Nóra Wenszky

Halle's recent views on primary word stress[*]

1 Introduction

This article is a critical review of Halle (1998) *The Stress of English Words 1968–1998* (henceforth H98). H98 summarises some of the most important developments in word stress research in the past thirty years, which I will not comment on, and gives a rule-based account of English word stress, which I will test and discuss in detail. This article accepts or leaves numerous claims of H98 untouched and aims at testing the basic rule-system presented in it, viz., the rules that are responsible for the place of primary stresses, revealing inadequacies and proposing some amendments.

2 The grid

H98's approach is similar to that of Halle & Vergnaud (1987) in that the stress pattern of a string is represented by a bracketed grid on a special autosegmental plane. The more prominent a stress-bearing unit is, the higher column of asterisks is placed above it, cf. (1).

(1) **Feet and foot-heads** (examples are from H98 : 550)[1]

```
a.  ∗              line 2        b.       ∗          line 2
   (∗        ∗     line 1                (∗    ∗     line 1
   (∗   ∗   [∗     line 0            ∗   (∗   [∗     line 0
   má   la  chìte                   sta  lág  mìte
```

* I would like to thank my supervisor, László Varga, for helpful comments and insightful suggestions on earlier versions of this paper. I also thank Attila Novák for commenting on the manuscript.

[1] H98 differentiates the parentheses inserted by Edge-marking, (7), and MSR, (9), orthographically: [and] are the result of Edge-marking, while (and) are inserted by the MSR. The two are functionally the same. This notation will be followed in this article.

The bottom line of asterisks (line 0) marks the stress-bearers. These units are grouped into feet; parentheses stand for foot boundaries in the grid. A major difference between Halle & Vergnaud (1987) and H98 is that in the former the feet were bounded and marked by matched parentheses, while in H98 (who follows Idsardi 1992) unmatched parentheses are sufficient (cf. Idsardi 1992 : 1, 74–80; Halle & Idsardi 1995; H98 : 544—547). Parentheses are introduced by the Edge-marking Rules (see (7) below) and the Main Stress Rule (MSR), (9), and mark the right or the left edge of a foot. The asterisks that follow a left boundary without an intervening parenthesis constitute a foot, and the asterisks that precede a right boundary without an intervening parenthesis constitute a foot, i.e., the rules listed above group the asterisks into feet. The heads of feet are also marked by these rules — except for the Edge-marking Rules, which insert parentheses that serve as the starting point of the MSR, (9). Though this is not explicitly stated in H98, since some rules are formalised without the headedness parameter, the complete rule system and the analyses suggest that all English feet are assumed to be left-headed, i.e., the leftmost asterisk of a foot will be given a corresponding mark on the next higher level (1). There are two feet on line 0 in (1a): *mála-* and *-chìte*; and in (1b) *-lág-* and *-mìte.* The two foot heads constitute another left-headed foot on line 1, whose head is marked on line 2. A further example — with a right parenthesis — is given in (2).

(2) **A word with a right parenthesis** (H98 : 555)[2]

∗				line 2
(∗				line 1
(∗	∗]	∗	·	line 0
mús	cu	la	ture	

[2] The dot in the last column of the grid marks that *-ure* is unstressable.

3 The basic grid-building rules

As Burzio (1994) claims, the stress of most unsuffixed English words follows the patterns in (3).

(3) **General patterns** (Burzio 1994 : 43)

In the case of nouns
  a. stress a heavy penult if there is one, e.g., *agénda*
  b. otherwise the antepenult, e.g., *América*

In the case of verbs
  c. stress a superheavy final if there is one, e.g., *prevént*
  d. otherwise the penult, e.g., *imágine*

In this section I will try to derive the stress patterns of these "regular" cases with the rule system of H98. The rules will be given as formulated by H98 on pages 564–565, the reference number, in brackets, after the name of each rule will be the original number given to it in H98. Since there are no optional rules, alternative stress contours might be derived by marking one form of the word as an exception to a certain rule, while the other form is regular. Since H98 does not touch upon the problem of alternative stress patterns, I will not deal with this problem either in this article.

3.1 The cycle and stress deletion

The stress rules are divided into two blocks: cyclic and non-cyclic rules. It is assumed that cyclic rules are applied every time a cyclic affix is added to the stem. Non-cyclic rules, however, only pass through the word once, when all the affixes have been added. Each constituent of a word is marked for cyclicity ([±cyclic]), and only the relevant rules work on them (H98 : 554, cf. Halle & Vergnaud 1987 : 79–81).

Stress derivation is cyclic because it is assumed that the other rules of phonology also work in cycles, i.e., in the manner described in Kiparsky 1979. There are some cyclic rules that make reference to stresses, e.g., noun-forming *-al* only attaches to verb stems with final stress (*arríval, *devélopal*). This means that in the first cycle the stem gets its stress (*arríve, devélop*), then the suffix attaches to the relevant stems. H98 claims that at this point, viz., every time a new cycle is started, all metrical structure is erased, (4). If a non-cyclic affix attaches to the stem, stresses remain untouched (e.g., in *expréssion* $\rightarrow$ *expréssion<u>less</u>*).

(4) Delete stresses and metrical structure assigned on previous passes through the cyclic rule block [24].

After the application of (4), the calculation of stress starts again as if the word — in our case *arrival* — were a monomorphemic item. The derivation of *arrı́val* is shown in (5), rules (6), (7) and (9) will be discussed in detail below.

(5) *arríve* → *arrı́val*

Cycle 1

$$\begin{array}{cccccccccc} & & & & & & & * & & \text{line 1}\\ & & & * & * & & * & (* & & \text{line 0}\\ \text{a} & \text{rrive} & \xrightarrow{(6)} & \text{a} & \text{rrive} & \xrightarrow{(9b)} & \text{a} & \text{rrive} & \rightarrow & \end{array}$$

Cycle 2

$$\begin{array}{ccccccccccccccccccc} & * & & & & & & & & & & & & & & & & * & \\ * & (* & & & & & & & * & * & * & & * & *] & * & & * & (*] & * \\ \text{a} & \text{rri} & \text{val} & \xrightarrow{(4)} & \text{a} & \text{rri} & \text{val} & \xrightarrow{(6)} & \text{a} & \text{rri} & \text{val} & \xrightarrow{(7a)} & \text{a} & \text{rri} & \text{val} & \xrightarrow{(9b)} & \text{a} & \text{rri} & \text{val} \end{array}$$

This approach suggests that words with identical CV structure will have identical stressing, irrespective of whether the item is simple or derived (not counting non-cyclic affixes). Stress rules must work in a cyclic fashion in order to provide information for other rules of phonology.

However, Kiparsky (1979), Selkirk (1984), Halle & Vergnaud (1987) and Halle & Kenstowicz (1991) claim that in the course of derivation existing foot-heads should be preserved when a new cycle is started. This ensures that words will keep the stresses of their stem and explains why *orìginálity* has the secondary stress on the second syllable rather than on the first (cf. *Wìnnipesáukee*). This assumption is in line with Burzio's (1996) Anti-Allomorphy, which says that morphologically related items "aim at" identitiy, i.e., the fewer allomorphs a certain morpheme has, the better.[3] If stem stresses are preserved, morpheme identity is ensured. In sum, this approach emphasises that words with the same stem will have the same stressed syllables.

[3] Furthermore, Burzio (1996 : 132) points out that cycles cannot deal elegantly with cases like *académic* ∼ *académical,* since the pattern of the latter is regular and *académic* "preserves" the stress of this, i.e., in cases like this the cycle should work backwards. This means that Burzio's Anti-Allomorphy can explain those exceptional cases where in a pair of words the derived item rather than the stem is regular, while the cycle can only account for cases where the stem is regular.

As noted above, H98 deletes all metrical structure at the beginning of every cycle and there is no rule that would copy the stresses from previous cycles. Thus, from the point of view of calculating stresses cycles are not needed at all, the cyclic recalculation of stresses is only needed for conditioning other rules. In practice the main stress of a complex item is calculated when the last cyclic affix is attached. Post-tonic secondary stresses also emerge in this cycle, while the non-cyclic stratum is responsible for pre-tonic secondary stresses.

3.2 The derivations

Firstly, the stress bearing units should be marked, which are syllable heads according to H98 (p. 556). This rule is essentially the same as Selkirk's Demibeat Alignment (1984 : 57) or Idsardi's line 0 element projection (1992 : 2). Halle does not formulate this rule, (6) is my wording based on Idsardi (*ibid.*).

(6) Project a line 0 element (i.e., an asterisk) for each syllable head.

This is an important step in the derivation, since further rules refer to already existing asterisks. (4) erases all asterisks, including the ones on line 0, so the stress bearers should be marked once again. Then the Edge-marking rule (7) inserts unmatched parentheses into the grid. The two rules are disjunctively ordered, i.e., if (7a) can apply, (7b) is blocked, if (7a) cannot apply, (7b) will come into play. Out of these two rules, (7a) is the unmarked one. There are several lexical exceptions to the rules in (7), such as the majority of verbs and unsuffixed adjectives, which are exempt from both kinds of edge-marking.

(7) **Edge-marking rules** [9]

a. RLR Edge-marking

$\emptyset \rightarrow] \Big/ \ * \ \_\_ \ * \#\#$ line 0

CONDITION J: Final $*$ projects short vowel.

b. LLR Edge-marking

$\emptyset \rightarrow [\Big/ \ * \ \_\_ \ * \#\#$ line 0

RLR Edge-marking, (7a), which inserts a Right parenthesis to the Left of the Rightmost syllable (hence the name), partly does the work of rules traditionally referred to as rules of extrametricality. When an asterisk is not followed by a right parenthesis or preceded by a left parenthesis without intervening parentheses, it will not belong to any foot (so it will not receive any stress in the cyclic stratum). This is illustrated in (8) below, where the syllables that are not arranged into feet are underlined. If such an asterisk corresponds to the final syllable (as in (8b)), the MSR will not see it, since its computation will start before the last syllable. This corresponds to the case of syllable extrametricality, which is needed for most nouns in English.[4]

(8) **Asterisks not belonging to any foot**

a. ∗ (∗
<u>ca</u> jóle

b. (∗ ∗] ∗
ské le <u>ton</u>

After the application of Edge-marking, the Main Stress Rule, (9), marks the syllable which will carry the primary stress of the word. (9) works in a similar fashion to the Edge-marking rules, i.e., (9a) and (9b) are disjunctively ordered. The MSR, (9), is different from the English Stress Rule of Liberman & Prince (1977 : 278) and the MSR of Halle & Vergnaud (1987 : 228) in that it is not iterative, therefore it does not create superfluous secondary stresses. This way, conflation is successfully avoided, which is a great advantage, since no effort is wasted to create metrical structure that is erased later. However, as mentioned above, the cyclic application of rules does exactly this — creates stresses that are erased at the beginning of the next cycle.

The MSR, (9), actually arises if we collapse two very similar rules into one. In one case the MSR starts from an already existing boundary, and in the other from the end of the word. The meaning of ⟨ ⟩ is that if there is an edge-marking boundary in the grid, which is separated from the end of the word by exactly one asterisk, the MSR, (9), will count from the boundary, not from the end. The word boundary functions as a starting point only when there are no edge-marks in the sequence, i.e., in words that are exempt from both types of edge-marking. (9b) only applies if (9a) cannot. (9c) puts an asterisk above the leftmost asterisk of the foot created by (7) or (9a) or (9b).

[4] On segment extrametricality see the discussion below after table (10).

(9) **MSR** [10]

a. $\emptyset \rightarrow (\,\Big/\, \_\_ * * \, \langle \mathrm{P}* \rangle \, \#\#$ line 0
CONDITION K: Second $*$ projects vowel in light rime.

b. $\emptyset \rightarrow (\,\Big/\, \_\_ * \, \langle \mathrm{P}* \rangle \, \#\#$ line 0

c. Line 0 heads are leftmost.[5]

The P stands for a boundary of either kind:] or [.

4 Contradictory treatment of syllable weight

Before trying to apply rules (7) or (9) to regular words, the notion of "light rime" (which is referred to in Condition K of (9a)) should be discussed. Traditionally, English syllables are LIGHT, HEAVY or SUPERHEAVY, (10): light syllables have only one segment in the rime, a short vowel; simple heavy syllables have two filled timing slots (i.e., a diphthong, a long vowel or a short vowel and a consonant), while superheavy syllables have three or four filled timing slots.

(10) **Syllable weight**

LIGHT	HEAVY				
	HEAVY		SUPERHEAVY		
CV	CVC	CVV	CVVC	CVCC	CVVCC
A.me.ri.ca	*put*	*go, see*	*tone, seen*	*bust*	*post, boost*

H98 treats CVC syllables (which are traditionally heavy) in two ways. In some cases CVC counts as heavy: the medial CVC syllables in *agénda, consístent, paréntal* (examples in H98's [8b], second column, p. 548) and in *stalágmìte* (second example in [14], p. 550) appear to have a heavy rime, since (9b) of the MSR works for them. By contrast, CVC is light in a number of cases: "the suffix *-ic* makes a light rime" (H98 : 550). Furthermore, the analyses on p. 548 ([8a], first column: *devélop, clandéstine* and [8b], first column: *América, cómpetent, oríginal*) suggest that a "light rime" refers to

[5] As the result of (7) and (9), the following feet may emerge: the result of RLR (7a) and MSR (9a) or (9b), looking (**] or (*] respectively, and the result of LLR (7b): [*. All are left-headed.

a syllable which has either a short vowel (CV), e.g., *America* or in word-final position a short vowel and a consonant (CVC), e.g., CVC *develop* in the rime. In sum, word-medial CVC is heavy, while word-final CVC is light.

One possible solution for the contradiction between (10) and H98's assumption — which may well be taken for granted by H98, though he does not say so — is consonant extrametricality.[6] Consonant extrametricality means that the final consonant of a word is not seen by the stress rules. Taking this approach, the four example words of (3) (*agenda, America, prevent, imagine*) are derived in (11). The derivations follow H98 : 548.

(11) a. *agénda* — the syllable *-gen-* is considered to be heavy

$$\text{a gen da} \xrightarrow{(6)} \begin{array}{ccc} * & * & * \\ \text{a} & \text{gen} & \text{da} \end{array} \xrightarrow{\text{RLR (7a)}} \begin{array}{ccc} * & *] & * \\ \text{a} & \text{gen} & \text{da} \end{array} \xrightarrow{\text{MSR (9a)}} \begin{array}{ccc} & * & \\ * & (*] & * \\ \text{a} & \text{gen} & \text{da} \end{array}$$

b. *América*[7]

$$\begin{array}{cccc} * & * & * & * \\ \text{a} & \text{me} & \text{ri} & \text{ca} \end{array} \xrightarrow{\text{RLR (7a)}} \begin{array}{cccc} * & * & *] & * \\ \text{a} & \text{me} & \text{ri} & \text{ca} \end{array} \xrightarrow{\text{MSR (9b)}} \begin{array}{cccc} & * & & \\ * & (* & *] & * \\ \text{a} & \text{me} & \text{ri} & \text{ca} \end{array}$$

c. *prevént*

$$\begin{array}{cc} * & * \\ \text{pre} & \text{vent} \end{array} \xrightarrow[\text{}]{\substack{\text{exc. to (7)} \\ \text{MSR (9b)}}} \begin{array}{cc} & * \\ * & (* \\ \text{pre} & \text{vent} \end{array}$$

d. *imágine* — the syllable *-gine* is considered to be light

$$\begin{array}{ccc} * & * & * \\ \text{i} & \text{ma} & \text{gine} \end{array} \xrightarrow[\text{}]{\substack{\text{exc. to (7)} \\ \text{MSR (9a)}}} \begin{array}{ccc} & * & \\ * & (* & * \\ \text{i} & \text{ma} & \text{gine} \end{array}$$

[6] This kind of extrametricality appears as a proviso of the Accent Rule in Halle & Vergnaud: "Accent Rule: Assign a line 1 asterisk to a syllable with a branching rime with the proviso that the word-final consonant is not counted in the determination of rime branchingness in the case of the final syllable of underived verbs and adjectives" (1987 : 231). However, the situation seems to be more complicated, since nouns like *Tibét* are exempt from edge-marking (i.e., syllable extrametricality) and have light final syllables if the final consonant is not doubled (cf. the examples in (16c) below and H98 : 551, fn. 9, point 2). This means that final consonant extrametricality is extended to nouns as well. With regularly stressed nouns this problem is irrelevant, since stress regularly falls on the penult or the antepenult, and the ultimate syllable is extrametrical whether it is light or heavy.

[7] In the derivations that follow, the effects of (6) — stress-bearing unit marking — will be shown automatically in the first grid.

Another, perhaps less likely, solution for the contradiction is to assume that CVC is always light. The derivation of *America* would remain the same, (11b), since there is no CVC syllable in it. Words like *prevént,* (11c) — with a superheavy ult —, would still be exempted from Edge-marking, just like *imágine*-type words, (11d). The only difference would occur with the first group, (11a), where the stress is on the "traditionally" heavy penult: words like *agénda, paréntal* and *consístent.* If CVC is light, *agénda, paréntal* are to be exempted from Edge-marking, (7), in a similar manner to *imágine*, where the stress is on the penult and the word ends in two consecutive light syllables (viz., CV or CVC according to this second solution). The MSR would correctly place the main stress on the penult, (12).

(12) *agénda, paréntal*

$$\begin{array}{ccccccc} & & & & & * & \\ * & * & * & & * & (* & * \\ \text{a} & \text{gen} & \text{da} & \xrightarrow{\text{MSR (9a)}} & \text{a} & \text{gen} & \text{da} \\ \text{pa} & \text{ren} & \text{tal} & & \text{pa} & \text{ren} & \text{tal} \end{array}$$

To extend this solution to the whole class of words that are stressed on a traditionally heavy penult would lead to incorrect patterns: for *consístent* the result will be a finally stressed **consistént*, since *-tent* does not have a light rime (even if the final consonant does not count) and the MSR, (9b), would place the stress on the ult, (13).

(13) **consistént*

$$\begin{array}{ccccccc} & & & & & & * \\ * & * & * & & * & * & (* \\ \text{con} & \text{sis} & \text{tent} & \xrightarrow{\text{MSR (9b)}} & {}^*\text{con} & \text{sis} & \text{tent} \end{array}$$

Therefore, if *consístent* is exempted from Edge-marking, Condition K should be switched off for it, (14).

(14) *consístent*

$$\begin{array}{ccccccc} & & & & & * & \\ * & * & * & & * & (* & * \\ \text{con} & \text{sis} & \text{tent} & \xrightarrow{\substack{\text{exc. to Cond. K} \\ \text{MSR (9a)}}} & \text{con} & \text{sis} & \text{tent} \end{array}$$

This condition is quite often inactive as the examples of H98 (p. 552f) show, two of which are given in (15).[8]

(15) **Exceptions to Condition K** (H98 : 552)[9]

(∗	∗	[∗		(∗	∗]	∗	line 0
sa	liv	ate		in	fam	ous	

In sum, two treatments of CVC syllables have been described above: one with consonant extrametricality (CVC is light word-finally, heavy medially) and the other where CVC is always light. Both are compatible with H98, since syllable weights are not explicitly stated in the article. However, English penultimate (i.e., word-medial) CVC and CVV syllables are generally stressed (cf. (3a) above), therefore counting CVC light in this position would require exceptional treatment of these words (e.g., switching Condition K off, as in (14)), so this solution would be more problematic than consonant extrametricality. Furthermore, consonant extrametricality shows that syllables at word-edges are different from word-internal syllables, which generalisation would be lost if CVC were always light.

[8] Since words that do not satisfy Condition K are "quite numerous" (H98 : 549), this condition is a weak point of the system. Burzio (1994) solves the problem by saying that syllables ending in a sonorant or *s* count as light if unstressed, thus legalising the great majority of cases where the foot would be (σ H). Since non-final closed syllables most often end in sonorants or *s* (the following obstruent is the onset of the next syllable), only the rare obstruent–obstruent clusters, such as /kt/ in *electricity* will cause problems.

[9] *-liv-* in *salivate* and *-fam-* in *infamous* are assumed to have long vowels underlyingly (cf. H98 : 551f), hence the heavy rime, even if CVC is considered to be light.

5 The interaction of grid-building rules

H98 assumes that the unmarked case is when both Edge-marking, (7), and the MSR, (9), work. Verbs and several unsuffixed adjectives (i.e., a huge set of words) are exceptions to all edge-marking, as the examples (11c–d) show (cf. H98 : 549), which may question the assumption that edge-marking works in the default case. Words which are primary stressed on their final syllable are also exempt from (7), as (16) shows. (16a) lists words with a superheavy final, i.e., where the rime has more than two elements: either a long vowel and a consonant, or a short vowel and two consonants. The words in (16b) have a final open syllable with a long vowel[10], while the ones in (16c) end in a CVC syllable. H98 claims that these words "are assumed to have final geminates" (p. 551), because otherwise the MSR would put stress on the penultimate syllable, since CVC has a light rime (cf. (11d) and fn. 6).

(16) **Primary stress on the final syllable** (examples are mainly from H98 : 548, 551)

a. *cajóle, divíne, usúrp, robúst*

$$\begin{array}{ccccc} & & & & * \\ * & * & & * & (* \\ \text{ca} & \text{jole} & \xrightarrow{\substack{\text{exc. to (7)}\\ \text{MSR (9b)}}} & \text{ca} & \text{jole} \end{array}$$

b. *kàngaróo, èmployée, applý*

$$\begin{array}{ccccc} & & & & * \\ * & * & & * & (* \\ \text{a} & \text{pply} & \xrightarrow{\substack{\text{exc. to (7)}\\ \text{MSR (b)}}} & \text{a} & \text{pply} \end{array}$$

c. *Berlín, Saigón, Tibét*

$$\begin{array}{ccccc} & & & & * \\ * & * & & * & (* \\ \text{Ti} & \text{bett} & \xrightarrow{\substack{\text{exc. to (7)}\\ \text{MSR (9b)}}} & \text{Ti} & \text{bett} \end{array}$$

[10] This group of words is problematic for Burzio (1994), since he does not recognise monosyllabic feet, but postulates that every word ends in a vowel. If the word ends in a consonant when pronounced, the final vowel slot is filled with a null segment, which is not phonetically realised. In the words in (16b) a final null segment must be assumed after the final pronounced vowel in order to avoid monosyllabic feet. This is exceptional (*applý* would be footed ap(plý.ϕ) (*ibid.* : 51, fn. 7)).

As noted above, a huge set of words is exempt from the workings of Edge-marking, (7), which might lead to the assumption that the exceptional set is the one with edge-marking. This issue is important if the rule-system is meant to model how people calculate stresses in reality. If edge-marking is the norm, it would suggest that new nouns in the language (if we assume that verbs are automatically exempted from edge-marking) are edge-marked. Whether or not this is the case needs further investigation.

Let us examine the effects of Edge-marking, (7), on the MSR, (9). The chart below, (17), shows the possibilities that emerge from the combination of (7) and (9).

(17) **The interaction of Edge-marking, (7), and the MSR, (9)**

	RLR (7a)	LLR (7b) (post-tonic secondary stress)	no edge-marking (in lexically marked words)
MSR (9a)	(A) ∗ (∗ ∗] ∗ A mé ri ca	(B) (∗ ∗ [∗ má la chìte	(C) ∗ (∗ ∗ i má gine
MSR (9b)	(D) ∗ (∗] ∗ a gén da (G) (∗] ∗ tém pest	(E) ∗ ∗ (∗ [∗ è pi cý clòid	(F) ∗ (∗ pre vént

Edge-marking is always needed if the main stress falls three syllables away from the end of the word, since the MSR can only create binary (9a) or unary (9b) feet, i.e., without edge-marking the MSR can place the primary stress on the final syllable (if it is CVV or CVCC or CVVC, i.e., does not have a light rime) or on the penult if the last syllable is CV or CVC. With edge-marking the main-stress will be on the penult if it does not have a light rime, and on the antepenult, if it does. From this discussion it follows that penultimate stress is achieved in three ways: (i) no edge-marking and MSR, (9a), (*imágine*), (ii) RLR and MSR, (9b), (*agénda, témpest*) and (iii) LLR with MSR, (9b), (*epicýclòid*). Case (iii) differs from the previous ones in that it has final secondary stress due to LLR. This means that if a word ends in a sequence of a heavy and a light syllable and it has no post-tonic secondary stress, the correct stress pattern can be derived in two ways: either following (i) or (ii). The two derivations lead to identical results as (18) shows, i.e., the stress pattern of these words can be derived without any form of edge-marking.

(18) **Penultimate stress with words ending in a heavy–light sequence**

i.

$$\begin{array}{ccccccc} & & & & & * & \\ * & * & * & & * & (* & * \\ \text{a} & \text{gen} & \text{da} & \xrightarrow{\substack{\text{no (7)}\\ \text{MSR (9a)}}} & \text{a} & \text{gen} & \text{da} \end{array}$$

ii.

$$\begin{array}{ccccccccccc} & & & & & & & & & * & \\ * & * & * & & * & *] & * & & * & (*] & * \\ \text{a} & \text{gen} & \text{da} & \xrightarrow{\text{RLR (7a)}} & \text{a} & \text{gen} & \text{da} & \xrightarrow{\text{MSR (9b)}} & \text{a} & \text{gen} & \text{da} \end{array}$$

Consequently, edge-marking is needed in the following cases (19).

(19) a. Primary stress is on the antepenult, i.e., nouns with a light penult (*América*), (17A)
b. Stress is on the heavy penult, the ult is heavy (for nouns, *témpest*), (17G)
c. Post-tonic secondary stress, due to LLR Edge-marking (*málachìte, èpicýclòid*), (17B, E)

If we do not want to apply RLR Edge-marking, (19b) may be treated by saying that these words are exceptions to Condition K, i.e., a binary foot will be constructed even if the second syllable is not light. This is the solution proposed for *consistent* in (14) above.

To sum up, we have seen two suggestions concerning edge-marking: (i) edge-marking is the default (syllable extrametricality, "hidden" consonant extrametricality); most verbs and unsuffixed adjectives are exceptional (H98's suggestion); (ii) lack of edge-marking is the default (no syllable extrametricality with consonant extrametricality); nouns like *America* and *tempest,* and words with post-tonic secondary stress are exceptional (the suggestion outlined above). Probably, the two solutions have a similar amount of "regular" cases.

The key issue, however, is that stress in English depends on syntactic category, which should be encoded into the rules. This way both *contést*$_{\mathrm{V}}$ and *cóntest*$_{\mathrm{N}}$ would be regular. It is quite frequent that phonological rules rely on syntactic information. For example, Archangeli & Pulleyblank (1989) says that tongue-root harmony is restricted to nouns in Yoruba. In Hungarian, verbs that are longer than one syllable end in a consonant, while the phonotactics of nouns does not contain a restriction like that.

6 Summary

As far as primary stress placement is concerned, H98 proposes a rule-system that has a very large number of of lexical exceptions (e.g., most verbs and unsuffixed adjectives), the need for which may be questioned. As an alternative, I first proposed that Edge-marking could apply only to lexically marked items, which solution is almost the mirror image of H98's proposal — and requires at least as many exceptions as H98. A far better alternative would be to encode the syntactic category of words into the rules, which would reduce the number of exceptions crucially and would reflect the fact that the categories Verb and Noun correspond to the two basic stress classes.

I pointed out that in H98 syllable extrametricality was encoded into the Edge-marking rules, but consonant extrametricality was not explicitly recognised. Another weakness of H98 is that Condition K of the MSR is switched off in large numbers of cases. A merit of H98 is that the conflation rule of Halle & Vergnaud (1987) is not needed, since the cyclic stratum only marks one syllable as stress-bearer and pre-tonic secondary stresses are only generated in the non-cyclic stratum. However, the possibilities that the cycle offers are not exploited: previously generated stresses are deleted and thus no form of stress preservation appears in this theory.

REFERENCES

Archangeli, Diana and Douglas Pulleyblank. 1989. Yoruba Vowel Harmony. Linguistic Inquiry 20 : 173–217.

Burzio, Luigi. 1994. Principles of English Stress. Cambridge: Cambridge University Press.

Burzio, Luigi. 1996. Surface constraints versus underlying representation. In Jacques Durand and Bernard Laks (eds.). Current Trends in Phonology: Models and Methods. Volume I. European Studies Research Institute, University of Salford Publications. 123–141.

Halle, Morris. 1998. The stress of English words 1968–1998. Linguistic Inquiry 29 : 539–568.

Halle, Morris and William James Idsardi. 1995. General properties of stress and metrical structure. In John A. Goldsmith (ed.). The Handbook of Phonological Theory. Cambridge, Mass. & Oxford: Blackwell.

Halle, Morris and Michael Kenstowicz. 1991. The Free Element Condition and cyclic vs. noncyclic stress. Linguistic Inquiry 22 : 457–501.

Halle, Morris and Jean-Roger Vergnaud. 1987. An Essay on Stress. Cambridge, Mass.: The MIT Press.

Idsardi, William James. 1992. The Computation of Prosody. PhD dissertation, MIT.

Kiparsky, Paul. 1979. Metrical structure assignment is cyclic. Linguistic Inquiry 10 : 421–442.

Liberman, Mark and Alan Prince. 1977. On stress and linguistic rhythm. Linguistic Inquiry 8 : 249–336.

Selkirk, Elizabeth O. 1984. Phonology and Syntax: The Relation between Sound and Structure. (First MIT Press paperback edition. 1986). Cambridge, Mass: The MIT Press.