A CONSTRAINT ON HIGH VOWEL DELETION
IN OLD ENGLISH*

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In this paper, we first point out common exceptions to previous generalizations on the phenomenon of Old English High Vowel Deletion, based mainly on the data in *The Anglo-Saxon Poetic Records*, *An Anglo-Saxon Dictionary* and *A Concise Anglo-Saxon Dictionary*, and then demonstrate that the exceptions exhibit a certain generality which is most properly captured by a universal principle. In order to capture this generality, we propose what may be called the Principle of Markedness for Phonological Derivation, which prohibits a derivation producing a more marked peak in a syllable than that of the immediately preceding stage. Finally, we argue that the principle also works in Modern German and that it is highly likely to be a linguistic universal.

0. INTRODUCTION. The lexicon of Old English (OE) contained the rule of High Vowel Deletion (HVD), which is exemplified in 1-3.¹

(1) a. word: n.a.pl. of *word* ‘word’
   b. *scipu*: n.a.pl. of *scip* ‘ship’

(2) a. *werod*: n.a.pl. of *werod* ‘troop’
   b. *heafodu*: n.a.pl. of *heafod* ‘head’

(3) a. *dēmān*: inf. ‘to judge’-dōm ‘judgement’
   b. *ferian*: inf. ‘to carry’-faru ‘journey’

Let us first consider the pairs in 1 and 2. *Scipu* and *heafodu* end in the inflectional ending -u, while *word* and *werod* do not. In fact, each of them is the nominative and accusative plural of a neuter noun. These facts show that, in order to maintain the regularity of the paradigm of the

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¹ Throughout this paper, I use the following abbreviations: n(om).=nominative; a(cc).=accusative; gen.=genitive; dat.=dative; sg.=singular; pl.=plural; l=the first person; 2=the second person; 3=the third person; inf.=infinitive; pret.=preterite; imp.=imperative; n/a=not applicable.
neuter noun, it is not unreasonable to assume that the high vowel /u/ is deleted in word and werod.

Notice also that déman ends in -an, while ferian ends in -ian. Taking into consideration the fact that déman is synchronically derived from the noun dōm, we must assume that the high vowel /i/ is deleted in déman. For, without assuming the underlying /i/, we cannot account for the fact that the stem vowel /o/ of dōm is mutated into /e/ in déman in the course of derivation.

The purpose of this paper is to find a universal principle governing the phenomenon of vowel deletion through an analysis of HVD in the West Saxon Dialect of OE on the basis of an investigation of the data in The Anglo-Saxon Poetic Records (ASPR), An Anglo-Saxon Dictionary (ASD) and A Concise Anglo-Saxon Dictionary (CASD). In Section 1, we point out problems with the previous studies on OE HVD. In Section 2, in order to solve these problems, we propose what I will call the Principle of Markedness for Phonological Derivation. In Section 3, we claim that the proposed principle is likely to be a linguistic universal through an explanation of exceptions to German Schwa Deletion. Section 4 is devoted to concluding remarks.

1. Previous Studies and Their Problems

1.1. Previous Studies. Various attempts have been made to capture the facts about OE HVD in both philological and generative perspectives. An exhaustive description of the phenomenon is made by such scholars as Sievers 1885, 1893, Wright and Wright 1925, Campbell 1959, and Nakao 1985, among others. The rule of OE HVD is formulated in various ways by generative phonologists, particularly by Kiparsky and O'Neil 1976, Dresher 1978, Watanabe 1980, Seki 1981, and Keyser and O'Neil 1985.

The previous generalization on OE HVD is best expressed as rule 4, which is formulated in terms of heavy syllables (H: C₀V₀C₀; C₀V₀C₁) and light syllables (L: C₀V).

(4) Old English High Vowel Deletion

A high vowel is deleted when it is contained in an L which immediately follows one H or two L's.

As illustrated in 5 and 6, rule 4 correctly predicts the deletion and the retention of the high vowels of the examples in 1-3.
1.2. THEORETICAL PROBLEMS. There are at least two theoretical problems. The first problem is that most of the previous studies only describe the facts about OE HVD and do not explain the reason for the deletion of high vowels.

The second problem is that it has never been explicitly demonstrated that rule 4 is a cyclic segmental rule. In fact, the rule cannot apply to a nonderived lexical item even if a high vowel in it is in a deletion environment. To make the problem clear, consider the paradigm of *wīte 'punishment' in 7.

(7) wīte  wītu
    nom./acc.  gen.  dat.

Dresher 1981:105 argues that the stem of *wīte is /wīti-/ rather than /wīte-/. If his proposal is correct, *wīte is derived through the lowering of the stem-final /i/ to /e/. Other inflected forms than *wīte are derived through the suffixation and the deletion of the stem-final /i/.

However, as shown in 8, rule 4 predicts that even the stem-final /i/ in /wīti/ is deleted to produce *wīt, which is unattested in the corpus on which our analysis is based.

(8) wīti
    HL
    φ  Rule 4

This problem can be circumvented only if we assume that rule 4 applies cyclically.
1.3. **Problematic Cases.** In this subsection, we present the data to which no attention has been paid in the generative phonological studies on OE HVD and point out some problems with rule 4.

1.3.1. **N. a. pl. of a-noun, neuter.** Let us begin our discussion by considering the problem caused by the nominative and accusative plural of an a-noun, neuter. We give the relevant examples in 9, which we henceforth refer to as the TUNGOL-type nouns.\(^2\) Cf. *ASD* and *CASD*.

\[
\begin{array}{ll}
\text{deoflu-deofol} & \text{‘devil’} \\
\text{facnu-facen} & \text{‘sin’} \\
\text{tacnu-tacen} & \text{‘token’} \\
\text{tunglu-tungol} & \text{‘star’} \\
\text{wæpnu-wæpen} & \text{‘weapon’} \\
\text{wolcnu-wolcen} & \text{‘ball’} \\
\text{wundru-wundor} & \text{‘wonder’}
\end{array}
\]

Before discussing the point we would like to make, we take a look at the morphological aspects of the nouns in 9. As an example, observe in 10 the paradigm of *wundor*, which shows that the stem of the citation form ends in -dor and that the stem of the inflected forms end in -dr.

\[
\begin{array}{ll}
\text{sg.} & \text{pl.} \\
\text{nom./acc.} & \text{wundor} \quad \text{wundru} \\
\text{gen.} & \text{wundres} \quad \text{wundra} \\
\text{dat.} & \text{wundre} \quad \text{wundrum}
\end{array}
\]

The above-mentioned observation indicates that the stem of *wundor* is to be either /wundor-/ or /wundr-/ . In this paper, we assume that the latter is the stem. We would like to justify this assumption below.\(^3\)

Notice that the class II weak verb *wundrian* ‘to wonder’ is derived from *wundor*. Following Dresher 1978: 46, we assume that the Class II Weak Verb is formed as in 11.

\(^2\) The survey of the TUNGOL-type nouns in *ASPR* reveals that a form identical with a citation form is used as a nominative and accusative plural. For example, *deofol* (=dëoflu), *tungol* (=tunglu), and *wæpen* (=wæpnu), all of which are derived through the deletion of /u/ and the epenthesis. These examples are prima facie problematic for our claim. In fact, however, they are not; they are to be treated from a diachronic viewpoint. For further details of the problem, see Chapter 4 of Okazaki 1987.

\(^3\) I owe to Wayne P. Lawrence some original suggestions for this assumption. However, the reasoning by means of Kiparsky’s DSC is my own.
Morphology of the Class II Weak Verb:

If /wundor-/ were selected as the stem, *wundrian* is derived through vowel deletion and *a*-Raising, as indicated in 12.

The underlying form in 11 is motivated on the following grounds. In the first place, let us observe the standard paradigm of the class II weak verb *lufian* 'to love' in the West Saxon Dialect of OE. Cf. Wright and Wright 1925: 286f. and Campbell 1959: 332.

(i) **Present**

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<th>Indicative</th>
<th>Subjunctive</th>
<th>Imperative</th>
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<tbody>
<tr>
<td>sg. 1</td>
<td>lufi(g)e</td>
<td>lufi(g)e</td>
<td>lufa</td>
</tr>
<tr>
<td>2</td>
<td>lufast</td>
<td>lufi(g)e</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>lufa+p</td>
<td>lufi(g)e</td>
<td></td>
</tr>
<tr>
<td>pl.</td>
<td>lufa+p</td>
<td>lufi(g)en</td>
<td>lufiap</td>
</tr>
</tbody>
</table>

In (i), /i/ appears before a vowel; /a/, before /Ə/ and in word-final position; and /o/, before /d/.

It might be possible to assume such an underlying form as that in (ii) on the grounds that the infinitive of the Class II Weak Verb ends in *-ian*.

(ii) **stem+i+inflectional ending**

Dresher 1978: 43f. argues, however, that this analysis faces several difficulties, on the basis of an investigation into the data in *Vespasian Psalter*, which is written in the Mercian Dialect of OE. My contention here is that the same holds for the data in the West Saxon Dialect.

The analysis which assumes the underlying /i/ brings about the following difficulties. First, there is no account for /a/ which appears before /Ə/ and in word-final position. The rule which converts /i/ into /a/ before /Ə/ and in word-final position is motivated on no independent grounds. Second, there is no account for optional alternations of short vowels with short diphthongs in verbs like *clipian–cliopian* 'to call'. Short diphthongs as such surface by the application of the rule of Back Umlaut. We cannot account for the alternations unless we assume a back vowel in the underlying representation.

Mainly for the two reasons above, we tentatively assume in line with Dresher 1978 an underlying representation for the Class II Weak Verb such as (iii) (=11).

(iii) **stem+o+inflectional ending**

Thus, in order to account for the vowel alternations in the paradigm of the West Saxon Class II Weak Verbs, we need the following two rules, which I call *a*-Raising.

(iv) a. \( \alpha \to i/ \ldots V \)
    b. \( \alpha \to o/ \ldots d \)
(12)  wundor+a+an
\[\phi\]
Vowel Deletion
\[i\]
a-Raising
wundrian

On the other hand, as shown in 13, if /wundr-/ is selected as the stem, the verb is derived straightforwardly through a-Raising.

(13)  wundr+a+an
\[i\]
a-Raising
wundrian

The desired output is produced in both 12 and 13. We are then confronted with the question of which derivation we are to select. It is interesting to note that the derivation in 13 is shorter by one step than its counterpart in 12. Other things being equal, the former is chosen in light of what Kiparsky 1982: 52 calls the Derivational Simplicity Criterion (DSC), which is restated in 14.

(14) Derivational Simplicity Criterion (DSC)
Among alternative maximally simple grammars select that which has the shortest derivations.

Mainly for the above reason, /wundr-/ is selected as the stem of wundor. This fact can be generalized as stated in 15.

(15) The stem of the TUNGOL-type noun ends in the sequence 
\[-(C)C\; [+cons, +son]\].

Having made clear the morphology of the TUNGOL-type nouns, we are now in a position to discuss the derivations of their nominative and accusative plurals. As examples, consider the derivations of tunglu and wolcnu. As illustrated in 16, rule 4 incorrectly predicts that the /u/ in word-final position is deleted. As the result of deletion, the unattested forms */tungl/ and */wolkn/ are produced.

(16) a. tungl+u  b. wolkn+u
\[H\]
\[L\]
\[\phi\]
\[\eta\]
\[
\phi\]
Assimilation
\[\phi\]
\[\eta\]

From 16, the descriptive generalization 17 can be made.

(17) The high vowel /u/ cannot be deleted in word-final position if the consonant cluster 
\[-(C)C\; [+cons, +son]\] is derived by the application of rule 4.

The above-mentioned generality cannot be captured by rule 4. This is
the first empirical problem with the previous studies on OE HVD.

1.3.2. Class I weak verbs. We will next consider the problem caused by the HYNGRAN-type and GIERWAN-type verbs, both of which are a subtype of the Class I Weak Verb.

Observe first some inflected forms of hyngran 'to be hungry' and gierwan 'to dress'. Cf. Wright and Wright 1925: 280f.

(18) a. hyngran b. gierwan

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<tbody>
<tr>
<td>a</td>
<td>hyngrede</td>
<td>gierede</td>
</tr>
<tr>
<td>b</td>
<td>hyngredest</td>
<td>gieredest</td>
</tr>
<tr>
<td></td>
<td>hyngredon</td>
<td>gieredon</td>
</tr>
<tr>
<td></td>
<td>hyngre</td>
<td>gierwe</td>
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</tbody>
</table>

Conjugated like the examples in 18 are the verbs listed in 19–21.5 Cf. Wright and Wright 1925: 281, ASPR, ASD, and CASD.

(19) HYNGRAN-type A: biecnan 'to make a sign'-beacen dieglan 'to conceal'-( ) frefran 'to console'-frefer forglendran 'to devour'-( ) bytlan 'to build'-bytel timbran 'to build'-timber

(20) HYNGRAN-type B: eglan 'to afflict'-( ) efnan 'to level'-efen raefnan 'to perform'-( ) seglan 'to sail'-segl pryman 'to suffocate'-( )

(21) GIERWAN-type: hierwan 'to despise'-( ) nierwan 'to constrain'-nearu sierwan 'to contrive'-( )

N.B. ( ) stands for the lack of a form.

Before going into the main topic, we must look briefly at the morphological aspects of the above-mentioned verbs, taking hyngran and gierwan as examples. Following Dresher 1978: 125, we assume that the Class I Weak Verb is formed as indicated in 22.

(22) Morphology of the Class I Weak Verb:

stem + i + inflectional ending

Given 22, we assume that the stem of hyngran and gierwan are /hungr-/ and /yaearw-/, respectively.

This assumption is justified in the following way. If we posited that the stem of hyngran is /hungor-/ on the grounds that the verb is derived

5 We can find in ASPR the inflected forms in which the high vowel /i/ is deleted. Thus, raefndon, gier(w)de, and hier(w)don. These examples are to be treated from a diachronic point of view. For further details, see Chapter 4 of Okazaki 1987.
from the noun *hungor* 'hunger', the unattested form */hunger.../ would be derived by the application of the rule of *i-Umlaut*. The same is true of *gierwan*. If we assumed that */yæaru-/* is the stem because the verb is derived from the adjective *gearu* 'ready', the unattested form */yæarů.../ would be derived.

One might argue that the problem can be circumvented by stipulating that Vowel Deletion and Glide Formation apply before *i-Umlaut* applies. If it were possible to stipulate these rules, the verbs would be derived as illustrated in 23.

\[\begin{array}{ll}
(23) & a. \text{hungor} + i + an \quad b. \text{yæaru} + i + an \\
\phi & n/a \\
n/a & w \\
\ddash & iü \\
\ddash & i-Umlaut \\
\ddash & \text{Rule 4} \\
\ddash & n/a \\
\ddash & \text{Assimilation} \\
hüngran & yiürwan
\end{array}\]

On the other hand, if we assume that the stems are */hungr-/* and */yæarw-/*, the derivations proceed as in 24.

\[\begin{array}{ll}
(24) & a. \text{hungr} + i + an \quad b. \text{yæarw} + i + an \\
\ddash & iü \\
\ddash & \text{Rule 4} \\
\ddash & n/a \\
\ddash & \text{Assimilation} \\
hüngran & yiürwan
\end{array}\]

Notice that the derivations in 24 are shorter than their counterparts in 23. Other things being equal, the derivations in 24 are chosen in accordance with Kiparsky's DSC. Moreover, Vowel Deletion and Glide Formation in 23 are hardly motivated on independent grounds. Mainly for these two reasons, we conclude that */hungr-/* and */yæarw-/* should be selected as the stems. From this fact follows generalization 25.

\[\text{(25) The stem of the HYNGRAN-type verb ends in the sequence -(C)C [+cons, +son]; the stem of the GIERWAN-type verb ends in the sequence -rw.}\]

Returning to the main stream of the discussion, we consider the problem caused by the examples in 18. For this purpose, let us observe the derivations of *hyngrede* and *gierede*. Under our assumptions, they would be derived as shown in 26.
Rule 4 predicts that the high vowels in 26 are deleted after the application of *i-Umlaut because they are in an L which follows one H. Contrary to this prediction, however, the high vowel /i/ is retained. In fact, it is lowered to /e/ by *i-Lowering, a phonological rule in OE motivated on independent grounds. Thus, the derivations must proceed as indicated in 27.

(27) a. hungr+i+de  
   H L L  
   ü  
   n/a  
   η  
   *hüngrede

b. yæarw+i+de  
   H L L  
   iü  
   n/a  
   η  
   *yiürwde

It is interesting to note that the deletion of /i/ in 26 produces the consonant clusters /-ngr/ and /-rw/. From this observation results a descriptive generalization stated as in 28.6

(28) The high vowel /i/ cannot be deleted in word-medial or word-final position if the consonant cluster -(C)C [+cons, +son] is derived by the application of rule 4.

The generality stated in 28 cannot be accounted for by rule 4. This is the second empirical problem common to the previous studies on OE HVD.

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6 To the best of my knowledge, this fact is first described, though partly, by Sievers 1885: 460f. He remarks:

... in burh timbrede Gen. 2840b, getimbrede Ex. 391a, æþrede El. 1271a, ponne hy hungrige Guth. 1701a, und sweopum seolfrynnum Sal. 143a konnte synkope wegen des auslauts der wurzelsilbe auf muta+liquida überhaupt nicht eingetreten.
1.4. **Summary.** In this section, we have pointed out some problems with the previous analyses of OE HVD. Particularly important are the problems which were posed by the counterexamples to rule 4, and underlying those examples were the two descriptive generalizations, which can be reduced to one as indicated in 29.

(29) A high vowel cannot be deleted if the consonant cluster -(C)C [+cons, +son]- is derived by the application of rule 4, i.e. the rule of OE HVD.

Thus, our next task is to answer the following question.

(30) Why is it that a high vowel cannot be deleted if the consonant cluster -(C)C [+cons, +son]- is derived by the application of the rule of OE HVD.

2. **Principle of Markedness for Phonological Derivation**

2.1. **Reformulation of Rule 4.** We begin by reformulating rule 4 under some assumptions of recent nonlinear phonology. In the first place, as indicated in 31, we assume that the syllable is organized into a hierarchical structure and that it consists of four distinct tiers. Cf. Halle and Mohanan 1985 and Keyser and O’Neil 1985.

(31)

```
| σ | R |
```

Syllable Tier

```
X ... X ... X ... ...
```

Rime Tier

```
[ ... [ ... [ F ] ... [ F ] ... ]
```

X-Tier

Segmental Tier

Second, it is assumed that the rule of deletion applies to the X-tier. Thus, the rule is characterized as Delete X. Cf. Haraguchi 1986.

Under these two assumptions, the rule of OE HVD is reformulated as stated in 32.

(32) In a derived environment, delete an X-slot freely when it is associated with a segment which is [+high] and with a nonbranching rime which immediately follows one branching rime or two nonbranching rimes in the rime structure.

2.2. **Syllabification in OE.** Syllabification in OE is subject to a universal principle, as in 33, which was originally proposed by
Lowenstamm 1981: 593.7

(33) In a string of segments, a syllable is a maximal substring such that:

(i) No segment is lower on the hierarchy than both its immediate neighbors.

(ii) No two segments of equal ranking on the hierarchy are adjacent.

N.B. hierarchy: vowel > glide > sonorant > fricative > stop

Syllabification in OE also obeys the following constraint, which is formulated on the basis of an observation by Keyser and O’Neil 1985: 137f.8

(34) At most one syllable-initial consonant can occur in morpheme-medial and morpheme-final syllables.

2.3. REINTERPRETATION OF THE DATA. According to the theoretical devices introduced above, the derivations of word and déman proceed as shown in 35.

(35) a. R R b. R R R

XXX X XX X X X X

[w o r d] [u] [d o m] [i] [a n]

7 Some remarks must be made on the syllabification of the OE diphthongs. It has traditionally been said that there are four short and four long diphthongs in OE which are represented by the digraphs ea, eo, ie, and io. Each of the diphthongs consists of two vowels: ea [æ(:)ːa], eo [e(:)ːo], ie [i(:)ːi], and io [i(:)ːo]. Cf. Lass and Anderson 1975 and Nakao 1985. Principle 33 requires that two vowels should not be contained in the same syllable. As a consequence, the OE diphthongs might be divided into two syllables. However, that is not the case. Notice that the diphthongs in OE behave metrically in exactly the same way as the monophthongs in OE do. This suggests that a diphthong should be taken as one unit, though it consists of two vowels. For this reason, we tentatively assume in this paper that two vowels may be contained in the same syllable if they form a diphthong. We must admit, however, that the OE diphthongs remain exceptions to principle 33, a problem to be resolved in future research.

8 There is an important theoretical consequence of the constraint which Keyser and O’Neil 1985 do not mention. We can safely say that Clements and Keyser’s Onset First Principle is too strong to capture the nature of syllabification in languages.
In 35, after the suffixation and the application of i-Umlaut, the X-slots associated with /u/ and /i/ are deleted. After their deletion, the Resyllabification Convention applies. In /word+u/, /d/, the syllable-initial consonant of the second syllable, is incorporated into the first syllable as one of the syllable-final consonants. In /dem+i+an/, /m/, the syllable-initial consonant of the second syllable, is incorporated into the following syllable as the syllable-initial consonant.

Notice, however, that, in 35, the high vowels and the R-nodes remain unsyllabified at the ends of the derivations. Here we assume that they are erased by a universal convention, as in 36, which is an extended version of Harris’ 1982: 35 Erasure Convention.

(36) Segments and R-nodes not incorporated into syllable structure at the end of a derivation are erased.

2.4. A SOLUTION TO PROBLEM 30. Having introduced the theoretical devices, we are now in a position to solve problem 30. For this purpose, observe the derivations of *tungl and *hyngrde in 37.

(37) a. R R R R
    XXXXX X
    [t u ng l] [u]

    R R
    XXXXX
    [t u ng l] [u]

    n/a

    33, 34

b. R R R R R
    XXXXX X XX
    [h u ng r] [i] [d e]

    R R
    XXXXX
    [h u ng r] [i]

    ü

    R R
    XXXXX
    XX

    i-Umlaut

    n/a

    33, 34

Suffixation

Resyllabification
In 37, syllabic consonants are derived at an intermediate stage through the reassociation of a sonorant with an R-node which is not incorporated into syllable structure. From this fact, we get generalization 38.

(38) A high vowel cannot be deleted if a syllabic consonant is derived by the application of Delete X.

However, 38 is a mere descriptive generalization as it stands. We must further investigate the relation between the retention of a high vowel and the production of a syllabic consonant.

The retention of a high vowel must be explained by a universal principle on the following grounds. First, the argument does not stand that the nonapplication of Delete X is due to violation of lexical redundancy rules in OE. Observe the consonant clusters in 39, which are derived by the application of the rule to the data adduced in Section 1. Given in 39a are permissible consonant clusters in word-final and syllable-final positions. Given in 39b are those which are permissible in neither position.

(39) a. OK: /-pn, -fn, -fr, -tr, -tl, -dr, -dl, -sm, -kn/
    b. *: /-gl, -rw, -ndr, -ngr, -mbr/

It follows from 39 that the retention of high vowels cannot necessarily be explained in terms of sequential redundancy in OE.

Second, the argument does not stand that the nonapplication of Delete X is due to the nonoccurrence of syllabic consonants in OE. To
make this fact clear, observe the examples in 40 and 41.9 Cf. Nakao 1985 and CASD.

(40) a. syllabic m: fæpm ‘fathom’; bōsm ‘bosom’
   b. syllabic n: tācn ‘token’; stefn ‘voice’
   c. syllabic r: spaldr ‘asphalt’; rōdr ‘rudder’
   d. syllabic l: hristl ‘shuttle’; lýtl ‘little’

(41) a. syllabic m: fæpmlic ‘embracing’; væstmlic ‘fruitful’
   b. syllabic n: tācnbora ‘standard-bearer’; stefnmælum ‘alternately’
   c. syllabic r: (
   d. syllabic l: süslbora ‘devil’; ceorllic ‘common’

The examples in 40 and 41 show that, in OE, syllabic consonants are able to occur in both word-final and word-medial positions.

Mainly for the two reasons above, we can safely say that the application of Delete X can be blocked properly not by phonological rules specific to OE, but rather by a universal principle.

Having proved that problem 30 must be solved by a universal principle, we must next consider what is a decisive factor in blocking the application of Delete X and what kind of universal principle is at work through phonological derivation.

As shown in 37, if the rule applies to /tungl+u/ and /hüngri+de/, the syllabic consonants /l/ and /r/ are derived. Recall also that we have assumed there that these syllabic consonants are derived at an intermediate stage of a derivation through the reassociation of a sonorant with an R-node which is not incorporated into syllable structure. This implies that, after the deletion of a high vowel, the position of the peak in the second syllable of each word is occupied by a sonorant. Thus, we can say that the decisive factor in blocking the application of Delete X is the kind of a segment which occupies the position of a peak in a syllable, or, more specifically, the markedness value of a segment which is in the position of a peak.

We assume here that the markedness value for the peak is determined as indicated in 42 in accordance with the marking conventions proposed by Cairns and Feinstein 1982.10

9 The fact that a sonorant in word-final position becomes syllabic in certain environments is also pointed out by Sievers 1885: 225; 480f. on metrical grounds.

10 For the marking conventions on which our analysis is essentially based, see Cairns and Feinstein 1982: 201ff.
Now, the fact that syllabic consonants are derived in 37 can be restated in terms of 42. As clearly shown in 43, if Delete X applies to /tungl+u/ and /hüngri+de/, the markedness value of the peak in the second syllable of each word changes from 0 to 1. In other words, if a syllabic consonant is derived by the deletion of a vowel, the markedness value of a peak becomes higher than that of a stage where the vowel is retained.

The above argument leads us to claim that if, as a result of vowel deletion, the markedness value of a peak becomes higher than that of the immediately preceding stage in a derivation, the application of the rule of vowel deletion is always blocked. Thus, in order to solve problem 30, I propose a principle which puts a constraint on the markedness value of a peak in a syllable. This principle is called the Principle of Markedness for Phonological Derivation, which is stated as in 44.11

11 Haraguchi 1987: 13 proposes a working hypothesis which is similar to principle 44. It simply says:

(i) A phonological rule applies so as to produce an unmarked structure.

Haraguchi’s proposal and mine are different mainly in the following two respects. In the first place, while principle (i) requires that an unmarked structure in an absolute sense should be produced by rule application, my proposed principle does not require it. Rather, it requires that a more marked peak of a syllable than that of the immediately preceding stage should not be produced by rule application. In this respect, principle 44 can be taken as a weakened and substantiated version of principle (i).
(44) Principle of Markedness for Phonological Derivation

Lexical rule application must produce a syllable structure in which the markedness value of the peak is equal to or lower than that of the immediately preceding stage in a derivation.

This principle can explain the reason for the nonapplication of Delete X to any of the examples adduced in Section 1.3. In those examples, the application of the rule results in violation of principle 44. More specifically, after the deletion of a high vowel, the markedness value of a peak becomes higher than that of the immediately preceding stage in a derivation.

Principle 44 also predicts correctly that Delete X does apply to examples like /word+u/ and /de+mi+an/. As illustrated in 45, the markedness value of any peak does not become higher after the deletion of high vowels. That is, the derivations in 45 do not violate principle 44 at all.

(45)

<table>
<thead>
<tr>
<th>Rule Application</th>
<th>Markedness Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R R Delete X and R</td>
<td>word</td>
</tr>
<tr>
<td>XXXX</td>
<td>word</td>
</tr>
<tr>
<td>0 0</td>
<td>0</td>
</tr>
</tbody>
</table>

There is a piece of evidence to weaken principle (i). Consider the word waestmlic, which is derived from waestm by the suffixation of -lic. It should be noticed that /m/ in waestm is syllabic and that it remains syllabic after the suffixation because of the vacuous application of the Resyllabification Convention. If syllabification is lexical rule application, we could say that it produces a marked peak of syllable in waestmlic. We cannot account for this fact if we assume that an unmarked structure must be produced. It becomes possible to do so only if we assume that the markedness of a peak must not become higher than that of a preceding stage.

Second, Haraguchi 1987: 18f. argues that the rule of Sonorant Syllabification applies to a nonderived lexical item at stratum 4 in the lexicon, as principle (i) requires. That is, in his position, Sonorant Syllabification applies to a nonderived lexical item to produce an unmarked structure. On the other hand, I maintain that a sonorant must be syllabified, if necessary, at the initial stage of a derivation or at stratum 1, as principle 33 requires. However, I do not know at the present time whether or not sonorant syllabification in a nonderived lexical item is a process which produces an unmarked structure. Suffice it to say here that sonorant syllabification must be regarded as a process which produces a more marked structure if it applies to a derived lexical item at an intermediate stage of a derivation.
Finally, it should also be noted that principle 44 is conceptually quite natural in that it prohibits a derivation which produces a more special and unstable syllable structure; in fact, it requires that a common and stable syllable structure should be retained through derivation. This is quite similar in nature to our social conducts of behavior according to which it is normal rather than abnormal behavior that is preferred in our society. In this sense, principle 44 has an epistemological priority.

3. IMPLICATIONS

3.1. THEORETICAL IMPLICATIONS. There are three theoretical implications of our analysis of OE HVD. The first implication is the shift from a rule-based analysis to a principle-based analysis. Recall that, unlike the previous studies, no ad hoc conditions are imposed on the rule of OE HVD. Rather, a universal principle of markedness is shown to be operative for syllable structures in a phonological derivation.

The second implication is the enrichment of the content of the lexicon of UNIVERSAL GRAMMAR (UG) in the sense of Chomsky 1986. Such enrichment is achieved by assigning the role of constraining rule application to a universal principle. It has been hypothesized that, in analyzing a phonological phenomenon, the distinction must be drawn between universal and language-particular aspects. Recently, this hypothesis has explicitly been mentioned in Archangeli and Pulleyblank 1986 and Haraguchi 1986, among others. Thus, it can be said that this paper strengthens and substantiates their claim.

The third implication is that the study of a dead language is also able to shed light on the nature of UG. It is noteworthy that principle 44 is formulated on the basis of an analysis of OE HVD, a segmental phenomenon of a language of a foregone age.

3.2. IMPLICATION FOR SCHWA DELETION IN MODERN GERMAN. In this subsection, I would like to show that principle 44 works in Modern German as well as in OE.

The lexicon of Modern German contains the rule of Schwa Deletion, which is exemplified in 46. The examples here indicate that the word-
final schwa in the imperative form of a verb is optionally deleted.12

(46) a. liebe/lieb-lieben ‘to love’
   b. tanze/tanz-tanzen ‘to dance’
   c. mische/misch-mischen ‘to mix’

In contrast, the word-final schwa is not allowed to be deleted in such examples as those in 47.

(47) a. atme/*atm-atmen ‘to breathe’
   b. ebne/*ebn-eben ‘to level’
   c. öffne/*öffn-öffnen ‘to open’

Taking öffne as an example, let us consider the reason for the retention of the schwas in the instances of 47. Because the verb öffnen is derived from the adjective offen ‘open’, the stem is to be either /ofn-/ or /ofen-/. The derivational history of öffnen becomes shorter if the former is selected as the stem, as explicitly shown in 48. Therefore, other things being equal, /ofn-/ is selected as the stem in accordance with Kiparsky’s DSC.

(48) a. ofn+i+en b. ofen+i+en
   n/a   φ
   ö    ö
   ə ə  ə ə
   φ    φ
   öffnen öffnen

Because /ofn-/ is the stem, *öffn is derived as illustrated in 49.

(49) ofn+i
   ö      i-Umlaut
   ə   Vowel Reduction
   φ    Schwa Deletion
   *öffn

In */öffn/, the word-final /n/ becomes syllabic, as principle 33 requires. Thus, with respect to the nonapplication of German Schwa Deletion, we can make a descriptive generalization, as in 50.

(50) A schwa cannot be deleted if a syllabic consonant is derived by the application of Schwa Deletion.

It is worthy of note that the condition on the nonapplication of German Schwa Deletion is exactly the same as that of OE HVD. It is

12 A precise formulation of German Schwa Deletion is excluded from discussion in this paper.
also striking that the retention of schwas cannot be accounted for in a unified manner by lexical redundancy rules in German. This situation is parallel with that of HVD in OE. As indicated in 51 and 52, the sequence /-fn/ occurs in both word-final and word-medial positions, while /-tm/ appears in neither position.

(51) a. offen [ofn-ofən]
   b. offenheit [ofnhayt-ofənhayt]

(52) a. atem [a:tem/*a:tm]
   b. atembar [a:temba:r/*a:tmba:r]

The above discussion leads us to conclude that the application of German Schwa Deletion must be blocked by a universal principle, or, more specifically, by principle 44. As shown in 53, the deletion of a schwa in öffe brings about violation of the principle. That is why the schwa is retained.

(53) R R Schwa Deletion and R R

XXXX other conventions XXX

ö fn ø 0 0 0 4 Markedness Value

Summarizing, we showed above that principle 44 operates in Modern German as well as in OE. This suggests that the principle is highly like to be a linguistic universal.

4. CONCLUSION. In this paper, we have attempted to explain the reason for the nonapplication of the rule of OE HVD to its exceptions by proposing two theoretical devices. One is the assumption that sonorant syllabification at an intermediate stage of a derivation amounts to the reassociation of a sonorant with an R-node which is not incorporated into syllable structure. The other is the Principle of Markedness for Phonological Derivation, which is formulated on the basis of the above-mentioned assumption and constrains the application of the rule of vowel deletion. In fact, the proposed principle can be taken as a linguistic universal because of its conceptual naturalness and of its ability to explain exceptions to OE HVD and German Schwa Deletion. Thus, I strongly believe that the Principle of the Markedness for Phonological Derivation sheds new light on the nature of UG.

There is a further consequence of our proposals. We argued that the exceptions to OE HVD are accounted for only by our proposed principle. Viewed from a methodological standpoint, this implies the shift
from a rule-based analysis to a principle-based analysis, the latter of which is adopted in current syntactic theory, more particularly, the theory of Government and Binding. Therefore, we can say that we have substantiated in this paper the claim that the methodology adopted in syntactic theory is applicable to an analysis of a phonological phenomenon.

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