English stress is flexible: A reply to Halle's (1998) The Stress of English Words *1968-1988*[*]

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Kim, Hyo-Young. 2002. English Stress is Flexible: A reply to Halle's (1998) The Stress of English Words *1968-1988.* *Studies in Phonetics, Phonology, and Morphology* 8.1. *85-100.* This paper aims to critically review Halle (1998) and answer two questions: Why English stress is variable and what common conditions govern the various stress. **(Sogang University)**

Keywords: English, stress, flexibility, constraints

0. Introduction

The goal of this paper is to examine Halle's (1998) analysis of English stress and propose an alternative. For main stress of English, Halle (1998) offers three rules. However, all the rules are not free of exceptions. In addition, the analysis is complicated with additional machinery needed to deal those exceptions. Since all the rules can be applied in exceptional ways, it is impossible to predict stress locations of English words by Halle's rules.

In contrast, recognizing that English stress is not fully predictable, the alternative proposal to be made in this paper aims to answer two questions: Why are various stress patterns allowed? and what common conditions govern these different patterns? The alternative proposal is mainly composed of three constraints on foot structures: FOOT BINARITY, NO LAPSE, and TROCHEE. The three constraints are always respected by all feet. Furthermore, the three constraints are ones assumed by all researchers including Halle (1998) in one form or another for English stress phenomena. Compared with Halle's, the alternative is simple with fewer assumptions and captures flexibility of English Stress. 'Flexibility' refers to the fact that stress can be realized on different positions in words that apparently have the same syllable structure. *Cánada* and *banána* are examples of flexible stress.[1]

The rest of the paper is organized as follows. Section 1 summarizes patterns of English stress; Section 2 reviews Halle's (1998) analysis; Section 3 focuses on problems with the analysis; and Section 4 proposes the alternative.

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[1] An anonymous reviewer suggested an analysis where syllable weight is determined by stress locations ensuring that stressed syllables are heavy. This analysis would be opposite in the direction of prediction to previous analyses since previously stress locations are predicted (partly) by syllable weight.

1. English Main Stress: Data

This paper is only concerned with main stress of nouns and verbs, since stress patterns of adjectives are thought to follow either nouns' or verbs' patterns (Halle & Vergnaud 1987, henceforth H & V; Hayes 1985, 1995; Halle & Kenstowicz 1991; and Burzio 1994).[2] In nouns, heavy penultimate syllables take stress as in (1a); Otherwise antepenultimate syllables are stressed as in (1b).

(1) Nouns[3]
   a. Stress the heavy penultimate syllable, if there is one:
      agénda, horîzon
   b. Otherwise, stress the antepenultimate syllable:
      ásterisk, Cánada

Second, in verbs superheavy final syllables take stress as in (2a), otherwise, penultimate syllables have stress as in (2b).

(2) Verbs[4]
   a. Stress the superheavy final syllable, if there is one:
      usúrp, decîde
   b. Otherwise, stress the penultimate syllable:
      fóllow, inhábit

However, there exist words, whose stress patterns do not fit the descriptions in (1) and (2). I will discuss two groups of them. The first group concerns words with stress on penultimate syllables which are light.

(3) Penultimate stress: *banána, Kentúcky*

The second group involves two types of final stress, i.e., (4a) stress on heavy syllables and (4b) stress on the superheavy syllable. 'σ' indicates syllables.

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[2] Suffixed adjectives behave in the same way as nouns as in (i) while unsuffixed ones behave as verbs as in (ii).
   i. suffixed: *pérsonal, repúgnant, desîrous*
   ii. unsuffixed: *sólid, absúrd, supréme*

[3] There are nouns which do not follow the general description above: *banána, adúlt, Japán, machîne,* and *stúdio*.

[4] There are verbs which do not fit the description above such as *góvern* and *sácrifice*, which contain superheavy final syllables but not stress on them. There are verbs which are stressed on non-superheavy final such as *agrée*, and *permît.*

(4) Final Stress
a. heavy σ: *giráffe, permí˝t*
b. superheavy σ: *ánecdòte*, *dérelî˝ct*

The final syllables in (4b) bear secondary stress. However, whether it is primary or secondary is irrelevant for the present purposes because the syllables cannot be assigned secondary stress unless they are assigned 'stress' in the first place (Halle & Vergnaud 1987; Hayes 1981; Burzio 1994) Thus, it would not be paid attention to the primary/secondary distinction.

2. Halle (1998)

2.1. Rules for English Stress

Halle (1998) has three parameterized rules for English stress: the Edge-Marking Rules in (5), the Main Stress Rule in (6), and the Rhythm Rule (7). For ease of understanding, these rules are presented in paraphrased forms provided by Halle (1998).

(5) Edge-Marking Rules (EMR) (Halle 1998: 549)
a. RLR Edge Marking (RLR)
Insert a right parenthesis to the left of the rightmost syllable on line 0.
Condition J: the final syllable contains a short vowel.
b. LLR Edge-Marking (LLR)
Insert a left parenthesis to the left of the rightmost syllable on line 0.

(6) Main Stress Rule (MSR) (Halle 1998: 549)
a. Construct a binary foot at the end of string on line 0.
Condition K: the last grid projects a light syllable.
b. Construct a unary foot where this is not the case –that is,
where the syllable is heavy or there are not enough syllables in the word.

(7) Rhythm Rule (RR) (Halle 1998: 550)
Build an unbounded left-headed foot on line 1.

The Edge-Marking rules apply first, after syllables are projected onto line 0. RLR is ordered before LLR. LLR applies only in words where RLR has not applied. The effect of the rules is to make final syllables with short vowels unfooted, as in (8a), while making final syllables with long vowels footed, as in (8b).

(8)[5] a. RLR b. LLR

```
x x] x   x x]x        x x [x      x x[ x
agenda horizon      hurricane   stalagmite
```

As a result, stress on the final syllables is possible only when the final syllable contains a long vowel. After EMR, the Main Stress Rule applies to all words. Since MSR applies after EMR, 'the end of string' or 'the last grid' in (6a) refers to the underscored syllables in (9). To avoid confusion, the boundaries inserted by MSR are marked by parentheses and those inserted by EMR are indicated by square brackets.

(9)

```
          i)          ii)             iii)
a.RLR:    x           x               x
         (x  x) x    x(x) x          (x)  x
          Ca na da    a gen da        vi lla

b.LLR:    x    x        x  x        x  x
         (x  x [x     x (x  [x    (x  [x
          hu rri cane  sta lag mite  um pire
```

Due to Condition K of MSR, [σL] or [H] is built on the leftover string after EMR, as in (9i) and (9ii), respectively. When there is not enough material, either [L] or [H] is built, as in (9iii). RR builds a left-headed binary constituent over the heads of feet built by EMR and MSR. Due to RR, the head of a non-final foot bears primary stress, as illustrated by *hurricane* in (10).

(10)

```
                    x
line 1   x      x      (x    x
line 0  (x   x [x      (x  x [x
        hurricane RR->  hurricane
                        ↑    ↑
                    primary  secondary
```

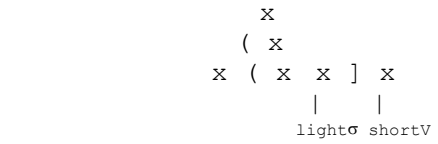
The three rules predict the following stress patterns.

[5] Halle (1998) differs from other theories in foot representation. Feet in Halle (1998) can be represented by a single boundary as in (i), following Idsardi's (1992) and Halle & Idsardi's (1995) proposal on single boundary feet.

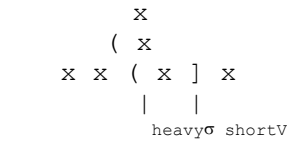
(i) Feet (Halle 1998: 545)

a. (x b. x x) c. (x x)

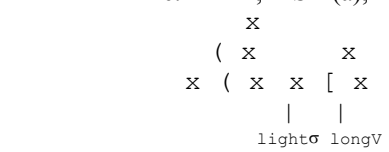
(11) a. RLR, MSR (a), RR



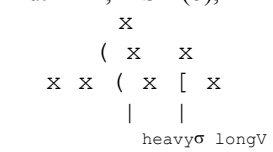
b. RLR, MSR (b), RR



c. LLR, MSR (a), RR



d. LLR, MSR (b), RR



First, final syllables with short vowels cannot be stressed, as in (11 a, b), but final syllables with long vowels take stress, as in (11c, d). Secondly, primary stress falls on heavy penultimate syllables, as in (11 b, d), but it falls on antepenultimate syllables when penultimate syllables are light (11 a, c).

2.2. Analysis

With these predictions in mind, consider how Halle's stress rules generate stress of the English words which are presented in section 1 and repeated below for convenience. First, look nouns in (12). For them, nothing special is needed. For simplicity, only foot boundaries are marked leaving out the x's.

(12) Nouns
a. heavy penultimate, if there is one*: a(gen)da, ho(ri)zon*
b. otherwise, antepenultimate: *(aste)risk, (Cana)da*

Next, consider verbs in (13). For them, Halle (1998: 549) needs to add one more option of the way to apply EMR besides RLR and LLR, namely 'no EMR'.

(13) Verbs
a. *u(surp* : no EMR
de(cide : no EMR
b. *(follow*: no EMR
in(habit : no EMR, final C e/m

Without 'no EMR', verbs would be stressed on wrong syllables; **(u)surp, *de[cide, *fo[llow, *(inha)bit, *(ima)gine*.

In addition, Halle assumes that final consonants are extrametrical (Halle,

p.c.)[6]. Without Final Consonant Extrametricality (final C e/m, henceforth), *inhabit* would be assigned word-final stress; **inha(bit,* as in (14a).

(14) *a. without final C e/m b. with final C e/m

x x (x	x (x x
in ha bit	in ha bi<t>

In (14), EMR does not apply to *inhabit.* With EMR, stress falls incorrectly on the antepenultimate syllable, as in (15). Thus, Halle (1998: 549) assumes that most verbs are not subject to EMR.

(15) *a. with EMR b. without EMR

(x x]x	x (x x
in ha bi<t>	in ha bi<t>

Now consider words with stress on light penultimate syllables such as *banana* and *Kentucky*. They are explained in further complication: Halle (1998:551)[7] assumes gemination (g/m) of consonants accepting Burzio's (1994) proposal. Gemination accounts for these words as illustrated in (16).

(16) Gemination

*a. without gemination b. with gemination

(x x]x	x (x] x
ba na na	ba nan na

Through gemination, as in (16b), the penultimate syllable becomes heavy and gets stressed. As can be seen, gemination plays a pivotal role in assigning stress onto the right syllables but no justification for it is provided by Halle (1998).

Now, consider words with stress on final syllables as in (17).

(17) Final Stress

a. heavy σ: *gi(ráf<fe>, per(mít<t>*: Gemination, No EMR

b. final secondary stress: (*ánec[dò<te>*: [-Condition K],

(*dére[lî c<t>:* exceptional LLR

Words with stress on final syllables such as those in (17a) cannot be explained even with help of 'no EMR'. As the case with *banana*, *permit* and *giraffe* would be stressed on the first syllables, without gemination: **(per] mi<t>* and **(gi]ra<ffe>*. That is because the final syllables have light rimes after the final C is excluded as extrametrical. (18) illustrates how 'no EMR' combined with gemination accounts for the word.

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[6] Halle (1988: 548) assumes this e/m. implicitly in his analysis of *de(ve lop.* Without the final C e/m the final syllable, *lop*, would be counted heavy and get stressed.

[7] Halle's gemination has no phonetic evidence, either.

(18) a. no EMR, g/m *b. EMR, no g/m *c. no EMR, no g/m

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x ( x          (x ) x          (x   x
per mit<t>      per mi<t>       per mi<t>
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Let us consider (17b) with stress on superheavy final syllables. In these words, RLR, no EMR, gemination, or final C e/m does not work. Halle's resolution to the problem is to give exemption to these words from Condition K or to apply LLR exceptionally.

First, consider *ánecdòte*. If Condition K of MSR is operative, a binary foot is built only when the syllable in the non-head position of the foot contains a light syllable: (σ L. (compare (11 a, c) with (11 b, d)). However, *ánecdòte* has a (underscored) heavy syllable in a non-head position: (σ H. Thus these words should be marked as 'no Condition K'.

(19) *a. Condition K: see (11d) b. No Condition K

```
      x                x
     (x  x            (x    x
   x (x  [x           (x  x  [x
   a nec dot           a nec dote
```

Recall that generally final syllables can bear stress only when they have long vowels, as shown in (11 c, d). However, there are some words like *derelict* with stress on a final syllable that does not have a long vowel. These words are marked as 'exceptional LLR'. With 'exceptional LLR', a final syllable is treated as if it contained a long vowel, even though it does not, as in (18).

(20) Secondary stress on a final syllable without a long vowel

*a. normal RLR: see (11a) b. exceptional LLR

```
 x                    x
(x                   (x  x
(x x) x              (x x [x
 de re lict           de re lict
```

To sum up, dealing with English word stress, Halle uses three types of exceptional markings: 'no EMR' (Halle 1998: 549), 'no Condition K' (Halle 1998: 549, 551), and 'exceptional LLR' (Halle 1998: 551). In addition, two more assumptions are adopted: gemination of intervocalic consonants (Halle 1998: 551) and final consonant extrametricality (Halle 1998: 548, p.c.). These exceptional markings are lexically specified. In other words, Halle's rules predict only a subset of the stress patterns; the other patterns are exceptions which are handled by lexical specification

3. Problems

3.1. Exceptions (no prediction)

The review of Halle's approach in the last section has shown that the approach treats some stress patterns as regular but others as exceptional. For example, *Canada* is regular while *banana* is exceptional. Exceptional patterns require additional stipulations which complicate the theory. For example, two of the three major rules, EMR, MSR, and RR, may be prevented from applying: EMR has 'no EMR' and 'exceptional LLR', MSR has 'no Condition K'. Furthermore, the other rule, RR, is in need of exceptional marking as well since there are words with primary stress on the final foot like *lèmonáde*. Compare this with *rénegàde*. These exceptional cases cannot be described in a systematic way. In consequence, it is impossible to predict the stress pattern of a given word.

3.2. Number of Exceptions

Moreover, the number of words that require stipulations is not small. For example, 'generally' unsuffixed adjectives, verbs (Halle 1998: 549), all words with stress on the final syllables as in (21a), and all monosyllabic words as in (21b) must be marked 'no EMR'.

(21) a. cát, pút
b. políce, políte, augúst, achiéve, prevént, Tennessée

Note that stress of unsuffixed adjectives, verbs, and words in (21) is derived through regular application of rules in H&V (1987), and Halle & Kenstowicz (1991), Burzio (1994), and Hayes (1995, 1985), which again means that the number of words requiring no EMR is not small enough to be ignored as exceptions.

In addition to the huge number of words with 'no EMR', the number of words marked as 'no Condition K' (Halle 1998: 551-553) is 'quite numerous', as Halle himself (1998: 549) points out. These 'no Condition K' words include words with stressless heavy penultimate syllables such as *récognîze, ánecdòte,* and *sátisfŷ* and words with vowel alternations such as *înfamous-fámous, cónfident-confîde,* and *résident-resîde*.

At this point, it is noteworthy that these words were treated as regular in H&V (1987). Once again, the earlier regular treatment of these words implies that the number of words marked as exceptions to condition K is not small.

3.3. Simplicity

Finally, Halle's analysis is not simple at all. It has been shown that the

assumptions on two types of extrametrical elements (RLR and final consonant extrametricality) are required in addition to the three major rules and their exceptions (no EMR, exceptional LLR, no Condition K). This is not the end of the list; Gemination is assumed at the end of words. Increasing the complexity, moreover, Halle (1998: 555-57) offers unstressable element, for example, *-er* and *-al* in (22a). Unstressibilities render an element invisible to metrical rules, much like extrametricality. Worse, 'unstressable' elements are sometimes visible, as in (22b).

(22) Unstressibility (Halle 1998:563)

a. unstressable		b. stressable	
(x]x .	(x]x .	x(x] x	(x x]x
cucumber	pedestal	December	marginal

In fact, the concept of unstressability encounters a further problem. For example, both the unstressable *–al* in (25a) and the stressable *–al* bear stress in *pedestálity* and *marginálity.*

3.4. Summary

In sum, Halle has three rules, three types of extrametricality (RLR, unstressability, and final consonant extrametricality), and gemination. These rules predict only a subset of the stress patterns; the other patterns are exceptions which are handled by lexical specification for no EMR, exceptional LLR, or no Condition K. Even with these complex mechanisms, Halle cannot predict the stress locations of English words.

4. An alternative proposal

4.1. Motivation

As has been shown up to now, English word stress is not fully predictable. Halle's way of catching this unpredictability is to allow exceptions to rules. Unlike Halle (1998) and other current approaches (H&V 1987; Hayes 1995; Halle 1998; Hammond 1999), the proposal to be made treats all the stress patterns of English equally, thus shifting interest and broadening the theoretical target from a restricted set of stress patterns to all stress patterns; for example, under the present proposal the stress of *banána* is considered to be as regular as that of *Cánada.*

There are four reasons to reject the division of the vocabulary into regular and exceptional with respect to stress patterns. First, a theory that treats the entire lexicon is better than one that treats only part of it. Ideally, rules or constraints should apply to the whole lexicon, not just a subset of the lexicon. Second, the distinction between regularity and exceptionality is not consistent with recent statistical analyses of stress location in English

words. Alcantara (1998), for example, reports that some 'regular' words are, in fact, less frequent than 'exceptional' words. Third, which stress patterns are treated as regular varies from theory to theory. For example, Halle & Vergnaud (1987) and Hammond (1999) treat *police* as regular, but Hayes (1995) and Halle (1998) treat it as an exception. Fourth, the patterns that are uniformly regarded as regular in current approaches fail to reflect the statistical patterns of English. For example, although all current approaches including Halle (1998) regard unsuffixed adjectives as though they follow the stress patterns of verbs, the majority of unsuffixed adjectives, in fact, follow the stress pattern of nouns (Alcantara 1998).

Recognizing that stress in English is not fully predictable (Hayes 1981, 1995; Giegerich 1992), and is therefore flexible, I attempt to answer two questions: Why are various stress patterns allowed? and what common conditions govern these different patterns? To answer the latter question, I will propose three foot constraints. As long as a word meets the requirements of these three constraints, it can have one of the many possible metrical structures. This is, in essence, why the English lexicon displays flexibility: the stress of a particular word is constrained, but not fully predicted, by the metrical principles of grammar. Thus the stress of a particular word is partly idiosyncratic. Actual selection involves the interplay of many more factors than just foot structure and syllable structure. Among these are such important factors as the origin of the word, the speaker's dialect, date of borrowing, the speaker's knowledge of the language, and the stress of words with similar structure. Yet, however complicated the process of selection is, once a structure is selected for a word, the structure is registered in the lexicon (Burzio 1996a, 1996b; Kenstowicz 1998).

4.2. Constraints

As the alternative, I suggest three foot constraints (23), which are respected by 'all' English words.

(23) English Foot Constraints
- a. TROCHEE (TROCHEE): feet are left-headed.
- b. FOOT BINARITY (FTBIN): feet are binary.
- c. LAPSE (*LAPSE): no two adjacent stressless elements are allowed.

I now illustrate briefly the function of each of these constraints. TROCHEE requires a binary foot to be stressed on its first element. Thus, the structure in (24a) violates TROCHEE (Prince 1983; Giegerich 1985; Kager 1989; McCarthy & Prince 1993; Prince & Smolensky 1993) while that in (24b) does not. 'σ's indicate syllables.

(24) Trochee

*a. x b. x
[σ σ] [σ σ]

FTBIN (Liberman & Prince 1977; Giegerich 1985; Kager 1989; Prince & Smolensky 1993; McCarthy & Prince 1986, 1993), claims that all feet must have two members. Thus, the structures in (25a, b) violate FTBIN while that in (25c) does not.

(25) FTBIN

*a. [σσσ] *b. [σ] c. [σσ]

FTBIN reflects the fact that rhythm alternates between syllables, as in *Àlabáma.*

NOLAPSE (Prince 1983; Selkirk 1984; Kager 1991, 1993, 1994, Green 1995; Green & Kenstowicz 1995) prevents the occurrence of two free syllables in a row.[8] The effect is shown in (26).

(26) NoLapse

*a. [σσ]σσ[σσ] b. σ[σσ]σ
*c. [σσ]σσ d. [σσ]σ[σσ]

The structures in (26a, c) violate NOLAPSE since two free elements occur in a row. The other structures satisfy the constraint.

[8] The fact that one free syllable is allowed but not two can be accounted for by ranking FTBIN, NONFINALITY, and ALIGN RIGHT over PARSE-SYLLABLE, as in the following tableau.

America	Nonfin	FtBin	Align-R	Parse-σ
☛A[meri]ca			*	**
Ame[rica]	*!			**
[A][meri]ca		*!	*	*
[Ame]rica			**!	**

However, these constraints and the ranking of them wrongly select *A[laba]ma* for *Alabama*, as in the following tableau.

	NONFIN	FTBIN	ALIGN-R	PARSE-σ
[Ala][bama]	*!			
[Ala][bam]a		*!	*	*
☛*A[laba]ma			*	**

4.3. Silent beats[9] [10]

In English, FOOT BINARITY seems to remain a problem, as can be seen by the contrast between (27a) and (27b).

(27) a. pre(vent) b. (per fect)[11]

To ensure that FOOT BINARITY applies to all cases, I propose that silent beats are added at the end of words with stress on the final syllables. Silent beat addition is independently motivated by both phonetic and phonological evidence under various notions such as null vowel, empty nucleus, and zero beat in literature. For the details of evidence for them, see Chomsky and Halle 1968; Pike 1946; Selkirk 1984; Burzio 1994; Harris 1994; and Backman, de Jong, and Edwards 1987. (28) exemplifies one of evidence: Timing.

(28) ding dong bell
Kitty's in the well

(28) contains two lines from a nursery rhyme. Each monosyllabic word in the first line counts for two beats, as is clear when matching the first line with the second. For example, *ding* corresponds rhythmically to *kitty's*, a word that obviously counts for two beats. To account for this rhythmic correspondence, I assume an abstract 'silent beat' after *ding,* as in (29). The silent beat is expressed with '0'.

(29) Phonological representation of rhyme
(kitty's)(in the) (well0)
(ding0)(dong0)(bell0)

A silent beat is crucially assigned a moraic and syllabic status, as in (30). The letters. m's, indicate moras.

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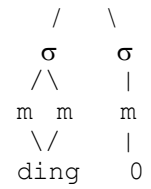
[9] One of an anonymous review's concerns is circularity problem which silent beats may cause. However, some phonetic experiments support the extra duration silent beats represent, as will be mentioned in the following discussion. Thus, the problematic circle can be broken by 'duration'. That is, final syllables with stress have a silent beat because the syllables are longer than stressed syllables in a word medial position. Still, on might argue that the extra length comes from stress and thus the circularity problem remains unsolved.

[10] Functions of silent beats and extrametrical elements are different. Silent beats are to make sure that FOOT BINARITY is always obeyed while extrametricality is to exclude some elements from metrical structures.

[11] Here, *perfect* is an adjective.

(30)


Having established the usefulness of silent beats, I compare them with other empty constituents that have been proposed to account for English words with final stress. Consider, first, Burzio's null vowels. The main problem with these empty segments is their unrestricted distribution; they occur word-initially as in *refute* (*0re. fu:. te0,* Burzio 1994: 324), word-internally as in *sixths* (*sik.s0. th0.s0,* Burzio 1994: 64) and *apartment* (*a.par.t0.men.t0*, Burzio 1994: 64), and word-finally as in *giraffe* (*gi.raf.fe0*, Burzio 1994: 55). Moreover, because null vowels in Burzio's analysis are motivated by the assumption that all words end in a vowel, it is not clear why a null vowel is added to words already ending in a vowel, as in *bee* (*[bee.0]*). Second, Hammond (1999) suggests invisible suffixes. These are used only for verbs and adjectives, not for nouns. Thus, even with these invisible syllables, Hammond cannot explain final stress in nouns. Furthermore, Hammond needs invisible suffixes even in words with stress on antepenultimate or penultimate syllables like *develop* (*de.ve.lo.p0*) and *jettison* (*jett.i.so.n0* or *jett.i.sn.0*).

Silent beats, on the other hand, occur only at the end of words.[12] In addition to being theoretically desirable, the proposed restricted distribution is supported by the phonetic evidence. Phonetic experiments has shown that (i) the durational difference between stressed and stressless vowels is largest when the stressed vowel is word final (Klatt 1976) and (ii) pre-(foot) boundary lengthening is significantly large when the pre-

[12] A top-ranked constraint in Correspondence Theory of OT, CONTIGUITY INPUT-OUTPUT, can prevent addition of silent beats other than word-finally. The definition and illustration of the constraint are given in (i) and (ii).

(i) CONTIG-IO (Kager 1999, McCarthy & Prince 1999): no medial epenthesis of segment (silent beat).

(ii) Silent beats at the end of words

percént, súbject	WS	Trochee	FtBin	Contig-IO
a. ☛ [súb.jec].t				
b. ☛per.[cén.t0]				
c. per.[cén].t			*!	
d. [per.cén]. t0		*!		
e. per.cen. [t0]	*!		*	
f. [pér.0]cen.t				*!

To show stress flexibility, *subject* is also included in (ii). *[sub.jec]t0* is also a possible output since it does not violate any constraint.

boundary syllable is stressed (Whiteman et al 1992). These findings suggest that only stressed final syllables have extra duration and thus need an abstract representation to express.

Returning to words in (27), consider the foot structures for them in (31).

(31) a. pre (vent0) b. (per fect)

The word with final stress does not incur a violation of FTBIN any more.

4.4. Analysis

Now let us see how the present alternative works for English stress. Trochaic binary feet with an optional free syllable between them and an optional silent beat in word-final position are the all and only requirements for feet, as can be seen in (32)-(35).

(32) Nouns
a. a(génda), ho(rízon) b. (áste)risk, (Cána)da
(33) Verbs
a. u(súrp0), de(cíde0) b. (fóllow), in(hábit)
(34) Light penultimate stress
ba(nána), Ken(túcky)
(35) Final main stress
a. per(mi˝t0), gi(ráffe0)
b. (ánec)(dòte0), (dére)(ĩict0)

Regarding the distinction between primary and secondary stress as displayed by words in (35b), it is assumed that foot theory does not predict which syllable bears primary stress and which bears secondary stress. What the theory does determine is that the first and the penultimate syllables are stressed and that the feet which are not weak carry primary stress. 'Weak feet' are the feet with a zero beat.[13]

4.5. Conclusion

Let us recall the two questions which this paper has attempted to answer: Why does English stress display flexibility? and what are the conditions all the attested stress patterns should satisfy? With regard to the second question, I have proposed the three foot constraints. The three constraints also give the answer to the first question. As long as they satisfy the foot

[13] However, this causes a problem. The present proposal cannot explain the difference in stress locations of *lèmonáde* and *rénegàde*. The words displaying retractions are not problem only with the present proposal, though. All the previous analyses of English stress face the same problem.

constraints, alternative foot structures are possible. Thus, more than one possible stress pattern is theoretically possible for a given syllable structure. In addition to the answers, the theoretical constructs of the present proposal are able to predict that some metrical structures are not attested in English. For example, Hammond (1999) reports that there are no English words of the form *σσσ́(σ ..) or *σσσσ́(σ…). This is predicted by the present theory since the foot structures of the hypothetical words would violate NOLAPSE. Also, there is no word with two adjacent equal stresses in English. This follows from FOOT BINARITY.

In conclusion, it has been shown that Halle's (1998) analysis of English stress depends on violable rules, is very complicated requiring unstressable elements, final consonant extrametricality, gemination, and exceptional applications of the three rules. Compared with it, the alternative proposal depends on one well-motivated assumption, silent beats, and universal foot constraints, which apply in a simple and consistent way to all words.

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