

No Exception in the English Lexicon: A Reply to Hammond (1999)*

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Kim, Hyo-Young. 2002. **No Exception in the English Lexicon: A Reply to Hammond (1999)**. *Korean Journal of English Language and Linguistics* 2-1, 53-76. This paper aims to review Hammond's (1999) analysis of English word stress and propose an alternative by exploring two questions: Why English words display flexible stress patterns and what are the conditions all English words have to obey. As answers to the questions I propose an invisible suffix after words with final stress, foot structures with two levels, and four constraints, two of them are attained by revision of Hammond's. As long as words satisfy the constraints, more than one foot structures are allowed. That is why the English lexicon displays flexibility.

1. Introduction

The purpose of this paper is to review Hammond's (1999) analysis of English mono-morphemic word stress and propose an alternative by exploring two questions. The first is why English words display flexible stress patterns even when words apparently have the same syllable configurations as illustrated in (1).

- (1) Cánada-banána, ovért-cóvert, Tennessee-commíttee-pédigree
cábin-Japán

The proposal to be made treats all words in (1) equally; for

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example, under the present proposal the stress of *banana* is considered to be as regular as that of *Canada*. In this respect, the present proposal is a significant departure from other current approaches including Hammond (1999) which treat some patterns as the target of analysis but mark others as exceptions. For example, the stress of *banana* has been considered exceptional (Halle and Vergnaud 1987, henceforth H & V; Hayes 1995; Halle 1998; Hammond 1999).

The second question to be explored is what are the conditions all English words have to obey regardless of so-called regularity or exceptionality.

The rest of the paper is organized as follows. Section 2 reviews Hammond (1999). Section 3 proposes an alternative analysis by revising Hammond's analysis. Section 4 closes the paper with some concluding remarks.

2. Hammond (1999)

2.1. Constraints

Hammond (1999) formulates his analysis of English stress in the OT framework (Prince and Smolensky 1993). Hence, constraints and their rankings play important roles. The following constraints in (2) are central to his analysis.

- (2) Basic foot constraints
- a. TROCHEE (T): stress occurs on the left side of the binary foot.
 - b. FOOT BINARITY (FTBIN): feet are binary.
 - c. WEIGHT-TO-STRESS PRINCIPLE (WSP): heavy syllables are stressed.
 - d. FAITH (\hat{v}): accented (lexically marked) syllables must be stressed.

TROCHEE requires disyllabic feet to be stressed on the first syllable: [ṣ s]. ‘S’ indicates syllables. FOOT BINARITY states that disyllabic feet are optimal. FTBIN for Hammond is defined on syllables and thus the foot [H] violates FTBIN, even though it is binary in terms of moras. The WEIGHT-TO-STRESS PRINCIPLE ensures that heavy syllables are stressed. Due to the WEIGHT-TO-STRESS PRINCIPLE and BIMORACITY, which requires all stressed syllables to be at least bimoraic, all heavy syllables are stressed and all stressed syllables are heavy in Hammond’s approach. FAITH (∅) guarantees that lexically marked syllables get stressed. ‘∅’ indicates vowels with lexically marked stress. This last constraint is used in dealing with exceptions.

At this point, it should be mentioned that Hammond’s syllable theory is different from the traditions on syllabification. The characteristics are summarized in (3).

(3) Simultaneity of syllabification and foot parsing

a. Stressed syllables are heavy.

(The Onset Rule does not have to apply to stressless syllables.): *Cánada* - *can.a.da*, *banána* - *ba.nan.a*

b. Stressed syllables have an onset.

(The Onset Rule applies to stressed syllables.)

ràccóon - *rac.coon*, *ballóon* - *ba.lloon*

Hammond (1999:246) argues that syllabification is affected by stress location. As a consequence, it is always ensured that the stressed syllables are heavy and heavy syllables are stressed. To achieve this effect, Hammonds assumes that the universal Maximal Onset Rule does not apply to the stressless syllable. Thus, [n] in *Canada* is syllabified as the coda of the first syllable rather than the onset of the second syllable. In contrast, the Onset Rule applies to stressed syllables, leading to ambisyllabicity of a consonant between two stressed syllables as in

ràc.cóon.

In addition to the general constraints, the following constraints in (4) are assumed for English. The constraints are presented in simplified forms since the details of mora assignment, needed for the original constraints, go beyond the focus of this paper.

(4) Constraints for English

- a. ROOTING (RT): all words are stressed.
- b. NONFINALITY (NF): the final syllable is not footed.
- c. STRESS VV (VV): syllables with long vowels are stressed.
- d. STRESS VCC (VCC): syllables with consonant clusters as the coda are stressed.
- e. STRESS VC (VC): syllables with a consonant as the coda are stressed.

ROOTING forces a word to be stressed. NONFINALITY forbids final syllables to be footed. In relation to NONFINALITY, it should be noted that Hammond (1999:278) assumes that verbs and adjectives are followed by an invisible suffix. This allows verbs and adjectives to have *final* or *penultimate* stress without violating NONFINALITY; s [s]. 0# or [s s] 0#, where 0 marks an invisible suffix and # indicates a word boundary. For English, the WSP in (2) is divided into three parts, (4c-e), since the effect of heavy syllables on stressing in English varies depending on the type of syllable; final syllables containing long vowels (VV) or consonant clusters (VCC) are most likely to attract stress, as in *degré* and *percént*, respectively; final syllables containing a short vowel and a consonant (VC), are less likely to attract stress, as in *básk**et*. Note that STRESSVCC is relevant only to nouns since the final (C)VCC in verbs/adj. is syllabified as (C)VC.C0 with an invisible suffix. The ranking among the constraints is given in (5).

(5) Constraint ranking for English stress

TROCHEE, ROOTING, FAITH (ϕ) >> VV, VCC >> NF >> VC
>> FTBIN

2.2. Predictions

There are five main predictions made by the ranking in (5) First, all words are stressed because of Rooting. Consider the tableau in (6). Words without square brackets around them like 'cat' below do not carry stress.

(6) ROOTING >> ...

cat	R	NF	FB
[cat]		*	*
cat	*!		

A candidate with stress is more optimal no matter how many constraints it violates than a candidate without stress, since ROOTING is top-ranked. Candidates without stress will not be considered in the following tableaux. In the following discussion, candidates violating TROCHEE are not included, either, since TROCHEE is top-ranked; [s s] = [ṣ s].

Second, nouns with final consonant clusters and all words with final long vowels are stressed on their final syllables since STRESSVCC and STRESSVV rank over NONFINALITY, as seen in (7).

(7) Nouns with superheavy finals: final stress

percent	STRESS VCC	NF	FB
per[cent]		*	*
[per.cent]	*!	*	
[per]cent	*!		

(8) Words with final long vowels: final stress

a. nouns

Tennessee	STRESSVV	NF	FB
* Tenne[ssee]		*	*
Te[nness.ee]	*!	*	
[Tenn.e]ssee	*!		

b. verbs

guarantee	STRESSVV	NF	FB
* gauran[tee]0			*
gau[ran.tee]0	*!		
[gaur.an]tee 0	*!		

The stress of verbs/adj. with final Sc (superheavy syllable with two consonants) depends on the weight of the other syllables. If there are no syllables with long vowels, then the final Sc is stressed, as in *prevént*, whereas this syllable is not stressed if there is a syllable with a long vowel, as in *clímax* (v.). This is so because the final Sc in verbs/adj., unlike in nouns, is syllabified as (C)VC.C0 with an invisible suffix and STRESSVC is ranked lower than STRESSVV. The main difference between nouns and verbs with final long vowels is that an optimal candidate for the latter does not violate FB due to a final invisible syllable, as can be seen in (8).

The third prediction of the constraint ranking in (5) is that stress falls on a heavy penultimate syllable, if there is one, as in (9). Stress falls on antepenultimate syllables of nouns and penultimate syllables of verbs when penultimate syllables are light, as in (10). For syllabification in word with invisible suffixes, refer to Hammond (1999:278).

(9) Words with heavy penults: penultimate stress

a. nouns

agenda	NF	STRESSVC	FB
a[gen]da			*
a[gen.da]	*!		
[ag.en]da		*!	
agen[da]	*!	*	*

a. verbs

abandon	NF	FB
aban[do.n0]	*!	
a.[ban]do.n0		*!
a[ban.do]n0		

(10) Words with light penultimate

a. nouns: antepenultimate stress

Canada	NF	FB
[Can.a]da		
Ca[nad.a]	*!	
Ca[na]da		*!

b. verbs: penultimate stress

develop0	NF	FB	ALIGNRIGHT
[dev.e]lo.p0			**!
de[vel.o]p0			*
deve[lop.0]	*!		

The different stress locations between nouns and verbs as illustrated in (10a) and (10b) is due to the invisible suffix which is allowed only for verbs and adjectives. In (10b), there is an additional constraint, ALIGNRIGHT. This constraint requires the right edge of the foot to be aligned with the right edge of the word. The first candidate in (10b) violates this constraint twice

since the right edge of the foot is two syllables away from the right edge of the word.

The fourth prediction is that final syllables with (C)VC are not stressed in the word-final position, since STRESSVC is ranked lower than NONFINALITY. The effects of this ranking are illustrated in (11) and (9b).

(11) Words with final (C)VC

animal	NF	VC	FB
ani[mal]	*!		*
a[nim.al]	*!	*	
[an.i]mal		*	

The fifth prediction is complicated and concerns the cases where there is more than one of Sv (a superheavy syllable with a long vowel), Sc (a superheavy syllable with two consonants), Hv (a heavy syllable with a long vowel), or Hc (a heavy syllable with a consonant) in a word. There are two sub-cases. The first case is when there are one of Sc, Sv, or Hv and one Hc. In this case, Sc, Sv, or Hv is stressed due to the ranking of VCC/VVC over VC. An example of this case was already given in (8b). The second case is when there are two Sc, Sv, or Hv or when there are two Hc's in a word. In this case, the non-final syllables are stressed: antepenultimate syllables in trisyllabic nouns, penultimate syllables in disyllabic nouns/verbs, or penultimate syllables in trisyllabic verbs, as in (12).

(12) Words with two of Sv, Sc, or Hv or two Hc

a. noun

ancestor	NF	VC	FB
an[ces]tor		**	*!
[an.ces]tor		**	
an[ces.tor]	*!	**	

b. verbs

advantage(v.)	NF	VC	FB	ALIGNRIGHT
[ad.van]ta.ge0		*		**!
ad[van.ta]ge0				*
ad.van[ta.ge0]	*!	**		

2.3. Exceptions: FAITH(†)

Some words which do not fit the predictions summarized in the last section are exemplified in (13).

- (13) a. light penultimate syllable with stress: banana
- b. final CVC with stress: Japan
- c. final long vowel without stress: committee
- d. final superheavy syllable without stress: covert

All exceptional words are accounted for by the top-ranked FAITH (‡) as below. The tableaux of the words in (13) are given in (14).

(14) Exceptions: FAITH (‡)

a. light penultimate with stress

banâna	FAITH (‡)	NF	FB
[ban.a]na	*!		
ba[nan.a]		*	

b. final CVC with stress

Japân	FAITH (\hat{v})	NF	FB
[ja.pan]	*!	*	
☞ ja[pan]		*	*
[ja]pan	*!		*

c. superheavy final without stress

côvert	FAITH (\hat{v})	NF	FB
co[ver.t0]	*!	*	
☞ [co.ver]t0			
co[ver]t0	*!		*

d. final long vowels without stress

commi ^o ttee	FAITH (\hat{v})	STRESSVV	NF	FB
commi[ttee]	*!		*	*
co[mmitt.ee]		*	*!	
[comm.i]ttee	*!	*		
☞ co[mmi.tt]ee		*		

Without FAITH (\hat{v}), then, [ban.a]na would be the optimal output since it does not violate any constraints. It is very evident that with FAITH (\hat{v}), any stress pattern can be selected as an optimal output.

2.4. Problems

Hammond's OT analysis is quite simple and makes use of commonly assumed constraints, such as FTBIN, TROCHEE, ALIGNRIGHT and WSP. Even with these violable constraints, some stress patterns must be treated as exceptions and are thus subject to lexically marked stress via FAITH (\hat{v}). Thus, it can be concluded that there is no true account for stress flexibility in Hammond (1999). For example, the stress of *banana* (14) (but not *Canada* in (10a)), and of *committee* in (14d) (but not *Tennessee* in

(8a)) are marked in the lexicon. The lexically marked stress is respected by foot parsing due to FAITH ($\hat{\nu}$), a device so powerful that it can derive any stress pattern. In sum, a large number of exceptional words are assigned stress through the powerful FAITH ($\hat{\nu}$), whose application is lexically governed and can assign stress on any syllables.

The second criticism concerns monosyllabic feet, which are allowed in Hammond's approach. Consider the different behaviors of *cú*cúmb*er* and *á*mpers*à*nd with regard to Expletive infixation. According to Hammond (1999:162-163), these words have the foot structures in (15a). F stands for the Expletive infix.

- (15) Hammond's foot structures
 a. [amper][sand], [cu][cumber]
 b. amper-F-sand, *cu-F-cumber

(15b) shows that the Expletive infixation is possible in *ampersand* but not in *cucumber*. (The judgement about infixation is Hammond's.) Both words should show the same behavior with respect to infixation since the Expletive infix is inserted between the feet. However, as (15b) shows, they do not. In the next section, I will show that a proposal with strictly binary feet at both moraic and syllabic levels can explain clearly why *cucumber* does not allow infixation; in such a proposal the foot structure of *cucumber* is not [cu][cum.ber] but [cu.cum]ber.

The third problem is related to syllabification. The WEIGHT-TO-STRESS PRINCIPLE (a constraint for stress) refers to syllable weight, implying syllabification comes before stress. For example, compare second syllable of *Canada* with that of *agenda*. According to Hammond and his WSP, only the second syllable of *agenda* is stressed because it is heavy. On the other hand, BIMORACITY (a constraint for syllabification) refers to stress, implying stress comes before syllabification. According to syllabification

(BIMORACITY), syllable structures of *banana* and *Canada* are *ba.nan.a* and *can.a.da*. The different syllabification results from different stress locations. Such problems with ordering between syllabification and stress assignment suggest that syllabification and stress should be calculated simultaneously, a proposal we will adopt in Section 3. Simultaneous syllabification (Hammond 1999:246) is not sufficient in Hammond. The insufficiency can be illustrated with the stress of *banana*. Recall that even under the simultaneity of syllabification, lexical marking is required, as has been seen in (14).

To summarize, Hammond bases his account of the stress of English words on OT constraints. The overall system is simple and the mechanisms are well motivated, even though flexible stress patterns are not recognized and many stress patterns are handled exceptionally, with the powerful FAITH ($\hat{\nu}$).

3. Alternative Proposal

3.1. Motivations

3.1.1. Statistical Results and Exceptions

I showed that Hammond like most other researchers on English stress has focused on accounting for certain selected stress patterns rather than on accounting for the flexibility of stress. As a consequence, the selected patterns have been treated as regular, and all others as exceptions. Making such a distinction among the stress patterns of a language requires solid motivation. At the very least, it is expected that the regular patterns are the most common, i.e., we expect the majority of words to be 'regular.' However, this is not the case, as is illustrated with statistical data below. Thus, I propose an alternative analysis that makes no distinction between regular and exceptional words.

First, Hammond's constraints expect that words with final

superheavy syllable such as *percent* and *expect* to get stressed on the final syllables. However, a statistical survey by Alcantara (1998:96) shows that only 33% of nouns and 42% of verbs meet the prediction.

(16) Stress on superheavy final syllables in disyllables (%)

	All bisyllables	Nouns	Verbs	Adjectives
Stress on superheavy final ¹⁾	36	33	42	40

Second, Hammond's constraints and ranking predict that adjectives and verbs ending in superheavy syllables have final stress. However, this generalization is not supported by Alcantara's (1998:103) data, shown in (17). (In the tables below, an H in final position indicates a superheavy syllable of the form CVVC or CVCC. This is so since Alcantara (1998:98) treats CVC as light when it occurs in word-final position of a trisyllabic word.)

(17) Stress patterns in trisyllables (Alcantara 1998:103) (%)

	Nouns			Verbs			(Unaffixed)Adjectives		
	1 σ	2 σ	3 σ	1 σ	2 σ	3 σ	1 σ	2 σ	3 σ
HHH	33	54	11	4	11	84	34	35	30
LHH	36	53	9	58	17	25	47	52	0
LLH	72	7	18	62	2	34	71	8	19
HLH	77	3	17	24	6	69	56	3	40

Except for verbs of the form HHH or HLH, words with superheavy final syllables are stressed on their penultimate or antepenultimate syllables more often than on their final syllables. Thus, Hammond's assumption is not reflected in the statistical patterns of the language.

Thirdly, Hammond needs special stipulations to account for

¹Heavy syllables (CvC) in Alcantara are our superheavy syllables since a final consonant is excluded as an extrametrical element in Alcantara.

stress on final CVC syllables in nouns and verbs, as in *Japán* and *discúss*. However, as shown in (18), the percentage of words ending in CVC that have final stress—one-third or more of nouns and verbs—is so large as to make exceptional treatment highly suspect.

(18) Final stress on CVC (Alcantara 1998:96) (%)

Nouns	Verbs	Adjectives
33	42	40

Fourthly, according to Hammond's ranking in (5), stress falls on the final long vowels even though it causes a violation of FTBIN or NF. That is because STRESS VV is ranked higher than NF and FTBIN. However, only half of the words in the words examined by Alcantara meet this expectation, as shown in (19).

(19) Stress on the final long vowels in disyllables (Alcantara 1998:98)

Nouns	Verbs	Adjectives
46 %	48 %	49 %

Also, words with stress on the final long vowel like *Tennessee* comprises 16% and those like *guarantee* is 9% according to Alcantara (1998:102).

Fifthly, consider the stress patterns of trisyllabic words in (20).

(20) Stress of trisyllabic words (Alcantara 1998:103)

	Nouns			Verbs			(Unfixed)Adjectives		
	1 σ	2 σ	3 σ	1 σ	2 σ	3 σ	1 σ	2 σ	3 σ
HHH	33	54	11	4	11	84	34	35	30
LHH	36	53	9	58	17	25	47	52	0
LLH	72	7	18	62	2	34	71	8	19
HLH	77	3	17	24	6	69	56	3	40
HHL	35	62	1	3	91	5	3	97	0
LHL	23	73	2	6	85	8	31	67	0
HLL	74	15	8	12	60	27	51	42	6
LLL	78	15	5	36	45	18	82	17	0

Although Hammond treats unsuffixed adjectives like verbs with respect to stress assignment, the table in (20) shows that, except for words of the form HHL, adjectives actually behave more like nouns. For example, 33% of nouns, 4% of verbs, and 34% of adjectives of the form HHH are stressed on their antepenultimate syllables.

The data in (16)-(20) suggest that the stress patterns assumed to be regular by Hammond are not the most frequently observed patterns and that the number of exceptional words is too large to be ignored by analysis of English stress.

3.1.2. Disagreement on Regular Patterns

The second motivation for the present proposal is the fact that the words that are treated as regular varies from researcher to researcher, as summarized in (21), where only primary stress is marked. This variation argues against the distinction between irregular or exceptional and regular stress patterns in English as Hammond does.

(21) Words involving disagreement in analyses

Stress location	Words	Regular in	Exceptional in
Final σ	percént	Hammond	H & V, Hayes, Halle
	políce	Hammond	Hayes, Halle
Penultimate σ	rélic	Hammond	Hayes
	vílla	Hammond	Hayes
Antepenultimate σ	ármistice	Hammond	H & V, Hayes, Halle
	phóbia	Hammond	H & V, Hayes, Halle

To take one example, *percent*, a noun with stress on a final superheavy syllable is treated as regular by Hammond, but as exceptional by the others.

To sum up, section 3.1 has shown that the division of the lexicon into regular and exceptional words is not consistent with statistical findings (Alcantara 1998) and the number of

exceptional words is not small. Second, researchers are not always in agreement on which patterns are regular.

3.2. Revisions

Recognizing the selection of 'regular' patterns is arbitrary, I attempt in this paper to find conditions that govern all stress patterns in English since a universal theory of stress should, if possible, provide an analysis of the entire lexicon. To that end, I propose to revise Hammond's analysis. The revision to be made can be summarized as follows.

(22) Revisions

- a. to posit invisible suffixes after words with final stress
- b. to form foot structures both at syllabic and moraic levels
- c. to subsume BIMORACITY under WSP
- d. to add one more constraints: PREPARSE 2

First, recall Hammond's (1999) invisible suffixes. The suffixes are used only for verbs and adjectives, but not for nouns. Thus, even with these invisible syllables, Hammond has to depend on FAITH (\hat{v}), an exceptional marking. 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*). Instead, I suggest that an invisible suffix should occur at the end of words with final stress regardless of the categories of words. The proposed distribution is supported by the phonetic evidence. Phonetic experiments have 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-boundary syllable is stressed (Whiteman et al 1992). These findings suggest that only stressed final syllables need an abstract representation to express their extra duration.

Second, though feet are formed at the syllabic level as hinted in the definition of FTBIN, Hammond needs WEIGHT-TO-STRESS to consult the internal structure of syllables i.e., moraic structures. This device guarantees that heavy syllables receive stress. Furthermore, given the standard assumption that a minimal word is a foot (Selkirk 1980; McCarthy and Prince 1986; Kager 1993, 1999; Hayes 1995), Hammond's syllable counting theory predicts that the minimal word in English should be defined only in terms of the syllabic trochee. 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 a mora-counting system as well as a syllable-counting system. In addition, recall that it was necessary to posit MINWD by Hammond to avoid hypothetical words composed only of a light syllable. To resolve these problems, I represent both levels in foot structures, as in (23). I call foot structures with syllabic and moraic levels 'dual-counting' foot structures.

(23) Dual counting foot structure

x		
[σ σ]		s(yllabic)- foot
so da		string of segments
[mm] m		m(oraic)- foot
x		

Since both syllabic and moraic feet are built, it will be assumed that the foot constraints must be met at both levels.

Using the dual foot structures and the revised invisible suffixes, the words with final stress will be represented as in (24).

(24) x	x
[σ σ]	σ [σ σ]
John 0	pre ven t0
[mm] m	m [mm] m
x	x

Finally, consider the foot constraints in (25) which are assumed in the alternative proposal in addition to the constraints suggested by Hammond.

(25) Foot constraints

- a. PREPARSE 2 (PP-2): only one free syllable is allowed before feet.
- b. WEIGHT-STRESS (WS): stressed syllables are heavy and heavy syllables are stressed.

PREPARSE 2 combines two constraints: PREPARSE (Hammond 1999:98) and NOLAPSE (Prince 1983; Selkirk 1984; Kager 1993, 1994; Green 1995; Green and Kenstowicz 1995). PREPARSE requires that the syllables preceding a foot be parsed into feet, while allowing the syllables after a foot to be free. NOLAPSE prevents the occurrence of two free syllables in a row. Their combined effect is to prevent the occurrence of two free syllables to the left of a foot.

(26) PP-2

- | | |
|--------------------|-----------------|
| a. *[σ σ]σ σ [σ σ] | b. σ [σ σ]σ |
| c. [σ σ]σ σ | d. [σ σ]σ [σ σ] |

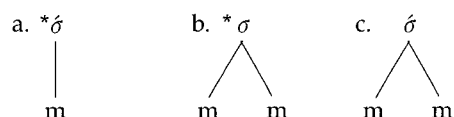
Only the structure in (26a) violates PP-2 since two free elements occur before a foot. The other structures satisfy the constraint.

PP-2 is intended to capture the fact that there are words with

more than one stressless syllable after a stressed syllable, such as $\acute{\sigma} \sigma \sigma$ (e.g., *Cánada*) or $\acute{\sigma} \sigma \sigma \sigma$ (*présidency*) while there is no English word with more than two stressless syllables before a stressed syllable, such as $*\sigma \sigma \acute{\sigma}$ or $*\sigma \sigma \sigma \acute{\sigma}$ (Hammond 1999). Words such as *Alabáma* ([Ala][báma]) and *àbracadábra* ([àbra]ca[dábra]) show that there must be at least one secondary stress when there is more than one syllable before the primary stress. *América* and *Kentúcky*, on the other hand, show that one free syllable can occur before a foot. PARSE-SYLLABLE alone cannot capture this fact.

The second constraint, WEIGHT-STRESS, states that stressed syllables are heavy (Kahn 1976; Selkirk 1982; Clements and Keyser 1983; Giegerich 1992; Hammond 1999) and heavy syllables are stressed (Prince 1991; Giegerich 1992; Burzio 1994; Hammond 1999) which is assumed by Hammond but not expressed formally. Consider structures in (27).

(27) WEIGHT-STRESS



A light syllable with stress, as in (27a), and a heavy syllable without stress, as in (27b), violate WS. In fact, WS is a re-statement of the previous WEIGHT-TO-STRESS PRINCIPLE (Myers 1987; Prince 1991; Riad 1992; Hammond 1999). Restatement is necessary since WEIGHT-'TO'-STRESS presupposes that there is a linear ordering between syllabification and stressing, with words being syllabified before they are stressed. Recall, however, that in Hammond, syllabification and foot parsing must occur simultaneously. As a result of the simultaneity, it is necessary to restate WEIGHT-TO-STRESS as WEIGHT-STRESS.

3.3. Analysis: No Exception

Under this approach, a given string of phonemes can have different syllable and foot structures (hence be flexible) as long as they meet basic metrical constraints (TROCHEE, FOOTBINARITY, WEIGHT-STRESS, and PRE-PARSE 2) at both the syllabic and moraic levels (dual-counting foot structure). For example, consider *Canada* and *banana* in (28).

(28) ² x	x
[σ σ]σ	σ[σ σ]
Can.a.da	ba.nan.a
[mm]m m	m[mm]m
x	x

Despite the apparent similarity in segmental composition, these two words are stressed on different syllables and have different syllable structures. *Canada* could have been syllabified as *Ca.nad.a* with stress on the second syllable or *Can.a.da* with stress on the first syllable. *Banana* could have been syllabified as *ban.a.na* with stress on the first syllable or *ba.nan.a* with stress on the second syllable. Since both structures, *Ca.nad.a* and *Can.a.da* or *ban.a.na* and *ba.nan.a*, satisfy the four constraints (e.g., feet are trochaic and binary in both levels; there is not more than one free syllable before a foot; there is no stress on light syllables and there are no heavy syllables without stress), they are possible words in English. That the English lexicon has *ba.nán.a* and *Cán.a.da* rather than *bán.a.na* and *Ca.nád.a* is an idiosyncrasy; however, neither pattern is treated as exceptional since both satisfy the relevant constraints. After the selection of a particular

²An anonymous reviewer points out that Hammond's system can predict the stress location of a new word with a CVCVCV configuration while the proposal presented here cannot do so. It is true that the present proposal do not predict a single location for stress. However, Hammond's system may not predict the stress pattern of the words since it is not quite clear whether the new word would be accent-marked or not.

form is made, that form is stored in the lexicon (Flemming 1995; Burzio 1996a, 1996b; Kenstowicz 1998).

Now consider the words which were in need of FAITH (\forall) in Hammond.

(29) x σ [σ σ] Ja pan 0 m [m m] x	x [σ σ] co vert [mm][mm] x x	x σ [σ σ] co mmitt ee m [mm] [mm] x x
-------------------------------------------------------------------------	----------------------------------------------------------	--------------------------------------------------------------------------

All the 'exceptional' words have good foot structures without violating any of the four constraints, PREPARSE 2, WEIGHT-STRESS, FIBIN, and TROCHEE.

4. Conclusion

Two questions were raised in the beginning: 1) Why English words display flexible stress patterns and 2) what are the conditions all English words have to obey. Section 3 showed that Hammond does not provide the answers to them since he does not intend to do so. However, the division of the English words into regular and exceptional ones is not well motivated as shown in section 3.1 and 3.2. Thus, treating all words as regular, I attempted to answer the two questions by revising Hammond's proposals.

To recapitulate the main line of arguments of this paper, different syllable and foot structures are possible for words with similar segmental composition since 1) there is no linear ordering between syllabification and foot parsing and 2) invisible suffix is allowed at the end of words with final stress.

In addition to allowing for flexible stress patterns, the current proposal has some advantages compared to that of Hammond.

First, it predicts which metrical structures are illicit. For example, Hammond (1999) reports that there are no English words of the form $*\sigma\sigma\acute{\sigma}$ ($\sigma..$) or $*\sigma\sigma\sigma\acute{\sigma}$ ($\sigma\dots$). This is predicted by the dual-counting theory since the foot structures of the hypothetical words would violate PREPARSE 2. Another correct prediction of this theory is that stressed monomoraic words and words with stress on the final light syllables are impossible. This result is due to WEIGHT-STRESS. Also, there is no word with two adjacent equal stresses in English. This follows from FOOT BINARITY.

Furthermore, the present proposal again unlike Hammond, states the conditions (four foot constraints) which both 'regular' and 'exceptional' patterns must satisfy.

In sum, by revising Hammond's proposals, I have presented constraints commonly shared by 'regular' and 'exceptional' stress patterns of English. The constraints successfully distinguish unattested patterns from attested patterns. This distinction was not successfully made in Hammond. I provides a simpler analysis of the flexibility of stress; where Hammond requires lexical markings.

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