

Old English stress: A synchronic analysis with some notes on its diachronic development

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Kim, Yookang. 2001. Old English stress: A synchronic analysis with some notes on its diachronic development. *Studies in Phonetics, Phonology and Morphology* 7.1. 21-61. In this paper, I observe that there exists asymmetry between Old English main stress and secondary stress assignment: morphologically-sensitive main stress and phonologically-sensitive secondary stress. In addition, non-uniform features of secondary stress patterns are noted in Old English: quantity-sensitive as well as quantity-insensitive. I claim that these features of Old English stress patterns are well accounted for by separating the prosodic domains of main stress and secondary stress. I propose that main stress is assigned in the domain of the syllable and secondary stress in the domain of the bimoraic foot in Old English. (Hankuk University of Foreign Studies)

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1. Introduction

The main goal of this paper is to offer a synchronic account of Old English (henceforth, OE) main stress and secondary stress assignment in the frameworks of lexical and metrical phonology. I observe that there is asymmetry between OE main and secondary stress assignment: main stress is morphologically sensitive and secondary stress is phonologically sensitive. In addition, it is noted that there are two kinds of secondary stress in OE: weight sensitive and insensitive secondary stress. In this article, I mainly attempt to account for these two main features of OE stress assignment: the asymmetry between main stress and secondary stress assignment and non-uniformity of secondary stress assignment.

I argue that the two features of OE stress assignment are well explained by separating the prosodic domains of main stress and secondary stress in OE. In more detail, morphologically sensitive main stress is placed in the prosodic domain of the syllable and phonologically sensitive secondary stress is assigned in the domain of a higher prosodic unit, the foot.

For the account of main stress, I follow the lexical phonology framework that the lexicon consists of an ordered set of domains at which specific processes take place (Kiparsky 1982b, Mohanan 1982, 1986). Different behaviors of prefixes with regard to main stress are accounted for by the division of lexical level, the assignment of the prefixes to the levels, and the application of OE main stress rule. I claim that the OE main stress

rule applies in the domain of the syllable regardless of syllable weight. To account for secondary stress sensitive to phonological structure (especially, syllable weight), I use a prosodic tree developed by Selkirk (1980a,b) and elaborated by McCarthy and Prince (1995) in the metrical framework of Hayes (1985, 1995). I show that the OE secondary stress rule makes reference to an OE bimoraic foot as its domain of application.

The asymmetry between main stress and secondary stress assignment and non-uniformity of secondary stress assignment in OE are not captured in the previous analyses of OE stress because they assume that the two stresses in OE are assigned at the same prosodic level. The domain for OE stress assignment in such analyses is either phonological (Halle and Keyser 1971, McCully 1992, McCully and Hogg 1990, Dresher and Lahiri 1991, Halle, O'Neil and Vergnaud 1993, and Idsardi 1994) or morphological (Suphi 1985, 1988, Hutton 1998). The recent Optimality theoretic analyses (Moon 1996, Bermúdez-Otero 1996, McCully 1999a,b) also fail to account for these main features of OE stress by allowing simultaneous application of phonological and morphological constraints. Due to their assumption of mono-base for OE stress assignment, the different behaviors of main and secondary stress as well as two kinds of secondary stress in OE are not treated well. In my analysis, which differentiates the levels of application of main stress and secondary stress, the asymmetry between main stress and secondary stress assignments and non-uniformity of secondary stress are well accounted for without exceptions and additional ad hoc rules.

The organization of this paper is as follows. Section 2 describes main features of OE stress assignment, discussing historical development of secondary stress placement. Section 3 is a critical review of previous analyses of OE stress assignment. Section 4 provides my alternative analysis, demonstrating the role of prosodic systems in OE. Section 5 briefly investigates stress changes in Middle English and their implication for my prosodic algorithm. Section 6 is a conclusion.

2. Historical developments of OE stress

Campbell (1959: 30-37) subdivides OE stress into three groups: *word-accent*, *half-stress* and *sentence accent*, and describes the distribution of these three stresses. His observations on OE stress have been cited as a main source of data for the previous descriptive and theoretical analyses of OE stress. Following his classification of OE stress, I assume two degrees of OE word stress: main stress and secondary stress.¹ *Sentence accent* is

¹ Campbell's description of OE stress is mainly based on Sievers' observations about stress and meter (cf. Sievers 1878). Bliss (1967) uses the term, *tertiary stress* for the first time to object to Sievers' assumption of stress at the lower (non-primary) level. Tertiary stress is Bliss's term for the stress assigned in Sievers' analysis to all syllables that are neither

not examined in this analysis. Main stress is marked by ‘ˈ’ and secondary stress is marked by ‘˘’ and weak stress is unmarked.

The principal features of main stress in OE are the following (Campbell 1959: 30-33):

- (1) a. Main stress falls upon the first syllable of the non-prefixed stems:

hūs ‘house’ stānas ‘stones’

- b. Prefixed nouns and adjectives have main stress on the first syllable of their prefixes while prefixed verbs have it on the first syllable of their stems:

Nouns		Verbs	
<i>ān</i> -saca	‘apostate’	<i>on</i> -sacan	‘deny’
<i>ō</i> -þanc	‘mind’	<i>a</i> -þencan	‘devise’
<i>wī</i> þer-saca	‘adversary’	<i>wī</i> þ-sacan	‘refuse’
<i>bī</i> -genga	‘inhabitant’	<i>be</i> -gān	‘occupy’

Adjectives	
<i>ān</i> -fenge	‘acceptable’, <i>ūn</i> -synnig ‘innocent’

- c. Some prefixes are always or almost stressless even in nouns and adjectives.

‘ge-’: ge-feōht ‘fight (noun)’

‘be-’: be-bód ‘command (noun)’ be-beóðan ‘to command’
(exceptions: bī-leofa ‘food’, bī-spell ‘proverb’)

‘for-’: for-bód ‘prohibition’ for-beóðan ‘to forbid’
(exceptions: fōr-wyrd ~ for-wýrd ‘ruin (noun)’)

- d. Some prefixes are always or almost always stressed, even in verbs:

fōm-hweorfan ‘turn away’ bī-standan ‘stand by’
ófa-drīvan ‘drive away’

inflectional nor found in compounds whose elements have retained their semantic force. Campbell does not distinguish between secondary and tertiary stress, referring to both as *half-stress*. Phonologically and metrically, it is very difficult and controversial to make a distinction between the two stresses. In this analysis, this problem is not examined due to lack of relevancy.

- e. Any compound word has main stress on the first syllable of the first element regardless of its word category:
 nouns: þéod-cýning ‘king of a people’
 adjective: góld-wlanc ‘proud with gold’
 verb: æfter-spýrian ‘inquire’
 adverb: eál-swà ‘quite so’

It is important to note that main stress assignment in OE is morphologically determined regardless of the phonological structure on the morphemic or word level. The weight of stressed syllables is not considered in the OE main stress assignment. For example, main stress is found on a light syllable (e.g., *onsacan* ‘deny’, *cýning* ‘king’) or on a heavy syllable (e.g., *apéncan* ‘devise’, *stānas* ‘stones’). On the other hand, OE main stress assignment is a matter of whether a word has a prefix or not, and which prefix is attached to the word if it has one. Namely, main stress is assigned to the prefixes of the prefixed nouns and adjectives, and on the stems of the prefixed verbs.

Campbell (1959: 34-35) describes the properties of OE secondary stress assignment as follows:

- (2) a. Secondary stress falls on the second element of a compound and on the first syllable of a prefixed noun or adjective:

góld-wlanc ‘proud with gold’
 ándsaca ‘apostate’
 órþanc ‘mind’
 ándfenge ‘acceptable’

- b. The second elements of compounds, which do not fully maintain their original meaning², carry secondary stress only when they are either disyllabic or followed by an inflectional ending. The syllables carrying secondary stress can be heavy or light. Therefore, monosyllabic second elements of compounds that are in the uninflected form and thus in the word final position are not assigned secondary stress.³

² For example, OE *hlāford* came from *hlāfweard* whose second element, *weard* means ‘guardian, keeper’. The original meaning and form of the reduced element *-ord* might not be clearly identified in OE.

³ It has been suggested that some degree of stress falls on the uninflected monosyllabic second elements of compounds which do not have semantic force because the vowels in the

wínelēasne	but	wínelēas	‘friendless’
hlāfōrdes		hlāford	‘lord’
Hrōþgāres		Hrōþgār	‘Hrothgar’

- c. Heavy suffixes have secondary stress after a heavy syllable or its equivalent (two light syllables in sequence), when followed by an inflectional ending. These suffixes can be derivative (–*els*, –*en*, –*end*, –*ere*, –*erne*, –*estre*, –*ig*, –*ing*, –*isc*, –*ness*) or inflectional (–*op*, –*ende* (participle), –*enne* (inflected inf.), –*est*, –*ost* (superlative), –*i*- and –*od*- (second class weak verb)).

ǣþelinges	but	ǣþeling	‘prince’
hāligre	but	hālig	‘holy’

- d. There is no secondary stress on any heavy syllable following an initial light syllable:

cýninges	‘king’s’	wésende	‘to be, pres. part.’
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It is shown in (2a) that secondary stress is placed on the second element of compounds containing their full meaning. Similarly, secondary stress appears on the first stem vowels of prefixed nouns or adjectives with main stress on their prefixes. It is important to note that secondary stress is found in the prefixed words or compounds regardless of its syllable weight (e.g., heavy or light) or its position in a word (e.g., word final or word medial). However, as can be noted in (2b), when the second element of a compound loses its full meaning, secondary stress appears sensitive to the position of the second element in a word. Namely, secondary stress falls on non-final syllables of the second element of a quasi-compound.⁴

Considering the tendency of reduction in the final syllable in Germanic

elements do not undergo reduction. It has also been proposed that the retention of vocalic quality in these elements should be attributed to analogy to the corresponding inflected forms. I speculate that inflected forms of these elements are generalized.

⁴ The second elements of quasi-compounds in Proto-Germanic came from two sources. One was from IE accented suffixes (e.g., PGmc nominal suffix **-tūt* as in Gothic *gamainduþs* ‘community’) and the other was from the second elements of regular compounds through their semantic reduction (e.g., PGmc negative suffix **lāus* as in Old Saxon *endilos* ‘endless’), which, in sequence, came to function as derivational suffixes. I assume that the suffixes which had been accented in IE might have maintained a degree of linguistic stress even after the shift of accent in Germanic and thus they were more prominent than other historical suffixes inherited from IE unaccented suffixes. With regard to the second elements of quasi-compounds developed from regular compounds through semantic reduction, it was argued that they were still linguistically more prominent than historically unstressed suffixes.

languages, it is not surprising that secondary stress no longer appears on the final syllable of the second elements of quasi-compounds in OE. In particular, the semantic and phonological reduction of the second elements of Germanic quasi-compounds become greater in the course of time, and thus more prone to be reduced in the metrically-weak final position. Therefore, secondary stress falls only on the non-final syllable of the second element of quasi-compounds in OE.

Now let us turn to secondary stress assignment on the suffixes. In (2c), heavy suffixes carry secondary stress when followed by an inflectional ending. It means that secondary stress falls on suffixes only when they are heavy and word medial. Unlike secondary stress assignment on the second elements of compounds and quasi-compounds in (2a, b), we see that secondary stress on these suffixes is sensitive to the weight of the syllable where it is assigned because it only appears on heavy syllables. However, like quasi-compounds in (2b), secondary stress is not placed on the final syllable of these suffixes.

The quantity-sensitive secondary stress on the non-final heavy syllable is an innovation of Germanic since secondary stress was only assigned on (quasi-) compounds in a quantity-insensitive way in Proto-Germanic.⁵ Secondary stress in OE is controversial and more difficult to reconstruct. Even though Campbell reconstructs the distribution of OE secondary stress, he admits "... half-stresses are often neglected in verse, and in late Old English syllables bearing them are frequently subject to change and loss, like fully unaccented syllables" (Campbell 1959: 35). Gąsiorowski (1997: 41) remarks about the controversial reconstruction of OE secondary stress:

"... first, the relevant evidence is poorer, unsupported by alliteration, and therefore less convincing than in the case of primary stress ... not the same in the eighth and the eleventh centuries; the gradual decay and the eventual loss of the traditional alliterative line in late OE and early ME testify to a critical widening of the gap between the literary tradition and the common usage ... It is quite possible that the rate of change varied from dialect to dialect."

These problems might render some of the previous literature on OE stress silent with regard to secondary stress assignment.

However, Fulk (1992: 169-235) provides phonological and metrical evidence for existence of secondary stress on the word medial vowels in OE.⁶ One piece of his phonological evidence is the matter of lengthening

⁵ See Kim (2000) for the comprehensive analysis of stress assignment in Proto-Germanic.

⁶ Fulk employs Bliss's term, *tertiary stress* instead of secondary stress or Campbell's term, *half-stress*. Since it is a matter of convenience to have a term for an intermediate level of

in later Latin borrowings such as *māgister*, *gīgantas* < Lat. *magíster*, *gigántes*. Luick (1964) claims that the Latin accent was retained as secondary stress in OE. As secondary stress in OE is not assigned on the second heavy syllable preceded by a light initial syllable (see (2d)), the first vowels in these Latin words became lengthened such that the musical accent be preserved as secondary stress. If there were not secondary stress in OE, there could be no way to account for the vowel lengthening on the first initial syllable of these words.

Another indication of the existence of OE secondary stress presented by Fulk is found in the different developments of unstressed and stressed vowels. For example, in early OE, the short vowel *u* becomes *o* in unstressed syllable, as in the preterit plural ending *-on* < *-un*. It appears however that the derivational suffixes carrying secondary stress in inflected forms are not affected by the vowel change and thus we find, for instance, *-full* rather than **-foll*, and *-dom* rather than **-dam*.

As metrical evidence for secondary stress, Fulk cites Hoover's (1985) observation that compounds without secondary stress are not distributed like those with secondary stress in respect to alliteration. Double-alliterating compounds bearing secondary stress, such as *wigweorþunga* (Beowulf 176a) and *heardhicgende* (Beowulf 394a) only appear in the on-verse. This implies that the second alliterating position carrying secondary stress is banned from the off-verse. By contrast, similar verses without secondary stress occur freely in either half of the line.

Fulk finds further evidence for the existence of OE secondary stress in Orm's orthographic convention. By Orm's spellings, short vowels are indicated by following double consonants whereas the final nongeminate consonant manifests a long preceding vowel. The heavy derivational suffixes *-lēas-*, *-dōm-*, and *-hād-* carrying secondary stress are followed by a single consonant even in uninflected forms. In particular, the suffix *-dōm*, when inflected, is never found in OE verse in a position where ictus is placed.

Thus, we see that there seems to be enough phonological and metrical evidence to support a claim for the existence of OE secondary stress. Even though the evidence cited above from Fulk (1992) cannot be called decisive, it may be convincing enough to refute arguments against secondary stress assignment in OE. The fact that some syllable carrying secondary stress is ignored in OE verse and that it does not bear ictus cannot prove that secondary stress does not exist in OE because there is not necessarily one-to-one relationship between ictus and linguistic stress.

stress between primary stress and no stress, I will just use the term secondary stress as a general term to include Fulk's tertiary stress and Campbell's half-stress.

Therefore, based upon Huguenin (1901) and Cable (1974)⁷, Suphi (1988: 189) proposes, “while all linguistic stresses need not be reflected in the metre, a rise on the other hand, can only be filled by a syllable which has some degree of stress.” Put another way, even though ictus-bearing syllables contain some degree of phonological stress, all stressed syllables do not necessarily bear metrical ictus. Therefore, it cannot be said that secondary stress does not exist just because it does not bear metrical ictus.

Furthermore, the reduction of some syllables carrying secondary stress in late OE cannot indicate the absence of secondary stress because, as discussed above, stressed and unstressed forms of heavy derivational suffixes or quasi-compounds coexist, depending on whether they are followed by an inflectional ending. If such words appear to have reduced vowels in the syllable carrying secondary stress in late OE, analogy may play a role and unstressed forms may be generalized in accordance with an overwhelming tendency of reduction of unstressed syllables at that time. In conclusion, without more convincing evidence against OE secondary stress, I shall continue to assume secondary stress does exist in OE.

Now let us return to the issue of weight sensitivity in OE secondary stress assignment. It is important to note that the placement of secondary stress is described in terms of phonological structure (e.g., syllable or syllable weight) as well as morphological information (e.g., distinction between two compounds depending on semantic force of their second element). In detail, OE secondary stress is phonological because it is found only with heavy syllables when it is placed on the heavy suffixes and stems. In particular, heavy syllables following initial light syllable do not carry secondary stress (see (2d)). Therefore, in such cases, secondary stress assignment is sensitive to the weight of the syllable where it is assigned and to the weight of the preceding syllable carrying main stress. In addition, OE secondary stress placement also refers to morphological information of the words where it occurs. As shown above, regular compounds whose second elements have full meaning have secondary stress regardless of whether the syllable carrying secondary stress is word-final or not, or whether it is heavy or not. By contrast, the second elements of quasi-

⁷ With regard to the relationship between secondary linguistic stress and its representation in the meter Huguenin (1901: 8) writes, “Such syllables do not belong to the stress-scheme of the verse. Since these syllables – under other conditions capable of secondary stress – are on account of their environment no longer available for ictus, they must be in accentuation below the grade of the usual secondary stress. Consequently, relative suppression of the potential second accent will take place only when this accent occurs between two stresses, or between a stress and a pause at the verse end.” Cable (1974) also proposes a condition to make a distinction between linguistic stress and metrical ictus that “a syllable can bear metrical ictus only if it has greater linguistic prominence than at least one adjacent syllable.” (All citations are directly from Suphi (1988: 188)).

compounds carry secondary stress only when they are word-final. This means that morphological information of compounds must be referred to at some level before secondary stress assignment. These non-uniform features of OE secondary stress assignment are summarized below in (3).

(3) Non-uniform features of OE secondary stress assignment

	Syllable-weight sensitivity	Position in a word
Compounds	insensitive (heavy or light)	final or medial
Quasi-compounds	insensitive (heavy or light)	medial
Suffixes	sensitive (heavy)	medial

Additionally, the asymmetry between main stress and secondary stress must be captured. As described above, OE main stress assignment is mainly morphological while secondary stress assignment is mainly phonological with some morphological aspects. In this article, I account for this difference between the two stresses by means of the separation of the prosodic domains in which they are assigned.

The following section provides a critical review of previous analyses of OE stress. It is shown that the asymmetry between main stress and secondary stress, as well as the non-uniformity of secondary stress assignment has not been captured in the previous literature.

3. Previous Analysis

The first attempt at a formal description of OE word stress can be found in Halle and Keyser (1971: 87-97). This pioneering work has been followed by a number of recent formal analyses made within different theoretical frameworks such as Suphi (1985, 1988), McCully and Hogg (1990), McCully (1992), Dresher and Lahiri (1991), Halle, O'Neil and Vergnaud (1993), Idsardi (1994), Moon (1996), Bermúdez-Otero (1996), Gąsiorowski (1997), Hutton (1998), and McCully (1999a,b). Some representative works are critically reviewed below.

Suphi (1985, 1988) argues that stress is assigned in the lexicon, accompanied by rules of word-formation, and is sensitive only to morphological criteria. According to these analyses, the OE lexicon is organized into two levels on the basis of the different behaviors of prefixes and suffixes with respect to the OE stress: only morphemes which are present at level 1 are subject to the stress rule and thus only they surface

with some degree of stress. The affixes are classified mainly based on the syntactic category of the word to which they attach: nominal and adjectival prefixes at level 1 and verbal prefixes at level 2. Thus nominal and adjectival prefixes are assigned main stress while verbal prefixes are not.

Even though this morphologically-based approach to stress assignment works well in accounting for different behaviors of OE affixes with regard to main stress, it has some problems. One of them comes from his analysis of secondary stress assignment on quasi-compounds and heavy derivational suffixes. Suphi (1988: 192) places the second elements of quasi-compounds and heavy suffixes carrying secondary stress in the same category as lexical suffixes. He proposes that these stressed lexical suffixes are affixed at level 1 while the other stressless suffixes occur at level 2. The lexical suffixes are assigned main stress by an OE stress rule as is a nominal or adjectival prefix. Then, the Word Rule applies and derives main stress on the initial syllable of a root and secondary stress on the lexical suffixes. Therefore, in his analysis, all lexical suffixes are assigned main stress by the OE stress rule regardless of the weight and the morphological position of the syllable just because they are affixed at level 1. And then the Word Rule applying at the end of level 2 may derive main stress on the left-most syllable carrying main stress and secondary stress on the following main stress. Namely, main stress and secondary stress are purely derived on morphological grounds and so phonological factors (e.g., syllable weight) are completely ignored. However, as shown in (3), it is important to note that the lexically stressed suffixes in Suphi's analysis are not stressed when they are in the word-final position or they are light. In Suphi's purely morphological framework, there is no way to make a distinction between heavy and light suffixes, and between lexical suffixes in the word-final and in the word-medial positions in terms of stress patterns. Secondary stress is mechanically computed by the Word Rule in a phonologically blind way on the stems and affixes which occur at level 1 and thus undergo the main stress rule.

Another recent morphological analysis of OE stress is Hutton (1998). He claims that metrical structure in OE is quantity-sensitive and it mainly consists of [H] and [LL]. Metrical foot formation also permits word-initial [LH] and [L]. However, he goes on to claim that the OE stress assignment is morphologically determined because the quantity-sensitive demand of the metrical foot is overridden by the morphological sensitivity of the OE stress system which was originally inherited from Proto-Germanic.

Following Halle and Vergnaud (1987), Hutton argues that the lexicon in OE is organized into two levels: cyclic and noncyclic. Unlike the lexical model employed by Suphi (1988), a loop between cyclic and noncyclic levels is allowed. Therefore, the cyclic and noncyclic affixes are interleaved and thus the ordering of morphemes does not necessarily mean

that cyclic affixes always precede noncyclic ones. Hutton proposes that in OE, roots and nominal prefixes (except stressless prefixes like *ge-*) occur at the cyclic level while all suffixes and inflectional endings are affixed at the non-cyclic level. To account for OE stress, he presents the following parameters as in (4) where *c* and *n* stand for cyclic and noncyclic respectively.

- (4) Parameters for stress assignment in OE (Hutton 1998: 873)
- a. Iteration: no (c/n)
 - b. Direction of footing
 - i. Left to right (c)
 - ii. Right to left (n)
 - c. Degenerate feet: yes
 - i. Yes (c; in strong position)⁸
 - ii. No (n)
 - d. Level of parsing: moraic
 - e. Head: left (c/n)
 - f. Nonfinality⁹: yes (n)
 - g. *Lapse (n): the head of a foot should not be more than one syllable from the right edge of the PrWd.
 - h. End rule: left

To account for secondary stress assignment in OE, Hutton assumes that the second elements of quasi-compounds¹⁰ and heavy suffixes are noncyclic. The fact that secondary stress does not fall on the final syllable of these non-cyclic morphemes is captured by the prohibition of foot construction word finally, which is enforced by *Nonfinality* in (4f).

This morphological (and partly phonological) analysis of OE stress has some advantages. As in Suphi (1988), morphological sensitivity of main stress assignment and secondary stress assignment on compounds is well accounted for by the parameters applying to the cyclic domain. In addition, secondary stress assignment on quasi-compounds and derivational suffixes is also derived by noncyclic parameters. In particular, the phonological aspect of OE secondary stress (e.g., quantity-sensitivity of secondary stress on the penultimate of suffixes) was enforced by a synchronic constraint **Lapse* in (4g). Therefore, Hutton's approach is morphological and partly

⁸ Hutton (1998: 863) argues that a degenerate foot may occur only in a light initial monosyllable. For instance, he states that a generated foot is constructed on the stressed prefix *un-* preceding a vowel.

⁹ "No foot is absolutely final in the prosodic word" (Hutton 1998: 865). Hutton proposes this constraint to explain that final syllables of suffixes and reduced compounds do not carry secondary stress. Therefore, he claims that this constraint applies only to noncyclic affixes.

¹⁰ The second elements of quasi-compounds are called 'compound suffixes' by Hutton (1998). For consistency and convenience, the term 'quasi-compounds' is consistently used.

phonological.

However, there are some problems in Hutton's analysis of OE stress. Hutton stipulates that a degenerate foot may be generated only in a metrically strong position at the cyclic level. For instance, he argues that cyclic prefixes may have a degenerate foot on their initial syllable when they are followed by a vowel. The prefix *un-*, for example, is assigned a degenerate foot even when it becomes monomoraic by being attached to a stem beginning with a vowel at the cyclic level. However, a degenerate foot cannot be generated on the initial light syllable of stems like *cýninges* even though the initial syllable of this word is in the strong position at the cyclic level. Thus, Hutton allows a foot parsing [LH] ([cýning]es) which is, in fact, not a typical pattern for a bimoraic trochaic foot.¹¹ It is not clear what the conception of 'strong position' is. It is ad hoc to stipulate that a degenerate foot is only allowed on the prefix occurring on the initial strong position at the cyclic level.

Dresher and Lahiri (1991) (henceforth, DL) briefly analyze OE stress. DL argue that the OE stress system requires a new type of the metrical foot that they term the Germanic foot. The Germanic foot can contain up to four moras, essentially the canonical iambs of Hayes (1985, 1995) – H, LL or LH. The Germanic foot has trochaic prominence, with the leftmost element as the head. They propose the Germanic Foot and *Final Destressing Rule* to account for OE stress assignment as in (5):

- (5) a. Germanic Foot: From left to right, build binary, quantity-sensitive left-headed trees whose left branch contains at least two moras.
- b. Final Destressing Rule: Defoot a final weak non-branching foot.

Left-dominant word trees constructed by the Germanic Foot formation in (5a) account for main stress assignments on the first syllables of OE words. The fact that final syllables generally do not receive secondary stress is accounted for by the *Final Destressing Rule* (5b). The foot trees constructed by (5a), which represent mora, syllable and foot structures in a hierarchical order, work well in accounting for OE stress, especially, syllable weight sensitive secondary stress assignment.

In spite of the advantages, their analysis has some drawbacks. The first problem arises from their foot formation. The Germanic Foot proposed by

¹¹ The foot parsing of [LH] in a bimoraic trochaic foot system is also proposed by Dresher and Lahiri (1991). However, Hayes (1985, 1995) criticizes that this kind of foot formation is not empirically well attested and [LH] is a typical pattern for an iamb.

DL in (5a) is ad hoc because it allows the parsing of $[LH]_F$, a canonical iambic foot even though it, they claim, is a trochee. Hayes (1985) observes that this kind of foot formation is not well attested.¹²

Another drawback is that the *Final Destressing Rule* in (5b) may produce wrong stress pattern on compounds. This eliminates a final non-branching foot, thus preventing secondary stress from occurring on the final syllable. However, if this rule applies to monosyllabic second elements of compounds (e.g., *hórs-fèt* 'feet of a horse') which retains its semantic force, and thus removes the foot on the second element, secondary stress cannot occur in the second element. Consequently, the wrong stress pattern is produced. Therefore, the *Final Destressing Rule* must refer to lexical information of the final syllable before it applies.

OE stress has been analyzed in the OT framework by Moon (1996), Bermúdez-Otero (1996) and McCully (1999a,b). Even though these analyses commonly provide a constraint-based account of OE stress, they differ in terms of constraints they propose and the ranking of the constraints. There is not even an agreement among them about whether levels can be completely removed in the constraint-based analysis. For example, unlike Moon (1996) and Bermúdez-Otero (1996) who assume a single level in line with the traditional OT concept, McCully (1999b) takes the view that OE constraints should operate at two different levels: cyclic and non-cyclic levels. Let us review Moon (1996) first to see how OE stress can be analyzed in the OT framework where a single level is assumed and then discuss why McCully comes to have a multi-level constraint-based approach.

Moon (1996) classifies OE words into two groups based on their morphological structure: non-derived words and derived ones (e.g., prefixed words and compounds). She claims that non-derived words have a single prosodic word while derived ones have more than one prosodic word. In her analysis, different behaviors of OE words with regard to stress patterns are the result of their different prosodic status and the appropriate prosodic structures are selected by the interaction of constraints referring to the morphological information of the words they affect. The constraints and their hierarchy for the account of OE stress are summarized in (6).

(6) a. Constraints for OE stress assignments (Moon 1996: 122-123)

- (i) Foot Binarity (FTBIN): Every foot is minimally binary at some level of analysis (μ , σ), i.e., either syllabically or moraicly binary.
- (ii) Foot Form (FTFORM): ALIGN (FT, L, H(FT), L): The left

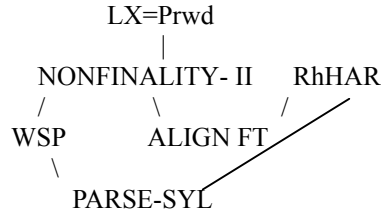
¹² According to Hayes (1985, 1995), in a language which has a trochaic foot, LH and HL are footed as $L[H]_F$ and $[H]_FL$, respectively, where the Ls are left unfooted.

edge of every foot coincides with the left edge of the head of the foot. (Trochaic Foot)

- (iii) ALIGN Head (PrWd, L, H(PrWd), L): The left edge of the PrWd must be the head of the PrWd. (Primary stress assignment)
- (iv) LX=PrWd: A member of the morphological category M_{Cat} corresponds to a PrWd.
- (v) NONFINALITY-II: No prosodic head of a foot is final in a PrWd.
- (vi) Rhythm Harmony (RhHAR): HL is prohibited. (= *HL)
- (vii) PARSE-SYL: Every syllable belongs to a foot.
- (viii) Weight-to-Stress Principle (WSP): Heavy syllables are prominent in foot structure and on the grid.
- (ix) ALIGN FT (FT, R, PrWd, R): Every foot stands in final position in a PrWd.

b. The constraint hierarchy for OE stress

undominated constraints: FTBIN, FTFORM, ALIGN Head



A monomoraic degenerate foot (e.g., [(cý)(ning)]¹³) is prohibited by FTBIN (6(i)) and FTFORM (6(ii)) enforces trochaic foot parsing (e.g., [(cýning)] but *[(cýning)]). Initial prominence is represented by ALIGN Head (6(iii)) (e.g., [(æþe)(líng)es] but *[(æþe)(líng)es]). NONFINALITY-II (6(v)) accounts for the absence of word-final stress (e.g., [(æþe)ling] but *[(æþe)(líng)]). However, the presence of main stress in monomoraic lexical words (e.g., [(wýrd)]) is explained by the ranking of constraints, LX=PrWd (6(iv)) > NONFINALITY II (6(v)). In addition to FTFORM (6(ii)), RhHAR (6(vi)) enforces trochaic foot parsing by prohibiting iambic foot parsing composed of one heavy syllable and a following light syllable (e.g., [(H)L] but *[(HL)]). WSP (6(viii)) accounts for the fact that secondary stress appears on the heavy syllables.

¹³ In Moon (1996), a foot is indicated by a parenthesis, () and a prosodic word by an angled bracket, [].

This OT analysis of OE stress discusses different behaviors of non-derived words and different kinds of derived words based on the differences in their morphological and prosodic structures. Without rule orderings and levels, the relevant prosodic structures of the different kinds of words are selected by the hierarchy of the constraints. It is significant to note that OE stress patterns are accounted for on a morpho-phonological basis in this OT analysis.

Moon seems to gain an analytical advantage by integrating OE stress patterns into a single constraint ranking and by removing levels and rule orderings. She states that her constraint-based analysis “unifies the stress pattern of ‘fully stressed’ words, ‘lexicalized’ compounds and words with derivational suffixes, as well as nonderived words, into one hierarchy of universal constraints.” (Moon 1996: 165) However, this analytical gain is achieved at the expense of explanatory power. In other words, the main features of OE stress patterns discussed in the previous section are not accounted for in a motivated way even though they work mechanically. Recall that OE stress patterns are featured by asymmetry between main stress and secondary stress and by non-uniformity of secondary stress. Main stress is assigned on the left edge of OE words (root initial or word initial) and its assignment is morphologically sensitive. By contrast, secondary stress appears on the right edge of words and its assignment is morpho-phonological. In addition, secondary stress of compounds is determined between two main stresses on each element while secondary stress of derivational suffix and quasi-compounds is assigned in the quantity-sensitive way. These features will be well accounted for in my derivational analysis by postulating lexical levels and differentiating domains of stress assignment. However, these important features of OE stress are not captured in the single-level analysis because a single hierarchy of constraints is used to account for both main and secondary stresses. Even though Moon discusses different behaviors of OE words with regard to stress based on morphological structures of OE words, she fails to show in a motivated way how the different morphological structures surface. For example, in order to account for main stress assignment of derived words, she proposes alignment constraints. These phonological constraints can refer to morphological information of the words they apply to. For instance, some constraints such as WdCon, ALIGN-RT, ALIGN-STEM_{NOUN} must refer to the morphological status of the words they affect before they select optimal prosodic structures. However, other constraints such as NONFINALITY-II, WSP and PARSE-SYL apply in a morphologically-blind way. Therefore, there seem to be two kinds of constraints in terms of their morphological sensitivity: morphological constraints and non-morphological constraints. Furthermore, there is seen another asymmetry among the constraints. Namely, while

some constraints such as ALIGN HEAD and ALIGN-STEM_{NOUN} play a role only to derive main stress, other constraints such as NONFINALITY-II are needed only for secondary stress assignment, which is not allowed to appear in the word-final heavy syllable. These differences among the constraints in terms of their morphological sensitivity and phonological role cannot be captured in the single-level theory. That is the reason why Moon (1996) fails to account for the asymmetry between main and secondary stress and non-uniformity of secondary stress assignment. Furthermore, this OT analysis fails to show in a motivated way why morphological constraints can have access to morphological information of the words they apply to. Therefore, the morphological constraints actually play a similar role to that of extrametricality, or the morphological stipulations of phonological rules in the derivational phonology.

These problems do not arise in the derivational analysis. The insight of the lexical phonology adopted in my analysis clearly captures the differences of phonological rules in terms of their morphological sensitivity and phonological roles in a motivated way. In particular, the interaction between phonology and morphology is accounted for in a systematic way by separating the lexical levels and the phonological domains of the application of phonological rules. In such a well-motivated theoretical framework, the main features of OE stress (e.g., asymmetry between main and secondary stress and non-uniformity of secondary stress) were well accounted for.

In conclusion, the analytical advantage Moon gains by removing lexical levels and rule ordering, relying instead on a single level and a single hierarchy of constraints, sacrifices explanatory gain. Therefore, it is not surprising that McCully (1999b) recognizes multiple levels in his OT analysis of OE stress. He states:

“What seems impossible here is to agree with Pater that ‘stress assignment can be integrated into a single level’ as far as OE is concerned. As far as the apparent facts reviewed here go, Root Stress is weight-blind, and acts in concert with cyclic affixation to produce ‘left-edge stress’ in OE. Non-cyclic affixation, on the other hand, is in OE very much a right-edge process, and unlike Root Stress, is incipiently (at least) quantity-sensitive” (McCully 1999b: 31).

His argument may come from the necessity to capture the morpho-phonological features of OE stress assignments. Therefore, he claims that different constraints must be used at different levels in order to handle different behaviors of OE morphological categories with regard to stress pattern. He thus assumes that OE constraints for stress pattern are assigned

at two separate levels: cyclic and non-cyclic. His tentative ranking is summarized in (7).

- (7) Tentative constraint ranking for OE (McCully 1999b:33)
 - a. Cyclic
 - Root Stress > Initial Prominence > Nonfinality, Align-L > Ft-Bin
 - b. Non-cyclic
 - Ft-Bin > Parse Syllable > Weight-to-Stress

It is hard to determine now if McCully's OT framework with multi-levels works better than Moon's traditional single-level OT analysis in accounting for OE stress assignment. It is beyond the scope of this work to discuss how an OT framework with levels works and what advantage it can achieve. But the emergence of multi-level OT analysis of OE stress indicates that the main features of OE stress assignment cannot be accounted for in a motivated way in the single-level framework of OT. In this aspect, the analytical gain of Moon's OT analysis becomes weak.

In OT, every language makes use of the same set of constraints, but the ranking of constraints differs depending on individual languages. Moon argues that the constraints proposed for OE stress assignment are all universal. However, some constraints, she proposes are hard to regard as universal. For instance, ALIGN STEM_{NOUN} which applies to nominal prefixes and constitutes a foot on them, is motivated by main stress assignment of OE nominal prefixes. It does not make any sense to assume that this idiosyncratic and language-specific constraint universally exists in all languages. Therefore, it is not convincing to claim that OE stress is integrated into a hierarchy of universal constraints without language-specific constraints, rules, or parameter settings.

In sum, I showed some advantages and drawbacks of the previous works of OE stress assignment. To account for main and secondary stress assignment in OE, they provided their own prosodic algorithms within the different theoretical frameworks. The main problem they commonly had was to fail to capture the asymmetry between main and secondary stress assignment as well as non-uniformity of secondary stress placement. They just used the same prosodic algorithm to account for all stress patterns in OE and thus had theoretical paradox to use quantity-sensitive foot in order to account for quantity-insensitive main stress in OE. The following section shows how to handle this problem in my prosodic algorithm and how OE stress patterns can be accounted for in an explanatory way.

4. Alternative analysis

Van der Hulst (1984) and van der Hulst and Booij (1994) propose a "main

stress first” approach, where main and secondary stresses are assigned separately at different domains. According to this view, main stress is assigned first and then secondary stress assignment occurs in a language where their assignment operates differently, and consequently the algorithms of the assignment differ.

As discussed above in section 2, main stress assignment and secondary stress assignment in OE operate differently: main stress is sensitive to morphological information and secondary stress is sensitive to phonological structure. In line with van der Hulst (1984) and van der Hulst and Booij’ (1994) view, I assume that main stress and secondary stress in OE are assigned in different domains. Morphologically-sensitive main stress is assigned in the domain of the syllable and phonologically-sensitive secondary stress is placed in the domain of a higher prosodic unit, the foot. The asymmetry of the two stresses in Germanic is well captured by simply separating the domains of their assignment: main stress assignment in the domain of the syllable and secondary stress assignment in the domain of the foot.

4.1 Main stress assignment

It has been proposed within lexical phonology that the lexicon consists of an ordered set of domains in which specific word-formation processes take place. The motivation for the division of the lexicon into a number of levels is found from groupings of morphological and phonological behaviors: some affixes share certain properties with respect to being subject to one set of phonological rules and not another. Lexical phonology thus emphasizes the relationship between morphological structure and phonological rules by claiming that the latter apply to the outputs of each morphological process in their designated domain. Therefore, the phonological rules applying in the lexicon are cyclic.

In the analysis of main stress, I appeal to lexical phonology because, as I have already pointed out, main stress is sensitive to morphological operations (e.g., prefixing). I claim that, regardless of word category, stressed prefixes are attached to their stems at level 1 before the stress rule applies and stressless prefixes at level 2 after stress rule applies.¹⁴ I assume that compounding occurs at level 2 after inflectional suffixation. The division of the OE lexicon can be summarized as in (8).

¹⁴ I will not discuss it in detail here because suffixation does not have any effect on main stress assignment in OE.

(8) OE Main Stress Assignment in the lexicon

Level 1
Main stress assignment
Affixation

Level 2
Main stress assignment
Affixation
Compounding

In the beginning of level 1, every stem is assigned main stress. Then, stressed prefixes are attached to their stems at level 1 and assigned main stress in the beginning of level 2. On the other hand, prefixes attached to the stems at level 2 do not carry main stress because main stress has already been assigned at level 2 before their attachment. The Germanic main stress rule can be thus formulated as in (9):

(9) Germanic Main Stress Rule (GMSR)¹⁵

$[\sigma \rightarrow [\sigma_s$

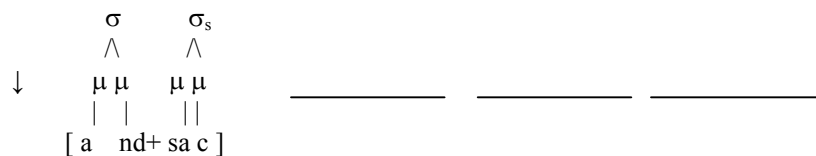
This rule simply states that a morpheme-initial syllable is assigned main stress regardless of its weight. The GMSR (9) implies that syllabification is ordered before the stress rule. This syllabification rule applies cyclically after each affixation (e.g., *sac.* → *on + sac.* + *an* → *on.sa.can*).

Let us look at how the GMSR (9) works in accounting for OE main stress assignment in the lexicon as organized in (8). Sample derivations are given below:

	(10) a. ándsàca (N.)	b. onsácan (V.)	c. gefeóht (N.)	d. góldwlànc (compound)
Level 1				
Syllabification				
	σ_s ^	σ_s ^	σ_s ^	σ_s σ_s ^ ^
↓	μ μ	μ μ	μ μ	μ μ μ μ
GMSR	[sac]	[sac]	[feoht]	[gold] [wla nc]
↓				

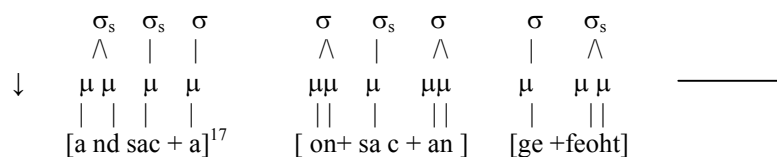
¹⁵ Non-initial syllables following an initial stressed syllable remained underspecified (and thus unmarked) for stress on the syllable level.

Affixation

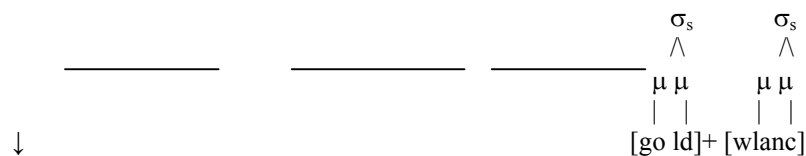


Level 2

GMSR

Affixation¹⁶

Compounding



¹⁶ The attachment of inflectional endings does not affect stress patterns in Old English. Thus I assume that all inflectional suffixes are added at level 2.

¹⁷ I assume that syllabification occurs cyclically in the lexicon after each affixation. When a suffix with an initial vowel is added to a stem with a postvocalic final consonant (e.g., *sac + a*), the consonant is resyllabified as an onset of the following syllable in accordance with the Onset Maximal Principle to avoid an onsetless syllable and the resyllabified consonant leaves a stray mora. There are two ways of treating the stray mora: deletion or reparsing by some process like compensatory lengthening. Since no compensatory process occurs after resyllabification, I assume that the stray mora deletes.

Before foot formation

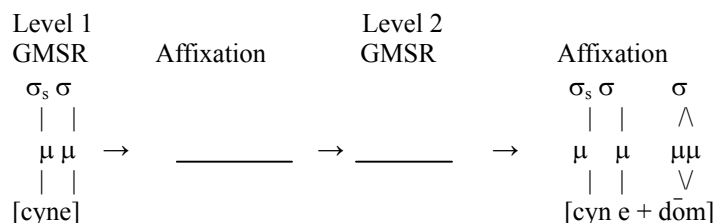
σ_s	σ_s	σ	σ	σ_s	σ	σ	σ_s	σ_s	σ_s
\wedge			\wedge		\wedge		\wedge	\wedge	\wedge
$\mu\mu$	μ	μ	$\mu\mu$	μ	$\mu\mu$	μ	$\mu\mu$	μ	$\mu\mu$
a	nd	sa	ca	on	sa	c	an	ge	feo
								ht	go
								ld	wl
									anc

The GMSR in (9) labels strong an initial syllable of each morpheme present at level 1, placing main stress on it. After stressed prefixes are affixed at level 1, the GMSR applies at level 2 to assign main stress to them. Since stressless prefixes and suffixes are attached at level 2 after the application of the GMSR, they do not acquire stress, thus to be left unmarked. With regard to a compound word in (10d), the first element and the second element are assigned main stress at level 1 and then they are compounded at level 2, maintaining their main stresses. Consequently, prefixed nouns (adjectives) have the same stress pattern with compounds having two main stresses. It is shown in section 4.2 that secondary stress is derived from the second main stress by trochaic prominence of the bimoraic foot in Germanic on the foot level (e.g., *ándsáca* → *ándsáca*, *góldwlánc* → *góldwlánc*).

With regard to quasi-compounds, I take the view that their second elements cannot be treated as lexical words in OE anymore because of the significant degree of semantic and phonological reduction they have undergone. Compared to quasi-compounds in Proto-Germanic, these OE quasi-compounds tended to be much more reduced semantically and underwent considerable phonological changes in all cases. It is not even easy to trace the original lexical words from which the second elements came. Considering the growing tendency of vowel reduction in the weakly-stressed syllables in Germanic, it is not unnatural to have the greater reduction of the second elements of quasi-compounds in OE. I call these reduced elements of quasi-compounds lexical suffixes.¹⁸ Synchronically, it is hard to make a distinction between historical suffixes and lexical suffixes in terms of their phonological roles in OE. Therefore, I assume lexical suffixes are identical with historical suffixes for the metrical purpose in OE, and thus classify these quasi-compounds not as compounds but as affixed words. In consequence, the lexical suffixes are attached to the preceding lexical elements at the same level (level 2) where derivational and inflectional suffixes occur. (11) shows derivations of OE lexical suffixes and their main stress assignment.

¹⁸ In similar fashion, Hutton (1998) refers to these quasi-compounds as compound suffixes.

(11) Main stress assignment of OE lexical suffixes



As shown in (11), main stress is only assigned on the initial syllable and the lexical suffix cannot carry stress because it is attached after the GMSR applies at level 2. The following section shows how different types of secondary stress are derived in the domain of the foot.

4.2 Secondary stress assignment

I propose that the foot in Germanic¹⁹ is a bimoraic trochee and claim that secondary stress in OE is assigned in the domain of the bimoraic foot. The parameters of the foot can be described in (12).

(12) The parameters of the foot in Germanic (the bimoraic trochee)

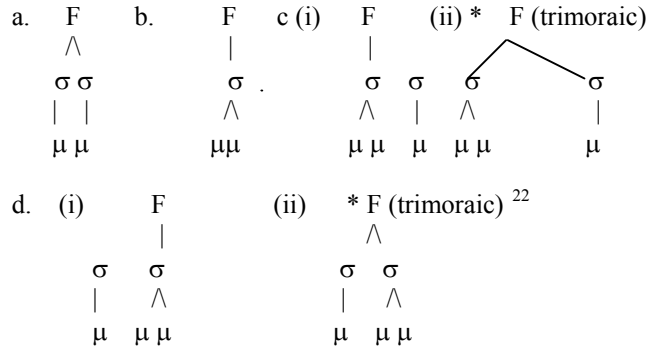
- a. Feet are bimoraic.
- b. Feet are parsed from left to right.
- c. Feet are left-dominant both at foot-level and at word-level.²⁰
- d. Foot construction is iterative.
- e. Degenerate feet are not allowed.
- f. Stray moras or syllables can be refooted by some phonological process.

The bimoraic requirement in (12a) limits the possible number of patterns of feet to only two: $[[\mu\mu]_\sigma]_F$ or $[[\mu]_\sigma, [\mu]_\sigma]_F$, disallowing $*[[\mu\mu]_\sigma, [\mu]_\sigma]_F$ ²¹ or $*[[\mu]_\sigma, [\mu\mu]_\sigma]_F$ which consists of three moras as illustrated below in (13).

¹⁹ In Kim (2000), I showed the phonological role of the bimoraic trochee from Germanic to Middle English. I argued that the foot served as a phonological domain of gemination in West Germanic, Sievers' Law in East Germanic, High Vowel Deletion in Old English, vowel lengthening in Middle English, and so on. In accordance with this view, I claim that the bimoraic foot is constructed by the same parameters in (17) throughout all the periods of Germanic.

²⁰ The parameter governing dominance at word level can be derived indirectly, as at foot-level. Word-level labeling may refer to the internal structure of feet in accordance with the Metrical Locality principle (Hammond 1982) which states that rules may refer only to elements at the same or adjacent layers of metrical structure.

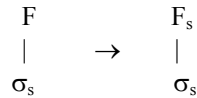
(13) Foot Formation in Germanic



The monomoraic σ s in (13ci) and (13di) are skipped in the process of foot formation because trimoraic feet would otherwise be generated as in (13cii) and (13dii). According to the parameter in (12e) disallowing degenerate feet, a bare σ remains unfooted. However, stray syllables can be repaired by some processes (e.g., lengthening of consonants as in West Germanic Gemination). Otherwise, since the status of the stray syllables is not prosodically stable, the segments in such syllables can be deleted (e.g., OE High Vowel Deletion).²³

After foot construction, secondary stress is assigned to the foot. To account for secondary stress assignment on the foot level, the location of main stresses on the syllable level should be marked on the foot level. I postulate that main stress assigned on the syllable level percolates into the foot level by the *Stress Percolation Rule* formulated in (14).

(14) Stress Percolation Rule (SPR)



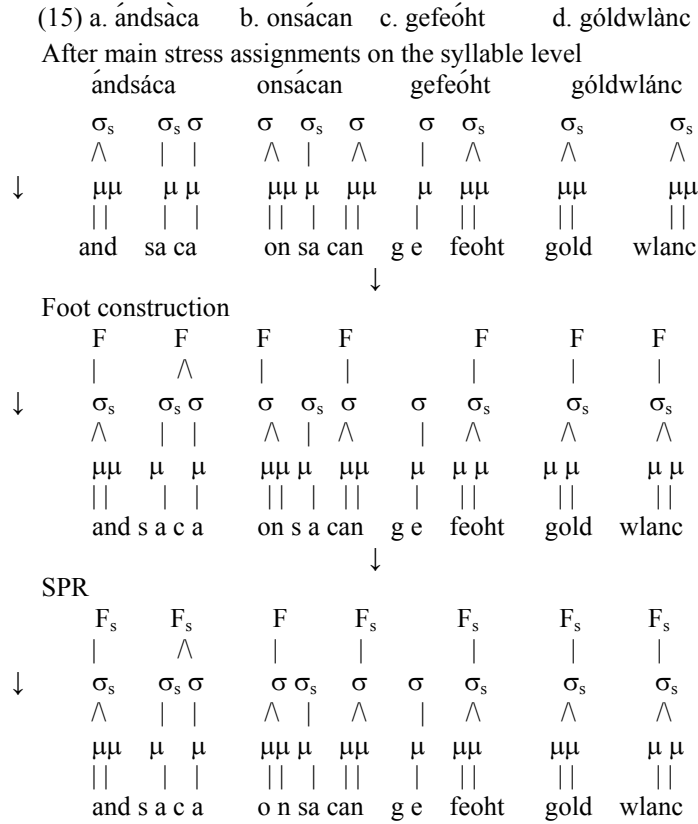
²¹ The trochee of syllables which are unequal in terms of weight (e.g., [HL]) is called the *uneven trochee* by Hayes (1995: 76). The *uneven trochee* is presented by Myers (1987) and Kager (1989) for English, Jacobs (1990) for Latin, and Drescher and Lahiri (1991) for Germanic.

²² The avoidance of [LH]_F in the trochaic languages is observed by Kager (1993) in Australian languages and Finnish. According to him, in such trochaic languages, [LH]_F is avoided by *Skipping* (Gooniyandi, Guugu Yimidhirr, and Yindjibarndi), *Shortening* of the second syllable (Latin, English), or *Lengthening* of the first syllable (Finnish).

²³ See Kim (2000) for relevant prosodic analyses of OE High Vowel Deletion and West Germanic Gemination.

If two main stresses on the syllable level percolate into the foot level, secondary stress is automatically derived by the initial prominence parameter (trochaic prominence) of the foot in (12c) (e.g., $F_s F_s \rightarrow F_s F_w$).²⁴

Now let us return to the outputs of morphological operations in (10), and see how foot structures are constructed.



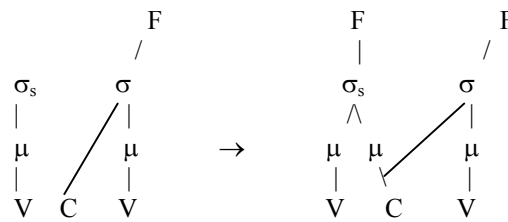
The foot structures are straightforwardly formulated in the words of (15a,d). The bimoraic feet are constructed above the syllable level and the two main stresses assigned on the syllable level percolate upward on the foot level by the SPR. By means of the trochaic parameter of the foot, the first main stress becomes more prominent than the other, so that secondary

²⁴ Stress is marked in three ways on the foot level: S as in F_s - most prominent (main stress), W as in F_w - less prominent (secondary stress), and unmarked as in F - least prominent (no stress). Therefore, in this analysis, the unmarked foot, F is prosodically the weakest one on the foot level and underspecified for stress.

stress is derived from the second main stress: $F_s F_s \rightarrow F_s F_w$ (e.g., ándsàca: $[\text{and}]_{F_s}[\text{saca}]_{F_s} \rightarrow [\text{and}]_{F_s}[\text{saca}]_{F_w}$, góldwlànc: $[\text{gold}]_{F_s}[\text{wlanc}]_{F_s} \rightarrow [\text{gold}]_{F_s}[\text{wlanc}]_{F_w}$). Recall that secondary stress assignments on OE compounds, as well as prefixed nouns and adjectives are not quantity sensitive, while secondary stress on the suffixes must be heavy and thus appear sensitive to syllable weight. This non-uniformity of OE secondary stress assignments is easily accounted for in this analysis where two different kinds of secondary stresses are assigned in the different ways. As shown in (15a,d), quantity-insensitive secondary stress on prefixed words and compounds is derived from multiple main stresses having been assigned to the initial syllables in the relevant morphological domains. Quantity-sensitive secondary stress falling on heavy syllables of suffixes is assigned by another stress rule on the foot level, which will be discussed below.

In (15b), the bimoraic requirement of the OE foot left the second syllable unfooted. According to (12f), such an unparsed syllable could be reparsed as a foot, otherwise deleted. Notice that this syllable acquired main stress by GMSR at level 1 in the lexicon. In order to refoot the bare σ_s with the main stress, I propose the *Resyllabification Rule* to reparse the unparsed light syllable carrying main stress by means of resyllabifying the onset of the following syllable to the coda of the unparsed syllable. I postulate that the resyllabified consonant is ambisyllabic: it is still the onset of the second syllable as well as the coda of the first one. This *Resyllabification Rule* is formulated in (16).

(16) Resyllabification rule

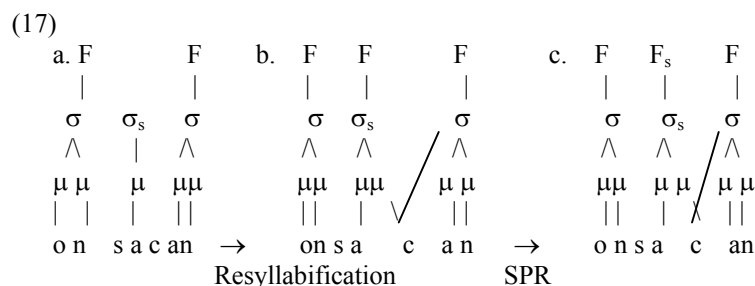


Suzuki (1996a: 247-258) discusses ambisyllabicity of the coda of a stressed syllable in Germanic. According to him, any consonant in the onset of a syllable following a stressed syllable is resyllabified to the coda of the preceding stressed syllable 'by virtue of its stress-inherent attracting power' (Suzuki 1996a: 247). Even after resyllabification, the resyllabified consonant still remains in the onset of the syllable. Therefore, the consonant belongs to the preceding stressed syllable as well as to the following syllable. As one piece of evidence for ambisyllabicity, he

discusses /h/-Deletion in pre-OE period (Suzuki 1996a: 254-256). In the pre-OE period, /h/ deletes between voiced segments (e.g., **séhan* > **séohan* > *sēon* ‘see’, **fēorhes* > *fēores* ‘life’). However, /h/ is not dropped when it is present (1) in geminates (e.g., *hliehhan* ‘laugh’), (2) in the syllable following an unstressed syllable (e.g., *behindan* ‘behind’), (3) in the coda of the second element of a true compound (e.g., *hēahburh* ‘chief town’). Suzuki (1996a: 256) proposes that ‘/h/-deletion be characterized as a process conditioned by ambisyllabicity: when coming to stand in the coda by virtue of ambisyllabification, /h/ was subject to loss.’

I agree with Suzuki’s argument that ambisyllabicity plays a role in Germanic phonology. It is shown below that the ambisyllabicity of the intervocalic consonant plays a role in making a distinction between the heavy syllables which have ambisyllabic consonants and those which do not in terms of the assignment of the secondary stress in OE. However, the motivation of resyllabification in my analysis is different from his. Even though Suzuki does not discuss the motivation of ambisyllabicity in detail, he briefly writes that resyllabification of an ambisyllabified consonant is caused by ‘stress-inherent attracting power’. In this analysis, the resyllabification is prosodically motivated: to reparse an unfooted stressed syllable as a foot.

Let us return to the prefixed verb in (15b). According to the *Resyllabification Rule* (16), the stressed bare σ_s is reparsed as a foot by acquiring an extra mora from the resyllabified consonant as shown in (17).



(17) shows that the stressed syllable acquires an additional mora from its following consonant and so forms a bimoraic foot. Then main stress percolates into the foot level. There is no secondary stress assignment derived from main stress in this word because single main stress appears on the foot level.

Let us return to the word *gefeohht* in (15c). The initial light syllable of the word is left unparsed in the foot formation. The unparsed syllable is not refooted by the *Resyllabification Rule* because it does not carry main stress, thus failing to meet the condition of the rule. I assume that this unfooted

syllable remains until the end of the OE period when unstressed vowels began to be reduced, and then became reduced and finally deleted.

It was shown above that secondary stress on compounds in (15d) or nominal stems in (15a) mechanically derived from two main stresses by trochaic parameter of the foot. As the secondary stress came from quantity-insensitive main stress assigned in the domain of the syllable, it appeared on any type of the syllable (light or heavy/ word-final or word-medial). However, it was pointed out in section 2 that there was another type of secondary stress pattern: quantity-sensitive secondary stress in the non-final syllable (e.g., æþelinges / æþeling, ðǫþerne / ðǫþern). Now let us look at quantity-sensitive secondary stress assignment in OE. Recall that quantity-sensitive secondary stress falls on the heavy syllable following an initial heavy syllable or two light syllables. Traditionally, this equivalence of a heavy syllable and two light syllables for the metrical purpose is called *resolution*. The resolution principle is well reflected in my bimoraic feet of $[[\mu]\sigma, [\mu]\sigma]_F$ and $[[\mu\mu]\sigma]_F$. Therefore, it can be stated in this analysis that secondary stress is assigned to the foot immediately following a foot carrying main stress (and also dominating σ_s). To account for OE secondary stress assignment, I formulate the *OE Secondary Stress Rule* (OESSR) as in (18):

(18) OE Secondary Stress Rule (OESSR) ²⁵

$$\begin{array}{ccc} F_s & F & \rightarrow F_s \quad F_w \\ | & & | \\ \sigma & & \sigma \end{array}$$

The OESSR in (18) implies that this stress rule applies after the application of the SPR because the first foot must be marked as strong before it applies. Compounds and prefixed nouns carrying two main stresses on the syllable level do not undergo this rule because two main stresses percolate into foot level and thus structural description of the rule is not satisfied in these words. Therefore, the OESSR only affects the words carrying one main stress. The second foot in (18) is not branching, which means it dominates a heavy syllable.²⁶ This forces secondary stress to be placed only on heavy

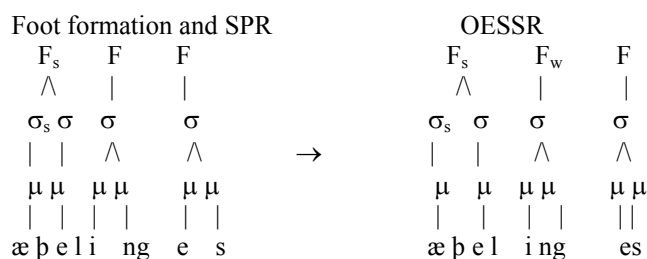
²⁵ The labels used for representing dominance at a syllable level are also used at the foot level: S: most prominent (main stress), W: less prominent (secondary stress), unmarked: least prominent (no stress). Therefore, the underspecified foot, F is the weakest one on the foot level.

²⁶ An anonymous reader pointed out that the OESSR in (18) was ad hoc in view of relational and rhythmic properties of stress because secondary stress was derived by a rule. However, unlike quantity-insensitive secondary stress derived by the left-dominant foot parameter, quantity-sensitive secondary stress in OE cannot simply be computed by the trochaic

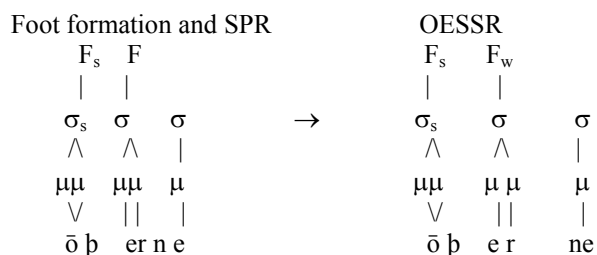
syllables. Finally, the quantity-sensitivity of OE secondary stress assignment is effectively captured in the formulation of the OESSR occurring in the domain of the bimoraic foot. Sample derivations are given in (19).

(19) Quantity-sensitive secondary stress assignment in OE

a. æþelīnges ‘prince, gen.sg.’



b. ōþerne ‘other, acc.sg.masc.’



It is shown in (19) that the second non-branching feet of these words are assigned secondary stress by the OESSR because they dominate a heavy syllable and follow a bimoraic foot.

Recall that there is no secondary stress assignment on the final syllable. For example, secondary stress is absent in the final syllable of the uninflected nominative form, *ōþern* of the word in (19b). By contrast, compounds and prefixed nouns have secondary stress in the final syllable (e.g., *gōld-wlānc*, *órþānc*). Therefore, it is clear that quantity-insensitive

parameter because it is only placed on non-branching foot dominating a heavy syllable. To handle this phenomenon, the OESSR in (18) was proposed. This rule prevents quantity-sensitive secondary stress from being placed on any branching foot. See Jensen (1977) and Mohanan (1986) for the difference between branching and non-branching feet in terms of their metrical role.

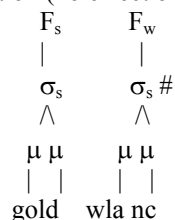
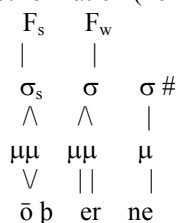
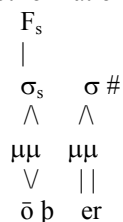
secondary stress can be placed in the word final position while quantity-sensitive secondary stress appears in the non-final syllable. This is another nonuniform aspect of OE secondary stress assignment. This aspect of OE secondary stress assignment is not captured in previous analyses because different kinds of secondary stress patterns are treated in a single way. They should specify some morphological categories of the words the secondary stress rule affects. Namely, they must stipulate in some way that lexical words can carry secondary stress in the final syllable while suffixes cannot.

On the other hand, my analysis clearly makes a distinction between different behaviors of different morphological categories with regard to word-final secondary stress patterns. As secondary stress is mechanically derived from main stress in compounds or prefixed nouns and adjectives, the final syllables of such words are labeled strong on the syllable level. By contrast, final heavy syllables of suffixes are not marked as strong on the syllable level because the GMSR does not apply to them. Therefore, distinct secondary stress patterns of different morphological groups of words are phonologically captured by arboreal notations on the syllable level without the use of morphological stipulation in this analysis. If we have a constraint preventing a word-final syllable without main stress from forming a foot, the absence of secondary stress in the word-final heavy syllables of suffixes is easily accounted for. By contrast, if a word-final syllable has main stress (and thus appears labeled strong), it is allowed to form a foot and is eligible for secondary stress assignment on the foot level. I formulate the constraint as in (20).

(20) Nonfinality

$$\begin{array}{c} * F \\ | \\ \sigma \# \\ \wedge \\ \mu\mu \end{array}$$

The *Nonfinality* constraint in (20) disallows a final unstressed heavy syllable to form a bimoraic foot. Stressed syllables marked as strong on the syllable level are not affected by *Nonfinality*. (21) shows how the *Nonfinality* constraint operates when the foot is constructed.

(21) a. compounds: *góld-wlànc*Foot formation (no effect of *Nonfinality*) / SPR / Trochaic Prominenceb. Inflected word: *ṑpèrne* ‘other, acc.sg.masc.’Foot formation (no effect of *Nonfinality*) / SPR / OESSRc. Uninflected word: *ṑpèrn* ‘other, nom.sg.masc.’Foot formation (application of *Nonfinality*) / SPR

In (21a), the bimoraic foot is constructed on the final stressed syllable. Since the final syllable is stressed, it is not affected by *Nonfinality*. The monomoraic final syllable of the word in (21b) is left unfooted because of the bimoraic requirement of the foot. The second heavy syllable of this word can form a foot because it is heavy and word medial. This foot is assigned secondary stress by the OESSR later. In contrast, the final heavy syllable of the uninflected word in (21c) is not allowed to form a foot on it because of the *Nonfinality* constraint and thus secondary stress cannot appear in this word. Therefore, the different behaviors of the words in (21)

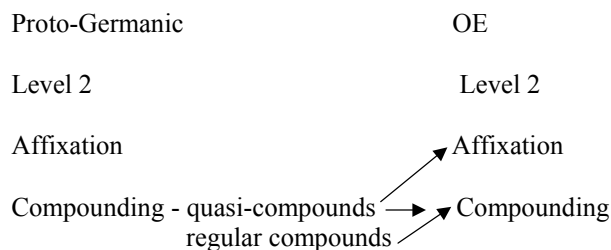
with regard to secondary stress assignment in word final position are accounted for by *Nonfinality* without morphological stipulations.

Let us consider secondary stress assignment on the second element lexical suffixes (quasi-compounds). The lexical suffixes are attached to the preceding lexical elements at level 2 as are historical suffixes. Recall that they are assigned secondary stress only if they are either disyllabic themselves (e.g., *-scipe*) or become word-medial by the addition of inflectional endings (e.g., *-dōmes*) (see (2b)). The syllables carrying secondary stress must be penultimate regardless of their weight. The only difference between lexical suffixes and historical suffixes in terms of stress assignment is that the latter must be both heavy and word-medial to carry secondary stress while the former must be word-medial but do not have to be heavy (see (3)). The absence of word-final secondary stress in both lexical and historical suffixes is enforced by *Nonfinality*. But it seems that the OEISSR in (18) cannot apply to the light syllables of disyllabic lexical suffixes (e.g., *-scipe*, *-bora*) because this rule assigns secondary stress only to heavy syllables. Therefore, there should be another way to assign secondary stress to the penultimate light syllables of lexical suffixes.

It is significant to note that OE lexical suffixes are heavy with only five exceptions: *-bora*, *-scipe*, *-stafas*, *-sum*, *-ware*. These five suffixes have a light initial syllable or become light when immediately followed by a vowel (Hutton 1998: 864-865). With regard to other lexical suffixes beginning with a heavy syllable, the OEISSR and *Nonfinality* produce their secondary stress. The question is again how to assign secondary stress on the light syllable of the five lexical suffixes. In order to deal with this problem, Hutton (1998: 870) stipulates they are lexically accented morphemes. However, it is theoretically undesirable to stipulate there are lexically-accented morphemes in the lexicon. If we assume that quasi-compounds having these light lexical suffixes are still derived by compounding as they were in PGmc, this problem can easily be solved without relying on morphological stipulation. In other words, if the five lexical suffixes are treated as the second elements of compounds for metrical purposes, we can get the correct stress pattern without having any additional device. It can be argued that even though these five second elements of lexical suffixes (quasi-compounds) underwent semantic and phonological reductions so that they might not be recognized as a lexical word by OE speakers, they still remain as lexical words in the OE lexicon. This speculation can be corroborated by stress patterns of Prot-Germanic compounds and quasi-compounds both carrying secondary stress on their second element. Proto-Germanic quasi-compounds had the same stress pattern with compounds even though their second elements were reduced in meaning and phonological form. Due to growing reduction, the second elements of Proto-Germanic quasi-compounds become lexical suffixes in

OE. The theoretical result of the semantic and phonological reduction is a shift of the lexical level for the reduced second elements. While the elements occur from the beginning of the lexicon (thus acquire main stress) and become compounded at level 2 in Proto-Germanic, their OE descendants take place as affixes at level 2 and become attached to their stem by affixation. However, I speculate that the diachronic change of lexical levels does not occur suddenly. I claim that the shift of the lexical level for the reduced elements continued through the course of OE and not completed in OE. Thus, some of the reduced elements such as *-bora*, *-scipe*, *-stafas*, *-sum*, *-ware* still remained as lexical words in the OE lexicon and compounded another lexical words.

(22) Shift of a lexical level for compounds in the OE lexicon



(23) exemplifies secondary stress assignment on the lexical suffixes in OE.

(23) Secondary stress assignment on lexical suffixes

a. *rædbòra*

Level 1 GMSR	Level 2 Compounding	Foot Form & SPR	Trochaic prominence
		F_s F_s	F_s F_w
		\wedge	\wedge
σ_s σ_s σ	σ_s σ_s σ	σ_s σ_s σ	σ_s σ_s σ
\wedge	\wedge	\wedge	\wedge
$\mu\mu$ μ μ	$\mu\mu$ μ μ	$\mu\mu$ μ μ	$\mu\mu$ μ μ
\vee	\vee	\vee	\vee
[ræd][bo ra] → [ræd + bo r a] →		[ræd bo ra] → [ræd bor a]	

b. cýnedōm

Level 1 GMSR	Level 2 Affixation	Foot Form., SPR, & Nonfinality		
		F_s	F_s	$*F$
		\wedge	\wedge	$ $
$\sigma_s \sigma$	$\sigma_s \sigma \sigma$	$\sigma_s \sigma$	σ	$\sigma_s \sigma \sigma$
$ $	$ \wedge$	$ \wedge$	$ $	$ \wedge$
$\mu \mu$	$\mu \mu \mu \mu$	$\mu \mu$	$\mu \mu$	$\mu \mu \mu \mu$
$ $	$ \vee$	$ \vee$	$ $	$ \vee$
[cyne] → [cyne + dōm]	→ [cy n e dōm]			[cy n e dōm]

c. cýnedōmes

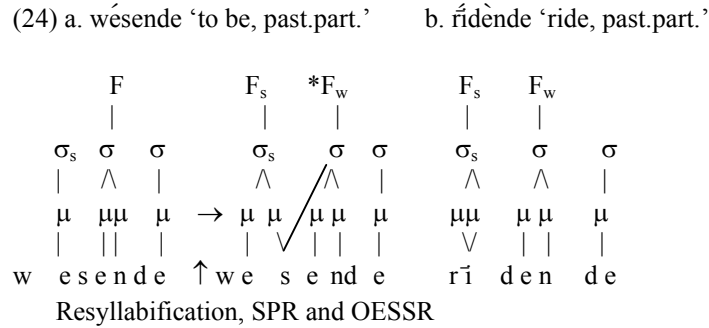
Level 1 GMSR	Level 2 Affixation	Foot Form., SPR, Nonfinality		OESSR
		F_s	F	$F_s F_w$
		\wedge	$ $	$\wedge $
$\sigma_s \sigma$	$\sigma_s \sigma \sigma \sigma$	$\sigma_s \sigma$	$\sigma \sigma$	$\sigma_s \sigma \sigma \sigma$
$ $	$ \wedge \wedge$	$ \wedge$	$\wedge \wedge$	$ \wedge \wedge$
$\mu \mu$	$\mu \mu \mu \mu \mu \mu$	$\mu \mu$	$\mu \mu \mu \mu$	$\mu \mu \mu \mu \mu \mu$
$ $	$ \vee $	$ \vee$	$\vee $	$ \vee $
[cyne] → [cyn e+dōm+es]	→ [cyne dōm es]			→ [cyne dōm es]

It is shown in (23a) that the first syllable of the disyllabic lexical suffix is assigned main stress by the GMSR at level 1 and compounded at level 2. After foot formation and the application of the SPR, the second main stress becomes secondary stress due to trochaic parameter of the foot. Since this lexical suffix acquires secondary stress derived from main stress, its first syllable does not have to be heavy. And the *Nonfinality* constraint cannot affect this lexical suffix because it is disyllabic and assigned main stress.

The uninflected and inflected quasi-compounds in (23b and c) are derived by affixation at level 2 so that they have one main stress on the initial syllable. When the foot is constructed on them, *Nonfinality* does not allow the uninflected suffix in (23b) to form a foot, otherwise non-branching final foot would be constructed. Since the inflected suffix in (23c) is not word final, it forms a bimoraic foot on it without violating *Nonfinality* and undergoes the OESSR.

As Campbell (1959: 35) points out, secondary stress does not appear on heavy syllables following an initial light syllable. My analysis produces the following foot structures of the two words with light and heavy initial

syllables as shown in (24):

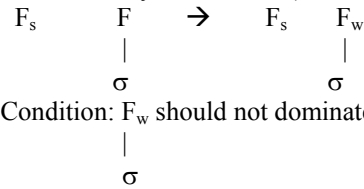


The initial stressed light syllable of the word in (24a) is reparsed as a foot by the *Resyllabification Rule*. As a result of the application of the rule and the subsequent SPR, the two words in (24) have the same foot structures where secondary stress would be assigned on the second foot. To prevent secondary stress from being assigned on the second foot of the word in (24a), we must differentiate the two words whose first syllables are underlyingly different in terms of weight.

Notice that the resyllabified consonant of the word in (24a) is ambisyllabic. After it is resyllabified to the coda, it still remains as an onset. As I briefly discussed above, Suzuki (1996a, c) provides phonological and metrical evidence for the role of ambisyllabicity in OE. He, for example, claims that fricative voicing and /h/ deletion in OE are conditioned by ambisyllabicity (Suzuki 1996c: 247-256). In line with his arguments, I also assume that ambisyllabicity serves as a possible basis for implementation of OE quantity sensitive stress assignment. In my analysis, the OESSR is blocked to apply on the foot dominating any ambisyllable. For the metrical and rhythmical purpose, the blocking of the OESSR is not an unnatural process because the foot dominating an ambisyllable is, in a way, connected with its preceding stressed initial foot through an ambisyllable. It may be argued that the foot is not rhythmically far enough from the preceding stressed foot to carry some degree of stress.

Consequently, we need to add another condition to the OESSR in order to keep secondary stress from being assigned to the foot dominating any ambisyllable as in (25).

(25) OE Secondary Stress Rule (OESSR)



In summary, OE main stress and secondary stress are assigned at the different prosodic domains. Morphologically sensitive main stress is assigned to the syllable, interacting with morphological operations, and phonologically sensitive secondary stress is assigned on the foot level after all morphological operations take place. By differentiating the prosodic domains for application of main stress and secondary stress rules, the asymmetry between main stress and secondary stress assignments is well accounted for. The classification of affixes and the cyclic application of GMSR explain different behaviors of prefixes without relying on morphological stipulations (e.g., postulation of lexically accented morphemes as in Hutton 1998) or any ad hoc device and many exceptions are eliminated (e.g. stressless prefixes, *ge-*, *for-*, *be-*). The Germanic bimoraic foot works well in accounting for secondary stress assignment. Above all, the non-uniformity of OE secondary stress assignments is well captured on the foot level. The quantity insensitive secondary stress assignment on compounds is automatically computed by the trochaic parameter of the foot between two main stresses percolating on the foot level from the syllable level. By contrast, the quantity sensitive secondary stress on the heavy stems or suffixes is placed by a stress rule, the OESSR. The presence and absence of word final secondary stress in compounds and suffixes respectively is also accounted for by *Nonfinality*, which prevents a final unstressed syllable from forming a foot but does not affect compounds carrying main stress in the final syllable. In addition, the well-attested bimoraic foot eliminates a need for ad hoc trochaic foot parsing of DL's analysis (e.g., [LH]_F).

It is important to note that the consequences described above are made possible by two theoretical assumptions. The first one is to differentiate the prosodic domains for main and secondary stress assignments. Since the previous analyses used the same prosodic algorithm for main and secondary stress assignments, the asymmetry between two stresses was not captured. In particular, they could not help but have a theoretical paradox that quantity sensitive trochee must be used to account for quantity insensitive main stress in Germanic. In particular, they had to allow a poorly-attested trochaic uneven foot parsing ([LH]_F) for one single reason, that is, to assign main stress in the initial light syllable immediately

followed by a heavy syllable (e.g., *cýning*). By contrast, such problems did not arise in my analysis because main stress is assigned on the syllable level and secondary stress is placed on the foot level.

Second, the prosodic hierarchy in which different prosodic units are associated with each other in the hierarchical order works well in accounting for interactions of the prosodic units in OE metrical phonology. Since the two stresses are assigned in the different prosodic levels but metrically connected with each other, the metrical rules and constraint (SPR, OESSR and *Nonfinality*) take place in the inter-prosodic levels. These phenomena are effectively represented in the prosodic hierarchy. Therefore, this analysis of OE stress assignments provides evidence for the interactions of prosodic units and the role of the prosodic hierarchy in Old English phonology.

In addition, it must be emphasized that these theoretical and explanatory advantages can be obtained only within a framework which addresses interactions between morphological and phonological operations occurring at different levels. These advantages are hard to obtain in any constraint-based theory which does not allow derivations and rule orderings. It was shown that the asymmetry between main and secondary stress assignments, and non-uniformity of secondary stress in OE were not well explained without having lexical orderings and phonological derivations.

5. Diachronic implication

In this section, I consider diachronic implication of my synchronic analysis of OE stress assignment. To begin with, I briefly describe changes of stress patterns in Middle English and show how my prosodic algorithm can account for them. I argue that the diachronic change of stress assignment in Middle English manifests the presence and usefulness of my stress system. Since there is no change of main stress assignment in Middle English,²⁷ focus is made on secondary stress placement.

It was claimed that there were two kinds of secondary stresses in OE: quantity-sensitive secondary stress assigned on the heavy syllables of suffixes and quantity-insensitive secondary stress assigned on the second elements of compounds. It is not clear whether quantity-sensitive secondary stress is still maintained in native ME words. Campbell (1959: 35) notes that the syllables bearing secondary stress are frequently subject to change and loss in late OE, like unstressed syllables. But Mossé (1952: 14) claims that secondary stress is still assigned on a ‘post-radical’ heavy syllable in long words and compounds in ME even though it is less

²⁷ See Kim (2000: 226-256) for the comprehensive analysis of Middle English stress assignment.

prominent and less frequent than in OE. Moor (1951: 73) also shows some differences between unstressed vowels and those carrying secondary stress in early ME in terms of deletion of the vowel *e*. Unstressed *e* in the final or medial position of polysyllabic words is lost while *e* in the syllable containing secondary stress is maintained in the early ME period (e.g. OE *mýnecène* 'nun' > EME *mínechène* > *mínchène* (loss of medial unstressed vowel *-e-*) > *mínchèn* (loss of final unstressed *-e-*) > *mínchen* (loss of secondary stress)).

It is not clear when quantity-sensitive secondary stress is lost in ME. However, it appears that quantity-sensitive secondary stress in ME native words is maintained in the early ME period and becomes lost toward the end of the ME period. On the other hand, compounds still carried quantity-insensitive secondary stress on their second elements throughout the ME period (Mossé 1952: 15, Halle and Keyser 1971: 108-109). Therefore, it is worth noting that OE quantity-sensitive secondary stress was lost in ME while quantity-insensitive secondary stress was still found in ME compounds. I showed in the preceding section that these different secondary stresses were assigned in different ways in OE. Namely, quantity-sensitive secondary stress was placed on heavy syllables by OESSR while quantity-insensitive secondary stress was derived from main stress on compounds via the trochaic parameter of the bimoraic foot.

It is significant to observe that the non-uniformity of OE secondary stress assignment is reflected in ME stress change. As discussed above, OE quantity-sensitive secondary stress on heavy suffixes and stems was preserved in the early ME period and became lost toward the end of the period. However, quantity-insensitive secondary stress in compounds was maintained throughout the ME period. Therefore, I claim that the OESSR having assigned quantity-sensitive secondary stress on heavy syllables is lost in the late ME period. However, the other quantity-insensitive secondary stress is still assigned on the second element of compounds on the foot level by trochaic prominence of the bimoraic foot throughout the ME period as in OE.

The diachronic change in ME secondary stress assignment reveals some important consequences of this analysis. Note that only quantity-sensitive secondary stress disappears while quantity-insensitive secondary stress is preserved. If OE secondary stress is computed all together on the same level with main stress or if the two kinds of OE secondary stresses are derived by the same rule or the same process, it is theoretically hard to account for why quantity-sensitive secondary stress only disappeared in ME, while quantity-insensitive secondary stress and main stress are preserved. For example, in OT, diachronic change is a change in a constraint ranking. Therefore, there should be a change of OE ranking in ME because of the change of secondary stress assignment. Since quantity-

sensitive secondary stress is lost in ME, some change of OE constraint ranking may be involved in WSP and Nonfinality, which play a role to enforce quantity-sensitive secondary stress on non-word final heavy syllables in OE. Since these constraints are also responsible for main stress and secondary stress on compounds, it is not explanatorily adequate to state that ME stress change is a change of a ranking involved in the two constraints. The empirical fact that only quantity-sensitive secondary stress assignment is lost in ME is not still accounted for in such a framework because the change of ranking involving the constraints is not exclusively related with the quantity-sensitive secondary stress. By contrast, in this analysis, the loss of quantity-sensitive secondary stress in ME is a loss of OESSR which was the stress rule only responsible for the quantity-sensitive secondary stress assignment in OE. The preservation of the OE metrical system and other rules (GMSR and trochaic prominence of the bimoraic foot) in ME accounts for maintenance of the other stress patterns in ME. In conclusion, the loss of quantity-sensitive secondary stress and the preservation of quantity-insensitive secondary stress in ME imply that two kinds of secondary stress existed in OE and they were derived in different ways. This analysis provides a good theoretical basis to capture the synchronic and diachronic aspect of secondary stress.

6. Conclusion

I have provided a prosodic account of OE stress. I argued that OE main stress and secondary stress were assigned in different prosodic domains: morphologically sensitive main stress on the syllable level and phonologically sensitive secondary stress on the foot level. By differentiating the prosodic domains for main stress and secondary stress assignments, the asymmetry between them was well accounted for. In doing so, my analysis did not have the theoretical paradox of the previous analyses that quantity sensitive trochee had to be used to account for quantity insensitive main stress in Germanic.

The non-uniformity of OE secondary stress assignment was well captured on the foot level without morphological stipulations or any ad hoc phonological machinery. The quantity insensitive secondary stress assignment on compounds was automatically computed by the trochaic parameter of the foot between two main stresses percolating on the foot level from the syllable level. By contrast, the quantity sensitive secondary stress on the heavy stems or suffixes was placed by the OESSR. The bimoraic foot served as a prosodic domain for the application of the stress rule. Furthermore, my stress systems worked well in explaining diachronic changes in ME secondary stress assignments: the loss of native quantity-sensitive secondary stress. Since two kinds of secondary stresses were

derived in different ways, their different fates in ME (the loss of quantity-sensitive secondary stress and the maintenance of quantity-insensitive secondary stress) were well captured. I argue again that all these advantages were gained only within the metrical system where main and secondary stress were assigned in the different domains and stress rules applied in the lexicon where phonological and morphological operations interact with each other.

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