Pretonic and rightmost primary stress:
rénegàde and *lèmonáde**

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Hyo-Young Kim. 2003. Pretonic and rightmost primary stress: *rénegàde* and *lèmonáde*. *Studies in Phonetics, Phonology, and Morphology* 9.2. 381-391. In this paper, I will demonstrate that accounting for pretonic and rightmost primary stress illustrated respectively by *rénegàde* and *lèmonáde* is a problem for previous approaches to English stress (Halle & Vergnaud 1987; Burzio 1994; Hayes 1995; Halle 1998). After reviewing the approaches and pointing out the problems with them I will show the dual-counting metrical representation proposed by Kim (2001) can provide an account of the stress contrast illustrated by the two word-types. **(Sogang University)**

1. Introduction

The purpose of this paper is to show that accounting for pretonic and rightmost primary stress is a problem for previous approaches to English stress (Halle & Vergnaud 1987; Burzio 1994; Hayes 1995; Halle 1998) and to provide an account for it based on the dual-counting foot theory (Kim 2001) and silent beats (Kim to appear).

Pretonic and rightmost primary stress refers to primary stress realized on a non-final foot and final foot, respectively, as is illustrated by words in (1).

(1) a. Pretonic Primary Stress: rénegàde, lúllabỳ, dýnamìte
    b. Rightmost Primary Stress: lèmonáde, gàsolíne, clàrinét

Note that *rénegàde* and *lèmonáde* have different stress patterns even though they have a similar syllable structure. No current theory can account for both *rénegàde* and *lèmonáde* without lexical marking. Most of them treat one of the two word-types as exception.

2. Previous analyses and problems

Before formulating my explanation of such flexible stress, I review the previous accounts of this phenomenon given by Halle & Vergnaud (1987, henceforth HV), Burzio (1994), Hayes (1995), and Halle (1998) and show that none of them can handle both *renegade* and *lemonade*.

2.1 Halle & Vergnaud (1987)

HV (1987) propose four rules for stress of English nouns: Extrametricality Rule, Accent Rule, English Stress Rules, and Rhythm Rule. Here I want to leave out the details of HV's system irrelevant to the current discussion of pretonic and rightmost primary stress of nouns.

Extrametricality Rule states that final syllables in nouns are extrametrical (e/m) (HV 1987: 234). This means that the final syllables of nouns cannot hold stress. However, both *renegade* and *lemonade* are exempt from Extrametricality Rule since the final syllables contain long vowels. Otherwise, their final syllables would be extrametrical and thus could not be stressed. Accent Rule (AR) (HV 1987: 231) demands that a syllable with a branching rime is stressed.[1] Accordingly, the final syllables of the two words are stressed since the final syllables contain a long vowel. Then, English Stress Rule (ESR) (HV 1987: 228) builds a left-headed binary constituent on line 0, assigning stress on the first syllables of the words. Among the two stresses given by Accent Rule and ESR, the one on the last syllable is primary stress since a right-headed unbounded constituent is built by ESR on line 1. The procedures are illustrated in (2). Only the relevant parts are given in (2).

(2) HV's account of stress on a final foot

```
                                                  x
                      x          x    x      [x      x]
   x  x  x          x  x[x]    [x  x][x]     [x  x][x]
  lemonade          lemonade    lemonade      lemonade
 exempt from e/m   Accent Rule:  ESR:         ESR
                   stress heavy σ  left–headed binary  right-headed unbounded
```

renegade would be stressed in the same way as *lemonade* since both words have the same syllable structure in HV: *re.ne.gade* and *le.mo.nade*. Here dots indicate syllable boundaries. To get pretonic stress of *renegade*, an exceptional rule, the Rhythm Rule (RR, HV 1987: 235) applies to retract primary stress from the last syllable to the next stressed syllable, after the final syllable of *renegade* is incorrectly stressed as in (2) above, producing *rénegàde*, as shown in (3).

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[1] This rule has a 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. However, it is not relevant to the current discussion which focuses on nouns only.

(3) HV's account of pre-tonic stress: Rhythm Rule

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        x                    x
   [x     x]            [x      x]
   [x x][x]             [x x][x]
   renegade             renegade
   same as (2)          Rhythm Rule
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   Thus, under HV's account, the main difference between *lemonade*-type and *renegade*-type words is that words of the first type do not undergo stress retraction while words of the second type do. Since RR is lexically governed in HV, each word must be lexically marked whether it is subject to the RR or not. In sum, to account for *renegade* and *lemonade*, HV must resort to the theoretically inelegant device of lexical marking.

2.2 Burzio (1994)

The foot-based theory of Burzio (1994) differs in key respects from the tradition in that stress is not assigned by a set of rules. Rather feet are checked with respect to a foot typology. For English stress, binary feet with a heavy syllable as a head and ternary feet with a light syllable in the middle are allowed (Burzio1994: 18, 53): [Hσ] and [σLσ]. Examples are given in (4)

(4) [H σ]: a[gen.da]   [σLσ]: [Ca.na.da]

   In addition, Burzio adopts assumptions about null vowels and gemina-tion for words such as *vani☐lla* and *gira☐ffe*. Null vowels are marked by '0'.

(5) Null vowels and geminates
     vi☐lla: [vil.la],   gira☐ffe: gi.[raf.fe0]

   Besides, Burzio (1994: 16-7) distinguishes syllables with null vowels from other traditional syllable types, e.g., light and heavy syllables. The syllables with null vowels are called 'weak syllables'. This category also comprises syllables with word-final –*y* or syllabic sonorants, as shown in (6), where weak syllables are underscored.

(6) Weak syllables
     a. null vowel: Caroli:<u>ne</u>, objecti<u>ve</u>
     b. -*y*: aristocra<u>cy</u>, presiden<u>cy</u>
     c. syllabic sonorant: adven<u>ture</u>, exam<u>ple</u>

   According to Burzio, weak syllables have two characteristics relevant to stress placement. One is their variable metrification (Burzio 1994: 68), illustrated in (7).

(7) Metrification of weak syllables (Burzio 1994:16)
     a. metrified: aris[tocra<u>cy</u>], ob[ject<u>ive</u>][2], ad[ven<u>ture</u>]
     b. not metrified: [calum]<u>ny</u>, [adjec]ti<u>ve</u>[3], [aper]<u>ture</u>

   The other characteristic is that they yield what are referred to as 'weak feet' when they are metrified, as is shown in (8). (Weak feet are underscored.)

(8) Weak feet
     [o⬚rtho]<u>[do^xy]</u>, [i⬚nno]<u>[vative]</u>, [a⬚rchi]<u>[te^cture]</u>, [a⬚lli]<u>[ga^:tor]</u>

   Weak feet are unusual in that they may fail to attract primary stress, leading Burzio to assume (9).

(9) Primary Stress in English (Burzio 1994: 16)
     Primary stress falls on the rightmost non-weak foot.

   In other words, feet with null vowels cannot take primary stress as long as there is another foot which is not weak.
   Turn to the case of *lemonade* and *renegade*. Both words should be regular words and have good feet according to Burzio. To achieve this goal, Burzio (1994: 48-9) argues that there is no secondary stress on the final syllables of *renegade*-type words. Burzio continues to argue that final syllables with long vowels are simply unreduced vowels in an unstressed position in this case (Ladefoged 1993); for example, *renegde* is parsed as [σ L σ], without stress on its final syllable.[4] To account for final primary stress, as in *lemonáde,* Burzio assumes that some nouns follow stress pattern of verbs, which Burzio (1994: 43) describes as 'stress superheavy final, if there is one, otherwise, penultimate'. Notice that this is equivalent to a preference for metrifying the final weak syllables in verbs (Burzio 1994: 166). (10) shows Burzio's foot structures for *renegade* and *lemonade*.[5]

(10) a. rénegade [re.ne.ga]de0   b. lèmonáde [lem.mo][na.de0]

   Note that gemination is assumed in *lemonade* since the head of a binary foot should be heavy. (10a) gives the foot structure of *renegade* under the assumption that it is a 'normal' noun, that is, a noun that does not follow

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[2] *ob[jec.ti]ve* should be fine.
[3] *[ad.jec]ti.ve* should not be allowed since only weak syllables are allowed to be extrametrical in Burzio (1994: 18), but a strong syllable *ti* is unmetrified in *adjective*.
[4] It would also be possible to parse *renegade* as [ren.ne][ga.de0]. The principle in (9) would correctly render stress on the first syllable primary since the final foot is weak involving a weak syllable, *de0*. For some reason, Burzio does not mention this possibility, though.
[5] The argument to be made in this paper could be meaningless if *renegade* did not have any stress on the final syllable and thus had a single foot as Burzio argues. However, all the researchers except Burzio accept that words with a final long vowel are stressed on the final syllable, whether primary or secondary (HV 1987; Halle 1998; Hayes 1981, 1995; Hammond).

the verb pattern. Under such an assumption, the stress on the final syllable cannot be accounted for. Consequently, (10b) is the foot structure of *lemonade* when it is stressed according to the verb pattern rather than the noun pattern. Here, primary stress is correctly assigned to the final foot.

Now, compare *lèmonáde* in (10b) with ne□cessa ˆry in (11).

(11) ne□cessary [nec.ce][ssar.ry]

Both words have final weak feet since their final feet contain a null vowel or a word-final –*y* respectively. Therefore, there should be retraction in both words given the assumption that stress is retracted to a non-weak foot (Burzio 1994: 50). In fact, retraction does occur in *necessary,* though not in *lemonade*. Thus, Burzio must make one more stipulation than HV. That is, words must be marked whether they are of the *[ren.ne.ga]de*,0 *[lem.mo][na.de0]* (no retraction), or *[nec.ce][ssar.ry]* (retraction) type.

2.3 Hayes (1995)

Hayes' (1995) theory is much like that of HV's in that it is rule-based and represents metrical structures with bracketed grids. However, Hayes' theory for English stress differs from HV's in that feet are built on mora projections, not on syllable projections. After moras, not syllables, are projected onto line 0, rules apply to the moraic structures. The major rules for English, the Main Stress Rules, are summarized in (12).

(12)   Main Stress Rule (Hayes 1995: 92, 181)
         a. Extrametricality: final syllables of nouns are extrametrical.
         b. Footing: form a moraic trochee, going from right- to left.
         c. End Rule (Right).

After the extrametricality rule excludes the final syllable as an extrametrical element, Moraic trochees, [H] and [LL], are constructed according to (12b). After construction of moraic feet on line 0 and head projection onto line 1, the End Rule builds a right-headed constituent of maximal size on line 2. Due to (12a), stress on the final syllable of nouns, either primary or secondary, is exceptional.

For exceptional words, Hayes proposes exceptional device, revocation of extrametricality (Hayes 1995: 112). The function of revocation of extrametricality is to cancel the effect of extrametricality.[6] In *lemonade* and *renegade*, extrametrical elements are revoked and rules in (12) apply.

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[6] There is another device for exceptional words: incorporation of extrametricality (Hayes 1995:111-2). It has the same function as revocation of extrametricality. The difference between them is that Revocation of extrametricality is for words with stress on final syllable such as *giraffe* while incorporation of extrametricality is for those with stress on the light penultimate syllable such as *villa*.

(13)
```
                                                    x
                              x    x     [x    x]
    m  m<mm>      m  m  mm    [m  m] [mm]  [m  m] [mm]
    lemonade      lemonade    lemonade     lemonade
    final σ e/m   revocation of e/m  moraic trochee   EndRule(Right)
```

Even with the exceptional device, namely revocation of extrametricality, antepenultimate stress of *renegade* cannot be accounted for. The stress should simply be marked in the lexicon.

2.4 Halle (1998)

Like HV, Halle (1998) projects syllables onto line 0 and constructs feet over syllables by rule application. However, the two systems differ in foot representation. Feet in Halle (1998) can be represented by a single boundary, following Halle & Idsardi's (1995) proposal on single boundary feet. The second difference is the use of Edge Marking Rules (EMR, Halle 1998: 547) instead of Extrametricality Rules. The effect of the rules is to make final syllables with short vowels unfooted. In addition to EMR, Halle proposes two more rules for English stress: Main Stress Rule (MSR) and Rhythm Rule (RR). MSR (Halle 1998: 549) builds [σL] or [H] on the leftover string after Edge Marking Rule applies. Finally, Rhythm Rule (Halle 1998: 550) 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.

(14) shows how *renegade* is derived in Halle's (1998) analysis.

(14) Regular derivation of *renegade* with RR
```
                                          x
        x             x    x        [x    x
     x x [x        [x   x[x         [x x[x
    renegade       renegade        renegade
    Edge Marking:  Main stress rule:   Rhythm Rule:
    [σ long V      [ L L               left-headed binary
```

Since Halle's RR is a regular rule and assign primary stress on the non-final syllable, *lemonáde* is exceptional. That is, stress of words like *lemonáde* must be marked in the lexicon.

Recall that in HV, it is the other way around: *renegade* is exceptional which is derived through retraction by the exceptional rule, Rhythm Rule. In contrast to HV's RR, Halle's Rhythm Rule is not lexically governed; rather, it routinely assigns primary stress to a non-final foot, when possible.

In sum, I have shown that even though pretonic and rightmost primary stress are attested in English, no analysis proposed previously can deal both with *lemonade* and with *renegade* without lexical marking.

3. Proposal

In addition to the failure of previous analyses to incorporate the difference between *renegade* and *lemonade* into their rule regular system, we have seen that judgment on regularity or exceptionality of pre-toninc primary stress is not consistent across analyses, as is summarized in (15).

(15)   Disagreement on regular stress

	Lemonade	*renegade*
HV 1987	Regular Exempt from e/m	Exempt from e/m Exceptional (through RR)

Burzio 1994	Regular [H s][H w]
	Exceptional to
	  weak foot retraction
	Lexical marking
	  to differentiate it
	  from *necessary* and
	  renegade
		Regular [s L s]
		  Rejecting final
		  secondary stress

Hayes 1995	Exception
	  to noun e/m
	Regular
	  (End Rule Right)
		Exception
		to noun e/m
		Exception
		  To End Rule

Halle 1998	Exception: no RR	Regular through RR

   HV (1987) and Burzio (1994) consider *lemonade* as regular while Hayes (1995) and Halle (1998) do not. (15) shows that it is often arbitrary to decide which words are regular and exceptional: Researchers do not always agree on whether a given word is regular or exceptional. Even the same scholar shifts his decision depending on his analysis. Furthermore, as can be inferred from Halle's (1998: 549) statement that '(exceptional words) are quite numerous…unsuffixed verbs and adjectives are generally not subject to edge marking of any kind', the number of exceptional words is not small enough to be excluded as exception (Alcantara 1998; Halle 1998). In the light of this arbitrariness of the decision on the exceptional words and the huge number of exceptions, this paper aims to find the conditions which both so-called regular and exceptional words satisfy, following Giegerich (1992: 180) and Hayes (1995: 112) in that English stress is not predictable.
   One might think that the analysis proposed in this paper has the same problem with the previous analyses in that words should be marked whether they have silent beats or not.[7] However, lexical marking leads to a problem under the assumption that stress location is predictable. As

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[7] I thank an anonymous reviewer for pointing this issue out.

mentioned above, however, the prediction of stress location is not the purpose of the analysis in this paper.

The theory allowing for both stress patterns of *lemonade* and *renegade* as regular ones can be found in assumptions on the dual-counting foot theory (Kim 2001) and silent beats (Kim to appear).

First, according to the dual-counting foot theory, both moraic and syllabic structures are represented in foot structures, as in (16).

(16) Dual counting foot structure (Kim 2001: 879-881)

```
     x                      x          S-head
σ [σ   σ]              [σ   σ]          S-foot
a gen da              cos mos
m [mm]m               [mm] [mm]         M-foot
   x                   x   x            M-head
```

Trochaic feet are formed at both syllabic and moraic levels. The heads of moraic trochees and syllabic trochees are assumed to bear stress. Syllables with M- and S-heads such as *gen* and *cos* bear primary stress and syllables with an M-head bears secondary stress such as *mos*.

The proposal to represent both the moraic and the syllabic levels is not new. Analyses assuming syllabic trochee such as HV (1987), Burzio (1994), Halle (1998), and Hammond (1999) implicitly make use of moraic structure. That is, the syllable-counting theories require devices, such as HV's Accent Rule, Burzio's [Hσ], Halle's Main Stress Rule, and Hammond's WEIGHT-TO-STRESS, to consult the internal structure of syllables – i.e., moraic structures to make sure that heavy syllables receive stress. Furthermore, syllable counting theories predict that the minimal word in English should be defined only in terms of the syllabic trochee, since a minimal word is a foot (Selkirk 1980; McCarthy and Prince 1986; Kager 1993, 1999; Hayes 1995). However, a disyllabic minimal word requirement is plainly inadequate. One would have to further stipulate that monosyllabic words are allowed, but only if they contain two moras. This allowance for bimoraic minimal words can be taken as evidence that English is also a mora-counting system. On the other hand, a moraic trochee theory is not sufficient, either: Hayes (1995: 123) must refer to syllables in order to guarantee that moras belonging to a single syllable cannot be separated into two different feet. This suggests, then, that English needs both moraic and syllabic levels.

However, the foot structure does not predict which syllable bears primary stress when a word has more than one S-head, as in (17).

(17)
```
    x      x
   [σ σ]  [σ σ]
   A la   ba ma
   [m m]  [m m]
    x      x
```

The apparent difference between primary and secondary stress in *Alabama* is interpreted as a result of the superimposition of a neutral intonation pattern (Ladefoged 1993; Hayes 1995). To make this tonal interpretation of primary stress explicit, Tone Linking in (18) is assumed.

(18) Tone Linking
      Align a (neutral) high tone with the last S-foot.

Tone Linking has the effect to assign primary stress to the rightmost foot much like End Rule (Right). For example, in *Alabama,* the penultimate syllable is more prominent than the first syllable because of the high tone aligned with it.

```
(19)           H
               |
     x       x
     σ  σ] [σ  σ]
     A  la  ba ma
    [m  m] [m  m]
     x       x
```

Secondly, the assumption on silent beats is adopted. Kim (to appear) proposes silent beats which are postulated after the words with stress on the final syllable such as *percént, giráffe*, and *políce* based on phonetic and rhythmic facts found in English.

What numerous phonetic studies have proposed concerning stress is 1) stressed syllables are longer than stressless syllables, (20a), and 2) stressed syllables in the word final positions are longer than stressed syllables in word initial or word medial positions, (20b), (Barnwell 1971; Lehiste 1975; Oller 1972; Klatt 1973, 1975, 1976; Goldsmith 1981).

(20) a. stressed syllable > stressless syllable
         in**su'lt** > I'n**sult**
      b. word final position > other position
         ke'ep   > **ke'ep**er

The same segmental sequence, *sult* is longer when it is stressed than it is not. *keep* is longer when it is in the word final position, monosyllabic word in this case than *keep* when it is not in the word final position. According to Klatt's (1973) finding, summarized in (21), if the duration of *keep* when it is monosyllable word is set as 100, the duration of *keep* in *keeper* is 66.

(21) Vowel duration in stressed syllables (Klatt 1973: 1102)

	monosyllable	disyllable
mean duration (msec.)	198	131
mean duration (percent)	100	66

In spite of the fact that the stressed syllables in the word final position are longer than stressed syllables in other position and stressless syllables in the same position, the fact can not be expressed with any of the current empty constituents. For details of phonetic and rhythmic motivations, see Kim (to appear).[8]

Within the dual-counting foot theory along with the assumption on silent beats, *lemonade* and *renegade* represent two different well-formed metrical structures, as can be seen in (22).

```
(22) a.   H                     b.          H
          |                                 |
          x                     x     x
          [σ  σ] σ              [σ  σ] [σ  σ]
          re ne gade           le mo  na de0
          [m  m][mm]           [m  m] [mm]m
           x    x               x      x
```

In (22a), a moraic foot can be constructed over the final syllable while a syllabic foot is not constructed over the final syllable. Thus, this syllable does not receive S-stress and as a result, cannot bear primary stress. Instead, the final syllable with a moraic head bears secondary stress. In contrast, in (22b), the final consonant is syllabified as an onset with the help of the silent beat, forming a word-final catalectic syllable, and parsed into a binary foot. Thus, this syllable bears primary stress through application of Tone-Linking (Ladefoged 1993; Hayes 1995).[9]

In this way, only the dual-counting foot theory with the assumption on silent beats can account both for rightmost and pre-tonic primary stress.

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[8] One might think that there is a circularity problem in adopting silent beats; postulating silent beats makes use of information on positions of stress and foot parsing for assigning stress needs the silent beats. This problem may be avoided by following the assumptions of Burzio (1994) and OT (Prince & Smolensky 1993) that stress is not assigned by rules but rather output forms (foot structures in this case) are checked whether they have a good foot structure. To be good metrical structures in English, words should be able to form trochaic feet at both moraic and syllabic levels. Besides, foot parsing and syllabification are to be done simultaneously as in Hammond (1999).

[9] An anonymous reviewer's concern was that the foot structure proposed in this paper would lead to incorrect predictions in words with four or more syllables such as *América* and *àbracadábra*. Both of these words like other words illustrated above have good foot structures: *a [me ri] ca* and *[a bra]ca [da bra]*.

4. Conclusion

Previously, one of the attested patterns of noun stress is treated as exception. In other words, some stress patterns are considered to be marked in the lexicon, being excluded from the targets of regular rules. However, there is no agreement on which is exceptional and which is regular. In the light of this disagreement, it seems to be better to permit both patterns as legitimate and give them 'good' structures by finding out what common characteristics they share. The characteristics are found if the foot structures are represented at both moraic and syllabic levels and silent beats are assumed.

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