CV as the only syllable type

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O Introduction

Recent work in the framework of Government Phonology has led to reconsideration of common assumptions regarding syllable structure and segment organization. One such claim, briefly summed up in (1), appears in Kaye et al. (1990).[1]

(1)

If a language L meets the following two conditions, then L has no closed syllables:

i. L is a templatic language
ii. for any surface consonant cluster C_iC_j displayed by L, L also displays the mirror-image surface cluster C_jC_i.

According to (1), a language satisfying the conditions stated therein has no codas.

Going beyond (1), I will put forth the more radical claim that syllable structure universally, i.e. regardless of whether the language is templatic or not, reduces to CV. Directly confronting phonological objects typically deviating from the alleged unique type, I will argue that for all languages closed syllables, geminate consonants, and long vowels must be reanalyzed in terms of sequences of light open syllables. Unless such a reanalysis is adopted, I argue, significant generalizations are missed.

In Section 1, I spell out the nature of the proposed reanalysis. In section 2, I adduce supporting evidence from three languages falling within the scope of (1) on account of the templatic nature of their morphology, Classical Arabic, Chaha, and Tiberian Hebrew. Section 3 is an attempt at extending results from the

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1 For discussions crucially assuming (1), cf. Berhane (1991), Guerssel & Lowenstamm (forthcoming), Kaye (1990), Lasri (1990), Lowenstamm (forthcoming), Rose (in press), Ségéral (1995), Yoshida (1993)

preceding section to non-templatic morphological systems. In Section 4, I examine the case of Danish, arguing that its "virtual" geminates, as evidenced by stöd, support the claim that the syllabic structure of all languages reduces to CV. In Section 5, I return to the representational issue brought up in this introductory section and briefly sum up the main points of the paper.

1 Branching constituents and their reanalysis

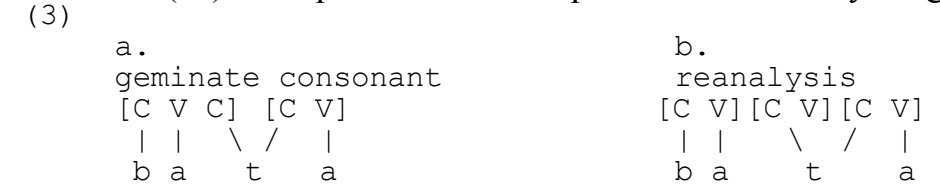
A closed syllable, tak, analyzed in classical fashion appears as the first constituant of the hypothetical form in (2a). I propose that the word [takti] be reanalyzed as in (2b), i.e. as a sequence of three light open syllables, the second of which has an empty nucleus.

(2)

From the vantage point of the reanalysis in (2b), the grammaticality of an object such as surface [takti] will be assessed in terms of the distribution of empty nuclei enforced in the language:[2] if empty nuclei are tolerated, the language will display what appears to be consonant clusters; if empty nuclei are not tolerated, the language will exhibit strict alternances of consonants and vowels.

Geminate consonants classically analyzed as in (3a) will be argued to justify a representation such as in (3b), with three light syllables. The salient feature of (3b) is the presence of the V position straddled by the geminate.

(3)



Much as (3a) can be viewed as a special case of (2a), (3b) is, essentially, a special case of (2b). One and the same phenomenon, Classical Arabic

2 The distribution of empty nuclei subsumes observations collected under the label "syllable inventory of a language". It is regulated by the Principle of Proper Government. See Kaye et al. (1990) and Scheer (1996) for discussion.

Metathesis, will document a joint discussion of both types of surface intervocalic consonant clusters in 2.1. below.

The long vowel of ba: traditionally represented as in (4a) is reanalyzed as a sequence of two light syllables, (4b). In (4b) the vowel links up to both nuclei and straddles an intervening empty onset.

(4)

(4b) will be discussed in two steps. In 2.2. below, I will argue, based on evidence from Chaha imperatives, for the presence of the *silent* C between the two V positions identified by vocalic material. In Section 3, I will discuss the general conditions under which such an object, a long vowel, is viable.

2 Clusters, long vowels, compensatory lengthening

2.1 Classical Arabic Metathesis, Geminates and Straddled Empty Nuclei[3]

Compare Cl. Arabic 3rd sg. active perfectives (Form I) forms from a sound root, √ktb (5a), and from a C_1C_2 or *deaf* root, √jr (5b).

(5)

	a.		b.	
3m	katab+a	[kataba]	jarr+a	[jarra], *[jarara]
3f	katab+at	[katabat]	jarr+at	[jarrat],*[jararat]

The forms of (5a) are uncontroversially CVCVCV. By contrast, forms from deaf roots, such as in (5b), display no vowel between the two instances of C_2. A hypothesis such as (6), call it *The special Template Hypothesis*, could conceivably be entertained.

(6)

Deaf roots are mapped onto a template of their own

3 The discussion of Classical Arabic metathesis owes much to joint work with Mohand Guerssel. Cf. Guerssel & Lowenstamm (in preparation).

A plausible interpretation of the differential mapping onto the "regular" and the putative "special" template for the forms at hand, appears in (7). Under the view just sketched out, the gemination in [jarra] results directly from the shape of the hypothesized template.

(7)

However, (6) must be rapidly discarded on, at least, two grounds. First, consideration of further forms of the same paradigm evidences identical arrangement of consonants and vowels for verbs from both kinds of root: sound in (8a), and deaf in (8b), thus weakening the plausibility of (6).

(8)

	a.		b.	
2m	katab+ta	[katabta]	jarar+ta	[jararta]
1st	katab+tu	[katabtu]	jarar+tu	[jarartu]

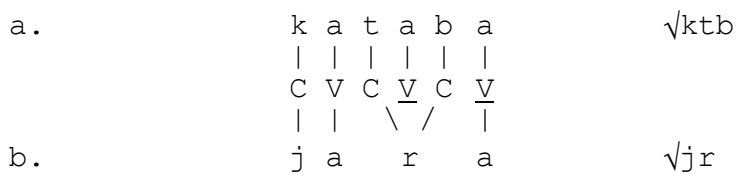
The second, perhaps even more compelling reason to reject (6) has to do with the very behavior of deaf roots in the first place: the charateristic spreading of C_2 unambiguously betrays the implementation of a template satisfaction requirement of the type convincingly argued for by McCarthy (1981). Indeed, in the absence of such a requirement, forms such as **jara**, **jartu**, etc. would be expected. The requirement of surface triliterality such that **jarra** and **jarartu** with two instances of C_2, surface instead, strongly suggests that one and the same template is being satisfied in the realization of verbs from both deaf and sound roots.

Clearly, the template onto which deaf roots are mapped, assumes no special shape. Rather, the decisive factor responsible for the presence or absence of a vowel between both instances of C_2 is the shape of the agreement marker: when the latter is V-initial, no vowel may appear "inside" the geminate (cf. 5b); when it is C-initial (cf. 8), a vowel must appear and no difference obtains any longer between verbs from sound and deaf roots. An account such as in (7b), too closely mirroring the audible evidence fails to capture what the forms of (5b) have in common with those of (8b) on the one hand, and with those of (5a) and (8a) on the other, viz. the expression of Category Form I Perfective.

I submit that the appropriate representation of that category is as in (9), where a unique template is shown to accomodate representative examples of

verbal forms from both kinds of roots (9a,b).

(9)



If (9) is to be adopted, then the syllabic analysis of **jarra** is the same as that of **kataba**, viz. CVCVCV.

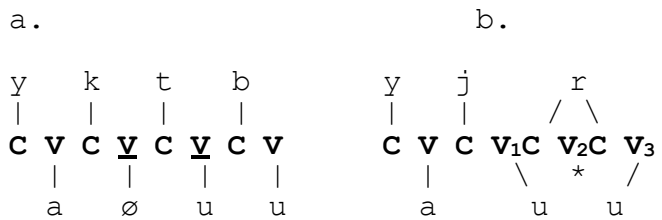
It follows that the geminate consonant in **jarra** must be construed as straddling an empty nuclear position.

Extending the same CVCV treatment to Imperfective forms provides important support for the detection and validation of empty nuclei. In Form I Imperfectives, such as in (10), no vowel appears between C_1 and C_2 in verbs from sane roots (10a), whereas a vowel (underscored) does appear between C_1 and the first instance of C_2 in verbs from deaf roots (10b).

(10)

Capturing binyanic identity, in this case, is entirely straightforward under a CVCV analysis. In (11a), the postulated nuclear position between C_1 and C_2 remains empty under Proper Government. The materiality of that position is vindicated by the fact that, in (11b), it is seen to support reassociation of vocalic material barred from appearing inside the gemination site, V_2: u simply reassociates to V_1.[4]

(11)



Under such an approach, the grammar of Classical Arabic is considerably simplified as there is no need for undesirable devices such as metathesis, or even

4 Again, the factor responsible for this island-like behavior of the geminate is the presence of a V-initial agreement marker. When the agreement marker is C initial, a 3f. pl. form [tajrurna] (<ta+jrur+na) will surface, parallel to [taktubna].

resyllabification.[5] As such, it provides strong support for the crucial underlying assumption that C's and V's strictly alternate in the makeup of the binyan.

I now turn to evidence from Chaha documenting another facet of the same claim, viz. the presence of an empty C between the two V positions forming a long vowel.

2.2 Chaha Imperatives from a-final verbs, Long Vowels, and Straddled Empty Onsets

Supporting evidence for this discussion comes from Imperative Feminine Singulars of a-final Chaha verbs.[6] Chaha, as most other Southern Ethio-Semitic languages, lost the set of guttural consonants it presumably inherited from Proto-Semitic (Leslau 1957, 1960). An **a** (underscored in (12a)) appears where other Semitic languages (12b,c,d,e) display a guttural:[7]

(12)

a.	b.	c.	d.	e.	f.
Chaha	Ge'ez	Tigrinya	Arabic	Hebrew	Gloss
qäTa-m	qäS9a		qaTa9a	qaTa9	cut
xäda-m		käd9e	xasa9a		betray
b^{w}äka-m		bäx^{w}9e			ferment
gäfa-m	gäf9a	gäf9e	žafa9a		push
käpa-m		käb9e			fold
däfa-m	däf9a	däf9e	dafa9a		push
säma-m	säm9a	säm9e	sami9a	šama9	hear

Following Lowenstamm (1991), I take the vowel system of Ethio-semitic, hence of Chaha, to be as in (13) where all five peripheral vowels are long,

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5 The reader can verify that in neither case of (10), an empty nuclear position fails to be licensed by Proper Government from a full vowel to its right. As to the orthogonal question of why the mobile vowel associates where, the reader is referred to Guerssel & Lowenstamm (in preparation).

6 Feminine Palatalization in Chaha is a rich and complex phenomenon. Space limitations preclude full discussion in the context of this paper. For a full discussion incorporating the analysis presented here, see Lowenstamm (in preparation).

7 To simplify the discussion, the data in (12) is limited to cases where Chaha a corresponds to the Proto-Semitic voiced fricative pharyngeal, 9. See Leslau (1957) for a richer set of examples. q is an ejective k; T is an ejective t; S is an ejective s; ^{w} indicates labialization; ^{y} indicates palatalization of a velar, e.g. g^{y}, k^{y}; C, the result of the palatalization of T is an ejective palatoalveolar strident; j, the palatalized version of d is a voiced palatoalveolar strident; š is the palatalized form of s; palatalization of t results in the voiceless palatoalveolar c.

whereas the two central vowels, ɪ and ä, are short.[8] ɪ is the epenthetic vowel, whereas ä is the short version of a:.

(13)

i:	ɪ	u:
e:		o:
	ä	
	a:	

The view of length put forth in (13) receives independent support from Chaha when coupled with the main thesis of this paper. Thus, consider the Masculine Singular Imperative forms from a sound root, √kft, in (14a) and from an a-final root, √bdA in (14b).[9]

(14)

a. kɪft "open !, ms."
b. bɪda "take away !, ms."

Under the length hypothesis inherent in (13), and the representational format advocated here, both types of roots can be mapped onto one and the same template, THE Jussive/Imperative stem template, as seen in (15).

(15)

a.

```
C V C V C V
 \  |  /
  k f t

[kɪft]
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b.

```
C V C V C V
 \  |  \ /
  b d   A

[bɪda]
```

How are such forms affected by Feminine Formation ? The Feminine singular marker takes the form of a floating prosody looking for a suitable landing site, and affecting a representation similar to that of the Masculine. In (16), the coronals and velars appearing in C_2 position in (16a,b) and (16c) respectively, are suitable landing sites. Palatalization ensues. The labials in C_2 of (16d,e,f,g) are not suitable docking sites and the Feminine marker looks further to the left: the root-initial velars of (16d,e) can sustain palatalization; not so with the root-initial coronals of (16f,g) and a vowel i appears instead. The examples of (16h,i) involving quadriliteral roots, √brtA "be strong", √qrbA "break off

8 See Praetorius (1886) and Dillmann (1907) for the length contrast. For more recent studies crucially relying on (13), see Berhane (1991), Lowenstamm & Prunet (1987), Ségéral (1995), Rose (in press).

9 The A of √bdA is an element in the sense of Kaye et al. (1985). Other examples of Chaha (and Semitic) roots involving "elements" are √mUt "die", √rUT "run" √bkI "cry", √sTI "drink", etc.

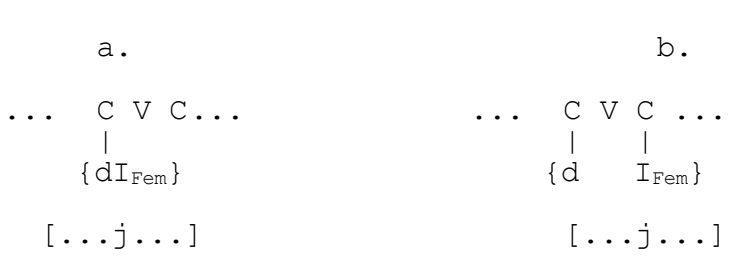
young branch", illustrate similar behavior.

(16) Feminine palatalization of a-final Imperatives

	Root	masc.	fem.	
a.	√qTA	qɪTa	qɪCä	
b.	√xdA	xɪda	xɪjä	
c.	√b^{w}kA	b^{w}ɪka	b^{w}ɪk^{y}ä	
d.	√gfA	gɪfa	g^{y}ɪfä	
e.	√kbA	kɪba	k^{y}ɪbä	
f.	√smA	sɪma	simä	*šɪmä
g.	√dfA	dɪfa	difä	*jɪfä
h.	√brtA	bärta	bärcä	
i.	√qrbA	qämba	q^{y}ämbä	

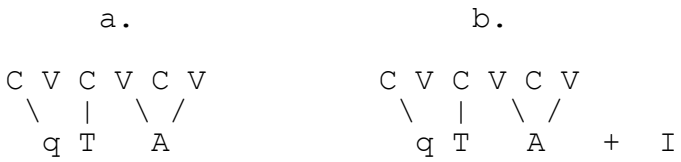
The careful reader will have noticed that a corollary always accompanies palatalization, viz. centralization into ä of the final a. Thus, Masculines are always a-final, whereas Feminines are always ä-final. This change of a to ä, subsequent to Palatalization, is the central point of this section. However, before it can be addressed, one last piece of information has to be adduced regarding the representation of palatalization. I argue in Lowenstamm (in preparation) that Chaha palatalization does not exclusively affect a segment of the root tier, a scenario represented in (17a). Rather, the palatalizing agent, I, claims a consonantal position of its own to the right of the palatalized segment. That is, a palatalized consonant is, for all intent and purposes, a cluster, as shown in (17b).

(17)



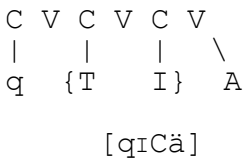
Consider now the fairly straightforward case of the derivation of a Masculine/Feminine alternation such as [qɪTa] (18a) vs. [qɪCä], the ingredients of which appear in (18b).

(18)



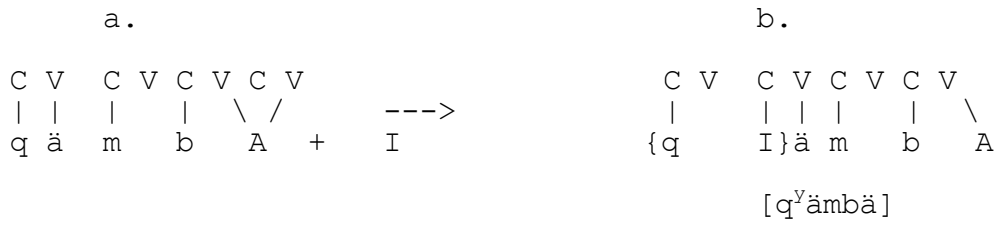
I, the Feminine marker, identifies the immediate vicinity of the rightmost coronal segment as a suitable docking site, (19). In the process of forming the {TI} cluster, though, I has claimed the binyan-final consonantal position, a slot formerly straddled by the double association of A in (18). A no longer being able to branch, **ä**, the short version of **a** is heard.

(19)



More interesting is the non-local manifestation of the same phenomenon. Consider the case of the derivation of [q^{y}ämbä], the Feminine Imperative of a verb from a quadriliteral root, √qrbA in (20):

(20)



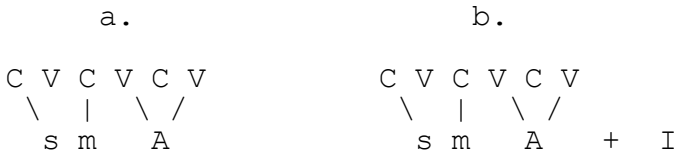
This time, the floating Feminine marker has to move all the way to the leftmost edge of the word to find a suitable docking site, the vicinity of the root-initial velar, **q**. I now forming a {qI} cluster with **q** in (20b), occupies the consonantal position formerly identified by **m** in (20a). **m**, as every other segment, has had to move one step to the right: **m** to the penultimate C position and **b** to the final C position of the binyan. As a result, **A** has been relegated to a position where no branching is possible. Accordingly, **ä** is heard.

If the injection of consonantal material anywhere in the representation inhibits branching of a vowel anywhere else, that is locally as well as non-locally, then surely branching of that vowel had to be crucially *involving* a

consonantal position.

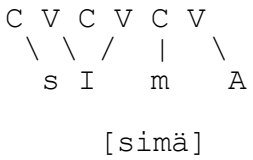
The point can be made even sharper with the examples of (16f,g). In (21), I have given the underlying representation of [sɪma] "listen !, ms." (21a), and [simä] "listen !, fem." (21b).

(21)



A labial is not a suitable docking site; neither is a root-initial coronal, two simple facts about Chaha. Thus, no consonant palatalization is observed. Instead, a long vowel, **i:** is heard. If long vowels are to be represented as I have advocated, then the medial C position to which **m** is linked in (21) is now straddled by **i:** in (22). Accordingly, **m** must *move* to the rightmost binyanic C position, thus inhibiting branching of A. This is shown in (22).

(22)



The striking fact about [sɪma] and [simä] is that, in each case, one and only one, peripheral/long vowel can be accomodated at a time. The exact location of that vowel matters little: it can appear to the right of C_2 as in [sɪm**a**], or to the left of C_2 as in [s**i**mä]. What does matter is that two peripheral/long vowels, such as in hypothetical *[s**i**m**a**], cannot coexist. It is easy to see from (21a) and (22) why the binyan is saturated by one single long vowel. It remains a challenge under any other analysis. Generalizing from this example, I submit that (23) obtains.

(23)

Law of Binyanic saturation (LBS)

If the makeup of a binyan involves x consonantal positions, that binyan can accomodate, at most, x:2 long vowels

That is, a triconsonantal binyan will fit no more than one long vowel, a quadriconsonantal binyan will fit no more than two long vowels, etc. LBS follows trivially as a mere consequence of the mode of representation of long vowels advocated here. Its remarkable feature is that the number of long vowels a given binyan can fit can be expressed in terms of the number of its consonantal

positions. Again, long vowels do not phonetically identify C positions. Yet, they *involve* them no less than if they did. Any alternative theory faces the question of whether it can derive LBS.

In the next subsection, I return to a classical problem of phonology, Compensatory Lengthening.

2.3 Compensatory Lengthening in Tiberian Hebrew revisited

Tiberian Hebrew Compensatory Lengthening (CL) is richly documented and has been extensively discussed.[10] Definite article prefixation, one of the several contexts in which CL takes place, will suffice to illustrate the phenomenon. Consider below several nouns in isolation in (24a), and preceded by the definite article in (24b).

(24)

a.	b.
na9ar"young man"	hanna9ar "the young man"
degel"flag"	haddegel "the flag"
keleb"dog"	hakkeleb "the dog"

In most cases, definite article prefixation will cause the initial consonant of the noun to geminate, as underscored in (24b). However, a different scenario is involved when the noun is guttural-initial, as illustrated in (25).

(25)

a.	b.	
Noun	Article + Noun	
	expected	actual (CL)
9ereb "evening"	*ha99ereb	ha:9ereb"the evening"

Biblical Hebrew gutturals are incapable of geminating. Thus, instead of the expected word-initial gemination (25b), CL takes place and a long vowel, ha:, appears. Of course, the challenge of CL is to offer a representation such that both gemination and CL can be construed as natural outcomes of the properties of such a representation. In the approach developed here, the respective targets of Gemination and CL are quite naturally a C position and a V position.[11]

(26)

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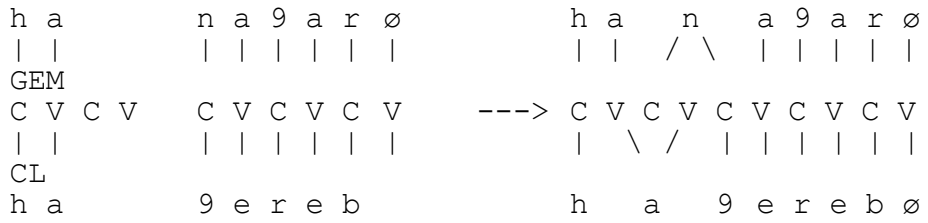
10 Cf. Ewald (1870), Gesenius (1881), Joüon (1923), Lowenstamm & Kaye (1986), among others.

11 The question of why Gemination appears to be the unmarked case and CL the special case is orthogonal to the representational issue.



All the arguments presented in this section have a common feature: in each case, once the binyan has been identified, we can independantly control the distance between both margins of a given entry. This access to the topology of a form makes it possible, in principle, to precisely determine the exact portion of the binyan occupied by any given segment, a crucial tool in the detection of empty nuclei or onsets. While such morphological information is not as readily available in non-templatic systems, the phonology of languages from the latter group does not appear to abide by radically different principles.

In the next section, I examine the plausibility of extending a CVCV treatment to non-templatic languages.

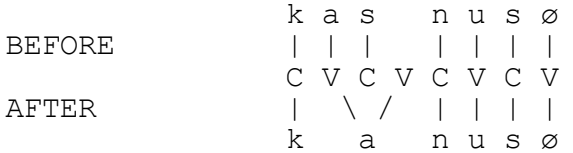
3 Beyond templatic languages

3.1 Three sets of facts

I will start by considering three sets of facts suggesting that clusters, long vowels and geminate consonants are handled in similar fashion by templatic and non-templatic languages alike. First, briefly consider CL again. Its operation in Latin is no different from TH. Indeed, the change from reconstructed [kasnus] to attested [ka:nus] can be represented with similar devices, as in (27).

(27)

Latin kasnus ----> ka:nus



Second, consider the facts of Standard Italian and Classical Arabic in (28).

(28)

	St. Italian	Cl. Arabic
a.	fatto	kattaba
b.	fa:to	ka:taba
c.	*fa:tto	*ka:ttaba

d.	*...ftto	*...kttaba
e.	*#tto...	*#tto...
f.	*...att#	*...att#
g.	*fattko	*kattba
h.	*fa:tko	*ka:tba

Both languages display geminate consonants (28a) and long vowels (28b). Both languages disallow a sequence of a long vowel followed by a geminate (28c), a geminate not preceded by a short vowel word-internally (28d), or a word-initial geminate (28e). Both languages disallow word-final geminates (28f). Finally, neither language tolerates a geminate followed by an obstruent (28g), or a long vowel before a word-internal consonant cluster (28h). Presumably, such restrictions bear on the representation of the configurations at stake, regardless of whether morphology provides, or fails to provide useful hints as to those representations.[12] Next, consider three exemples of non-final closed syllable shortening in (29).

(29)

a. Biblical Aramaic DEFINITELY TEMPLATIC

[yippe:l]	+ [la:x]	---->	[yippella:x]
it will fall	to you		it will befall you

b. Hausa POSSIBLY TEMPLATIC

[gado:]	+ [n] + [sù]	---->	[gadonsù]
"bed"	"of" "they"		"their bed"

c. Old English DOUBTFULLY TEMPLATIC

[hu:]s #	[bonda]	---->	[husbonda]
"house"	"master"		"husband"

In each of the above examples, a non-final closed syllable makes it impossible for its vowel to remain long (or to lengthen), again regardless of the templatic status of the language.

3.2 A format for the representation of long vowels

12 Two anonymous reviewers have correctly pointed out that some of the starred configurations in (28) are attested in the Finno-Ougrian family. However, my point is merely to document how two languages appear to enforce similar *clusters* of restrictions, the fact that one is templatic (Arabic) and the other non-templatic (Italian) notwithstanding.

Consider the two hypothetical forms in (30);

(30)

a.	b.
*[ka:tpi]	[ka:tupi]

The ungrammaticality of (30a) stems from the presence of a long vowel in a non word-final closed syllable. By contrast, (30b) is perfectly grammatical. In an approach recognizing light open syllables only, the representations of (30a) and (30b) are (31a) and (31b), respectively.

(31)

a.	b.
IMPOSSIBLE LONG VOWEL	POSSIBLE LONG VOWEL
C V C $V_{\$}$C $V_{£}$ C V | \ | | | | k a t ø p i	C V C $V_{\$}$C $V_{£}$ C V | \ / | | | | k a t u p i
[katpi] *[ka:tpi]	[ka:tupi]

In this framework, the crucial factor for successful spreading onto $V_{\$}$ is the presence of associated vocalic material in the next vocalic position, $V_{£}$. The vacuity of $V_{£}$ in (31a) blocks the association of a to $V_{\$}$. On the other hand, the identification of $V_{£}$ by a vowel in (31b) validates spreading of a onto $V_{\$}$. I submit that the relationship between $V_{\$}$ and $V_{£}$ is one of government.

(32)

The target of spreading must be licensed
A properly governed vocalic position is licensed

If this is correct, then a similar condition is involved in the validation of two types of configurations, geminate consonants and geminate vowels. It can be seen in (33) how in both cases $V_{\$}$ is in the crucially appropriate relationship with $V_{£}$, viz. it is licensed by Proper Government from a following non-empty $V_{£}$.

(33)

a.	b.
C_iC_i	V_iV_i
C V C $V_{\$}$C $V_{£}$C V | | \ / | | | k a t u p i	C V C $V_{\$}$C $V_{£}$C V | \ / | | | | k a t u p i
[kattupi]	[ka:tupi]

If Proper government is equally vital to the well-formedness of both types of geminates, a prediction ensues. I will deliberately consider the strongest possible form of such a prediction, (34).[13]

(34)

If a language has long vowels,
it has geminate consonants, and vice-versa

While (34) is expected under the proposals put forth here, it would be an accident under different assumptions regarding syllable structure. The response of languages of the world is, of course, mixed. On the one hand, (34) is verified upon simple inspection by languages such as Japanese, Italian, Classical Arabic, Amharic, etc. On the other hand, for most languages the length status of consonants and vowels will only result from analysis. Thus, Maghribi Arabic or Berber, display geminate consonants but no clear phonetic length contrast for vowels. Nevertheless, a number of arguments have been put forth in Bendjaballah (1995), Caubet (1993), Kabbaj (1990), Kaye (1990), Lowenstamm (1991) to the effect that a length contrast opposes the three peripheral vowels and the schwa in Berber and North African Arabic. Conversely, a language such as Chaha, the long vowels of which were discussed earlier, only reluctantly exhibits a very subtle manifestation of root medial gemination (Leslau, 1948). Then, languages such as English abound in minimal pairs opposing long and short vowels such as bit/beat, win/wean, Lynn/lean, kill/keel, lid/lead, will/wheel, rip/reap, etc. Yet, the phonetic signal contains no trace of geminate consonants. Clearly, for such languages geminates will have to have *virtual* status. In the next section, drawing heavily on Larsen (1994), I adduce evidence for such virtual geminates in Danish.

4 Danish stöd and virtual geminates

Danish stöd is a rich and complex phenomenon and several of its facets remain mysterious. An highly sketchy account will be given here. For fuller discussion of phonology and phonetics see Larsen (1994), and references therein.

The operation of stöd can be documented by the plural/singular alternations in (35). Plurals, marked by suffixation of +∂, are vowel-final, whereas singulars,

13 A weaker, less controversial prediction would be "if a language has long vowels, it has consonant clusters, and vice-versa".

marked by suffixation are consonant-final in the examples discussed in this section. A long vowel, u: appears before the stem final consonant in (35a); a short vowel followed by a liquid precedes the stem final consonant in (35c); the short vowel in (35e) is followed by a cluster of obstruents. The corresponding singulars, when bearing sentence stress (Sstress), are more interesting. In the singular of "house" (35b), no long vowel appears. Instead a manifestation of laryngeal activity, noted §, can be observed, much as if the word was now ending in a cluster, ...§s. In the singular of "falcon" (35d), the liquid is pronounced with creaky voice marked by the subscripted §.[14] No stöd is noticed when the word ends in an obstruent cluster (35f).

(35)

		+Sstress		-Sstress	
a.	[hu:s∂] "houses"	b.	[hu§s]	[hus]	"house"
c.	[falg∂] "falcons"	d.	[fal§g]	[falg]	"falcon"
e.	[gifd∂] "poisons"	f.	[gifd]	[gifd]	"poison"

Stress, a crucial factor as pointed out, operates as shown below with the example of (35c): stress claims as its domain the light syllable containing the target of stress proper and the following non-final light syllable. The domain thus defined is underscored in (36b). It corresponds to a heavy syllable, or heavy mora in more familiar modes of representation.[15]

(36)

a.		b.
C V C V C V	stress	C V C V C V
| | | | | |	--->	| | | | | |
f a l ø g ∂		f a l ø g ∂

In (37a), the penultimate empty vowel is licensed by Proper Government from the plural marker ∂, and nothing more need be said. In the singular of the same word, on the other hand, in the absence of a vocalic licenser for the penultimate null vowel, the syllable is licensed by assigning stöd to the onset, (37b). In a moraic framework, such an operation would be viewed as one of moraic heaviness implementation (Weight by Position) aimed at correcting the intrinsic lightness of a sonorant in the relevant position, (cf. Hayes, 1989).

(37)

14 The notation $l_{§}$ is not to be interpreted as a sequence; rather, as § being a feature of l.

15 On this point, the account given here differs from Larsen's.

```
a.   plural          b.   singular

C V C V C V£         C V C V C V                C V C V  C V
| | | | | |         | | | | | |     --->       | | | |  | |
f a l ø  g∂          f a l ø g ø                 f a l§ ø g  ø
```

Let us examine the realizations of the other Sstressed forms of (35), first [gifd] and then [hu§s].

(38)

```
a.   plural          b.   singular

C V C V C V£         C V C V C V                C V C V C V
| | | | | |         | | | | | |     --->       | | | | | |
g i f ø d ∂          g i f ø d ø                 g i f ø d ø
```

Plural [gifd∂] is ruled grammatical for the same reasons as [falg∂]. The absence of a phonetically realized number marker in the singular shifts the burden of licensing the penultimate syllable on its onset. This time, the intrinsic heaviness of the obstruent present in that position meets the requirement and no stöd is necessary.

In the case of **hus**, stress operates as described. However, (39a) being bisyllabic, no preexisting non-final light syllable can be claimed, as was done in (37), as part of the domain of stress. One is created as shown in (39b), the equivalent of stress lengthening in other accounts.

(39)

```
          a.                              b.

          C V C V        stress           C V C V C V
          | | | |        ---->            | |     | |
          h u s ø                         h u     s ø
```

In the plural, (40a), the penultimate empty vowel is licensed by Proper Government from $V_£$ and lengthening ensues. In the singular, in the absence of a proper governor, the penultimate syllable is, once more, licensed by identification of its onset via stöd insertion.

(40)

```
a.   plural          b.   singular

C V C V C V£         C V C V C V£               C V C V C V
|  \    | |         | |     | |     --->       | | | | | |
```

```
h   u   s ∂          h u      s ø                h u § ø s ø

[hu:s∂]                                         [hu§s]
```

Fischer-Jørgensen (1989) reports that "stöd is located approximately 10-12 ms. after the beginning of the preceding short vowel". In Larsen's treatment of Danish as a CV language Fischer-Jørgensen's observation naturally translates into a statement making direct reference to the target of stöd: stöd affects the onset following a short stressed vowel. More importantly, though, Larsen's account affords an important cue as to the position of the stöd bearing onset with respect to the right margin of the representation: § occurs exactly one (light) syllable away from the right edge of the word. With stöd, we recapture, in a sense, some of the information available in templatic languages, viz. the ability to assess with precision the location of a position.

This being the case, minimal pairs such as in (41) are disconcerting.

(41)

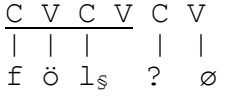
a.	[fö§l]	"feel !"
b.	[föl$_{§}$]	"follow !"

The analysis of (41a) is straightforward. In (42a), we see that [fö§l] with its penultimate stöd is "like" [hu§s] repeated for convenience as (42b).

(42)

What of [föl$_{§}$] ? According to Larsen's analysis, its stöd bearing liquid MUST BE the penultimate onset. This is, of course, begging a question: "what IS in the final onset ?", a query diagrammatically represented in (43) where a question mark appears where a final consonant would be expected.

(43)



Consideration of further realizations of the same verbal stem reveals the

presence of what Hjelmslev dubbed *latent* consonants. Thus, when the infinitive marker is added to the stem, the expected final consonant, the question mark of (43), shows up as y as shown in (44b). Similarly, one of Larsen's numerous examples, the adjectival ending **+i** reveals a latent **d** as the final consonant of the puzzlingly stöd-bearing word for 'sin' (44d).

(44)

a.	[föl$_{ʂ}$]	"follow !"	b.	[föly$_{∂}$]	"to follow"
c.	[sön$_{ʂ}$]	"sin"	d.	[söndi]	"sinful"

Consequently, the lexical representations corresponding to (44a,c) are as in (45a,b), respectively.

(45)

a.	b.
C V C V C V	C V C V C V
| | | | |	| | | | | |
f ö l$_{ʂ}$ (y) ø	s ö n$_{ʂ}$ (d) ø

The behavior of the shadow or latent consonants of (45) documents the reality of *virtual* occupation of a position by a consonant. In the examples of (45), the final virtual clusters ...l(y)# and ...n(d)#, involving two different consonants, are of type $C_i(C_j)$.

With the help of a brief comparison with Norwegian, a language closely related to Danish, I will soon turn to the virtual geminates of Danish, cases involving clusters of type $C_i(C_i)$. Norwegian, a stress lengthening language exhibiting surface geminates, displays an interesting interaction between long vowels and geminate consonants.[16] In the examples of (46), the adjective for 'sweet' exhibits a long vowel (46a). When the neuter marker **+t** is added, the vowel shortens and a word-final geminate, **tt** is heard (46b).

(46)

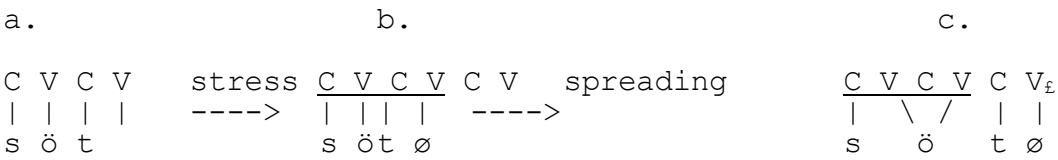
a.	[sö:t]	"sweet"	/söt/
b.	[sött]	"sweet (neuter)"	/söt+t/

The analysis of Norwegian, according to Larsen, runs parallel to that of Danish, with one difference: in Norwegian, a word-final nucleus enjoys the same licensing privileges as a full vowel. Accordingly, Tonic Lengthening affects bisyllabic (47a) as indicated in (47b). The licensing privileges of a

16 Cf. Kaye, Hellan & Johnsen (1990) for important discussion

Norwegian word-final nucleus make it possible for Lengthening to ensue.[17]

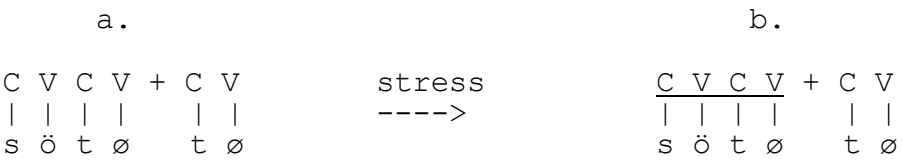
(47)



[sö:t]

The neuter being rendered trisyllabic by the addition of the gender marker (48a), Tonic Lengthening operates in the form of a mere analysis. The form being trisyllabic, stress claims its domain, the underscored portion of (48b). On account of the licensing privileges of the word-final empty nucleus, the configuration is declared viable *as such*.

(48)



[sött]

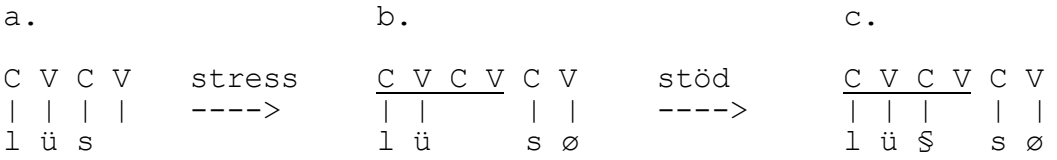
Consider now corresponding masculine/neuter alternations of the Danish adjectives in (49).

(49)

a.	[lü§s]	"bright (masculine)	/lüs/
b.	[lüst]	"bright (neuter)	/lüs+d/

The derivation of the masculine form in (50) proceeds exactly as that of **hus**.

(50)

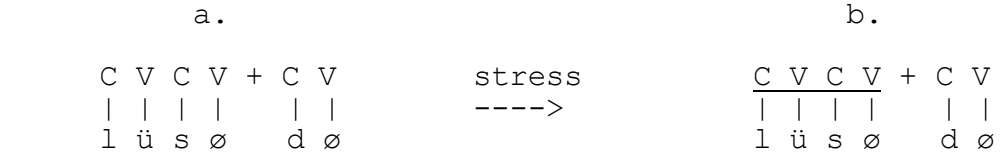


The derivation of the neuter /lüs+d/ is shown in (51). The form being trisyllabic, no visible lengthening occurs and a plain cluster final word [lüst]

17 Such licensing privileges are not unusual. The careful reader will recall Biblical Aramaic [yippella:x] and Old English [hu:s]

(stödless, like [gifd]), is derived.

(51)



The behavior of the Danish cognate of the Norwegian word for 'sweet' is extremely interesting. The facts are as in (52).

(52)

a.	[sö§ð] "sweet (masculine)"	/söd/
b.	[söd] "sweet (neuter)"	/söd+d/

Note the spirantization of the word-final coronal of (52a), and the absence of spirantization in the neuter (52b), an important point, as it will turn out. Except for spirantization, (52a), [sö§ð], with its word-final, clusterlike §C# is unremarkably similar to (49a), Danish [lü§s]. Moreover, it differs from (46a), Norwegian [sö:t] exactly as expected: **ö§** appears in Danish where **ö:** appears in Norwegian, for reasons mentioned above. By contrast, the neuter without spirantization or stöd, is highly intriguing. Indeed until now, we have always been in a position to precisely assess the position of a Danish word-final consonant. This is summed up in (53).[18]

(53)

i. if § occurs between a stressed short vowel and an obstruent (possibly as a feature of an intervening sonorant), the obstruent occupies the final C position, ex. [hu§s], [fal§g], [sön§(d)].

ii. if no § occurs between a stressed short vowel and an obstruent, the obstruent occupies the penultimate C position, ex. [gifd].

Assigning the final consonant of [söd] to either the penultimate or the last position is problematic. Both attempts are represented in (54). Both must be discarded.

(54)

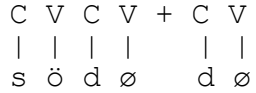
18... The scope of this statement is defined by the facts discussed in this section

If **d** were in the position indicated in (54a), § should be heard. In this case no difference would distinguish the masculine from the neuter. This is contrary to fact. If, on the other hand, **d** is in the position indicated in (54b), what prevents it from appearing in its spirant form, **ð** ?

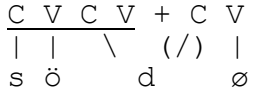
Larsen's elegant solution, consisting in combining features of both representations in (54), answers both questions. Neuter suffixation represented in (55a) is no different in Danish and in Norwegian. The adjacency of identical consonants results in the formation of a geminate (55b). Since Danish does not display geminates on the surface, the rightmost member of the word-final geminate in (55b) has latent status, a device that has already been shown to be independantly necessary for alternations such as [sön$_{§}$]/[söndi].

(55)

a.



b.



The *virtual* branching of **d** proposed in (55b) receives interesting phonetic confirmation from failure of spirantization to take place, a phenomenon reminiscent of germane Tiberian Hebrew evidence discussed in Leben (1980).

Unless "virtual" geminates of the type just discussed are recognized, it will be extremely difficult to make sense of the Danish evidence. Whether independant evidence of the type afforded by Danish, or evidence of another type will vindicate virtual gemination as an explanatory device for languages such as German or English is an empirical matter.

5 Conclusion

A number of arguments have been provided, in this paper, to the effect that CV is the only type of syllable. Unless such an impoverished version of segment organization is adopted, I have claimed, important generalizations regarding the behavior of "long" vowels and "clusters" of consonants cannot be expressed.

NOTES

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