STRESS DISTRIBUTION IN PRESENT-DAY ENGLISH

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The grammatical function of stress accent is categorized into morpho-
logical and demarcative subfunctions. We propose that these functions
are realized by Optimality-Theoretic constraints on prosodic structure.
The morphological function of stress is fulfilled by Identity Constraints,
which require a derived form to preserve the prosodic structure of the
base and the affix. Demarcative stress indicates a word boundary, and
this function of stress is realized by Alignment Constraints. Stress shift
is caused by transition which follows reranking of Alignment Constraints
over Identity Constraints. We claim the ongoing stress shift demon-
strates that the demarcative function predominates the morphological
function of stress accent in Present-Day English.*

Keywords: alignment, constraint ranking, demarcative stress, morphologi-
cal identity

1. Introduction

Most linguists believe that there is a pattern, or patterns, of stress
distribution in the English language. This belief is based on certain
tendencies in English word stress. However, we might be inclined to
reconsider this generally accepted fact when we are exposed to the fol-
lowing examples:

(1) a. Cánada, agénda, kangaróo
   b. céluloid, dýnamite, pálinode, áncedote
   c. ellípsoid, staláctite, eléctrode, peróxide

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The morphologically simplex words in (1a) show that there are three patterns of stress distribution among trisyllabic words. We could explain each of these words by syllable weight. However, syllable weight cannot explain stress distribution in other examples from the list above, such as voluntary in (2b) and considerable in (3c). The latter may reflect the prosodic structure of its base verb consider, but the word-initial stress of préférable in (2b) is not compatible with the final stress of its base verb préférer. In what follows, we attempt to explore the whole set of constraints that determine the pattern, or patterns, of stress placement in the framework of Optimality Theory.

2. The Grammatical Function of Stress Accent

Let us begin with a definition of stress accent. According to Hyman (1977), linguistic stress carries two different grammatical functions, i.e. demarcative and morphological functions. Morphological stress helps a morpheme preserve the linguistic identity of itself: a root, stem, or affix is identified by receiving stress. Here we propose that this function is fulfilled by Identity Constraints,1 which require the output form to preserve the prosodic structure of the input form, so that the output can preserve the morphological (and semantic) information of the input.

(4) a. IDENTITY-BASE: A derived form must preserve the prosodic structure of the base form.

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1 In the full theory of reduplication involving correspondence between stem and base, between base and reduplicant, and between stem and reduplicant, McCarthy and Prince (1995) employ a purely terminological distinction between the perfectly homologous notions “identity” and “faithfulness” solely to emphasize the distinct dimensions.
b. **IDENTITY-AFFIX**: A derived form must preserve the prosodic structure of the affix.

The Identity (hereafter ID) Constraints assess the identity of correspondent elements. Specifically, IDENT-BA in (4a) demands that a derived output preserve the morphological information of the base input by retaining stress of the base. Primary stress will best help an output preserve the identity of the base form, because the features of syllable peak are usually retained by stress. On the other hand, a derived form containing a stressed affix satisfies IDENT-AF in (4b). In other words, a derived form is highly evaluated by the ID constraints if the base and the affix are recoverable from the affixed construction.

Let us now turn to another grammatical function of stress accent, i.e. demarcative function. Demarcative stress indicates a word boundary in a sequence of utterances, and therefore it typically occurs at the beginning or the end of a word. This function is fulfilled by Alignment Constraints, which reflect the grammatical requirement that a certain constituent share at least one constituent-edge with another in prosody and morphology.

\[
\begin{align*}
(5) \quad a. \quad & \text{ALIGN-HEAD(PrWd)-R: } \text{Align(PrWd, R; H(PrWd), R)} \\
& \text{ALIGN-FOOT-R: } \text{Align(Ft, R; PrWd, R)}
\end{align*}
\]

The head-alignment constraint in (5a), which aligns the head of a prosodic word with the right edge of the prosodic word, realizes demarcative stress at the end of a word. ALIGN-FT-R in (5b), which requires every foot to stand in the final position of a prosodic word, excludes output forms with more than one foot, and realizes one and only one stress at the word end. These constraints are consistent with the demarcative function of stress, which is to indicate a word boundary.

We can predict the locus of grammatical stress of a word, but it may

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2 In the framework of Optimality Theory, there are separate constraints for each correspondence relation. McCarthy and Prince (1995) posit MAX, DEP, and IDENT(F) constraint families, which relate strings \(S_1\) (base, input, etc.) to \(S_2\) (reduplicant, output, etc.).

3 A cross-linguistic study of stress placement by Hyman (1977) shows that out of 444 languages, 114 exhibit dominant initial stress and 97 final. In contrast, he found only twelve languages with stress on the second syllable and six with antepenultimate stress.
be obscured through phonological processes such as deletion and epenthesis. Loss of vowel length distinction may also lead to unpredictable stress. When stress accent can no longer be predicted from a word boundary, it becomes free stress, which carries out the lexical function of highlighting a given syllable of a word. Hyman (1977: 40) so aptly states that “lexical or unpredictable stress derives, historically, from grammatical stress.”

The grammatical function of stress accent is thus differentiated into morphological vs. demarcative subfunctions. According to Hyman (1977: 39), however, “stress may function in any one or more of these,” and “a language with demarcative stress may be occasionally upset by morphological considerations.” When a prosodic boundary does not correspond to a morphological boundary, stress accent cannot fulfill both of the subfunctions. If a word is of recent derivation, the morphological function is of higher priority over the demarcative function. According as the word is assimilated in the lexicon, it will lose its morphological information, and stress accent will fulfill the demarcative function at the expense of morphological function. Stress shift is then caused by this transition, which, in our interpretation, follows re-ranking of the Alignment Constraints over the Identity Constraints.

3. Theoretical Assumptions

In Optimality Theory (McCarthy and Prince (1993, 1994), etc., hereafter OT), the serial derivation and phonological rules are replaced by the constraint hierarchy, which evaluates a set of output forms in a parallel fashion. The theory allows an infinite set of candidate forms to be generated from one input form. The hierarchically ranked constraints then evaluate the candidates, from which one candidate is selected for an optimal output form.

There is a nonempty and nontrivial set of linguistic constraints which are universal and universally present in all grammars. A grammar is a language-particular ranking of the constraint set. All constraints are violable, though minimally, and their violations are never repaired. Linguistic constraints require unmarked structures, and the requirements are often in conflict with each other. The conflicts are solved by constraint ranking.

A constraint dominates other constraints in the constraint hierarchy. In case of conflict, it is, other things being equal, worse to violate a
higher-ranking constraint. If more than one candidate violates a constraint, it is, ceteris paribus, worse to violate the constraint more severely. The generated candidates are excluded by the fatal violation of the hierarchically ranked constraints, until one candidate is selected for an optimal output form.

We assume the following hierarchy of constraints on prosodic structure for Present-Day English:

(6) Constraint Ranking in Present-Day English

<table>
<thead>
<tr>
<th>ALIGN-HD(PP)-R</th>
<th>NON-FIN(Ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALIGN-PRWD-R</td>
<td>ALIGN-HD(PW)-R</td>
</tr>
<tr>
<td></td>
<td>ALIGN-FT-R</td>
</tr>
<tr>
<td></td>
<td>IDENT-BA</td>
</tr>
<tr>
<td></td>
<td>ALIGN-HD(Ft)-L</td>
</tr>
<tr>
<td></td>
<td>FT-BIN(μ)</td>
</tr>
<tr>
<td>ALIGN-FT-L</td>
<td>IDENT-AF</td>
</tr>
<tr>
<td></td>
<td>NON-FIN(σ)</td>
</tr>
<tr>
<td></td>
<td>PARSE-σ</td>
</tr>
</tbody>
</table>

First, we must employ constraints on prosodic phrase in order to predict the location of primary word stress.

(7) a. ALIGN-HEAD(PrPh)-R: Align(PrPh, R; H(PrPh), R)
      b. ALIGN-PRWD-R: Align(PrWd, R; PrPh, R)4

Phrase stress, which demarcates a phrase, is carried by the rightmost prosodic word in a prosodic phrase. In the OT vocabulary, this is expressed by the head-alignment constraint in (7a). The constraint in (7b) aligns every prosodic word with the right edge of a prosodic phrase, excluding a candidate phrase with more than one prosodic word. When a prosodic word is isolated in a prosodic phrase, the phrase satisfies the Alignment Constraint, and the word receives final demarcative stress under ALIGN-HD(PW)-R stated in (5a).

When one prosodic word is followed by another in a single prosodic phrase, the preceding word violates ALIGN-PRWD-R. If stress clash arises between the adjacent words, final stress on the violating word

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4 This constraint is induced from the following constraints, which Selkirk (1995) posits for English:

Align(Lex, R; PWd, R)
Align(PPh, R; PWd, R)
Align(Lexmax, R; PPh, R)
must be eliminated by the following Nonfinality (hereafter NF) Constraint:

\[ (8) \] \text{NON-FIN}(Ft): The head foot of a prosodic word must not be final.

We assume that this constraint is activated when the prosodic phrase to be evaluated violates ALIGN-PRWD-R. The NF constraint, when active, prevents stress clash by prohibiting final stress on the misaligned prosodic word. In the same way, \text{NON-FIN}(\sigma) excludes a candidate form with final subsidiary stress.

The universal set of constraints is based on the typological study of natural languages. The right-alignment constraints are attested by word-final stress in current Romance languages. In these languages, stress retraction caused by stress clash is observed within a prosodic phrase containing more than one prosodic word. This fact gives evidence for the NF constraint in (8), which reflects a tendency to avoid adjacency of stresses.

The Foot-Binarity Constraint reflects the alternating stress pattern of many familiar languages.

\[ (9) \] \text{FT-BIN}(\mu): Feet must be binary under the moraic analysis. A foot is minimally bimoraic in quantity-sensitive languages which make distinctions in syllable weight. Satisfaction of this constraint and ALIGN-HD(Ft)-L results in trochaic feet. Since ALIGN-HD(PW)-R dominates the two constraints on foot structure, dominantly penultimate stress appears in current Romance languages.

In relatively longer words, primary word stress shares the demarcative function with subsidiary stress: if primary stress demarcates a word end, subsidiary stress will indicate the beginning of the word. ALIGN-FT-L realizes word-initial subsidiary stress.

\[ (10) \] \text{ALIGN-FOOT-L}: Align(PrWd, L; Ft, L)

This constraint is “a matter of empirical, not logical, necessity,” whose translation is that “the left edge of each PrWd must match the left edge of some foot” (McCarthy and Prince (1993: 93)).

\[ \text{McCarthy and Prince (1993: 94)} \] indicate that the order of constituent arguments is crucial because “it permits Alignment, within OT, to supplant both the non-iterative and the iterative operations of standard rule-based metrical phonology.” Note that ALIGN-FT-L in (10) permits iterative construction of feet while ALIGN-FT-R in (5b) allows foot construction non-iteratively.
trochaic foot then carries secondary stress, while the rightmost foot carries primary word stress under the dominating ALIGN-HD(PW)-R.

Finally, syllables must be parsed into feet under the assumption of prosodic hierarchy: otherwise, an unparsed syllable would be dominated immediately by a prosodic word. In reality, however, a word-initial syllable sometimes remains unparsed in Present-Day English. This is because Parse-σ and ALIGN-FT-L are dominated by ALIGN-FT-R, which allows one and only one foot at the word end.

4. Evaluation of Output Forms

4.1. Stress Distribution in Three Syllable Words

Let us first evaluate possible output candidates for the input form of the underived words cited in (1a). The simplest case for the evaluation is agenda, which contains a heavy penultimate syllable. IDENT-BASE is not active when evaluating underived words:

(11)

<table>
<thead>
<tr>
<th>agenda</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(Ft)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [(ágen)da]w</td>
<td></td>
<td>*!</td>
<td></td>
<td>*WSP</td>
<td></td>
</tr>
<tr>
<td>b. [a(génda)]w</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the prosodic word is isolated from other prosodic words, ALIGN-HEAD(PrWd)-R, the highest-ranked constraint on Prosodic Word, is the first to evaluate the candidate forms. The undominated constraint might seem to select the candidate in (11b) for the optimal output form, because primary stress is placed closer to the word end than it is in (11a). However, the latter as well satisfies the head-alignment constraint, which simply requires the rightmost foot to carry primary word stress. Since the two candidates satisfy the constraint, we proceed to ALIGN-FOOT-R, which demands every foot to be aligned with the right edge of the prosodic word. The candidate in (11a) is, then, excluded by the violation of the foot-alignment constraint, because the foot does not share the right boundary with the prosodic word.

It should be noted here that this excluded output does not completely satisfy ALIGN-HEAD(Ft)-L, in that the heavy syllable occupies the non-head position of the foot. We propose to include the Weight-to-Stress Principle (WSP) in ALIGN-HEAD(Ft)-L, in the case of
quantitiy-sensitive languages: 6

(12) WSP: Heavy syllables are prominent within the foot. This principle requires that “inherent prominence of syllables be aligned with positional prominence within the foot” (Burzio (1994: 149)). Burzio takes this kind of “condition” to be relativized “so that its effect will only be that of deciding between options and not that of an absolute prohibition.” 7 We assume the condition of optimal alignment in (12) to be a supplement to ALIGN-HEAD(Ft)-L, which calls for left-headed feet.

With this condition in mind, let us evaluate three possible candidates for the input form of *kangaroo* in isolation:

(13)

<table>
<thead>
<tr>
<th>kangaroo</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(Ft)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [(kánga)roo]</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. [kan(gároo)]</td>
<td></td>
<td>*</td>
<td>WSP!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. [kanga(róo)]</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

First, the candidate in (13a) is excluded by the violation of ALIGN-FOOT-R. Even if the final heavy syllable constructs a foot to receive subsidiary stress, it would also be excluded by ALIGN-HEAD(PrWd)-R. Next, the candidate in (13b), which fails to satisfy the supplementary condition WSP, is excluded by the supplemented constraint ALIGN-HEAD(Ft)-L.

When one prosodic word is followed by another in a single prosodic phrase as in *[kangaroo closure]*, the preceding word violates the constraint ALIGN-PRWD-R, which allows one and only one prosodic word at the right edge of the prosodic phrase. In this case, Non-Final-ity(Ft) is activated to exclude the candidate forms with final stress:

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6 Kager (1997: 470) assumes a ‘cover constraint’ FT-FORM as a shorthand notation for four constraints, including WSP and FTBIN, on the Macushi footing pattern.

7 Burzio (1994: 149) propounds the notion of “metrical alignment” to exclude heavy syllables in unstressed position.
When the rightmost prosodic word closure receives phrase stress, the prosodic phrase satisfies ALIGN-HEAD(PrPh)-R, but the preceding kangaroo violates ALIGN-PRWD-R. This violation activates NON-FIN(Ft), the highest-ranked constraint on Prosodic Word, to evaluate the three candidates for kangaroo in the prosodic phrase. The NF constraint excludes the output candidates in (14b) and (14c), and selects the candidate in (14a) for an optimal output form. According to the fifteenth edition of Jones’s (1997) *English Pronouncing Dictionary*, kangaroo is sometimes pronounced as /kæŋˈɡəru:/ in Australia.\(^8\) This fact suggests that the shifted stress is beginning to enter the English lexicon according as the NF constraint is freed from ALIGN-PRWD-R.

Let us now turn to the word-initial primary stress of *Cánada*. Primary stress here appears to be a mystery especially when compared with the penultimate stress of *banána*. Consider the following evaluation:

\[
\begin{array}{|l|c|c|c|c|}
\hline
\text{Canada} & \text{HD(W)-R} & \text{FT-R} & \text{HD(F)-L} & \text{FT-BN} & \text{FT-L} \\
\hline
\text{a. } [(\text{Cána})\text{da}]_w & * & \bot & \bot & \bot & \? \\
\text{b. } [\text{Ca(náda)}]_w & \bot & \bot & \bot & \bot & *! \\
\text{c. } [(\text{Cánada})]_w & \bot & \bot & \bot & \bot & \? \\
\hline
\end{array}
\]

After the candidate in (15a) is excluded by ALIGN-FOOT-R, the evaluation procedure is carried over to Foot-Binarity(\(\mu\)). If this constraint allows trisyllabic feet, the output in (15c) will win over the candidate in (15b), which is excluded owing to the misalignment of the left boundaries. Burzio (1994: 46) employs “ternary feet” for the account of the antepenultimate stress of *A(mérica)*. He argues against

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\(^8\) The dictionary also indicates that *Tennessee* is regionally stressed on the first syllable as in /tɛnɪst/.
syllable extrametricality on the grounds that ternary feet appear in other portions of the word than the final, and that extrametricality fails to provide an adequate account of antepenultimate stress in certain cases. Note that the initial syllable of Ca(nadian) is left unparsed. This fact suggests that the capacity of the English foot is no more than three moras under the constraint FT-BN(μ). It should be added that lengthening of the stressed vowel can provide an alternative British form /ˈbənəˌnaː/ for banana.

When we evaluate the prosodic structure of derived or affixed words, the ID constraints are activated to exclude output forms that do not preserve the prosodic structure of the base and the affix. We assume that IDENT-BASE is ranked equally to ALIGN-FOOT-R in Present-Day English. If the two constraints in equal ranking cannot solve their conflict, the evaluation procedure is carried over to ALIGN-HEAD(Ft)-L supplemented by WSP.9 We also assume that IDENT-BASE is substituted by IDENT-AFFIX when the base form of the input cannot be identified in the English lexicon. In evaluating affixed words, NON-FIN(Ft) is activated to exclude primary stress from the suffix, because suffixes usually receive subsidiary, not primary, stress in Present-Day English. When NON-FIN(Ft) is freed from the constraints on Prosodic Phrase, it is assumed to be ranked equally to ALIGN-HEAD(PrWd)-R, another highest-ranked constraint on Prosodic Word.

Let us now evaluate the output forms of dynamite cited in (1b). The word boundaries are omitted from the tableaux hereafter.

(16)

<table>
<thead>
<tr>
<th>dynam-(ite)</th>
<th>NF(F)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-AF</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (dýna)(mite)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. dy(námite)</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>WSP!</td>
<td></td>
</tr>
</tbody>
</table>

Since one output candidate violates NON-FIN(Ft) and the other voi-

9 The notion of “equal ranking” proposed by Kager (n.d.) is formulated as follows: “When two constraints C₁ and C₂ are ranked equally, the evaluation procedure branches at that point. In one branch, the constraint C₁ is ranked above the constraint C₂, while in the other branch the ranking is reversed. The winning candidates in each branch are retained as the output forms.” (Clements (1997: 315, footnote 20))
lates ALIGN-HEAD(PrWd)-R, the highest-ranked constraints cannot solve their conflict. The evaluation procedure is therefore carried over to ALIGN-FOOT-R and IDENT-AFFIX. These two constraints in equal ranking also fail to solve their conflict, because one candidate violates the foot-alignment constraint while the other violates the ID constraint by losing its suffixal stress. The solution is then left to ALIGN-HEAD(Ft)-L, and the candidate in (16b) is excluded by violating the WSP. Even if this candidate passes through the WSP, which is a relativized condition on the foot form, it would be excluded by ALIGN-FOOT-L.

Suffixes like -ite, -ode, -oid, and -ote are called by Liberman and Prince (1979) “weak retracting affixes,” because they retract primary stress to the presuffixal syllable if it is heavy, and two syllables to the left if it is not. Compare the following evaluation of stalactite cited in (1c) with that of dynamite:

(17)

<table>
<thead>
<tr>
<th></th>
<th>NF(F)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-AF</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (stálac)(ite)</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td>*WSP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. sta(lác)(ite)</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c. sta(láctite)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

As in the case of dynamite, the evaluation procedure is carried over to ALIGN-HEAD(Ft)-L. This constraint excludes the candidate in (17a) where the initial foot does not fulfill the supplementary condition WSP. Foot-Binarity( μ ) will not allow the overloaded foot in (17c). The candidate in (17b) is thus selected for an optimal output form. If the candidate in (17a) passes through the WSP, then the candidate in (17b) will be excluded by the violation of ALIGN-FOOT-L. Indeed, we find both (17a) and (17b) for the U.S. form and (17a) for the British form in Jones’s (1997) dictionary.

As the broken line indicates, there is no conflict between ALIGN-HEAD(PrWd)-R and ALIGN-FOOT-R because they are the constraints that realize word-final primary stress. With the assumption that the ID constraint is ranked equally to ALIGN-FOOT-R, the WSP which supplements ALIGN-HEAD(Ft)-L fills the crucial role of deciding between options in many cases. However, since its effect is not an absolute prohibition, the entire constraint hierarchy may fail to decide which is optimal and allow more than one output form as in the case of
4.2. Stress Distribution in Four Syllable Words

The application of syllable extrametricality to nouns fails to explain the following examples:

(18) a. brocâde, employée, millionaire, policé, régime, volontéer
    b. désignâte, récognize, sâtisfy

Halle and Vergnaud (1987: 234–235) concede that the above “nouns with a final rime containing a long vowel are systematic exceptions to Extrametricality.” In addition, they have to apply the Rhythm Rule to the suffixed verbs in (18b), which would otherwise receive word-final primary stress.

In the previous section, we have proposed to activate the Non-Finality Constraint when evaluating affixed words, on the grounds that English suffixes do not normally receive primary word stress by themselves. We will be able to select an optimal output form for aluminum cited in (2a), a nonderived word with a stressless ending, through the same evaluation procedure as that for affixed words:

(19)

<table>
<thead>
<tr>
<th>alumin-um</th>
<th>NF(F)</th>
<th>H(W)-R</th>
<th>FT-R</th>
<th>ID</th>
<th>H(F)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (ālu)(minum)</td>
<td>*</td>
<td></td>
<td>**!</td>
<td>*WSP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. a(lúmi)num</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. a(lúminum)</td>
<td>*</td>
<td></td>
<td>*WSP</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The evaluation procedure goes to ALIGN-FOOT-R, and the candidates in (19a) and (19b) are excluded by this constraint. Note that the candidate in (19b) is excluded because the final syllable is left unparsed, or extrametrical. The penultimate stress of an alternative form aluminium suggests that the final syllable of aluminum is included in the foot headed by the antepenultimate syllable.10

In Pater’s (1997) study on French learners’ knowledge of English

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10 According to the OED, aluminium is a modification of aluminum, a name given by its discoverer, Sir H. Davy (c. 1812), for which he had first of all used alumium (f. alumina). Both alumium and aluminum lived for some time. aluminium is the usual form in the U.S.
word stress, fifteen native speakers of English were tested as a comparison group on pronunciation of nonce words with a variety of syllable weight combinations. Of the sixteen test words, *paridamee, which contains three light syllables with a heavy final, is comparable to aluminum. In the results, no subject assigned any degree of stress to the final syllable in spite of its being heavy. The word was quite often pronounced with penultimate, as well as antepenultimate, primary stress. When it receives penultimate stress, the initial syllable receives secondary stress as in *(pari) (damee). When the antepenultimate syllable is stressed, the final syllable is included in the foot headed by the tonic syllable as in *pa(ridamee). Otherwise, the final syllable with a long vowel would be stressed. Although the pattern with light penult stress is deviated from Pater's prediction of antepenultimate stress, he concludes that "(i)t is in fact of some theoretical interest that light penult stress does occur in native speaker pronunciations of nonce words, since this is one indication that this pattern is at least marginally productive." (p. 245)

Indeed, the four syllable affixed words cited in (2c) exhibit more than one output form. Consider, for example, the following evaluation of three candidates for hospitable:

(20)

<table>
<thead>
<tr>
<th></th>
<th>NF(Ft)</th>
<th>H(W)-R</th>
<th>FT-R</th>
<th>ID-AF</th>
<th>H(F)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (hôspi)(table)</td>
<td>*</td>
<td>*</td>
<td>**!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ho(spitable)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. (hôspitable)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

Since the undominated constraints in equal ranking fail to solve their conflict, the evaluation procedure is carried over to ALIGN-FOOT-R and IDENT-AF. The candidate in (20a), which retains suffixal stress, is excluded by the fatal violation of ALIGN-FOOT-R.

It is presumed that the suffix -able carried primary stress when the loan words of Romance origin were introduced into the English language. The non-final foot was constructed on the left of the suffix, receiving subsidiary stress as in (hôspi)(table). The suffixal stress was then subordinated to the word-initial stress as in (hôspi)(table). As a result of this stress retraction, the suffixal stress was so reduced that it could not sustain the final foot, and the collapse of the final foot led to the subsequent rightward stress shift. In the twentieth century, pri-
mary stress began to move one syllable to the right. According to Wells’s (1990) *Pronunciation Dictionary*, 81 percent of British speakers prefer the shifted stress in *hospitable*. The rightward stress shift in the last century suggests that the Identity Constraint has been out-ranked by ALIGN-FOOT-R in Present-Day English.

On the other hand, *hospitable* is often stressed on the word-initial syllable with no subsidiary stress in American English. If the Foot-Binarity Constraint allows the entire word in one foot, the candidate in (20c) will win over the alternative form in (20b). If not, the latter will win because it only violates ALIGN-FT-L, which is ranked more lowly than FT-BIN.

To take another example for comparison, *arithmetic* has three different output forms as follows:

(21)

<table>
<thead>
<tr>
<th></th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID</th>
<th>HD(F)-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (àrith)(métique)</td>
<td>*</td>
<td></td>
<td>**</td>
<td></td>
<td>*WSP</td>
</tr>
<tr>
<td>b. (árith)(métique)</td>
<td></td>
<td>*</td>
<td>**</td>
<td></td>
<td>*WSP</td>
</tr>
<tr>
<td>c. a(ríthmetic)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The isolated form of the adjective in (21a) receives primary stress on the penultimate syllable just as other words with the suffix -ic usually do. In this case, ALIGN-HEAD(PrWd)-R dominates other constraints on Prosodic Word. When this word precedes another prosodic word within a single prosodic phrase such as *[arithmetic mean]*, stress is retracted to the word-initial syllable as in (21b). In this case, the violation of ALIGN-PRWD-R activates NON-FIN(Ft) to dominate others including ALIGN-HEAD(PrWd)-R. When the suffixed word is placed in the phrase-final position as a head noun, stress falls on the antepenultimate syllable as in (21c). In this case, the NF constraint is ranked equally to ALIGN-HEAD(PrWd)-R, and ALIGN-FOOT-R selects the output form containing a single foot.

Let us now consider the exceptional case *admirable* cited in (2b).

(22)

<table>
<thead>
<tr>
<th>ad(mire)-(âble)</th>
<th>NF(Ft)</th>
<th>H(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>H(F)-L</th>
<th>F-B</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (ádmire)(âble)</td>
<td></td>
<td>*</td>
<td>**!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ad(mirâble)</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (ádmirâble)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
After the suffix-preserving candidate in (22a) is excluded by the fatal violation of ALIGN-FOOT-R, the actual output in (22c) should be excluded because it fails to preserve the prosodic structure of the base verb admire. However, the candidate in (22b) is required to retain the long vowel of the second syllable in order to fully satisfy IDENT-BA.

We could ascribe the word-initial stress of admirable, unlike that of inventory, to its non-head status in a prosodic phrase. It is noticed, however, that the vowel of the antepenultimate syllable is not inherently long in words such as hospitable and centenary. This fact suggests that the word-final single foot is overloaded beyond capacity by a heavy syllable preceding a disyllabic suffix. It should be remembered that the word-final ternary foot is allowed in four syllable underived words like A(mérica), where the head syllable of the word-final foot is not heavy. The exclusion of the overloaded foot must be attributed not to Foot-Binarity but to a certain constraint that dominates ALIGN-FOOT-R. We will explore this constraint in the following section.

4.3. Stress Distribution in Five Syllable Words

In longer words, subsidiary stress is required to mark the beginning of a word while primary stress signals the word end. Let us first consider how primary and subsidiary stresses are distributed in an underived word containing five open syllables:

(23)

<table>
<thead>
<tr>
<th></th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID</th>
<th>HD(Ft)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>(àbra)(cädabra)</td>
<td>***!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>(àbraca)(dâbra)</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>a(bràca)(dâbra)</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>

The Non-Finality and Identity Constraints are not active in evaluating underived words. First, the candidate in (23a) is excluded because the right boundary of the non-final foot violates ALIGN-FOOT-R more severely than the other two. Next, if the non-final ternary foot in (23b) is allowed, the candidate in (23c) will be excluded because the word-initial syllable fails to receive demarcative stress.

It is noted by Burzio (1994: 149) that "well-formedness of a foot is not determined by absolute weight, but rather by weight 'optimization,' specifically that a foot is well-formed if it is the closest to optimal weight among several alternatives." Here we introduce a condition on
foot weight as follows:  

(24) Optimal Foot Weight (OFW): The word-final foot should not be quantitatively subordinated to the non-final feet. We propose that this condition supplements ALIGN-HEAD(PrWd)-R to realize word-final primary stress in Present-Day English. As in the case of WSP, the effect of OFW will not be absolute prohibition but that of deciding between options. Therefore, output candidates sometimes pass through the supplementary condition under some other constraints.

Let us now turn to another underived word Ticonderoga cited in (3a). According to Halle and Kenstowicz (1991: 492), the nonprimary stresses on the first two syllables are not of the same magnitude and vascillate as to which is stronger.

(25)

<table>
<thead>
<tr>
<th>Ticonderoga</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
<th>FT-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Ti(cônde)(rôga)</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. (Ticonde)(rôga)</td>
<td>*OFW</td>
<td>**</td>
<td>*WSP</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The final foot can obtain three moras owing to vowel lengthening of the tonic syllable. The weight of the non-final foot is equal to the final foot in the output in (25a), while that of the non-final foot surpasses the final foot in the output in (25b). Therefore, the trisyllabic sequence with a heavy median prefers binary footing in the non-final position of the prosodic word. If the candidate in (25b) passes through the relativized condition OFW as well as WSP, it will win over the competitor by receiving word-initial demarcative stress.

---

11 Burzio (1994: 147–155) sets optimal weight for rightmost feet at 12 in his proposed numerology, and he supposes the fixed difference between rightmost and non-rightmost feet to be a 12/10 ratio. Our proposal is simply that the condition of OFW prefers a candidate form in which the word-final foot surpasses the non-final in weight.

12 Burzio (1994: 153) claims that “while alignment generally overrules weight, a large weight divergence can overrule alignment instead.” Modern Romance languages like Italian do not call for the condition of OFW, probably because their suffixes can receive primary word stress. In the English language, the condition was not recognized until late Modern English. See footnote 14.

13 In this case, primary stress is possibly retracted to the initial syllable because the final foot is quantitatively subordinated to the non-final foot. Primary stress of the place-name Mānitowôc was retracted from the final syllable of Mānitawâuk.
To look at the examples cited in (3b), the derived words with five syllables well preserve the prosodic structure of the base verb. The input-faithful output is selected as follows:

(26)

<table>
<thead>
<tr>
<th>(quánti)(fy)-(able)</th>
<th>NF(F)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (quánti)(fiable)</td>
<td></td>
<td>*</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (quánti)(fiably)</td>
<td>*</td>
<td>***</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The output with initial stress in (26a) is preferred by NON-FIN(Ft) when the word is followed by a noun. If the evaluation is carried over to ALIGN-FOOT-R and IDENT-BA, the candidate in (26b) will then be excluded by the violation of the Identity Constraint. However, this output with final stress is at times selected by ALIGN-HEAD(PrWd)-R because the final foot surpasses the non-final in weight, thus fulfilling the condition OFW that supplements the constraint.

When the antepenultimate syllable is closed, it usually obtains primary stress. The following is the evaluation of three output forms for supplementary cited in (3d).

(27)

<table>
<thead>
<tr>
<th>(súipple)(mènt)-(àry)</th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>H(Ft)-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (súpplemen)(tàry)</td>
<td>*</td>
<td>*OFW!</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (súipple)(mèntary)</td>
<td>*</td>
<td></td>
<td>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (súipple)(mèntary)</td>
<td>*</td>
<td></td>
<td>***</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The final foot headed by the antepenultimate closed syllable is heavy enough to carry primary stress in comparison to the non-final foot consisting of two light syllables. It follows that the output in (27c) is selected by ALIGN-HEAD(PrWd)-R supplemented by OFW. When the word is misaligned in a phrase like [supplementary benefit]P, the violation of ALIGN-PRWD-R activates NON-FIN(Ft) to exclude the output with final stress. In this case, the output in (27b) will be preferred. The possible candidate in (27a), which preserves the prosodic structure of the base verb and the suffix, is excluded because the final foot is quantitatively subordinated to the non-final foot excessively.14

14 There is evidence in Cooper's (1685) Grammatica linguae Anglicanae which shows that anniversary and satisfactory had primary stress on the word-initial syl-
The examples in (3b) and (3d) have the identical prosodic structure with different locations of the head of a prosodic word. In contrast, the examples in (3c) exhibit a different prosodic structure from that of the above examples. Let us examine the following evaluation of output candidates for obligatory cited in (3c):

(28)

<table>
<thead>
<tr>
<th>(óbli)(gâtë)-(ôrty)</th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(Ft)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (óbliga)(tôrty)</td>
<td>*OFW</td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (ôbli)(gâtory)</td>
<td>*</td>
<td>***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. o(Blîgatory)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The output form in (28a), which violates OFW, fails to satisfy the supplemented constraint ALIGN-HEAD(PrWd)-R. When the evaluation procedure is carried over to ALIGN-FOOT-R, this constraint excludes the candidates in (28a) and (28b). The candidate in (28c), which has no subsidiary stress, is thus selected for an optimal output form. However, the losing candidates are included as possible output forms in Jones’s (1997) English Pronouncing Dictionary. The output in (28b) might be preferred by ALIGN-HEAD(PrWd)-R when the word is in the phrase-final position. This alternative form, where the vowel of the antepenultimate syllable is long, has the identical prosodic structure with that of (sûpple)(ménitary) in (27c).15

Note here that a short vowel of the second syllable receives primary stress in the examples in (3c), and that there is no lengthening of a stressed vowel in the open syllable. Moreover, the long vowel of the base verb inflâme is shortened in the derived form inflâmmary. The shortening of a stressed vowel is observed in the following words derived from disyllabic verbs with final stress:

15 When the vowel of the suffix -ary/ory is reduced to schwa, the antepenultimate stress is comparable to the penultimate stress of the adverb absolutely in interj yogary use.
(29) declamatory (<declaim), declaratory (<declare),
exclamatory (<exclaim), explanatory (<explain),
preparatory (<prepare), residuary (<reside)
Before the suffixation, the syllable at is inserted as a buffer between the
base verb with final stress and the stressed suffix -ory.16 When the
suffix is attached to verbs with non-final stress, the syllable insertion
does not occur:
(30) contributory (<contribute), depósitory (<deposit),
imaginary (<imagine), prohibitory (<prohibit)
Now compare the actual output inflammatory with a possible candi-
date which preserves the vowel length of the base verb:
(31)
<table>
<thead>
<tr>
<th>in(fláme)-at-(òry)</th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. in(fláma)(òry)</td>
<td></td>
<td>*OFW!</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. in(flámma)(òry)</td>
<td></td>
<td>*</td>
<td>**!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. in(flámmatory)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The inserted syllable at contributes to the construction of the foot
boundaries which divide the base with final stress from the stressed
suffix. The head foot of the candidate in (31a), where the length of
the stressed vowel is retained, violates the condition of OFW. The
output in (31b), where the stressed vowel is shortened, is preferred to
that in (31a). When the vowel of the suffix is so reduced that it can-
ot sustain the word-final foot, the candidate in (31c) is selected for an
optimal output form by ALIGN-FOOT-R.

It was indicated by Zamma (1994) that the suffix -ate is deleted be-
before the suffixation of -able, except when the latter is attached to verbs
with final stress:

16 The morpheme -atory is often analyzed as an allomorph of -ory (Aronoff
(1976)). Against this traditional analysis, Zamma (1994: 23) proposes that “the
suffix -ate” is brought between the stem and -ory, when the following phonological
requirement is not satisfied:
-ory and -ive attach to stems which end with a voiceless coronal obstruent
(i.e. /s/ and /t/).
argues for selectional restrictions on suffixes.
Let us evaluate three possible candidate forms for the input (édú)(câte)-(able):

<table>
<thead>
<tr>
<th>(édú)(câte)-(able)</th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
<th>HD(F)-L</th>
<th>FT-BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (éduda)(table)</td>
<td></td>
<td>*OFW!</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (édu)(câtable)</td>
<td></td>
<td></td>
<td>***!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (édu)(câble)</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All the above candidates violate ALIGN-HEAD(PrWd)-R. The input-faithful candidate in (33a) is excluded by the violation of OFW. The suffix -ate is a redundant syllable in this prosodic structure, because the final syllable of the “stem” is not stressed. The highest-ranked constraints fail to select only one optimal output form and have to leave the solution to ALIGN-FOOT-R and IDENT-BA. The candidate in (33b) is then excluded by violating ALIGN-FOOT-R more severely than the competitor in (33c). When the vowel of the suffix -able is reduced, the entire word is allowed into one foot as in (éducable). It should be noted that an alternative form éducatable is included in the OED, which preserves the prosodic structure of the base verb éducat. Incidentally, extricable cited in (2c) could be included in the word list in (32a). Though the word-initial syllable is heavy, primary stress is now shifting from the initial syllable to the antepenultimate open syllable of the word. This rightward stress shift suggests that stress distribution is more sensitive to foot weight than to syllable weight in Present-Day English.

So far we have found two distinctive patterns of prosodic structure among five syllable derived words as follows:

(34)  a.  \( (\sigma \sigma)(\sigma \sigma \sigma) \)  

b.  \( \sigma (\sigma \sigma)(\sigma \sigma) \)  

When the antepenultimate syllable is closed by a consonant, the syllable heads the word-final foot, as in (34a), to which primary word stress is assigned. When the antepenultimate syllable contains a long vowel, the syllable heads the final foot, but primary stress is usually assigned to the non-final foot. In these cases, the weight of the final
ternary foot is relativized to the non-final, and an overloaded final foot can satisfy OFW. In other cases, the word-initial syllable is likely to be left unparsed, and the second syllable heads the non-final binary foot as in (34b). As far as the vowel in the second syllable is short, the non-final foot can fulfill OFW, and it receives primary word stress since the final foot consisting of a suffix does not carry primary stress in Present-Day English. When the suffix is so reduced that it cannot sustain the word-final foot, it is absorbed into the preceding foot as in the case of inflammatory.

We have observed that quite a few words exhibit more than one output form as shown by quantifiable/quantifiable, supplementary/supplementary, and obligatory/obligatory. Furthermore, primary stress is oscillating between the initial, second, and antepenultimate syllables in the following words:

(35) compensatory/compensatory/compensatory
confiscatory/confiscatory/confiscatory
explicatory/explicatory/explicatory
imprecatory/imprecatory/imprecatory
inculpatory/inculpatory/inculpatory
indicatory/indicatory/indicatory

The following is an evaluation of the three output forms for compensatory:

(36)

<table>
<thead>
<tr>
<th>(cómpen)(sâte)-(óry)</th>
<th>NF(Ft)</th>
<th>HD(W)-R</th>
<th>FT-R</th>
<th>ID-BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (cómpen)(sátory)</td>
<td></td>
<td>*</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>b. (cómpen)(sátory)</td>
<td></td>
<td>*</td>
<td>***</td>
<td>*</td>
</tr>
<tr>
<td>c. com(pénsa)(tóry)</td>
<td></td>
<td>*</td>
<td>**</td>
<td>**</td>
</tr>
</tbody>
</table>

Since the antepenultimate syllable has a long vowel in the input, the syllable will be the head of the word-final foot as in (36a) or (36b). When the adjective is followed by a noun in a prosodic phrase like [compensatory lengthening]P, the violation of ALIGN-PRWD-R acti-

---

17 We follow Jones’s (1997) principle in citing variable stress placement: “Where more than one stress pattern is possible, the preferred pronunciation is given first and then alternatives are listed.”
vates NON-FIN(Ft) to exclude the output in (36b). However, this form with final primary stress will be selected by the undominated ALIGN-HEAD(PrWd)-R when the adjective is aligned with the right boundary of a prosodic phrase. If NON-FIN(Ft) and ALIGN-HEAD(PrWd)-R fail to solve their conflict, ALIGN-FOOT-R will select the output in (36c). The frequency of this form indicates that ALIGN-FOOT-R dominates IDENT-BASE in Present-Day English. Otherwise, the input-faithful output in (36a) would be selected by the Identity Constraint. The oscillation of primary word stress demonstrates that the higher-ranking constraints sometimes fail to select only one optimal output form, and leave the solution of their conflict to the lower-ranking constraints.

5. Summary and Conclusions

According to Bernhardt and Stemberger (1998: 474), it is difficult for English-learning children to acquire the adult pattern of stress placement, "which is sometimes right-prominent (if the final foot has two or more syllables, or if both feet are monosyllabic) and sometimes left-prominent (if the final foot is monosyllabic but the first foot has two syllables)." We have proposed to supplement ALIGN-HEAD(PrWd)-R with the condition of Optimal Foot Weight (OFW), which requires the final foot to surpass the non-final foot in weight. If this condition is not fulfilled, primary stress is likely to fall on the non-final foot under the requirement of NON-FINAL(Ft).

We have found two or more output forms of polysyllabic words in the adult pattern. The oscillation of primary stress indicates that the higher-ranked constraints sometimes fail to select only one optimal output form. In evaluating underived words, NON-FIN(Ft) is active only when the constraint on prosodic phrase, ALIGN-PRWD-R, is violated. In evaluating suffixed words, however, NON-FIN(Ft) is freed from ALIGN-PRWD-R and ranked equally to ALIGN-HEAD(PrWd)-R.\textsuperscript{18} If OFW is fulfilled by a candidate form with a relatively heavy final foot, the candidate is likely to be selected for an optimal output by

\textsuperscript{18} NON-FIN(Ft) is never freed from ALIGN-PRWD-R in modern Romance languages like Italian, where a suffix receives primary word stress.
ALIGN-HEAD(PrWd)-R supplemented by OFW. When OFW is not satisfied, NON-FIN(Ft) will prefer a candidate form with non-final stress.

When the highest-ranked constraints fail to solve their conflict, they leave the decision to lower-ranked constraints. We have observed that primary stress is now shifting one syllable to the right in some four-syllable derived words. This rightward stress shift indicates that IDENT-BASE has been outranked by ALIGN-FOOT-R during the twentieth century. The antepenultimate single stress is optimal for the demarcative function to be fulfilled. The reranking of the Alignment Constraint over the Identity Constraint demonstrates that stress accent fulfills the demarcative function at the expense of the morphological function in Present-Day English.

When the evaluation procedure is carried over to ALIGN-HEAD(Ft)-L, the supplementary condition WSP demands a heavy syllable to be aligned with the left edge of a foot. While underived words usually satisfy this condition, derived words often violate it because IDENT-BASE dominates ALIGN-HEAD(Ft)-L in the constraint hierarchy.

If a candidate passes through WSP and evades the violation of the supplemented constraint, the evaluation procedure is carried over to ALIGN-FOOT-L. This Alignment Constraint realizes word-initial subsidiary stress that marks the beginning of a prosodic word, while ALIGN-HEAD(PrWd)-R and ALIGN-FOOT-R realize word-final primary stress for demarcation. When primary stress falls on the non-final foot, subsidiary stress is carried by a suffix. As far as ALIGN-HEAD(PrWd)-R and ALIGN-FOOT-R dominate IDENT-BASE on the one hand, and ALIGN-FOOT-L dominates IDENT-AFFIX on the other, an optimal prosodic structure will contain word-final primary stress and word-initial subsidiary stress for demarcation. This distribution of stress in polysyllabic words demonstrates that the demarcative function predominates the morphological function in Present-Day English.

19 In Italian, subsidiary stress is obligatorily assigned to the word-initial syllable while primary stress falls on the word-final foot.
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