ACCENTUATION OF -ORY, -IVE, AND -ION

HIDEKI ZAMMA

University of Tsukuba

The present paper proposes an analysis accounting for the stress behavior of words with the suffixes -ory/-atory and -ive/-ative as an alternative to Halle and Vergnaud's (1987) "stress domain" analysis, which cannot be maintained for several reasons. Noticing that the suffix -ate exhibits a special property in English word formation, we postulate a special condition on this suffix which requires that it not bear stress. As our analysis also resolves all problems found in the "stress domain" analysis, it successfully predicts the correct stress of words with -ion/-ation.*

1. Introduction

Although Halle and Vergnaud (1987; henceforth H&V) is undoubtedly a landmark in the development of metrical theory, there remain several unsolved issues concerning the stress behavior of English in this and subsequent studies. H&V's analysis of words with the suffixes -ory and -ive, for example, is problematic in several respects, which we will discuss in section 3.3, and these problems remain unsolved in recent studies of metrical theory such as Halle and Kenstowicz (1991), Halle and Idsardi (1992), and Idsardi (1992). In this paper, we will present an alternative analysis which provides a natural account of the stress patterns of the words in question, resolving all problems found in H&V's "stress domain" analysis. In addition, we will show that this analysis satisfactorily accounts for the stress pattern of words with

* This paper originated in a talk presented at the 12th National Conference of the English Linguistic Society of Japan, held at the University of Tokyo on November 12, 1994. I would like to thank the audience for comments and discussion. I am also grateful to the following people for their valuable comments on an earlier version of this paper: Shosuke Haraguchi, Minoru Nakau, Yukio Hirose, and two anonymous EL reviewers. Finally, my thanks also go to Ronald Craig, who corrected stylistic errors.

© 1995 by the English Linguistic Society of Japan
-ion as well.

2. English Stress Assignment

Before we begin discussion of the main issue, we will briefly review the framework for English stress assignment we assume in this paper. We accept the general assumptions made by H&V and Halle and Kenstowicz (1991): namely, (i) that there are two levels in the English lexicon, the first of which (Level 1 in terms of Kiparsky (1982)) is quantity-sensitive while the second (Level 2) is quantity-insensitive; (ii) that at Level 1, trochaic feet are constructed in a right-to-left fashion, with the rightmost stress becoming primary; and (iii) that the rightmost syllable sometimes undergoes extrametricality. These assumptions are embodied in the grid structure as shown below:

```
(1) * ( * *)
   (* *) <(*)<(*) *

instrumental
```

The angled brackets are employed to show that the enclosed element is extrametrical. Feet are represented by the parentheses. Trochaic feet are constructed on the lowest line, and the head of each foot is designated on the middle line. The rightmost stress is primary, as the highest line shows.

Besides these general assumptions, we assume an important rule called the Rhythm Rule (cf. H&V (p. 235)). When primary stress is going to be assigned on the word-final syllable, this rule retracts the stress onto the nearest stress-bearing syllable, making the original stress secondary. We will see how the rule operates, taking designate as an example.

```
(2) * * R.R. (*) *
   (* *) (*) (*)
   designate designate
```

The above-mentioned stress system places primary stress on the final syllable at Level 1, and a quantity-insensitive foot is constructed at Level 2 on the sequence preceding the primary stress.1 The Rhythm

---

1 Stresses other than primary one is erased by a rule called conflation when the word emerges from Level 1. See H&V, Halle and Kenstowicz (1991), etc., for details.
Rule, which applies at this level, then retracts this word-final stress to the antepenultimate syllable, producing désignàte.

We will not discuss the mechanism of English stress assignment any further, since such is not the aim of this paper. Here it will be sufficient to note that the system and the rule above correctly predict the actual stress behavior of most English words. For a detailed discussion, see H&V, Halle and Kenstowicz (1991), etc.

3. -ory and -ive

In this section, we will discuss the stress patterns of words with -ory and -ive. The discussion is as follows. We first provide a generalization for these stress patterns in section 3.1. In section 3.2, we review how H&V analyze the same words. It becomes evident in section 3.3 that there are four problems with their analysis. Then, we propose an alternative analysis in section 3.4. We see in section 3.5 that our analysis can predict alternative pronunciations, an issue not addressed in previous studies.

3.1. The Data

First, we show below the basic data on the stress patterns of words which contain -ory and -ive. The words in (3) are examples which end with -ory/-atory; in particular, (3a, b) are those for -ory and (3c, d) those for -atory. Similarly, (4a, b) contain examples of -ive, and (4c, d), of -ative. (The data in this subsection are taken from H&V and Wells (1990).)²

(3)  
a. inhibitory, admonitory, transitory, auditory, depository
b. perfunctory, refectory, satisfactory, contradictory, introductory
c. anticipatory, articulatory, gesticulatory, reconciliatory, aleatory
d. confiscatory, compensatory, observatory, condemnatory, reformatory

(4)  
a. positive, prohibitive, cognitive, sensitive, punitive
b. effective, decisive, elusive, emotive, apprehensive

² Although Wells does not put secondary stress on the vowel of -ory, we assume the suffix to bear stress from the fact that the suffix always has long vowels in American pronunciation.
c. agglutinative, imaginative, associative, commemorative, significative

d. alternative, informative, conservative, demonstrative, contemplative

It is obvious in (3) and (4) that words with these suffixes show sensitivity to rime structure on accentuation, as H&V note (p. 254). Compare the words in (3a, c) and (4a, c) with those in words (3b, d) and (4b, d). The latter have primary stress on the heavy syllable which immediately precedes the sequences -ory/-atory and -ive/-ative. On the other hand, the former, which have primary stress on the second syllable before the sequences, have a light syllable between the stressed syllable and the sequences. From this fact, we can generalize the stress pattern of words containing these suffixes as follows:

(5) Primary stress falls on the syllable immediately preceding -ory/-atory, -ive/-ative if it is heavy, or on the second nearest syllable if the preceding syllable is light.

The following words also conform to the generalization in (5). Although the syllable preceding the sequence is light on the surface, primary stress falls on that syllable.

(6) defamatory, explanatory, declaratory, preparatory, declarative, provocative

This can be explained by assuming that the stressed syllables in these words have long vowels underlyingly, and that they undergo a vowel shortening rule after stress assignment (cf. H&V). Note that they have a previous cycle with a long vowel in the stressed syllable; e.g. explain, oblige, etc.

As for the words in (7), we assume that these have two /s/’s underlyingly, as the spelling shows.

(7) a. possessory, regressive, successive, permissive, expressive

Since the stressed syllables are analyzed as heavy under this assumption, the generalization in (5) holds here as well.

3.2. H&V’s Analysis

H&V employ a special mechanism called “stress domain,” primarily to analyze words of the kind we discuss here. This is because it is impossible to account for the stress pattern generalized in (5) using only the general rules of English stress assignment we have reviewed in section 2. Before we see how the mechanism works in detail, we will
illustrate the ways in which the general stress assignment system alone is insufficient, providing a more detailed explanation than presented in H&V (pp. 254-255).

First, the Rhythm Rule cannot account for the stress pattern. As we saw in our review in section 2, this rule applies at Level 2, which is supposed to be quantity-insensitive. However, the stress pattern in question exhibits quantity-sensitivity, as generalized in (5). Regular application of the rule would not produce the correct stresses.

H&V also pursued another approach within the general system, that is, extrametricality. But normal extrametricality produces wrong stress for words with -atory/-ative.3

(8) a. * b. *
   (* *) (* *)
   (* *) (* *)<*>(*)
   *celebratory *alternative

Since the vowel in -at- is long, it is predicted that the syllable containing it always has primary stress, which is not true. To produce the correct stress, the entire string -atory/-ative should undergo extrametricality:

(9) a. * b. *
   (* *) (* *)
   (* *) (* *)<*>(*)
   celebratory alternative

However, this analysis has some disadvantages. First, although the usual extrametrical syllable is monosyllabic and unstressed, this is not the case for -atory/-ative: these sequences consist of two syllables, and American pronunciation has secondary stress on the syllable containing -ory. Second, the vowel shortening phenomenon observed in many words with these suffixes (cf. (6)) cannot be accounted for in this analysis, because under this assumption the structural description of shortening (11) is not satisfied:

(10) a. * b. *
    (* *) (* *)
    (*) (* *)<*>(*)
    explanatory provocative

3 The word-final y is considered to be underlyingly a glide (cf. H&V: 239, fn.6).
(11) Shortening

\[
\begin{array}{c}
\text{Nucleus} \quad \text{Nucleus} \quad \text{Nucleus} \\
\text{X} \quad \text{X} \quad \rightarrow \quad \text{X} \quad \rightarrow \quad \text{X} \\
\end{array}
\]

The shortening rule (11) applies to a vowel which falls in the head of a trochaic foot. Since the target vowels in the structures in (10a) and (10b) are not included in a trochaic foot, shortening is not predicted here in this analysis. In order to account for the shortening of these vowels, the syllable containing -at- must be metrified in a foot as a dependent.

Moreover, it is impossible to assume that the suffixes in question are attached at Level 2, that is, after primary stress is assigned, although H&V do not mention this possibility. First, as we have just observed, many words undergo the shortening rule, which is argued to apply at Level 1. Second, there are words which do not have primary stress on the same syllable as words from which they are derived (e.g. confiscate/confiscatory, relate/relative, etc.). Third, we can observe alternations like expand/expansive, which are assumed to occur at Level 1. These facts strongly suggest that the relevant suffixes belong to Level 1.

As we have seen, the general system of English stress assignment alone cannot account for the stress patterns of the words in question. So, H&V pursue another possibility, employing the following assumption:

(12) -ory/-atory and -ive/-ative constitute a stress domain in and of themselves.

In other words, H&V regard -ory/-atory and -ive/-ative as allomorphs and assume that the stem and the suffix each constitutes a distinct domain for stress assignment, which independently undergoes stress assignment rules. Consequently, two primary stresses are assigned to a word containing a "stress domain" suffix at Level 1: one to the stem and the other to the suffix. At Level 2, a constituent is constructed over both domains and one of the stresses becomes primary.

Let us see how the above assumption works. Below is a sample derivation taken from H&V (p. 261).4

---

4 Although it is not clear what allomorphy rule H&V assume, they must analyze anticipatory as anticip+-atory, as opposed to the more intuitive anticipate+-ory.
The stem and the suffix independently undergo stress assignment rules at Level 1, producing stresses for each, as the leftmost structure in (13) shows. At Level 2, primary stress is assigned on the last syllable by constructing a right-headed, unbounded constituent (i.e. the second structure in (13)). The Rhythm Rule applies here because this structure has primary stress on the last syllable. Since the syllable /ti/ has the nearest stress, primary stress falls on this syllable.

H & V assume all stresses in words with these suffixes to be derived in the same way as we have seen for *anticipatory*. However, there are several problems with their analysis. We will examine these in the following section.

3.3. Problems with H & V's Analysis

We find four problems with H & V's "stress domain" analysis, two of which concern the Rhythm Rule, and the other two concerning vowel shortening and British pronunciation. We will discuss these problems in order.

The most serious difficulty is observed in the accentuation of words with -ative. Note that H & V give the following derivation for *authoritative* (p. 262):

(14)  

\[
\begin{array}{c}
* & * \\
(\quad) & (\quad) \\
(\quad) & (\quad) \\
* & (\quad) & (\quad) \\
\end{array}
\rightarrow
\begin{array}{c}
* & * \\
(\quad) & (\quad) \\
(\quad) & (\quad) \\
* & (\quad) & (\quad) \\
\end{array}
\rightarrow
\begin{array}{c}
* & * \\
(\quad) & (\quad) \\
(\quad) & (\quad) \\
* & (\quad) & (\quad) \\
\end{array}
\]

\text{authoritative} \rightarrow \text{authoritative} \rightarrow \text{authoritative}

As in the case of -atory, primary stress is retracted from the stressed syllable of the suffix to that of the stem by the Rhythm Rule. However, this derivation is actually impossible in H & V's system, since the second structure in (14) never satisfies the structural description of the Rhythm Rule. The structure has the target primary stress on the penultimate syllable, to which the Rhythm Rule never applies. Note that in words like *serendipity*, primary stress is not retracted from the penultimate syllable.
(15) *  
(*) (*)  
(* *) (*)(*)  
serendipity

On the other hand, assuming that -ive is extrametrical does not save the analysis either. In words with an extrametrical suffix -al, stress retraction is not observed.

(16) a. *  
(*) (*)  
(* *)  
philosophical  
b. *  
(*) (*)  
(* *)(*)(*)  
instrumental

It is clear from (15) and (16b) that the Rhythm Rule never retracts penultimate stress. Therefore, we can conclude that the actual stress of words with -ative cannot be derived using the “stress domain” analysis.5

Another problem involving the Rhythm Rule is that words with a “stress domain” suffix should undergo the rule even in an environment in which its application is not observed in other cases. First, let us consider how H & V would analyze the stress pattern of a word like missive. The derivation would be as follows:

(17) *  
(*) (*)  
(*)(*)(*)(*)  
missive ← missive

Through the Rhythm Rule, the stress assigned on the final syllable, i.e. that of the suffix, is retracted leftward. However, as Zamma (1993a) points out, disyllabic words usually do not undergo the Rhythm Rule, regardless of the weight of the first syllable.

(18) a. débaté, créate, reláte, aríse, revíse, replý, supplý, applý  
b. comprísce, implý, complý  
c. locáte/lócate, transláte/tránslate, confláte/cónflate, baptíze/báptize  
d. cóntempláte, álternàte, recógníze, múltíply

5 H&V’s -ative rule is not designed to save the analysis; it is responsible for the difference in the pronunciations /eitiv/ and /etiv/, to the latter of which the rule would apply. In other words, the rule would apply after the -ative words had undergone the Rhythm Rule.
The examples in (18d) show that words with the suffixes -ate and -ize or with the stem -ply undergo the Rhythm Rule when the word consists of more than two syllables. In contrast, although the words in (18a) and (18b) also contain the same suffixes or the same stem, primary stress is not retracted from the last syllable by the Rhythm Rule, irrespective of the weight of the preceding syllable ((18a) contains words whose first syllable is light, (18b), heavy). Even when the Rhythm Rule applies exceptionally to disyllabic words (i.e. (18c)), the words always have alternative pronunciations with final stress (in this case, the first syllable is always heavy).

On the other hand, words with -ory/-ive do not show such behavior: primary stress never falls on the suffix, the last syllable, even in disyllabic words.

(19) a. missive, pāssive, mássive, áctive, móttive, spójrtive, féstive, pénsive
   b. sénssory, cúsory
The words in (19) do not have alternative pronunciation as words in (18c) do. Therefore, if we analyze these words by means of the Rhythm Rule, we have to treat them in an exceptional manner.

Next, we will discuss the problem concerning vowel shortening. A number of words with relevant suffixes exhibit vowel shortening effect, as we see in (20).

(20) a. explanatory (<explain), inflamatory (<inflame), respiratory (<respire)
   b. declarative (<declare), preparative (<prepare), provocative (<provoke)
Obviously, the underlined vowels are shortened. As we discussed in section 3.2, H&V reduce this phenomenon to the shortening rule in (11), which applies to the head of a trochaic foot. However, their analysis cannot produce a structure which satisfies the structural description of the rule. For example, the metrical structure of explanatory would be as follows under their analysis:

(21) *
   (*
   (*
   * (*)(*)

explanatory
In this structure, the vowel which should shorten does not correspond to the head of a trochaic foot, since -at-, being a part of the suffix,
belongs to a different domain from that of the stem and thus cannot be the dependent of a foot. Therefore, the “stress domain” analysis cannot account for the shortening effect in the words in (20).\(^6\)

The last problem concerns British pronunciation. According to Wells (1990), the words listed below have primary stress on -at- as the major pronunciation in Britain, regardless of whether they have a previous cycle with -ate. (The words in (22a) have such a cycle, whereas those in (22b) do not.)

(22) British pronunciation

a. celebratory, compensatory, vibratory, circulatory, rotatory

b. lacrimatory, aleatory, sternutatory, purificatory

The “stress domain” analysis fails to predict this pronunciation, because under this analysis -at- is constantly skipped in the application of the Rhythm Rule, as we have seen in (13). Although the analysis succeeds in accounting for the American dialect in which the vowel in -at- is reduced to a schwa, it fails to capture the British pronunciation of these words.

### 3.4. Alternative Analysis

We have seen that H&V’s analysis is problematic in that it cannot account for (i) the stress pattern of words with -ative, (ii) the stress pattern of disyllabic words, (iii) vowel shortening, or (iv) British pronunciation. In this section, we will propose an alternative analysis which results in none of these problems.

First, we assume that -at- in the sequence -atory and -ative is the suffix -ate. Note that Zamma (1993b, 1994) assumes that the suffix has a special property. When the suffix -able is attached to words with -ate, for example, the latter suffix is deleted although other verb-

---

\(^6\) One might propose that this problem would not occur if we utilized an alternative analysis of vowel shortening which refers to closed syllables, such as that of Myers (1987) and Yip (1987). However, we follow H&V’s analysis, because the closed syllable shortening analysis is insufficient in that it cannot account for contrasts such as primitive/primal (<prime), decisive/decision (<decide), etc. Note that this contrast is naturally captured by (11).

\[\begin{align*}
(1) & \quad a. \quad * \\
& \quad b. \quad * \\
& \quad (*) \quad (*) \\
& \quad (* *) <(*) \quad (*) <(*) \\
& \quad \text{primitive} \quad \text{primal}
\end{align*}\]

See Zamma (1993b) for detailed discussion.
forming suffixes never show such behavior; cf. *communicable* (*communicate*) vs. *recognizable* (*recognize*). Moreover, the suffix is introduced when the stem does not satisfy a lexical requirement of the suffixes *-ory* and *-ive*, which need to be attached to stems which end with a coronal obstruent /s/ or /t/.

On the basis of these facts, we assume that the suffix *-ate* behaves in a special way also in accentuation. Specifically, we propose that this suffix is subject to the following condition:

(23) Metrical Condition on *-ate* (First Approximation):

- *-ate* cannot be stress-bearing word-internally.

In fact, *-ate* can bear stress word-finally. We have seen in (18) the cases in which the suffix contains primary or secondary stress. The condition is restricted to apply to word-medial *-ate*, as the formulation states.

Second, we assume that the suffix *-ory* is extrametrical although accented lexically. To represent this assumption formally, we propose that the suffix has the following lexical specification:

(24) *)* -ory

In (24), brackets and asterisks are specified on two lines. Because of the brackets, the stress assigned lexically for the suffix is excluded from the computation of primary stress assignment.7

This lexical specification resolves one of the problems we have observed in the previous section; that is, the fact that disyllabic words with *-ory* always have primary stress on the first syllable. Recall that the Rhythm Rule usually does not apply to disyllabic words. With the lexical brackets in (24), the problem is easily resolved. Let us show the derivation of *sensory*:

(25) *)* → (*)*

Because of the bracket specified on the upper line, only the first syllable constitutes a foot and thus the syllable bears primary stress.

---

7 Halle and Idsardi (1992) and Idsardi (1992) assume the same kind of “specified bracket” for other languages such as Polish. But their analysis is different from ours in that they attribute the lexical specification to the Edge Parameter, which we do not assume.
Note that Zamma (1993a) proposes that several suffixes are specified with the same kind of lexical brackets and accent. Observe in (26a) that disyllabic words with the suffixes -ary, -oid, and -ite also have primary stress on the first syllable.

(26)  
a.  prímary, úñary, týphoid, cóncoid, gráphite, sýlvite  
    b.  sécrétáry, légendárty, álkalóid, hóminóid, dýnamíté, mígnétite

This fact can be accounted for by assuming that these suffixes have the following specifications:

(27)  
\[ \text{-ary} \quad \text{-oid} \quad \text{-ite} \]

With these specifications, the stress in the words in (26a) is derived in the same way as (25). The fact that these suffixes have lexical accent is obvious from (26b), which contains secondary stress on the suffix. This stress, as well as that of -ory, is deleted when it lies next to stronger stress (cf. H&V’s Stress Deletion (p. 239)).

As for -ive, on the other hand, we will analyze this suffix as a normal extrametrical suffix.8

(28)  
\[ \text{active} \quad \text{active} \]

Since only the first syllable is available for stress assignment, it is not at all unnatural that the syllable bears the primary stress even though the word with the suffix is disyllabic. It should be stressed here that our analysis does not raise the problem of disyllabic word stress, because we do not make use of the Rhythm Rule.

8 Halle and Idsardi (1992) and Idsardi (1992) propose that extrametalicity can be reduced to lexical specification, i.e. the Edge Parameter. If we adopt this idea and assume in our framework that extrametrical morphemes are specified as in (i), we can treat -ory and -ive in the same way:

( i )  
\[ \text{-ive} \]

Note that under this assumption, no special conditioning on extrametalicity is necessary. Recall that H&V proposed that extrametalicity applies only to syllables that have a short vowel as nucleus (cf. H&V (p. 234)). However, since we do not have empirical evidence at present to show the adequacy of this assumption, we will leave this issue unresolved.
Now, let us see how the assumptions made above work in analyzing the stress patterns of -atory and -ative. First, observe the derivation of words in which -atory/-ative are attached to stems that end with a light syllable.

(29) a. 

\[
\begin{array}{c}
\text{undulatory} \\
\text{generative}
\end{array}
\]

The leftmost structures in (29a) and (29b) are inputs. When the stress assignment rules apply, the structures in the middle are constructed. In these structures, primary stress is assigned on the syllable containing -ate, because this syllable has rightmost stress (the stress on -ory is ignored because of the lexical bracket). However, these structures clearly violate the Metrical Condition on -ate (23), which requires that -ate not bear stress. To rectify this situation, we assume the following procedure takes place:

(30) 

\[
\begin{array}{c}
\text{-at-}
\end{array}
\]

This remedy eliminates the stress on -at-. Consequently, the first syllable acquires primary stress, since this syllable bears the second rightmost stress. The vowel of -ate becomes a schwa by a reduction rule which reduces a vowel without stress.

Similarly, -atory/-ative words in which the stems end with a heavy syllable will follow the derivation below:

(31) a. 

\[
\begin{array}{c}
\text{observatory} \\
\text{conservative}
\end{array}
\]
Primary stress cannot be assigned to the syllable containing -ate because of condition (23), hence it is assigned to the preceding heavy syllable through (30).

However, utilizing the condition in (23) along with the remedy process (30) alone still leaves unsolved the problem of vowel shortening observed in (20).

(32)  

\[
\begin{array}{c}
\text{explanatory} \\
\text{explanatory} \\
\text{explanatory}
\end{array}
\]

Note that the rightmost structures in (32a) and (32b) do not satisfy the structural description of the shortening rule in (11), since the syllable in which the (underlined) vowel should shorten constitutes a degenerate foot, not a trochee. To solve this problem, we assume the following convention.

(33) Full Foot Convention

\[
\begin{array}{c}
(* *) \\
(* *) \\
(* *)
\end{array}
\]

This convention requires an unmetrified element should be incorporated into the preceding degenerate foot to create a model trochaic foot.

Although the effect of the convention is intuitively adequate, we do not have further examples in which the convention operates at present. This is because the sequence of a degenerate foot followed by an unmetrified element is rarely produced in a normal derivation. Note that the condition in (23) produced the unusual structure in (32). Moreover, it is not clear whether this convention applies at both cyclic and noncyclic levels or only at the cyclic level. We must await further research on this issue.

When the convention in (33) comes into play, the following structures are produced.
(34) a. * *
   (* *) *  
   (*) (*) *
   explanatory → explanatory

b. * *
   (*)
   *(*)*(*) (33) * (**)*(*)
   provocative → provocative

Since the clumsy sequence of a degenerate foot plus an unmetrified element emerged because of the condition in (23), the convention in (33) integrates them into a trochaic foot. Consequently, the structures in (34) satisfy the structural description of the shortening rule in (11), which applies to the underlined vowels.

In fact, the words in (31) are also affected by the convention in (33).

(35) a. * *
   (* *) *  
   (*) (*) *
   observatory → observatory

b. * *
   (*)
   *(*)*(*) (33) * (**)*(*)
   conservative → conservative

However, the effect is not obvious, since they do not undergo a rule which applies to a trochaic foot, such as shortening.9

It is important to note that in our analysis we do not have to assume the special mechanism of “stress domain” for English. Most of the “stress domain” suffixes are regarded as underlingly accented extrametrical ones (i.e. (24) and (27)), and -ive as an ordinary extrametrical one. Recall that H&V assume such a mechanism mainly to accommodate the stress pattern of -atory/-ative: the whole sequence is skipped in primary stress assignment but cannot be extrametrical as a whole because of the vowel shortening effect. In our analysis, however, it is possible for just -ory/-ive to be extrametrical since we

---

9 We assume that in words like observatory, conservative, etc., the second syllable has /r/ as an underlying representation. Hence, the shortening rule in (11) is irrelevant for these words.
regard \(-atory\)/\(-ative\) as \(-ate\) plus \(-ory\)/\(-ive\). The stress pattern is accounted for by means of the Metrical Condition on \(-ate\) (23).

In summary, we have succeeded in accounting for the stress patterns of words with relevant suffixes, without causing any problems. The problems that remained unsolved under H&V's analysis dissolve. The accentuation of words with \(-ative\) and of disyllabic words are both explained without appealing to the Rhythm Rule, the former by means of the Metrical Condition on \(-ate\) (23) and the latter by specifying a lexical bracket for \(-ory\) and regarding \(-ive\) as extrametrical. The vowel shortening observed in various words is accounted for by postulating the Full Foot Convention (33), which feeds the usual application of the shortening rule (11). There is, however, one problem which has not been solved in the analysis so far; that is, how can the British pronunciation of \(-atory\) be accounted for in our analysis? We will consider this problem in the next section.

3.5. Alternative Pronunciations

Although we have presented arguments concerning only the pronunciation /\(\text{etory}\)/ for \(-atory\) and /\(\text{etiv}\)/ for \(-ative\)—i.e. those with no stress on \(-at\)—these suffixes also have the alternative pronunciations /\(\text{etory}\)/ and /\(\text{etiv}\)/, i.e. with primary or secondary stress on \(-at\). In this section we discuss how these pronunciations can be explained in our analysis.

First, we will consider the pronunciation /\(\text{etiv}\)/ for \(-ative\), which is observed both in Britain and the United States. We propose here that this alternative pronunciation comes from another possible interpretation of the Metrical Condition on \(-ate\). Note that it seems to be possible to interpret the formulation of the condition in (23) in two ways; that is, one that strictly prohibits any stress on \(-ate\), and the other that allows secondary stress but prohibits primary stress. The remedy process in (30) reflects the former interpretation. Under the loose interpretation, on the other hand, the following procedure will take place:

\[(36) \quad * \\
\quad * \rightarrow (\text{*)} \quad \text{(*)} \\
\quad \text{at-} \rightarrow \text{at-} \]

The structure in (37b) is produced by means of (36) under the loose interpretation, whereas that in (37a) arises when the condition is interpreted strictly (i.e. by means of (30)).
While in (37a) the vowel in -at- is reduced to a schwa because the syllable does not have stress (cf. H&V’s reduction rule (p. 240)), it remains a diphthong in (37b) with stress, producing /eitiv/.

However, this ‘loose’ interpretation seems to be somewhat limited, because not all words show this pronunciation. The occurrence seems to be influenced by whether the stem has a previous cycle with -ate or not. Examine the table below.10

(38) /eitiv/ major or minor only /ətiv/

| previous cycle with -ate | 60 | 21 |
| no cycle with -ate       | 17 | 35 |

It is clear in this table that many words which have a previous cycle with -ate are often pronounced as /eitiv/ either as a major or minor pronunciation (e.g. generative<generate). On the other hand, /ətiv/ is common for words which do not have such a cycle (e.g. affirmative<affirm).11

Second, we consider the British pronunciation /eitəri/, which is the fourth problem in H&V’s analysis. Recall our analysis of words with -atory, observed in (31). In the derivation, the primary stress is first assigned on the syllable containing -ate, and then removed from the syllable because of (30). We can easily assume that the pronunciation /eitəri/ occurs when the condition is not in effect.

As in the case of /eitiv/, the occurrence of this pronunciation is influenced by whether the stem has a previous cycle with -ate or not.

(39) /eitəri/ as major  /eitəri/ as minor  only /ətəri/ as major

| previous cycle with -ate | 16 | 19 | 7 |
| no cycle with -ate       | 6  | 6  | 24 |

10 The words examined in this paper conform to both of the following descriptions: (i) words which are mentioned in Klein (1967); (ii) words which have an entry in Wells (1990).

11 Nanni (1977) proposes that the secondary stress on -at- is eliminated when it is preceded by a syllable which ends with a sonorant. However, as H&V point out, this generalization is not accurate.
Obviously, words which have a previous cycle with -ate are often pronounced with /eiteri/ as either the major or minor pronunciation, whereas the pronunciation /ɔtəri/ is prevalent for words which do not have such a cycle.

However, there still remains the following question: why is this tendency observed only in British English? From the fact that the first vowel in -ory is reduced to a schwa in British pronunciation, we assume that this suffix undergoes normal extrametricality. Because of the difference in the underlying representation of the suffix, there also emerges a difference in metrical structure seen between British and American English. Observe in (40) the difference before the remedy process applies.

\[(40) \text{a. } * \quad \text{b. } * \]
\[\begin{array}{c}
\text{(* *)} \\
\text{(* *)(*)*}
\end{array} \quad \begin{array}{c}
\text{(* *)(*)*} \\
\text{(* *)(*)*}
\end{array} \]
\[
\text{undulator} \quad \text{undulator}
\]

The vowel in -ory does not have stress in British English (40a), while it does in American English (40b). Note that a stress clash occurs in (40b) between -ory and the syllable containing -ate because of the lexical accent. On the other hand, such a clash does not arise in British English. We can assume that the need to avoid stress on -ate is stronger in American English than in British.

The stress clash seems to answer another question as well; that is, why do we not find cases in which the condition in (23) is interpreted loosely for -atory? The answer is as follows. Under a ‘loose’ interpretation, the structure in (41a) would arise.

\[(41) \text{a. } * \quad \text{b. } * \]
\[\begin{array}{c}
\text{(*) * *} \\
\text{(* *)(*)*}
\end{array} \quad \begin{array}{c}
\text{(*) * *} \\
\text{(* *)(*)*}
\end{array} \]
\[
\text{undulatory} \quad \text{undulatory}
\]

It is clear that in (41a) there still remains a stress clash between the last two syllables. On the other hand, the clash does not occur in (41b), in

\[\text{12} \text{ As in the case of -ive, -ory in British English can be represented in the following lexical specification (cf. fn.8):} \]
\[(i) \]
\[\ast \]
\[-ory\]

In this case, the difference between British and American English is captured simply; i.e., whether the suffix has lexical accent or not.
which the condition is given a strict interpretation. We can conclude that the ‘strict’ interpretation is favored in words with -ory, since stress clash never occurs under this interpretation.

4. Accentuation of -ion

In this section, we consider whether the analysis presented so far poses problems in analyzing another suffix -ion, which has the ‘allomorph’ -ation. As with -atory and -ative, we analyze this form as consisting of -ate plus -ion, and the former as being introduced before the latter. This means that we predict the condition in (23) will operate also in words containing this sequence. However, there is a well-known fact about the accentuation of -ion, that primary stress always falls on the syllable preceding this suffix.

(42)  a. introduction, revolution, ignition, cohesion, exhibition
      b. compensation, imagination, explanation, recommendation

What we should notice here is that -at- always receives primary stress. This seems to be an obvious violation of the Metrical Condition on -ate (23), which requires -ate not to have stress. Can this fact be captured in our analysis by making a small modification? Or, should we abandon the whole analysis?

First we consider what metrical structure is constructed on the words with -ion. From the fact that -ion always places primary stress on the preceding syllable, we predict that the suffix does not undergo extrametricality. Under this assumption, the following structures would be constructed.

(43)  a. (*  *)
      b. (*  *)
          (*)  (**)
          (*)  (*)  (**)

If -ion undergoes extrametricality, primary stress would fall on the antepenultimate syllable of exhibition. The stress on the penultimate syllable strongly suggests that (43a) is the structure constructed for the word.13

We note in (43b) that -ate falls on the head of a trochaic foot, having

---

13 In this regard, Idsardi (1992) makes an incorrect analysis, proposing that -ion undergoes extrametricality (i.e. the Edge Parameter specification RLR, in his words).
-ion as the dependent. In words with -atory/-ative, on the other hand, -ate constitutes a foot of its own. Recall that the following structures are constructed before (30) applies:

\[
\begin{align*}
(44) & \quad \text{a.} & & \text{b.} \\
& & \text{(* *)} & \text{(* *)} \\
& \text{(* *)} & \text{(*)(*)} & \text{(*)(*)} & \text{(*)(*)} & \text{(*)(*)} \\
\text{undulatory} & \text{gene} & \text{rative}
\end{align*}
\]

This difference seems to be crucial in answering the relevant question. Thus, we will modify the Metrical Condition on -ate (23) in the following way.

(45) Metrical Condition on -ate (final version):

\[-\text{ate} \text{ cannot be stress-beari}\text{ng word-internally if it constitutes a foot on its own.}\]

Since in (44) -ate constitutes a degenerate foot by itself, it violates the Metrical Condition on -ate (45) and thus these stress patterns are avoided. On the other hand, because -ate in (43b) is included in a trochaic foot, the structure does not violate that condition.

However, there arises a problem here. That is, why can the vowel in -ate remain long when it falls in the head of a trochaic foot? Why is the vowel immune to the shortening rule in (11)? Kazumi's (1991) study gives us a clue to this problem. Reanalyzing so-called CiV-lengthening, she proposes the following condition.

(46) In the environment ______ CiV,

(i) \( i \) must be short, and

(ii) other vowels must be long. (Kazumi (1991: 148))

Since Chomsky and Halle (1968), it has been a well-known fact that an English vowel before the sequence consonant-/i/-vowel usually undergoes lengthening, as is observed in words such as Canadian (<Canada), harmonious (<harmony), and so on. Chomsky and Halle, as well as Rubach (1984) and Halle and Mohanan (1985), thus propose a rule called CiV-lengthening, which lengthens all vowels before the sequence CiV. However, there are words that do not undergo the rule. Kazumi notices that it is always the vowel /i/ which does not lengthen before CiV. Moreover, she points out that underlyingly long vowels shorten before the sequence (e.g. crocodilian (<crocodile), vicious (<vice), etc.). Therefore, she proposes the condition in (46), rather than a simple rule, in order to account for the lengthening/
shortening phenomena observed in this environment.\textsuperscript{14}

With the condition in (46), the problem of the non-application of the shortening rule in -ation is easily resolved: because of this condition, the shortening rule does not apply. Note that words with -ion form the sequence CiV when the suffix is attached to a stem which ends with a consonant. Actually, vowels besides that of -ate never shorten in this environment.

\begin{equation}
\text{(47) confusion (<confuse), promotion (<promote), completion (<complete)}}
\end{equation}

In these words, the underlined vowels remain long before the sequence CiV.

Finally, we will consider words which end with -atic to confirm the adequacy of our analysis. In Zamma (1994), it is argued that -ate is introduced before -ic when the stem ends with /m/ or /a/. From the fact that -ic always puts primary stress on the preceding syllable, we can conclude that the suffix does not undergo extrametricality. Thus, the following structure is constructed for problematic (<problem)...

\begin{equation}
\text{(48) *}
\end{equation}

\begin{equation}
\text{(* *)}
\end{equation}

\begin{equation}
\text{(* *)(**)}
\end{equation}

\begin{equation}
\text{problematic}
\end{equation}

Note that the vowel in -ate falls on the head of a trochaic foot, and thus undergoes the shortening rule in (11). Moreover, since the suffix is included in a trochaic foot—that is, not a degenerate one—the syllable containing the suffix is immune to the metrical condition in (45), and hence bears primary stress. Clearly, these two facts suggest that we are on the right track.

5. Summary

H&V's "stress domain" analysis is insufficient for accounting for the accentuation of words with the suffixes -ory and -ive. Their analysis raises problems in analyzing the following issues: (i) the accentuation of

\textsuperscript{14} It seems to be possible to revise the CiV-Condition in the following way:

\begin{enumerate}
\item Vowels other than i must be long before the sequence CiV.
\end{enumerate}

In this case, the shortening of i is accounted for by means of the rule in (11). To accomplish this, however, it is necessary to establish that the suffixes -ian, -ious, etc., constitute a trochaic foot with the preceding syllable. We simply suggest this possibility here and leave the issue for future research.
words with -ative; (ii) the accentuation of disyllabic words; (iii) vowel shortening effect; and (iv) British pronunciation. We have proposed an alternative analysis, assuming that -atory and -ative consist of -ate plus -ory/-ive. In short, taking into consideration the fact that the suffix -ate has a special property, we have posited the following condition on that suffix:

(45) Metrical Condition on -ate:
-ate cannot be stress-bearing word-internally if it constitutes a foot on its own.

This condition accounts for the fact that the sequence -at- is skipped in primary stress assignment both in -atory and -ative. By proposing the following convention, in addition, we have explained the vowel shortening effect.

(32) Full Foot Convention

* *

(*)* → (* *)

As a result of this convention, the vowel before -atory/-ative falls on the head of a trochaic foot, and hence undergoes shortening.

Not only does our analysis resolve the problems in H&V’s analysis, but it also has several advantages. First, we can analyze accentuation in parallel with suffixation by appealing to the special property of the suffix -ate in both cases. Upon suffixation, -ate is introduced when a stem does not satisfy the requirement which the suffix imposes (cf. Zamma (1994)). Upon accentuation, on the other hand, -ate does not bear stress because of the condition in (45).

Second, English stress assignment system becomes simpler than H&V’s, since we can do away with the special mechanism of “stress domain.” Most of the “stress domain” suffixes, including -ory, can be analyzed as extrametrical with underlying accent (-ive is analyzed as an ordinary extrametrical suffix). This proposal is embodied in the lexical specification (24).

(24) )* 

Note furthermore that this assumption also accounts for the stress pattern of disyllabic words with the suffix.

Third, our analysis can deal with the issue of alternative pronunciations, which has rarely been discussed in previous studies. British pronunciation, in particular, is analyzed as being exempt from the
condition in (45). The following factors seem to have an influence on this issue: a different interpretation of the condition in (45); the presence or absence of a previous cycle; and the presence or absence of stress clash.

In addition, the stress pattern of words with -ation (and also words with -atic) can be accounted for adequately in our analysis. Since in these words -ate does not constitute a degenerate foot, the condition in (45) does not apply and thus the syllable containing -at- can bear primary stress. Although the diphthong in -ation seems to be an apparent exception to the shortening rule (11), this fact can be justified by means of the CiV-Condition, proposed by Kazumi (1991).

REFERENCES


Yip, Moira (1987) “English Vowel Epenthesis,” *Natural Language and
Linguistic Theory 5, 463-484.
Zamma, Hideki (1993a) “Stress Retraction in English,” Tsukuba English Studies 12, 131-161, University of Tsukuba.
Zamma, Hideki (1994) “Phonological Requirements on Suffixation,” Tsukuba English Studies 13, 21-41, University of Tsukuba.

Institute of Literature and Linguistics
University of Tsukuba
Tennodai 1-1-1, Tsukuba-shi
Ibaraki 305
e-mail: HCD02316@niftyserve.or.jp