality facts is in (26):

(26) WDMIN, \*<sub>N</sub>BRANCHING >> MPARSE >> DEP- $\mu$ , \*MORAIC ONSET

WDMIN is undominated in the language and must be satisfied as much as possible, even if this entails insertion of moras (low-ranked DEP- $\mu$ ) or moraic onsets (low-ranked \*MORAIC ONSET). WDMIN satisfaction can only be blocked if it were to produce newly-introduced branching structures in the output (top-ranked \*<sub>N</sub>BRANCHING). In this case the null parse is preferred (MPARSE).

## 7. Final remarks

Before concluding, I would like to stress that the rankings presented in the preceding analysis are entirely consistent with the empirical facts, but some details could be somewhat different from what has been sketched out here. In particular, I have argued that the null parse is the winning candidate for /V/ and /C/ roots as well as for roots that exceed the mora maximum imposed in the language. It is however logically possible that /V/ and /C/ roots may actually lengthen to [VV] and [CC] or epenthesize a segment so that /C/ becomes [CV]. Similarly, extra-large roots could shorten by deleting segments and moras to fit the RtMax pattern.

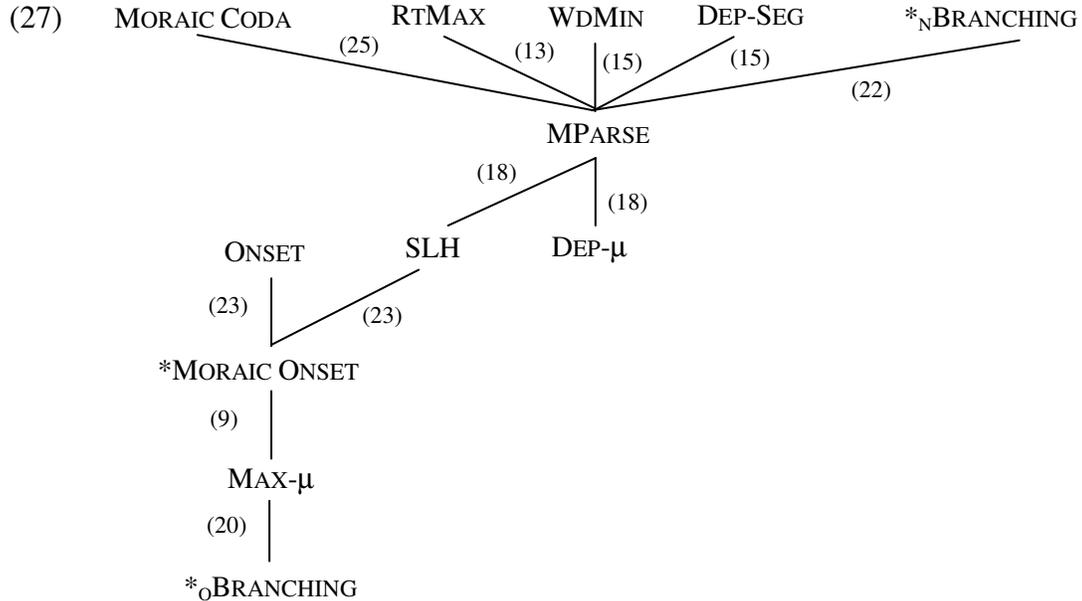
Through the empirical facts we simply cannot tell what exactly happens, but even if it were the case that these alternative strategies were optionally or wholly adopted, then we would just require some modification of the rankings suggested. For example, in (15), minimally altering the ranking from WDMIN, DEP-SEG >> MPARSE to WDMIN >> DEP-SEG, MPARSE would generate both the null parse and [C $\mu$ V $\mu$ ] as possible outputs for a /C/ word. Similar alterations could apply in other cases too.

In the absence of empirical confirmation towards one direction or the other, I have chosen to provide a grammar with stricter rankings than the ones required in the alternative cases. Note also that examination of some general facts of the language suggests that re-locating certain constraints might actually not be so desirable. For instance, in the above ranking, DEP-SEG has been demoted so that it can be violated in the language. This would imply that epenthesis is more generally allowed in the language. However, Bagemihl only mentions schwa insertion in BC, but also reports that this occurs very late in the phonetic component and has no phonological substance (B91: 600). In fact, he claims that “no other process of epenthesis is reported for Bella Coola” (B91, fn. 12), a fact that would run counter to this modified ranking.

Further exploration into the language would thus be required to establish a grammar that would take into account all the other possibilities, but remain consistent with the general BC facts. For the time being, the grammar proposed in (27) achieves the welcome results and does not bear any negative repercussions of the sort described.

In my view, however, the most important point is that irrespective of the specific details of the grammar, nothing changes with respect to the - up to now - controversial [CV] facts. No matter what the source of [CV] outputs is, e.g. /V/,

/C/ or /CV/<sup>3</sup>, this output has to include a moraic onset<sup>4</sup>. Consequently, the resulting grammar - under the proviso mentioned - with all the ranking arguments established is presented in (27).



## 8. Conclusion

In this paper, I have argued that Bella Coola onsets are moraic only in CV-words. On all other occasions, they are not. RtMax considerations have been presented to confirm this fact.

An important advantage of this proposal has been the fact that unlike Bagemihl (1998), we do not need to posit any underlying moraicity or require that WdMin is an input condition. Instead WDMIN is a constraint satisfied in the

<sup>3</sup> Although by Lexicon Optimization, /CV/ would be the preferred input.

<sup>4</sup> Elliott Moreton (p.c.) suggests that perhaps onset moraicity would be superfluous under a standard conception of moraicity and the ranking MAX-SEG >> WDMIN. The overriding requirement for segment preservation would ensure retention of CV words, while VV, VC (and probably CC) would fulfil the bimoraicity criterion. The problem is why CV would not change into CVV or CVC to also satisfy WDMIN. High-ranking DEP-SEG could explain the lack of CVC from a CV input, while some combination of DEP-μ and \*NBRANCHING would have the same effect for the absence of CVV as a remedy. We would thus end up with a ranking like \*NBRANCHING, MAX-SEG, DEP-SEG >> DEP-μ. As we have said, WDMIN would need to be low-ranked so that it would in principle allow light CVs. The relationship between WDMIN and MPARSE would now be the determining factor. If WDMIN >> MPARSE, then the output for /CV/ would incorrectly be [∅]. If MPARSE >> WDMIN, then the output would be [CV<sub>μ</sub>], but it would also imply that [V] and [C] outputs could survive as minimal words, as they would only violate the lowest-ranked WDMIN compared to their rivals with lengthening, insertion or null parse, all of which would violate more severe constraints. Consequently this alternative is not viable (for a more detailed illustration of the above, see Topintzi in prep.).

output. It forces moraic onsets in CV words, but not anywhere else where WDMIN is satisfied by other means and thus rendering \*MORAIC ONSET's violations superfluous. The inherent violability of constraints in OT can straightforwardly express the fact that one marked structure - moraic onsets - may appear only in a restricted environment in order that a top priority - WDMIN - in the language is satisfied. Whenever WDMIN can already be satisfied, moraic onsets will no longer emerge as the markedness constraint against them, i.e. \*MORAIC ONSET, albeit low-ranking is still active and rules out candidates with this structure.

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