

Main Stress Assignment in English Words*

Eiji Yamada
Fukuoka University

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0. Introduction

0.1. Aim

In this paper, I will attempt to account for the main stress assignment in English words within the framework of "Positional Function Theory."

0.2. Outline

The organization of the paper will be as follows: After this "Introduction," I will discuss "Previous Studies" on this subject, followed by a brief explanation of "Positional Function Theory" and its treatment of "Main Stress Assignment." The paper will end with a "Summary" and "Conclusions."

1. Previous Studies

Accounts for the subsidiary stress assignment mechanism of words in English have been relatively less successful in the history of generative phonology compared with the more successful treatment of primary (i.e. main) stress assignment initiated by Chomsky and Halle (1968), followed by Liberman and Prince (1977), Hayes (1980), Halle and Vergnaud (1987), Halle and Kenstowicz (1991), and Idsardi (1992), among others. In this context, after a number of unsatisfactory

attempts to explain the mechanism in Hammond (1999) and Pater (1995, 2000), a new analysis of subsidiary stress assignment has recently been put forward in Yamada (2010).

2. Positional Function Theory

Yamada (2010) postulates that the subsidiary stress rule for words in American English is composed of sixteen "Positional Functions," and that the seemingly complicated subsidiary stress assignment can be reduced to the combination and relation of these Positional Functions shown in (1):

(1) 16 Positional Functions:

- a. *Farness* (*F*) $f(x) = *$
- b. *Heaviness* (*H*) $h(x) = +$
- c. *Trace* (*T*) $t(x) = +$
- d. *Binarity* (*B*) $b(x) = +$
- e. *Rhythm* (*R*) $r(x) = +*$
- f. *Alveolar Consonant Sequence* (*ACS*)
 $acs(x) = *$
- g. *Velar-Alveolar Sequence* (*VAS*)
 $vas(x) = *$
- h. *Bare Nucleus Avoidance* (*BNA*)
 $bna(x) = -$
- i. *Edge Exemption I* (*EE-I*)
 $eeI(x) = *$, accompanied by $b(x) = +$
- j. *Edge Exemption II* (*EE-II*)
 $eeII(x) = *$
- k. *Double Stop* (*DS*) $ds(x) = *$
- l. *Category Selection* (*CS*) $cs(x) = *$
- m. *Free Binarity* (*FB*) $fb(x) = +$
- n. *Rhythmic Adjustment* (*RA*) $ra(x) = *$
- o. *Stress Reduction* (*SR*)
 $sr(x) = -$ (or $\neg*$)
- p. *Sole Stress Resistance* (*SSR*)
 $ssr(x) = @$

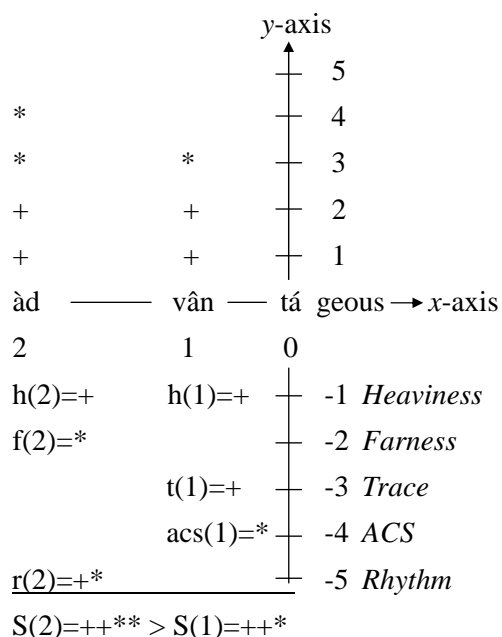
where, for example, *Farness* (1a) is one of the Functions. The formula for each Function is

shown to the right of the Function, i.e. " $f(x) = *$ " for *Farness*, " $h(x) = +$ " for *Heaviness*, and so forth. For detailed definitions of these Functions, refer to Yamada (2010).

Now, let us look at how these Positional Functions can account for the subsidiary stress assignment of the adjective *àdvântágeous* (2310) for instance, derived from the noun *advántage* (010). Note here that in this and subsequent discussions, stress values are shown by numerals in parenthesis or accent marks: "tertiary" stress is marked by "3" or a circumflex accent, "secondary" stress by "2" or a "grave" accent, and "primary" stress by "1" or an "acute" accent.

In the case of *àdvântágeous* in (2), five Positional Functions, *Heaviness*, *Farness*, *Trace*, *ACS*, and *Rhythm*, are triggered in six positions on the "stress computational plane":

(2) *àdvântágeous* (2310) (< *advántage* (010))



The area below the x -axis line is the "stress computational plane," and the area above the line the "stress representation plane." The stress value is expressed on the vertical y -axis, while the horizontal x -axis shows the word under analysis. The numerals enclosed by parentheses

to the right of the Function indicate the syllable position counted from the position of main stress. The main stress is expressed at $x = 0$.

In this case, five Functions are triggered in six positions according to the conditions for application. Since the syllables *àd* and *vân* are heavy, the Positional Function *Heaviness* is triggered under each syllable by means of the formulae $h(2) = +$ and $h(1) = +$. Here the Function *Heaviness* gives a value "+(plus)". In the case of the syllable *vân*, the Positional Function *Trace* is triggered under the syllable, because the main stress is assigned to the syllable of its stem word, *advántage*.

Two further Functions, *ACS* and *Rhythm*, are also triggered in their respective positions; however, because of space limitations I will not discuss these in this paper.

The resulting values are added, and their sum is shown as the value of syllable positions 2 and 1. Finally, these stress values are mapped onto the stress representation plane, giving the desired stress pattern of this word, 2310.

Using these postulated Positional Functions, I have shown in Yamada (2010) that almost all the examples in the previous literature on subsidiary stress can be properly accounted for.

3. Main Stress Assignment

However, one important issue remains unsolved, namely main stress assignment, even if the analysis using these Positional Functions is appropriate for the account of the subsidiary stress assignment mechanism of words in English. In this paper, therefore, we will investigate to what extent Positional Function Theory is applicable to the main stress assignment of words in English.

3.1. Data

Let us cite a few examples, in (3), from the study by Halle and Vergnaud (1987). They proposed their English stress rule mainly on the basis of the data shown here. The so-called extrametrical element is enclosed by angled brackets, and the phonological syllable break is shown by a dot. When there are two or more lexical categories for a given word, the relevant category under consideration is indicated by a subscript capital.

- (3) a. *Cá.na.<da> a.gén.<da> ma.rí.<na>*
tú.<na> hén.<na> a.lú.mi.<num>
co.nún.<drum> (Nouns)
- b. *ò.no.mà.to.póe.<ia>*
À.pa.là.chi.có.<la> sè.ren.dí.pi.<ty>
Cà.li.fór.ni.<a>
hà.ma.mè.li.dán.the.<mum>
 (Nouns)
- c. *pér.so.<nal> di.a.léc.<tal>*
à.nec.dó.<tal> ví.gi.<lant>
re.púg.<nant> com.plái.<sant>
màg.ná.ni.<mous> mò.mén.<tous>
de.sí.<rous> (Adjectives ending in
certain suffixes)
- d. *só.li.<d> cé.r.tai.<n> as.tó.ni.<sh>*
de.tér.mi.<ne> ab.súr.<d>
rò.bús.<t> di.réc.<t> ù.súr.<p>
tòr.mén.<t>_v ca.vór.<t>
su.pré.<me> dis.cré.<te>
i.ná.<ne>_A a.chié.<ve> ca.jó.<le>
ca.róu.<se>_v a.rì.sto.crá.ti.<c>
 (Adjectives and verbs)
- e. *po.líce_N brò.cáde_N ba.róque_N*
ba.záar re.gíme tòu.pée àt.ta.ché
kàn.ga.róo Tè.nne.ssée (Nouns
 with a long vowel in the final
 syllable)

Now let us examine the data in (3a, b). Note here that “main stress falls on the penult if it is heavy, and on the antepenult otherwise.” For

example, in the case of *agén.da* on the first line of (3a), the penult *gén* is heavy, so main stress falls on the penult; while in *Cána.da* the penult is light, so main stress falls on the antepenult. Furthermore, in (3a, b) “no stress is given to the final syllable.”

3.2. Generalization and Setting

Therefore, the well-known generalization derived from (3a, b) is given in (4):

- (4) Main stress falls on the penult if it is heavy, and on the antepenult otherwise.

No stress is given to the final syllable.

The principle in (4) is also applied to the words in (3c) ending in certain suffixes. Further, in (3d) main stress is located by the same principle as in (3a, b, c) except that in (3d) “stress is dislocated one syllable toward the end of the word—that is, either to the penultimate or to the final syllable,” if the final consonant in (3d) is not counted (Halle and Vergnaud 1987: 230). In other words, if the final syllable in (3a, b, c) and the final consonant in (3d) are not counted, main stress assignment follows a single principle.

Then, given that this principle does not apply for words with a long vowel in the final syllable as in (3e), we follow Halle and Vergnaud (1987) and postulate Extrametricality in (5) as the setting for our analysis:

(5) Extrametricality

- a. The final syllable with a short vowel is not counted in nouns (3a, b) and in certain suffixes (3c).
- b. The word-final consonant is not counted in verbs and adjectives (3d).

In addition, I should mention here that main stress is placed on one of the so-called “three windows (i.e. syllables)” counted from the end

of the word, which we term the “Three-Window Principle”:

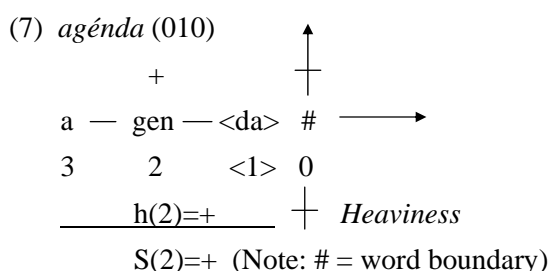
- (6) Three-Window Principle: Main stress is placed on one of the last three windows.

3.3. Positional Functions for Primary Stress Assignment

Given (5) and (6) as our setting, we can proceed to an account of the main stress assignment of words in English within the framework of Positional Function Theory.

3.3.1. Heaviness

The Positional Function that immediately springs to mind is *Heaviness*, which can deal with the main stress in words such as *a.gén.<da>*, *ma.rí.<na>*, *tú.<na>*, *co.nún.<drum>* in (3a), as well as *Cà.li.fór.ni.<a>*, *dì.a.léc.<tal>*, *de.tér.mi.<ne>* in (3b, c, d), as in (7):



In (7) only one Positional Function, *Heaviness*, is triggered in syllable position 2, which accounts for the main stress assignment for this word. Note here that when dealing with main stress, the $x = 0$ line at the intersection of the coordinate axes shows a word boundary rather than the primary stressed position for subsidiary stress treatment.

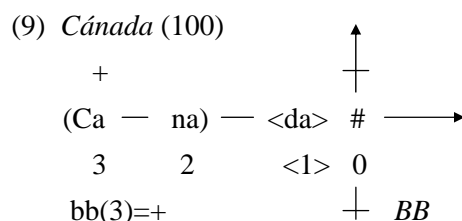
3.3.2. Bounded Binariness for Primary Stress Assignment

The next Positional Function necessary for our purpose will be *Bounded Binariness* in (8), which is newly assumed for primary stress:

(8) Bounded Binariness (BB) for Primary Stress Assignment

In a successive sequence of two light syllables metrically adjacent to the origin (0, 0), an intrinsic Positional Function *Bounded Binariness (BB)* is triggered on the left head of the binary constituent, placing a stress for the binary constituent by the formula $bb(x) = +$.

Note here that *Bounded Binariness* differs somewhat from the Positional Function *Binariness (B)* or *Free Binariness (FB)* assumed for subsidiary stress in Yamada (2010). *Bounded Binariness (BB)* is triggered as in (9):

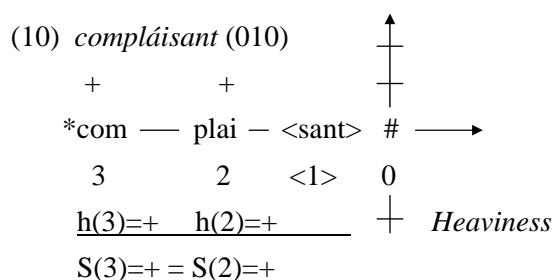


S(3)=+ (Note: *BB* is enclosed by ())

In this case, since there is “a successive sequence of two light syllables metrically adjacent to the origin,” i.e. *ca* and *na*, they are treated as a binary pair to be a bounded binary constituent. Thus, the Positional Function *Bounded Binariness* (8) is triggered on the left head of the binary constituent in the case of English, as shown by the parentheses, (*ca — na*).

3.3.3. Rhythmic Adjustment for Primary Stress Assignment

However, in the case of *compláissant* in (10, and 3c), for example, an incorrect result will be predicted as things stand now, since *Heaviness* is triggered twice:



Thus, we need a device to enhance the stress on syllable 2. This can be accomplished by the following Positional Function newly assumed here for primary stress assignment:

(11) *Rhythmic Adjustment (RA)* for Primary Stress Assignment

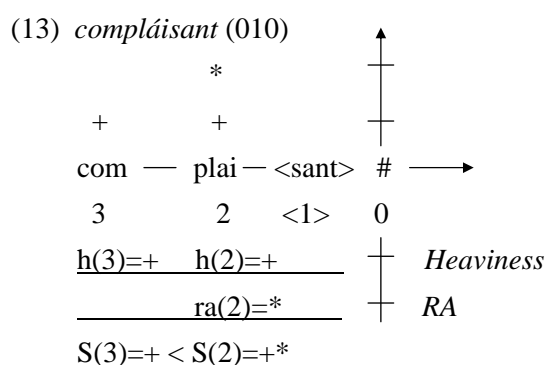
When an even-stressed pattern appears, augment the *rightmost* of the relevant syllables by one, by means of the formula $ra(x) = *$.

Note here that *RA* in (11) also differs somewhat from "*Rhythmic Adjustment (RA)* (optional)" in Yamada (2010) in that the *RA* in (11) is no longer "optional" for primary stress assignment and the position of the head is set in the opposite direction, i.e. *rightmost* in (11) compared with *leftmost* for subsidiary stress of *Rhythmic Adjustment (RA)* (optional) in (12):

(12) *Rhythmic Adjustment (RA)* (optional) in Yamada (2010)

When an even-stressed pattern appears, augment the *leftmost* of the relevant syllables by one, by means of the formula $ra(x) = *$.

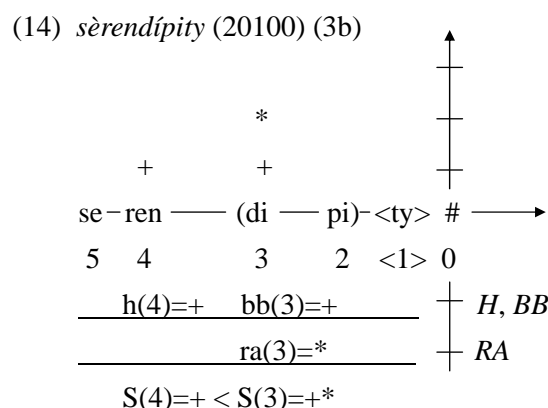
Thus, the stress pattern of *complaisant* is computed as in (13):



In this case, the Positional Function *Rhythmic Adjustment (RA)* is triggered under syllable 2, giving a stress value of one "*" (star). Thus, the sum of the stress values under syllable 2 is "+*", which is mapped onto the stress plane.

The words for which *RA* is necessary are *sèrendípity* in (3b), *ànecdótal* in (3c), *absúrd*, *ròbúst*, *ùsúrp*, *tòrmént*_v, *discréte* in (3d), and so forth. Analyses of some of these words are shown in (14) to (16).

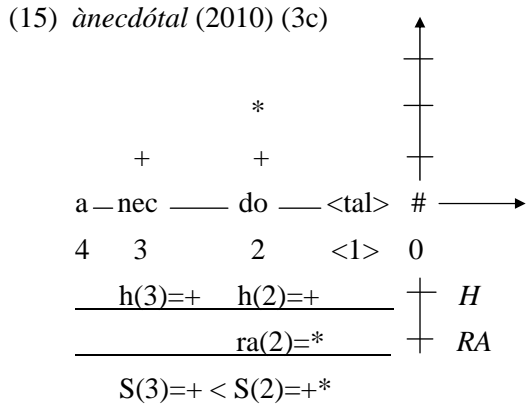
In the case of *sèrendípity* in (14, 3b), *Heaviness* is applied to syllable 4 and *Bounded Binariness* to syllable 3 as in (14):



Thus, *Rhythmic Adjustment* is obligatorily applied to syllable 3, giving the desired main stress.

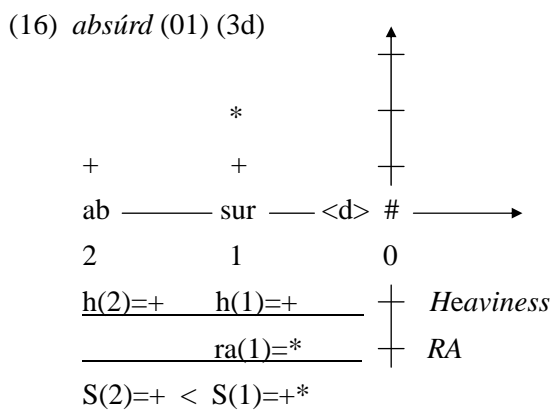
Note here that when *subsidiary* stress assignment is computed by the subsidiary stress assignment rule, all stress values are deleted except for main stress. If this were not the case, the stress on syllable 4, *ren*, would be undeleted when the word underwent subsequent application of the subsidiary stress assignment rule. This would not produce the desired stress pattern of the word, 20100, with subsidiary stress on the first syllable, as shown in the analysis in Yamada (2010: 293). Here we have theory-internal evidence for the existence of an order of application between the main stress rule and the subsidiary stress rule in Positional Function Theory.

In (15, 3c), two *Heaviness* Positional Functions are triggered on syllables 3 and 2, giving equal stress values. Thus, *Rhythmic Adjustment* is obligatorily applied here again to ensure the desired main stress:



Here, too, we have theory-internal evidence for the existence of an ordering relation between the main stress rule and the subsidiary stress rule.

In the case of *absúrd* in (16, 3d), the final consonant is not considered, since it is extrametrical. Two *Heaviness* Functions are applied here, giving the same stress value on syllables 2 and 1. Thus, *Rhythmic Adjustment* is obligatorily applied as well:



The same kind of treatment is applicable to *ròbúst*, *ùsúrp*, *tòrmént_v*, *discréte* in (3d).

4. Summary

In this paper, we have attempted to show how the primary stress assignment of words in English can be accounted for within the

framework of Positional Function Theory put forward in Yamada (2010). For subsidiary stress assignment, sixteen Positional Functions are parametrically set according to Yamada (2010), while for primary (i.e. main) stress assignment only three Positional Functions are necessary with the help of Extrametricality (5) under the Three-Window Principle (6). One of these Positional Functions is *Heaviness*, which is also used for subsidiary stress assignment. The other two are *Bounded Binariness* in (8) and *Rhythmic Adjustment* in (11). Although these are newly assumed for primary stress assignment, they are not unknown, since they are conceptually equivalent to the *Binariness / Free Binariness* and *Rhythmic Adjustment*, respectively, assumed for subsidiary stress assignment. Their differences will be treated as a parametric variance.

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