AN EDGE MARKING ANALYSIS OF ENGLISH STRESS CHANGE

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An attempt will be made to analyze the historical change of English word stress within a framework of parametric metrical phonology. Parameter values are set for each historical period based on a learning model, which regards homogeneous settings as preferable to heterogeneous ones for a child. It will become clear that, however, while some changes in parameter values increase the homogeneity of the stress system, others make the system less homogeneous. Our investigation will lead us to the conclusion that, though the principle governing the homogeneity of the system plays an important role in the history of English, it always competes with other principles of stress assignment.*

Keywrods: historical change of word stress, UG parameters, language acquisition, homogeneity

1. Introduction

Various attempts have been made to explain the stress facts in Old and Middle English from both traditional and generative perspectives. Recent work on both Old and Middle English stress includes the linear analyses of Halle and Keyser (1971) and Nakao (1985, to appear), the non-linear account of Kaminashi (1996), and the Optimality-Theoretic approach of Shibata (1997). Pioneering studies of Old English stress in the light of bracketed-grid theory are presented in Dresher and Lahiri (1991), Halle, O'Neil, and Vergnaud (1993), and Kaminashi (1989), among others. Idsardi (1994) also reanalyzes Old English stress using the Edge Marking Theory, which is proposed by Idsardi (1992) and Halle and Idsardi (1995).[1]

One of the main differences in stress assignment between Old English and Middle English is that final syllables are never stressed in Old English while the syllables in question always receive stress in Middle English. Many kinds of rules or parameters have been proposed to capture the fact, but there is no agreement about how and why the English stress system changed. Sawada (1996) analyzes Middle English stress within the framework of Idsardi (1992) and Halle and Idsardi (1995) and provides a theoretical account of the historical changes of English word stress from the viewpoint of parameterized rules. Based on the analysis, the present paper tries to investigate the cause of historical stress change using the learning model proposed by Dresher and Kaye (1990) and Dresher (1994).

The rest of the paper is organized as follows. In section 2, after presenting data about Old English word stress, we will review Idsardi's (1994) analysis of Old English stress. We will also introduce the learning model which is outlined by Dresher and Kaye (1990) and Dresher (1994). In section 3, sets of parameterized rules will be proposed for Late Old English and Middle English, and the historical change of word stress from Old to Middle English will be accounted for by means of parametric changes towards a homogeneous system. Section 4 will be devoted to an analysis of stress change from Middle to Present-day English. Specifically, it will be pointed out that a change in parameter settings did not always increase the homogeneity of the stress system because the tendency toward the homogeneous system competes with other principles of stress assignment. Concluding remarks will be made in section 5.

2. An Edge Marking analysis of Old English stress

2.1. Word stress in Old English

Although the manuscripts of Old English do not show the positions of word stress exactly, the facts about vowel reduction and metrics can tell us about the prominence of words. According to Campbell (1959: §§ 87-92) and Nakao and Ono (1980: 153-7), descriptive generalizations of Old English stress in unmarked cases are given in (1).

(1) Old English word stress
    a. Primary stress falls on the initial syllable of a word.
    b. Secondary stress goes on the penultimate heavy syllable if it is preceded by a heavy syllable or two light syllables.

Some examples are cited below from Nakao (1985: 476) and Nakao and Ono (1980: 156-157).

(2) a. Águstus, Ápollínus, básilisca 'basilisk'
    b. rǽdels / rǽdèlsas 'riddle' Sg. Nom. / Pl. Acc.
       æþeling / æþelinges 'prince' Sg. Nom. / Gen.
    c. cýning / cýninges 'king' Sg. Nom. / Gen.
       wésan / wésende 'be' Imp. Inf. / Pres. Part.

Primary stress is assigned to the word-initial syllables in all words, and the final syllable of a word is never stressed. In (2b) additions of derivational and / or inflectional suffixes generate secondary stress, while secondary stress is not observed in the words in (2c) because the penultimate syllable of the words is preceded only by a single light syllable.

In the theory proposed by Idsardi (1992) and Halle and Idsardi (1995), stress is controlled by metrical structures which are constructed on a stress plane. The surface stress patterns illustrated above are, therefore, derived from grid representations such as in (3).

(3)   x   x   x   line 2
       (x x   (x x   (x   line 1
       (xx)(xx)x (x x)(xx)x (x xx)x line 0
       ræ del sas æþe linges cyninges

In the representation above, the relative stress of a syllable is indicated by the height of its grid column: the existence of line 1 marks indicates that the syllables receive stress and the presence of line 2 marks means that the syllables are assigned primary stress. In the next subsections, we will see how these metrical structures are constructed in the bracketed-grid theory outlined by Idsardi (1992) and Halle and Idsardi (1995).

2.2. Five UG parameters

Idsardi (1992) proposes an algorithm whereby stress contours are assigned to words and phrases by constructing an autosegmental plane that originates from Halle and Vergnaud (1987). Though his theory is similar to Halle and Vergnaud's theory, he also follows Prince (1983) in placing line 0 metrical parentheses rather than line 1 marks. In his work, Idsardi postulates five UG parameters, some of which are improved by Halle and Idsardi (1995: 407-8, 418). Those parameters are presented in (4) in order of application.

(4) Five UG parameters
    a. Line 0 mark projection
       Project a line 0 element for each *syllable head.*
    b. Syllable Boundary Projection parameter (Project)
       Project the $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$ boundary of *certain syllables* onto line 0.
    c. Edge-Marking parameter (Edge)
       Place a $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$ parenthesis to the $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$ of the $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$-most element in the string.

d. Iterative Constituent Construction parameter (ICC)

Insert a $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$ boundary for each pair of elements.

e. Head Location parameter (Head)

Project the $\left\{ \begin{array}{c} \text{left} \\ \text{right} \end{array} \right\}$-most element of each constituent onto the next line of the grid.

In order to account for the stress system of Old English, Idsardi (1994) proposes a set of rules and constraints. Although he does not set the values of the UG parameters above, some of those rules are what the parameters actually govern. The parameter settings for Old English are given in (5) below, where "left" and "right" are abbreviated as L and R, respectively.

(5) Parameter settings for Old English

Line 0   Projection: rime members
         Project: L of a heavy syllable
         Edge: LLL   ICC:R   Head: L
Line 1   Edge: LLL   Head: L

As we will see below, the metrical grid is constructed through the relevant application of these ordered parameterized rules. The rules, however, sometimes produce violations. Adopting Avoid Strategy, Idsardi (1992) prevents rules from creating ill-formed structures. Idsardi (1994: 523, 526) proposes the constraints in (6) and ordered a deletion rule in (7) before the Head Location parameter in (4e).

(6) a. Avoid   x x x   line 0
                   \|/
                    σ

    b. Avoid   x x   line 0
                \ /
                σ #
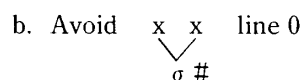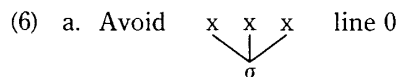
(7) (→ φ / # (x____

The application of the parameterized rules and the constraints is illustrated in the sample derivations in (8).

(8) a. Projection xx xx x   x x xx x   x xx x
                  ræ del sas æþelinges   cyninges

    b. Project: L (xx (xx x   x x(xx x   x(xx x
                  ræ del sas æþelinges   cyninges

    c. Edge: LLL   (x x(xx x   (x (xx x
                            æþelinges   cyninges

    d. ICC:R   (xx)(xx) x (x x)(xx) x (x (xx) x
                  ræ del sas æþe linges   cyninges

    e. Rule (7)   (x xx)x
                                         cyninges

    f. Head: L   x   x   x   x   x
                  (xx) (xx) x (x x)(xx)x (x xx) x
                  ræ del sas   æþe linges   cyninges

    g. Line 1   x   x   x
       rules   (x   x   (x   x   (x
                  (xx) (xx) x (x x)(xx) x (x xx) x
                  ræ del sas   æþe linges   cyninges

First, in (8a), the Line 0 mark projection projects two grid marks from a heavy syllable and one from a light syllable. Although many languages choose *syllable head* for the italicized phrase of the parameter, Idsardi follows Dresher and Lahiri (1991) and Halle, O'Neil, and Vergnaud (1993) in assuming that stressable elements are rime members in Old English. Since the rule is subject to the constraint in (6b), final syllables never receive more than one grid mark. Then, in (8b), for the pair of grid marks belonging to a heavy syllable, Project: L inserts a left boundary, specifying that the syllable begin a constituent.

Ordered after the rules of projection is the Edge-Marking parameter in (4c). In some languages, elements at the edge of the word always receive stress, and in other languages, element at the end of the form are constantly excluded from the calculation of stress. The Edge-Marking parameter accounts for these generalizations which hold for many languages. If a language chooses Edge: LLL, which means "Place a left boundary to the left of the

left-most element," the initial syllable of a word is stressed in the language, and if a language selects Edge: RLR, the last syllable of a word may not receive stress.[2] In Old English, the fact that the initial syllable begins a constituent is captured either by Project: L or by Edge: LLL of line 0, as in (8c).

Alternating stress is explained by the fourth parameter, the Iterative Constituent Construction parameter given in (4d). Since this parameter places the far bracket, left boundaries are inserted from right to left, and right boundaries are inserted from left to right. Among the five parameterized rules which Idsardi postulates, the rule of Iterative Constituent Construction is the only rule that is directional. In (8d), ICC: R correctly groups two grid marks into a constituent from left to right. After the rule closes metrical constituents on line 0, the rule in (7) applies to delete the left parenthesis after a single light syllable in (8e) and prevents the later rules from assigning secondary stress to a penultimate syllable preceded only by a light syllable.

Finally, constituent heads are placed by the Head Location parameter in (4e). All languages set this parameter and the Line 0 mark projection, though, as to the other parameters, languages vary in the rules they invoke. In Old English, Head: L projects the left-most grid mark of each constituent onto line 1 as in (8f), and then, in (8g), the line 1 rules complete the derivations. Thus the parameterized rules in (5) correctly generate the grid representations given in (3). Note that Idsardi's theory does not require a matched set of parentheses to delimit a metrical constituent. The theory postulates that a left parenthesis groups all metrical elements on its right up to the next parenthesis or to the end of the string, whereas a right parenthesis groups the elements on its left up to the next parenthesis or beginning of the string. Therefore, elements that are not to the right of a left parenthesis or to the left of a right parenthesis are not part of any constituent.

In this section, we have outlined the Edge Marking Theory and reviewed Idsardi's analysis of Old English stress. In the following sections, we will analyze Middle and Modern English stress using the Edge Marking Theory and set parameter values for both Middle and Modern English. A comparison of the parameter values for Old English and those for Middle and Modern English will tell us how the English stress system has changed. Before leaving this section, however, we will introduce in the next subsection the learning model outlined by Dresher and Kaye (1990) and Dresher (1994), which may throw some light on the problem of why the English stress system has changed.

2.3. Acquisition of stress system

In the parametric metrical theory, it is assumed that the basic principles governing the construction of the stress plane are fixed and do not have to be learned. The task of learners is, therefore, to set the parameters such as those proposed in (4). Adopting the metrical theory of Idsrdi (1992) and Halle and Idsardi (1995), which was reviewed in the preceding subsection, Dresher (1994) proposes an algorithm for the acquisition of stress systems. Following Dresher and Kaye (1990), he postulates that parameters are set in a certain order and that the setting proceeds on the basis of cues. In the theory outlined by Dresher (1994 : 84), the parameter values of, say, the Line 0 Parenthesis Projection parameter in (4b) and the Head Location parameter in (4e) would be set in the way illustrated in (9) after the setting of the line 1 Head Location.

(9) Look for: Position of stress in words with only light syllables.
    Result: Succeed on the left.
    Conclude: Line 0 constituents are left-headed; heavy syllables project $(x$ on line 0.

What is interesting about the learning model is that each parameter is assumed to have two values, namely, a default value and a marked value. Furthermore, cues are required to reflect a fundamental property of the parameters. Of course, the cues are not necessarily restricted to stress

contours. As Dresher (1994: 81) claims, metrical structure produces effects on other areas of phonology than stress contour, such as vowel lengthening and deletion.

Dresher himself admits, however, that there are cases where no language-specific evidence is found to select one value instead of the other. Dresher and Kaye (1990) claim that the child prefers homogeneous parameter settings to heterogeneous parameter settings. In other words, the unmarked value is the one which increases the homogeneity of the system. In that case, therefore, the cue which is associated to the parameter in question would be stated as follows.

(10) Cue : Look for homogeneous settings.

As we have noted in the last subsection, this learning model seems to provide a clue to the historical development of word stress. Let us now move on to a discussion of the stress change from Old to Modern English.

3. Stress change from Old to Middle English
3.1. Word stress in Late Old English

The Indo-European stress system has changed in many languages from final stress to fixed initial stress. According to Idsardi (1992), this change is modeled in two ways. One is the loss of lexical stresses, and the other is parameter change. Idsardi (1992: 52) implies that the Edge Marking parameter has been changed from Edge: RRR to Edge: LLL in many Indo-European languages, as illustrated below.

(11)   x   x
      xxxxx)   →   (xxxxx

Old English also developed a stress system which assigns stress to the initial syllable of a word and sets the Edge-Marking parameter on line 0 to Edge: LLL. As we have seen in the previous section, Dresher and Kaye (1990) and Dresher (1994) claim that the child prefers homogeneous parameter settings to heterogeneous parameter settings.

Following their assumption, Idsardi states that this change in the Edge-Marking parameter is a favorable development since it increases the homogeneity of the system.

Indeed, all parameter settings of Old English came to refer to L after the reduction of unstressed vowels. Let us have a look at the examples from Late Old English below which are cited from Nakao (1985: 319.)

(12) bócère > bócre 'writer'
     óðèrre > óðre (< ōðer) 'other'
     wǽpènman > wǽpman 'male'
     fúlwihtère ~ fúlhtere 'baptizer'

The data above show that, in Late Old English, penultimate stressed syllables lost their stress and that they were subsequently deleted. In other words, words are assigned just a single accent, namely initial stress. Recall that parameters other than the Line 0 mark projection and the Head Location parameter are not necessarily set in their values. It is clear that languages with such a system do not include any form of the Iterative Constituent Construction parameter and the Line 0 Parenthesis Projection parameter. Word-initial heavy syllables are assigned a left boundary by Edge: LLL whether the Line 0 mark projection selects *rime members or syllable heads*.[3] If our analysis is correct, the stress system of Late Old English will be modeled with the parameter settings given in (13) where the coexisting values are put on the both sides of a slash.

(13) Line 0   Projection: Rime members / Syllable heads
              Edge: LLL   Head: L
     Line 1   Edge: LLL   Head: L

As the sample derivations in (14) illustrate, the parameterized rules successfully assign only the initial primary stress to each word.

(14) a. Projection (xx x   (xx x x   or (x x   (x   x x
                   bōcre   fulhtere   bōcre   fulhtere

b. Line 0   x   x   x   x
   rules (xx x   (xx x x   (x x   (x   x x
           bōcre   fulhtere   bōcre   fulhtere

c. Line 1   x   x   x   x
   rules (x   (x   (x   (x
         (xx x   (xx x x   (x x   (x   x x
           bōcre   fulhtere   bōcre   fulhtere

Comparing the two sets of parameterized rules, we will find that the new parameter settings in (13) are more homogeneous than those in (5). This change clearly increases the homogeneity of the system a little further on. Note that the original values of the two line 0 projection parameters and the Iterative Constituent Construction parameter are unproductive in Late Old English. As we will see in the next subsection, these parameters change their values in Middle English.

3.2. Word stress in Middle English

After the Norman Conquest, many words entered English, mainly from French, where words generally had final stress. According to Nakao (1972: 456-457), final stress retracted leftward, making the original stress secondary. He also argues that some of them lose their secondary stress during the period of Middle English. The development in stress patterning is exemplified in (15).

(15) honóur > hónòur > hónour
     bàchelér > báchelèr > bácheler
     bènefíce > bénefìce > bénefice
     astrònomíe > astrónomìe > astrónomy

On the other hand, words of native origin lost their original secondary stress as we have noted in the previous subsection, but some polysyllabic words with a final heavy syllable came to have final secondary stress, which shows that the stress patterning of the foreign words had a considerable effect on the stress system of the language. The data in (16) are from Nakao (1985: 484).

(16) a. élbòw médòw sálòw yélòw fólòw
        swállòw
     b. bódi pény émpty háppy búry
        méry

Based on observations made by Nakao (1978), Sawada (1996: 32) provides the following descriptive generalization of Middle English word stress.

(17) Middle English word stress
  a. A final heavy syllable is stressed; otherwise, stress falls on a heavy penult.
  b. When the stressed syllable is preceded only by a single syllable, stress falls on the latter; otherwise, stress is assigned to each preceding alternate syllable.

Sawada (1991) shows that binary quantity sensitive feet are constructed from right to left in Middle English as in Present-day English. To account for this distribution of stresses within the framework of Idsardi (1992), we will first assign stress to the rightmost heavy syllable, and then assign stresses to the even-numbered syllables preceding the rightmost stress. In case where the rightmost stress is preceded by a single syllable, we will assign stress to it. Formally, this procedure requires the following parameter settings, where the unproductive rule is parenthesized.[4]

(18) Parameter settings for Middle English
  Line 0   Project: Syllable heads
           Project: L of a final heavy syllable
           (Edge: LLL) / ICC: L   Head: L
  Line 1   Edge: LLL   Head: L

The values of the Iterative Constituent Construction parameter on line 0 and the Line 0 Parenthesis Projection parameter, which were not set in Late Old English, are set to L above. All of the parameters now choose L as their value, making the system highly preferable. Let us illustrate how these rules work in the sample derivations in (19).

(19) a. Projection   x (x   x x(x   x x(x   x   x x (x
　　　　　　　　　honour bacheler benefice astronomie

　　　b. Line 0   x x   x   x   x x   x   x
　　　　　rules   (x (x   (x x(x   (x x(x   x (x x (x
　　　　　　　　　honour bacheler benefice astronomie

　　　c. Line 1   x   x   x   x
　　　　　rules   (x x   (x   x (x   x   (x   x
　　　　　　　　(x (x   (x x(x (x x(x   x (x x (x
　　　　　　　　honour bacheler benefice astronomie

By the operation of the new rule of ICC: L, the original rightmost stress of a borrowed word correctly places primary stress two syllables to its left. On the other hand, Edge: LLL applies only to *honour,* where ICC: L does not assign primary stress. Although Middle English inherits Edge: LLL from Old English, the scope of its application has become restricted.

In this section, we have seen that the English stress system has changed from the heterogeneous parameter settings of the Indo-European stress system to the homogeneous parameter settings of the Middle English stress system by replacing Edge: RRR and ICC: R by Edge: LLL and ICC: L, respectively. It is also pointed out that the ICC:L took the place of ICC: R presumably because the latter had been unproductive in the grammar. As we will see in the next section, however, the system becomes rather complex in the later stage of Middle English.

4. Stress change from Middle to Modern English

4.1. Loss of secondary stress

Let us now go back to the data given in (15) above. Although the parameter settings for Middle English in (18) are completely homogeneous, the historical change of Middle English stress implies that the parameter settings are not handed down as such to the later stage of Middle English. As we have noted, some double-stressed words lost their secondary stress on word-final heavy syllables and came to realize antepenultimate stress. The loss of secondary stress subsequently caused the reduction

of final vowels. This fact suggests that the language now does not invoke the rule of Line 0 Parenthesis Projection and selects *RLR* for the Edge-Marking parameter on line 0. The new parameter settings are partly listed below.

(20) Line 0 (Project: L) Edge: RLR ICC: L Head: L
　　　Line 1　　　　　　　Edge: LLL　　　　Head: L

Recall that Edge: LLL had not been as productive in Middle English as in Old English. The rule is now replaced by the new rule of Edge: RLR. The application of the newer set of parameterized rules goes as follows.

(21) a. Projection   x x   x xx   x x x   x x x x
　　　　　　　　　honour bacheler benefice astronomie

　　　b. Line 0   x   x   x   x
　　　　　rules   x) x   (x x)x   (x x)x   x (x x) x
　　　　　　　　　honour bacheler benefice astronomie

　　　c. Line 1   x   x   x   x
　　　　　rules   (x   (x   (x   (x
　　　　　　　　x) x   (x x)x   (x x)x   x (x x) x
　　　　　　　　honour bacheler benefice astronomie

The introduction of Edge: RLR, which successfully accounts for the stress change, makes the stress system less homogeneous.

4.2. Word stress in Early Modern English

We have noted in the previous subsection that some words remain double-stressed in Early Modern English while others lost their secondary stress in Middle English. In addition to single-stressed words and double-stressed words with initial primary stress, words with final primary stress are also observed in Early Modern English. The words in (22) are some examples of Early Modern English words given in Nakao (1985: 489).

(22) a. émpire épitàph phenómenòn
　　　b. àntique màgazíne

The syllable structures of the words in (22a) imply that the statements in (17), which generalize Middle English stress, also apply to Early Modern English stress and that the metrical structure in (23a) is predicted by the parameterized rules for Middle English in (18). On the other hand, as the metrical structure in (23b) indicates, the stress contour in (22b) cannot be handled with those sets of parameterized rules,

(23) a.   x   b.   x
       (x   x   (x   x
      x(x   x (x   (x   x (x
    phenomenon   magazine

The metrical structures in (23) show that the line 0 rules of Early Modern English grammar include Head: R as well as Head: L, which is handed down from Old English. The parameterized rules which construct the metrical structure in (23b) are given below.

(24)   Parameter settings for Early Modern English
      Line 0   Project: Syllable heads
                Project: L of heavy syllables
                (Edge: LLL)   ICC: L   Head: L
      Line 1   Edge: LLL   Head: R

To sum up so far, the parameter settings for Middle English in (18) and (20) are handed down to Early Modern English, but some words are subject to Head: R of line 1 but not to Head: L.

4.3. Parameter settings for Present-day English

    The literature on Present-day English stress indicates that not only the final secondary stress but also the initial secondary stress is sometimes deleted in Modern English. It is widely assumed that stress falls on one of the last three syllables of a word in Present-day English. To explain Present-day English word stress, Idsardi (1992: 42) set the parameter values as follows.

(25)   Parameter settings for Present-day English
    Cyclic stratum
      Line 0 : Project : Syllable heads
             Project : L of a heavy syllable
             Edge   : RLR   ICC : L   Head : L
      Line 1 : Edge   : RRR   Head : R
   Noncyclic stratum
      Residue :   ICC : R   Head : L

In many languages pretonic stresses are assumed to be located in the noncyclic stratum. In the framework of Idsardi, a form is firstly subject to the rules of the cyclic stratum and then undergoes Circumscription and Residue Deletion when it enters the noncyclic stratum. He terms the portion of the form containing main stress the base and the pretonic portions the residue. The operations are given below.

(26)   a. Circumscription
       Divide a form into two domains at the main stress.
     b. Residue Deletion
       Delete the metrical structure of the residue.

After the deletion, the residue is metrified by the parameterized rules of the noncyclic stratum.[5] Let us illustrate how these parameterized rules work in the sample derivation in (27).

(27)   a. Cyclic   Projection   x(x   x x x   (x   x (x x(x x
        stratum   serendipity   onomatopeia

     b.   Line 0   x   x   x   x   x
            rules   x(x (x x)x   (x   x (x x(x)x
                   serendipity   onomatopeia

     c.   Line 1   x   x
            rules   x   x)   x   x   x)
                   x(x (x x)x   (x   x (x x(x)x
                   serendipity   onomatopeia

AN EDGE MARKING ANALYSIS OF ENGLISH STRESS CHANGE

d. Noncyclic   Circ. &
   stratum   deletion

```
                     | x                    | x
                     | x)       x     x     | x)
              x x    |(x x)x    x  x  x x)   |( x)x
              seren  |dipity    onomato      |peia
```

e.   Rules
               for
               residue

```
                     | x                    | x
                 x   | x)       x     x      | x)
              x x)   |(x x)x    x  x )x x)    |(x)x
              seren  |dipity    onomato       |peia
```

Thus the primary stress and the secondary stresses are assigned in the different stratum by the different sets of parameterized rules.   Comparing the parameter settings for Modern English with those for Present-day English, we find that homogeneous line 1 settings are achieved by the replacement of Edge: LLL by Edge: RRR.

5. Conclusion

In this paper, we have attempted to explain the stress systems of Old, Middle, and Modern English and to make clear how the English stress system has changed by comparing the parameter values which construct the metrical structures of each historical period.   The parameter values are repeated in (28) below.

One of the main differences in stress assignment between Old English and Middle English is that metrification proceeds from left to right in Old English but from right to left in Middle English. Our investigation also makes it clear that all parameters except the Head Location parameter of line 0 have changed their values once in history. Those parameters whose values undergo a change in a certain historical period are unproductive, unspecified, or coexisting with other values in the preceding period in the history. In other words, they are ready to be replaced by the new values.

The rule summary further shows that some changes in parameter values makes the stress system or a part of the system more homogeneous while others decrease the homogeneity of the system. It suggests that the tendency toward a homogeneous parameter setting provides a motivation for stress change but that the homogeneity of the system by itself does not necessarily mean its stability. Tanaka (1998, 2000) claims that stress change is controlled by the principle of rhythmic alternation and the principle that requires stressing heavy syllables. It is relevant therefore to conclude that, just like those principles, the principle governing the

(28)   Parameter values for Old, Middle, and Modern English

		OE	LOE	ME		EModE	PE
Projection		Rime	Rime / Syllable	Syllable	Syllable	Syllable	Syllable
Project		L	—	L	(L)	L	L
		Heavy syllable		Final heavy syllable	(Final heavy syllable)	Heavy syllable	Heavy syllable
Line 0	Edge	LLL	LLL	(LLL)	RLR	RLR	RLR
	ICC	R	—	L	L	L	L
	Head	L	L	L	L	L	L
Line 1	Edge	LLL	LLL	LLL	LLL	LLL	RRR
	Head	L	L	L	L	L / R	R

homogeneity of stress system competes with other principles. What remains unsolved is the problem of cycle. Idsardi assumes noncyclic rules in analyzing Present-day English but not in the analysis of Old English. It seems that we must await further research on the organization of Middle and Early Modern English phonology, if we are to explain the historical change of English stress based on the parametric change.

NOTES

* This paper is based on chapters 3 and 4 of my graduation thesis for the completion of the doctoral course. I wish to express my gratitude to my advisor at Tsuda College, the late professor Toshio Nakao for various comments on the graduation thesis and to Noriko Yamane for valuable comments on earlier versions of this article. I would also like to express special thanks to James Landkamer for stylistic improvement. Needless to say, any inadequacies are my own.

1. Halle and Idsrdi call their theory Simplified Bracketed Grid Theory instead of Edge Marking Theory. But we will use the latter because it is more familiar.

2. Edge: RLR is often related to the idea of extrametricality, because the parameter setting excludes the final syllable from the computation of stress. But we are not sure whether this parameterized rule and Edge: LRL have the same effect as the one taken by the extrametricality rule.

3. Late Old English word stress can be dealt with by counting either rime members or syllable heads, which I came to recognize thanks to Shin-ichi Tanaka's comment.

4. In Sawada (1996), primary stress is assigned in the noncyclic stratum while secondary stress is given in the cyclic stratum. We have chosen to deal with both primary and secondary stresses without recourse to the Circumscription and the Residue Deletion in (26) here, since this analysis makes it much clearer that Edge: LLL is handed

down from Old English to Middle English than the previous analysis did.

5. In Idsardi's analysis, various kinds of pretonic secondary stress patterns are handled with the rule of Retraction and / or with different values for the Edge Marking parameter of the noncyclic stratum.

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