

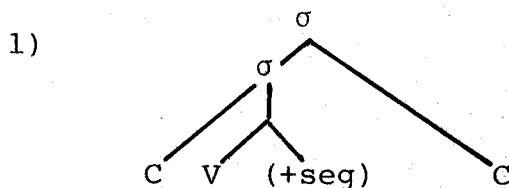
## IS THE SYLLABLE OR THE SUPERSYLLABLE A CONSTITUENT ?\*

Youssef Aoun

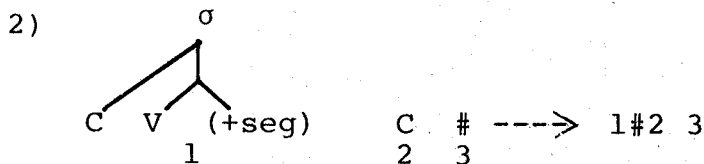
## PRESENTATION

In a metrical framework <sup>1</sup> in which light syllables (or rimes) [CV] are represented as non-branching and heavy syllables (or rimes) [CVV or CVC] as branching for the purpose of stress assignment, <sup>2</sup> the problem of the representation of 'superheavy syllables' [CVVC or CVCC] arises. <sup>3</sup>

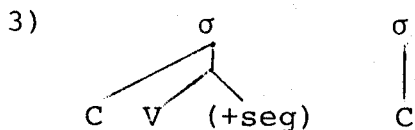
For the purpose of stress assignment in several Arabic dialects, superheavy syllables are represented in 1) (cf. McCarthy, 1978, hereafter, Mc):



This structure is derived by "Chomsky-adjointing a word final consonant to a preceding heavy syllable" Mc p. 18:



In this work, I will suggest that, in order to account for the stress facts in Arabic, rule 2) is superfluous. More precisely, I will suggest that - at the point where stress is assigned - superheavy syllables are to be represented as a sequence of heavy+degenerate syllables:

1. THE TREATMENT OF SUPERHEAVY SYLLABLES WITH RESPECT TO STRESS<sup>4</sup>

It is stated in Mc and in H&V that in Cairene Arabic - as in most dialects of Arabic - there are three kinds of syllables:

light: CV  
 heavy: CVV or CVC  
 superheavy: CVVC or CVCC

The distribution of superheavy syllables is highly constrained in Cairene Arabic: "In non-final syllables, there is only a

two way contrast of heavy vs. light syllables, since extraheavy syllables (=superheavy syllable Y.A.) appear only in word final position. For purposes of stress assignment, there is only a two way contrast in word final syllables. The contrast there, however, is not of light vs. heavy and extraheavy (...) but rather the relevant opposition is between extraheavy, i.e. CVVC or CVCC, and the other syllables." (H&V)

In order to account for these facts, Mc adopts representation 1) which is derived by the application of rule 2). This rule allows Mc to treat "a superheavy ultima as a syllable which also contains a heavy syllable as its left daughter. That heavy syllable (...) becomes in effect a heavy penultimate since it is the second last major constituent in the word. It, therefore, is stressed like any heavy penultimate." (Mc)

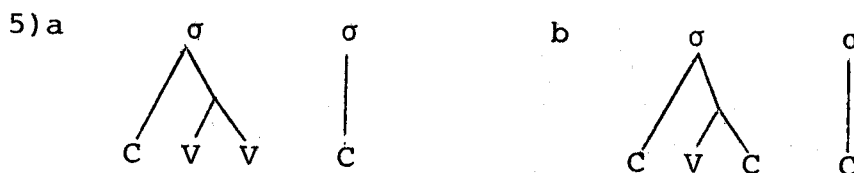
There are, in what I have reported in this section, two logically distinct - though interacting - points. The first deals with the characterization of a superheavy syllable, the second with the behavior of a superheavy ultima with respect to stress. The following two sections will deal with these two points respectively: section 2 will deal with the representation of superheavy syllables; it will be suggested that superheavy syllables are to be represented as in 3). Section 3 discusses the relevance of the proposal outlined in section 2 for the analysis of stress assignment.

## 2. CHARACTERIZATION OF THE SYLLABLES

Suppose that there exist basically two types of syllables in Arabic:

- 4) light: CV  
heavy: CVV or CVC

As for the sequences CVVC and CVCC, suppose that they constitute two syllables: heavy and degenerate:

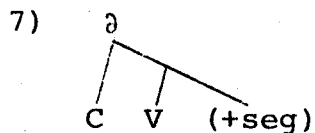


The last consonant C in these sequences constitutes a degenerate syllable.

In order to illustrate more clearly what has been said above, let us suppose that Arabic has one type of onset and three types of rimes:

- 6) Onset: C  
Rimes: V  
VV  
VC

given by the following syllable template:



Suppose, for the purpose of illustration, that words are scanned as sequences of onsets and rimes from left to right (Halles's proposal class lectures, Spring 1979)<sup>5</sup>, as in the following words<sup>6</sup>:

8)a	O R	O R	O R				
	C V	C V	C V				
b	O R	O R	O R		Λ		
		Λ					
	C VC	C V	C V				
c	O R	O R	O R			Λ	
			Λ				
	C V	C VC	C V				
d	O R	O R	O R		Λ	Λ	
		Λ		Λ			
	C VC	C VC	C V				
e	O R	O R	O R				Λ
				Λ			
	C V	C V	C VC				
f	O R	O R	O R		Λ		Λ
		Λ					
	C VC	C V	C VC				
g	O R	O R	O R			Λ	Λ
			Λ		Λ		
	C V	C VC	C VC				
h	O R	O R	O R		Λ	Λ	Λ
		Λ		Λ		Λ	
	C VC	C VC	C VC				

Let us consider the case of the degenerate syllable: given the syllable template 7), we will have a degenerate ultima if and only if the penultima has a branching rime, i.e., cases e'), f'), g'), h')):

8)e'	CV CV CVC C			Λ	C
f'	CVC CV CVC C	Λ		Λ	C
g'	CV CVC CVC C		Λ	Λ	C
h'	CVC CVC CVC C	Λ	Λ	Λ	C

Note that if the scanning convention is to be thought of as a theory of syllabification, the last consonant is to be treated as an onset (but cf. the last section) :

9)  $\sigma$   
 |  
 O  
 |  
 C

I will simply say, for the moment, that 10) is the representation of a degenerate syllable, i.e., an unsyllabified C is represented as in 10):

10)  $\sigma$   
 |  
 C

Note that a degenerate syllable is marked, i.e., costly with respect to the specific syllable template 7) or, more generally, to the universal template (on which cf. Kiparsky, 1979) where it is considered that the unmarked syllable is CV)<sup>7</sup>.

I will now turn to the relevance of this approach for the analysis of stress assignment.

### 3. STRESS ASSIGNMENT

Cairene Arabic will be chosen to illustrate the behavior of supersyllable with respect to stress. The other Arabic dialects mentioned in Mc and H&V could have been chosen as well.

#### 3.1. Cairene Arabic

The stress facts of Cairene Arabic are as follows (cf. Mc and H&V):

- 11)a "Stress a superheavy final syllable; otherwise  
 b stress a heavy penult; otherwise  
 c stress the penult or antepenult which is separated by an even number of syllables from the right-most non-final heavy syllable, or, if there is no final heavy syllable, from the left boundary of the word".

In order to account for the stress facts of Cairene Arabic, binary feet gathered under a right-branching word tree are constructed in Mc and in H&V. There are some differences between the two analyses; for instance, the feet are assigned from left to right to pairs of light syllables in Mc, while feet are right-branching in H&V: However, these differences are not relevant for the purpose of our discussion (cf. for more details Mc and H&V).

More relevant is the treatment of superheavy syllables. Since "rimes are defined as the right-branch of  $\sigma$ ", a superheavy syllable contains two rimes in Mc (cf. 1): a heavy fol-

followed by a light rime. A word containing a superheavy ultima is equivalent to a word with a heavy penultima, and receives stress in exactly the same way (cf. Mc for more details).

In H&V, a final syllable will count as a foot. If it is only heavy, it will be shaped like a binary foot and, by convention, will be non-branching with respect to the word tree. If it is superheavy, it is assumed that it has the structure:



and will be branching with respect to the word tree (cf. H&V for more details).

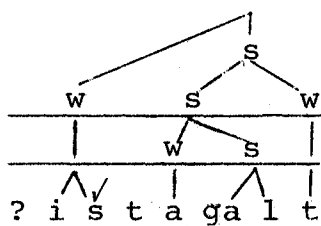
I think that, in the following treatment, this convention can be dispensed with if we assume that the right-most syllable (or rime) is always projected as non-branching. Recall that in word final position the following syllables can occur; light (CV), heavy (CVC or CVV) and degenerate (C), i.e., all the possible types.

Except for the special treatment in projecting the word final syllable, stress assignment in Cairene Arabic will be accounted for as in H&V. In particular, "the foot tree is constructed on the projection of the syllable rimes, and these are paired into branching feet from left to right, subject to the restriction that a branching rime cannot be the left branch of a foot (...) or, equivalently, that only right-branching feet are admitted. (...) The feet in Cairene Arabic are labelled by convention L":

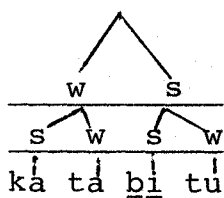
"Convention L: Given two sister nodes,  $n_1$  and  $n_2$ , label them w and s respectively<sup>1</sup> if and<sup>2</sup> only if  $n_2$  branches."

As for the word tree, "all feet except the last are projected as non-branching, whereas (...) the topmost node of the last foot is projected. The feet are then combined into right-branching structures which are labelled by L". This analysis is illustrated in 12); the stress bearing rime is underlined.

12)



'I worked'

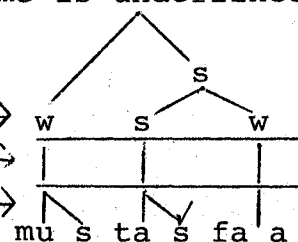


'she wrote it'

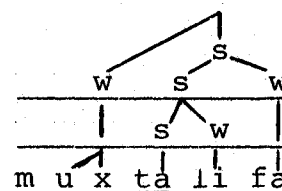
word layer

foot layer

syllable layer



'hospital'



'different'

In the preceding sections, I have suggested that it is possible to dispense with rule 2) for the purpose of stress assignment. It is interesting to wonder whether rule 2) is needed at all.

A priori, intuitions seem to suggest that a superheavy syllable constitutes one syllable. When asked to parse words containing superheavy ultima into syllables, native speakers treat a superheavy as a unit (/./ represents a syllable limit, the Lebanese realization of these words is exemplified in 13) and 14):

- 13)a ba<sup>h</sup>r. 'sea'  
 b ka. tabt. 'I wrote'  
 c ʔs. ta ʔ. malt. 'I used'

The facts, however, are more complicated and native speakers' intuitions more subtle. In Lebanese Arabic, as in most Arabic dialects, superheavy syllables may appear under very restricted conditions in non-final position, as a consequence of a deletion process for instance, (cf. Brame, 1971):

- 14)a /t a a l i ʔ/ vowel deletion [t a a l i ʔ] 'I am going up' [masc.]  
 14)b /t a a l i ʔ a/ [t a a l i ʔ a] 'I am going up' [fem.]

Now, when native speakers of Lebanese Arabic are asked to parse 14b) into syllables judgements vary:

- 15)a taal. ʔa  
 b taa. l ʔa

15a) and 15b) are possible answers.

It is superfluous to mention that, at word edges, a stray consonant will adjoin to the only existing syllable:

- 16)a ka. tabt ← 'I wrote'  
 b → ktab. to 'you wrote (plur)'  
 c → ← ktabt 'I wrote'

In order to account for these facts, several possibilities suggest themselves. One is to generalize 2) to a mirror image rule, i.e., a degenerate syllable will attach to a preceding or a following syllable. Another is to treat degenerate syllables as ambisyllabic and to attach them to a preceding and a following syllable (cf. Kahn, 1976). If, however, ambisyllabicity is to be treated on a foot level (cf. Kiparsky, 1979), a resyllabification rule like 2) is

inappropriate. For the moment, I don't have any evidence that allows us to choose between these possibilities.

### 5. IS THE SYLLABLE A CONSTITUENT ?

I would like to conclude with the following considerations. When one considers the various phonological analyses referring to the syllable, one notices that they don't crucially refer to the syllable. They may be reformulated in terms of rime or onset. This observation can be accounted for if it is assumed that the syllable doesn't have any status with respect to competence; it may at best have a status with respect to performance. This idea was first suggested by E. Williams and is explored by J.R. Vergnaud and M. Halle<sup>9</sup>.

Let us consider that each rime is generated with an index and that co-indexing procedures assign the index of the rime to the preceding onset.

17)a

O	R <sub>i</sub>	O	R <sub>j</sub>
	^ <sub>i</sub>		^ <sub>j</sub>
C	VC	C	VV

b Indexing:

O <sub>i</sub>	R <sub>i</sub>	O <sub>j</sub>	R <sub>j</sub>
<sup>i</sup>	^ <sub>i</sub>	<sup>j</sup>	^ <sub>j</sub>
C	VC	C	VV

c Percolation down:

O <sub>i</sub>	R <sub>i</sub>	O <sub>j</sub>	R <sub>j</sub>
	^		^
C <sub>i</sub>	V <sub>i</sub> C <sub>i</sub>	C <sub>j</sub>	V <sub>j</sub> V <sub>j</sub>

It is possible, now, to define the syllable as the set of elements bearing the same index. We can, under the standard assumption that the structural description of the rules refer to constituents or to phonological features, account for William's idea: no rule will refer to the syllable since there is no node (constituent) labelled "syllable."

The problem here is that the "geometrical" representation provided by the tree is inadequate (insufficient). To overcome this inadequacy, I used a formalism that has been developed in another context, and with a different purpose by Vergnaud and Halle, namely the formalism of indices. I used indices to represent relations that, clearly, are not relations of "sisterhood" or "brotherhood" or of constituency. Thus, I am thereby introducing a new kind of relation. The empirical and theoretical content of this formalism is determined by the form of the theory. For example, rules only refer to phonological features or to constituents. Also, the rules of indexing interact with other notions (such as the notion of "projection" formalized by Halle and Vergnaud) (cf. H&V for more details).<sup>10</sup>

Suppose, moreover, that every segment must be indexed:

18) \* [+seg] unless indexed

We can account for the fact that a syllable may exist without an onset (VC, V) but not without a rime (\*C): since the onset receives its index by means of the indexing rules, it may not exist without a rime.

Note finally, that filter 18) means, for the Arabic cases we have been examining, that a degenerate syllable is a rime; more precisely, a degenerate rime, i.e., a rime without a nucleus.



## FOOTNOTES

\* I wish to thank M. Halle, P. Kiparsky and J.R. Vergnaud.

1. cf. Halle and Vergnaud (1978), hereafter H&V; Kiparsky (1979); Liberman and Prince (1977); Selkirk (forthcoming) and Vergnaud (ms).

2. cf. H&V.

3. In a non-metrical framework such as the one outlined in S.P.E., the notation ( $C_0$ ) prevents the problem from arising. cf. Langendoen (1968) and Mc for a linear formulation of the stress rule in Cairene Arabic and Brame (1971) from the stress rule in Palestinian Arabic.

4. The following discussion is based primarily on Mc. cf. also H&V.

5. It is not relevant to the present discussion to say that this proposal represents a theory of syllabification. In any case, it is adopted for the sake of illustration.

6. ( $\wedge$ ) represents a branching rime.  
( $|$ ) represents a non-branching rime.

The rimes VC and VV being identical with respect to branchingness, we illustrate the scanning with only one type, VC.

7. A degenerate syllable is also costly in Mc's treatment.

8. In any case, the word-boundary is to be dropped from the structural description of 2).

9. The status of the syllable is in a way similar to the status of relational notions such as subject of, object of ... which have no theoretical status, i.e., no rule whether operating on a syntactic level or in the Logical Form refers to them (as for the Specified Subject Condition. cf. Chomsky (forthcoming)). The difference is that the syllable may have an existence on a performance level whereas it is not clear that this is the case for the functional notions.

10. In a sense, the notion of "relational index" that I am arguing for is akin to the idea of "thematic index" developed in syntax by Rouveret and Vergnaud cf. also Chomsky (forthcoming).