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Prosody and *i/j* Alternation in Gothic

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Since prosodic units were introduced as a point of reference in sound change, Sievers' alternation of [i] and [j] in Gothic has been examined in terms of the syllable or the foot. However, such prosodic studies fail to capture the empirical fact that Sievers' alternation of [i] and [j] is consistently manifested only in the masculine *ja*-stem nouns and *ja*-stem verbs in Gothic. Furthermore, to account for the alternation, these studies rely on exceptional syllabification (Murray and Vennemann 1983), problematic foot parsing (Dresher and Lahiri 1991), or unmotivated abstract rules (Calabrese 1994), among other devices.

The main goal of this paper is to provide an account for Sievers' Law in Gothic with attention to its prosodic and morphological aspects. I propose that the bimoraic trochee serves as a prosodic domain of Sievers' Law in Gothic (cf. Hayes 1995 and Kiparsky 1998). Sievers' Law in Gothic is interpreted as one of several measures to reparse an unfooted syllable into a bimoraic foot by vocalization of the glide /j/. Furthermore, the morphologically limited application of Sievers' Law is accounted for by assuming that the alternation is derived by a lexical rule (vocalization of /j/) that is active only in certain morphological categories in Gothic.

1. Introduction.

Since Sievers (1878) first observed an alternation of [i] and [j], and [u] and [w], in Indo-European languages, this alternation, traditionally known as Sievers' Law, has been a subject of controversy. The development of nonlinear phonological theories led to reanalysis of this long-standing problem in terms of suprasegmental phonological units, namely the syllable and the foot (e.g., Murray and Vennemann 1983, Murray 1988, Dresher and Lahiri 1991, Riad 1992, Calabrese 1994, Suzuki 1995, Barrack 1998, and Kiparsky 1998, among others). The introduction of prosodic units as a point of reference in sound change overcomes some of the serious problems in Germanic historical phonology. That is, prosodic theories provide the basis for the account of a variety of early Germanic phonological changes like West Germanic Gemination, Old

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English High Vowel Deletion, Middle English Open Syllable Lengthening, and so on.[1]

This paper can be seen as an extension and refinement of this trend. Its main goal is to provide an account of Sievers' Law in Gothic in the prosodic domain of the foot. I propose that the foot structure in Gothic is a bimoraic trochaic pattern. This pattern is crosslinguistically well attested (cf. Hayes 1995) and serves as a domain for other phonological phenomena in Germanic phonology, such as stress and West Germanic Gemination (Kim 2000). Sievers' Law in Gothic is interpreted as one of several measures to reparse an unfooted syllable into a bimoraic foot by vocalization of the glide /j/. Therefore, Sievers' data can be understood as part of a broader pattern of prosodically motivated phenomena across the Germanic languages.

In addition to providing a prosodic treatment of Sievers' Law in Gothic, I investigate a morphological aspect of this phenomenon that has not been formally examined in previous works. Observing that Sievers' alternation of [i] and [j] is only seen in specific morphological categories (e.g., masculine *ja*-stem nouns or *ja*-stem verbs), I argue that the alternation is derived by a lexical rule that applies only after the affixation of specific suffixes (e.g., *-is/-iþ*). In this way, the morphologically limited application of Sievers' Law in Gothic is accounted for. Furthermore, Sievers' Law in Gothic is examined diachronically in comparison with the Proto-Indo-European (PIE) patterns that appear more broadly, regardless of the nature of the affected suffixes.

This paper is organized as follows. Section 2 contains the crucial data for Sievers' Law in Gothic, describing its main features. Section 3 is a brief review of previous analyses, demonstrating their failure to handle the main features of Sievers' Law in Gothic. Section 4 offers an alternative analysis of this phenomenon, proposing that Sievers' Law in Gothic is a prosodically motivated lexical rule. Section 5 is a conclusion.

2. Data and Observations.

Sievers (1878) first observed an alternation of [i] and [j], and [u] and [w], in Indo-European languages such as Greek, Latin, Germanic, and Indo-

[1] See Kim 2000 for a critical review of previous prosodic analyses of these phenomena and alternative analyses.

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Iranian: PIE **y* (or **w*) occurs after light syllables[2] and **iy* (or **uw*) after heavy syllables.[3] For example, there are two forms of the *ya*-nominal suffix in Vedic: *-iya-* and *-ya*. The alternation has been refined in subsequent studies, especially by Edgerton (1934, 1943), and has been a subject of controversy for over a century. Above all, Sievers' original formulation of [i]/[j] cannot account for the alternation of polysyllabic *j*-stems in some dialects like Germanic (compare Erdmann 1972:410, Nagy 1970:35). It has been observed in Germanic grammars that polysyllabic *j*-stems are inflected like heavy *j*-stems (e.g., Gothic *mikileis* 'glorify (2sg.)', *sōkeis* 'seek (2sg.)'). Second, Sievers' description of the alternation in terms of a heavy/light syllable distinction appears inadequate because of forms ending in a long open vowel (e.g., Gothic *stōjis* 'judge'). Even though Sievers' Law predicts [i] after a heavy stem, *stōjis* has [j].[4] These problems are treated in the prosodic domain of the foot in section 4.2.

Diachronically, Sievers (1878) takes the view that the alternation originally existed in Proto-Indo-European and then was inherited by its daughter languages. However, his account is rejected in later works such as those of Sihler 1971, 1977, and 1995, which take the view that Sievers' alternation did not exist in Proto-Indo-European, but rather arose independently in different languages. Sihler (1995:176) argues that Sievers' alternation is produced by the historical development of [ij] into [j] in certain contexts, or conversely of [j] into [ij].

It is beyond the scope of this analysis to argue for or against Sievers' view on the historical development of the alternation in Indo-European

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[2] Following traditional convention, I use *y* for the palatal glide [j] in Indo-European words and *j* in Germanic words.

[3] "Heavy" and "light" syllable distinctions are based on the definition used by Sanskrit grammarians for *guru* and *laghu*. A heavy syllable, or *guru,* has a long vowel or diphthong, or a short vowel followed by more than one consonant; other syllables are light.

[4] Sievers' distinction between light and heavy stems is ignored in Murray and Vennemann's (1983) reconstruction of the syllable structure in Proto-Germanic. According to them, the Proto-Germanic light root VCRV sequence (where R is a resonant) is syllabified as VC.RV, and the heavy root V:CRV sequence as V:.CRV (where < . > indicates a syllable boundary). Their syllable-based approach is reviewed in section 3.1.

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languages. However, Sievers' historical view appears more adequate in light of the distribution of Sievers' alternation throughout the Indo-European languages. For example, in some Indo-European languages such as Vedic, Sievers' alternation appears more regularly, while it is found in a limited range of morphological categories in other dialects like Gothic. In particular, most dialects in Germanic barely maintain any trace of the alternation. If Sievers' historical view is right, the dialectal differences can be easily understood by assuming that conservative daughter languages (with regard to Sievers' Law) maintain the alternation inherited from their parent language while innovative daughter languages just maintain traces of it in a specific morphological category. Therefore, I follow Sievers' historical view and account for the dialectal or diachronic aspect of Sievers' Law in section 4.1 within the framework of Lexical Phonology in a principled way.

It is important to note that the alternations of [i] and [j], and [u] and [w], appear whenever their phonological conditions are satisfied in Proto-Indo-European: namely [i] and [u] after a heavy syllable, and [j] and [w] after a light syllable. However, unlike the Proto-Indo-European patterns, the alternation of [i] and [j] in Gothic is consistently manifested only in the masculine *ja*-stem nouns and the *ja*-stem verbs (in particular Class I weak verbs).[5] In addition to the alternation based on the syllable weight of stems, it has been noted that polysyllabic words in such noun and verb classes in Gothic contain the same variant (*-ei-* [i:]) of the suffixal alternation with long stems. The paradigms in 1 illustrate this.

[5] *Ja*-stem verbs are composed of Class I weak verbs and strong verbs. In contrast with a number of the weak verbs, there are not many strong *ja*-stem verbs. According to Wright (1954:144–145), strong Class V and VI have some verbs with *j*: *bidjan* 'to pray' (Class V); *fraþjan* 'to understand', *hafjan* 'to raise', *hlahjan* 'to laugh', *ga-raþjan* 'to count', *ga-skapjan* 'to create', *skaþjan* 'to injure', *wahsjan* 'to grow' (Class VI). Among them, *wahsjan* is the only heavy stem. The Sievers' alternation regularly occurs in these *ja*-stem verbs: *bidjis* (2nd pres. ind. sg.), *bidjiþ* (3rd pres. ind. sg.), versus *wahseiþ* (3rd pres. ind. sg.).

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(1) Morphological paradigms containing Sievers' alternation in Gothic (Vennemann 1985:196–197)

a. Masculine *ja*-stem nouns

	Light stem	Heavy stem	Polysyllabic stem
nom. sg.	harjis 'army'	hairdeis 'herdsman'	sipōneis 'disciple'
gen.	harjis	hairdeis	sipōneis
dat.	harja	hairdja	sipōnja
acc/voc.	hari	hairdi	sipōni
nom. pl.	harjōs	hairdjōs	sipōnjōs
gen.	harjē	hairdjē	sipōnjē
dat.	harjam	hairdjam	sipōnjam
acc.	harjans	hairdjans	sipōnjans

b. Present indicative of Class I Weak verbs

	Light stem	Heavy stem	Polysyllabic stem
inf.	nasjan 'save'	sōkjan 'seek	mikiljan 'praise'
1 ind.sg.	nasja	sōkja	mililja
2	nasjis	sōkeis	mikileis
3	nasjiþ	sōkeiþ	mikileiþ
1 dual	nasjōs	sōkjōs	mikiljōs
2 dual	nasjats	sōkjats	mikiljats
1 plural	nasjam	sōkjam	mikiljam
2	nasjiþ	sōkeiþ	mikileiþ
3	nasjand	sōkjand	mikiljand

The alternation of [i] and [j] can be seen in the nominative and genitive singular forms of the masculine *ja*-stem nouns and in the 2nd singular and plural and the 3rd singular indicative of the Class I weak verb. The light stems have suffixes beginning with [j], and the heavy and polysyllabic stems have suffixes beginning with a long vowel, [ī], orthographically represented as <ei>. Therefore, it should be pointed out that reflexes of Sievers' Law in Gothic appear in a very limited range of morphological categories. Synchronically it can be argued that Sievers' Law in Gothic is sensitive to morphological information (word class, case, number) of the words that it affects. Furthermore, this alternation only takes place before a high suffixal vowel (e.g., *-is*/*-iþ*). That is, [j] always appears before mid and low vowels regardless of the weight of the following syllable as shown in infinitive forms (e.g., *nasjan* and

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sōkjan). The crucial forms in the *ja*-stem nouns and Class I weak verbs are given in 2.[6]

(2) Crucial forms of Sievers' Law in Gothic
(based on Dresher and Lahiri 1991:264)

a. Heavy stems
sōkeis [so:ki:s] 'seek (2sg.)'
namneis [namni:s] 'name'
haiteis [he:ti:s] 'wheat'
andeis [andi:s] 'end'

b. Polysyllabic stems
mikileis [mikili:s] 'glorify (2sg.)'
sipōneis [sipo:ni:s] 'disciple'

c. Light stems
nasjis [nasjis] 'save (2sg.)'
arjis [arjis] 'plow'
niþjis [niθjis] 'relative'

However, it should be pointed out that the reflex of Sievers' Law in Gothic can be seen in other morphological categories. The alternation of [i] and [j] occurs in the neuter *ja*-stem nouns (e.g., *kunjis* 'race (gen. sg.)' vs. *trausteis* 'alliance (gen. sg.)'); in the strong declension of the *ja*-stem adjectives (e.g., *midjis* 'middle (masc. nom./gen. sg.)' vs. **wilþeis*[7] 'wild

[6] It must be noted that the phonological environments of Sievers' Law in Germanic are distinct from those of Proto-Indo-European, owing to several phonological changes. For example, a Proto-Indo-European light stem becomes a heavy stem in Gothic: PIE **wr̥gyeti* (light stem) > PGmc. **wurkjiþ* (heavy stem; vowel epenthesis) > Gothic *waurkeiþ* (*j*-deletion and some other changes). In addition, some Proto-Indo-European words that were originally unaffected by Sievers' Law come to show the alternation in Gothic by means of undergoing phonological changes: PIE **sodeyeti* (irrelevant to Sievers' Law) > PGmc. **satijiþi* (umlaut) > Gothic *satjiþ* (*j*-deletion plus some other change).

[7] There is no attested genitive singular form of an adjective having a heavy stem (Wright 1954:107). However, since the genitive form of the masculine adjectives has the same ending (*-jis* in light stems, *-eis* in heavy stems) as the nominative form, it can be assumed that the genitive form of *wilþi* would have been **wilþeis*. On the other hand, in the strong declension of the neuter adjectives where nominative and genitive endings are distinct, it is hard to reconstruct a genitive form from its attested nominative form.

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(masc. nom. sg.)') (Vennemann 1985:195, Wright 1954:106–107). However, the alternation is not regular in these morphological categories. According to Marchand (1973:73), Sievers' alternation in Gothic is violated by about forty examples.[8] The list in 3 includes attested genitive singular forms of the neuter *ja*-stem nouns in Snædal's (1998) concordance to biblical Gothic. The number in parentheses indicates how many times the forms are attested in Gothic texts.[9]

(3) Reflexes of Sievers' Law in the neuter *ja*-stem nouns in Gothic (based on Snædal 1998)

a. Light stems (*-jis*: 100% (2/2))
fraþjis (3; RmC 12:2, EfA 4:23, EfB 4:23), *kunjis* (4; FlB 3:5, FlA 3:5, LK 7:31, LK 1:8)

b. Heavy or polysyllabic stems (*-jis*: 65% (15/23), *-eis*: 35% (8/23))
aiwiskjis (2; 2KA, 2KB), *andbahtjis* (4; EfA, 2KB, 2KA, 2KB) / *andbahteis* (1; LK), *andwaírþjis* (1; LK 9:29), *arbjis* (3; EfA 1:18, EfB 1:18, K1B 3:24), *ataþnjis* (1; Jh 18:13), *awēþjis* (1; 1KA 9:7), *faírgunjis* (2; LK 19:37, LK 4:29), *faúrfilljis* (2; GlB 2:7, GlA 2:7), *faúragaggjis* (1; LK 16:2), *faúramaþleis* (2; Neh 5:14, Neh 5:18), *gawaírþjis* (8; LK 10:6, 1ThA 5:23, 1ThB 5:23, LK 1:79, RmC 14:19, LK 14:32, EfA 6:15, EfB 6:15) / *gawaírþeis* (6; EfA 4:3, EfB 4:3, 2KB 13:11, 2KA 13:11, 2ThA 3:16, 2ThB 3:16), *hʋáiþteis* (1: Jh 12:24), *naitofaþeis* (1: Neh 7:26), *praizbwtaireis* (1; 1TA 5:19), *reikjis* (1; 1KA 15:24), *trausteis* (2; EfA 2:12, EfB 2:12), *ufkunþjis* (1 EfA 4:13), *unwitjis* (2: EfA 4:18, EfB 4:18), *waldufnjis* (3; 1KA 15:24, EfA 2:2, EfB 2:2) / *waldufneis* (1; Sk 7:1), *witubnjis* (1; RmC 11:33)

[LK: Luke, Ef: Ephesians, Gl: Galatians, Jh: John, Fl: Philippians, Kl: Colossians, 1T: I Timothy, 1Th: I Thessalonians, 2Th: II Thessalonians, 1K: I Corinthians, 2K: II Corinthians, Neh:

[8] Marchand (1958, 1973) ascribes the cessation of the regular alternation in Gothic to a breakdown in the Gothic vowel length system. He argues that vowel length is no longer phonemic in Gothic and that the presence of *j* in the sequence of *VCCjis* and *VVCjis* indicates the breakdown of the contrastive vowel length system in Gothic (cf. Vennemann 1985:204–205).

[9] The list in 3 includes attested genitive forms of the neuter *ja*-stem nouns I have found in the concordance.

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> Nehemiah, A: Codex Ambrosianus A (with Taurinensis, Sk: Skeirenis (Codex Ambrosianus E and Vaticanus)), B: Codex Ambrosianus B, Rm (RmC-Codex Carolinus)]

It is shown in 3 that light stems of the neuter *ja*-stem nouns have [j] in their genitive endings without any exception, obeying Sievers' Law. By contrast, only 35% of heavy or polysyllabic stems contain *-eis* in their genitive forms. Therefore, the neuter *ja*-stem nouns tend to have [j], thus violating Sievers' Law. Some heavy stems in 3b show variations in their genitive endings, *-jis* and *-eis*: *andbahtjis* (3 times) / *andbahteis* (once); *gawaírþjis* (8 times) / *gawaírþeis* (7 times); *waldufnjis* (3 times) / *waldufneis* (once) (see Braune/Ebbinghaus 1973:67, Vennemann 1985:199). As a result, it is hard to say that Sievers' Law in Gothic regularly applies in the neuter *ja*-stem nouns given the exceptions and variations. Sievers' Law in Gothic does not occur as a phonological process in the neuter *ja*-stem nouns.[10]

With regard to Sievers' alternation in the strong declension of the *ja*-stem adjectives, there is no attested genitive singular form of heavy or polysyllabic stems in Gothic texts (Vennemann 1985:202, Wright 1954:107). Only light stems have attested genitive forms with [j]. In the masculine declension where genitive and nominative endings are the same (*-jis* in light stems /*-eis* in heavy stems), genitive forms of heavy or polysyllabic stems may be reconstructed from their attested nominal ending *-eis*. However, the difficulty of reconstructing the genitive form from an attested nominative in the strong declension of the neuter adjectives remains, as discussed above in note 7. Therefore, at this point, due to lack of empirical evidence, it may be safer to assume that Sievers' Law does not apply in the paradigms of strong adjectives.[11]

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[10] It has been traditionally agreed that analogy plays a role in leveling the genitive forms of the neuter *ja*-stem nouns. See Vennemann (1985:201–204) for a critical review of different theories of exceptions to Sievers' Law in Gothic and the role of analogy.

[11] An anonymous reader points out that Sievers' Law might be operational in the strong declension of masculine *ja*-stem adjectives because genitive forms of heavy stems can be reconstructed from their attested nominative forms. In such a view, the lack of attested genitive forms is just an accidental gap. However, it is hard to assume that Sievers' Law indeed applies only to the masculine *ja*-stem adjectives because Sievers' alternation does not appear in another adjectival declension. For example, Sievers' Law is not seen in the weak declension of

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Other morphological groups possibly showing the reflex of Sievers' Law in Gothic include *jan*-stem nouns and the weak declension of *ja*-stem adjectives. Sievers' alternation is almost entirely leveled in favor of one of the two variants in these categories. First, the genitive and dative singular forms of the heavy and polysyllabic *jan*-stem nouns and adjectives have [j] before inflectional endings as in *fiskjins* 'fisherman (gen. sg.)', *fiskjin* 'fisherman (dat. sg.)', *wilþjins* 'wild (gen. sg.)', *wilþjin* 'wild (dat. sg.)' for **fiskeins, *fiskein, *wilþeins, *wilþein* (Wright 1954:73, Vennemann 1985:195, 202). By contrast, leveling appears to occur in the opposite direction. Light stems of the feminine abstract nouns derived from the Class I weak verbs favor the *-ei-* variant: *naseins* 'salvation (gen. sg.)' (from *nasjan* 'save') for **nasjins* (compare heavy or long stems: *dáupeins* 'baptism (gen. sg.)' (from *dáupjan* 'to baptize'), *láiseins* 'teaching, doctrine (gen. sg.)' (from *láisjan* 'to teach') *wilþein* (Wright 1954:73, Vennemann 1985:195, 202). It is clear that the *i/j* alternation becomes obscure due to leveling or analogy in these morphological groups. Therefore, Sievers' Law in Gothic does not apply to these morphological categories as a phonological rule.

In conclusion, I argue that Sievers' Law in Gothic as a phonological process appears in very limited range of morphological categories: masculine *ja*-stem nouns and *ja*-stem verbs. Furthermore, it occurs only before a suffixal *i*. Synchronically it can be argued that Sievers' Law in Gothic is sensitive to morphological information (word class, case, number) of the words it affects. In addition, it occurs in a derived environment after a morphological operation (affixation of a relevant suffix, e.g., *-is* or *-iþ*). This morphological aspect of Sievers' Law in Gothic has been noted in previous works (Erdmann 1972, Vennemann 1985). However, there has been no recent formal treatment of morphological factors operative in Sievers' Law in Gothic. The morphological sensitivity of this phenomenon is treated in a motivated way from the perspective of Lexical Phonology in section 4.1.

The main features of Sievers' Law in Gothic can be summarized as in 4.

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masculine *ja*-stem adjectives and there is no evidence that Sievers' Law affects neuter *ja*-stem adjectives. That means that there is no single attested genitive form of *ja*-stem adjectives showing regular Sievers' alternation in Gothic. Without having any attested form, it may be safer to assume that Sievers' Law is not operational in *ja*-stem adjectives.

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(4) Descriptive facts about Sievers' Law in Gothic
   a. In contrast with Proto-Indo-European, Gothic shows a morphologically limited application of Sievers' Law. (diachronic aspect)
   b. In Gothic, [i] appears after a heavy stem or a polysyllabic stem, while [j] appears after a light stem. (phonological aspect)
   c. Synchronically, the alternation only occurs after *-is/-iþ* of *ja*-stem nouns and *ja*-stem verbs. (morphological aspect)

Previous treatments of this phenomenon have only handled the phonological aspect out of the three aspects in 4. However, in my analysis, all three features of Sievers' Law in Gothic are examined. The following section briefly shows how the phonological aspect of Sievers' Law in Gothic has been accounted for in previous analyses. I only review selected accounts within each theoretical framework.

3. Previous Analyses of Sievers' Law in Gothic.

3.1. Syllable-based Approaches.

In syllable-based analyses of Sievers' Law in Gothic, syllabification is a vital condition for the alternation of [i] and [j] (Riad 1992, Murray and Vennemann 1983, Vennemann 1988, Murray 1988, 1991, 1993). For example, Murray and Vennemann (MV) claim that [j] appears in syllable-initial position, otherwise [i] surfaces, thereby resulting in the long vowel [i:] through contraction with the following vowel [i] of the suffix.

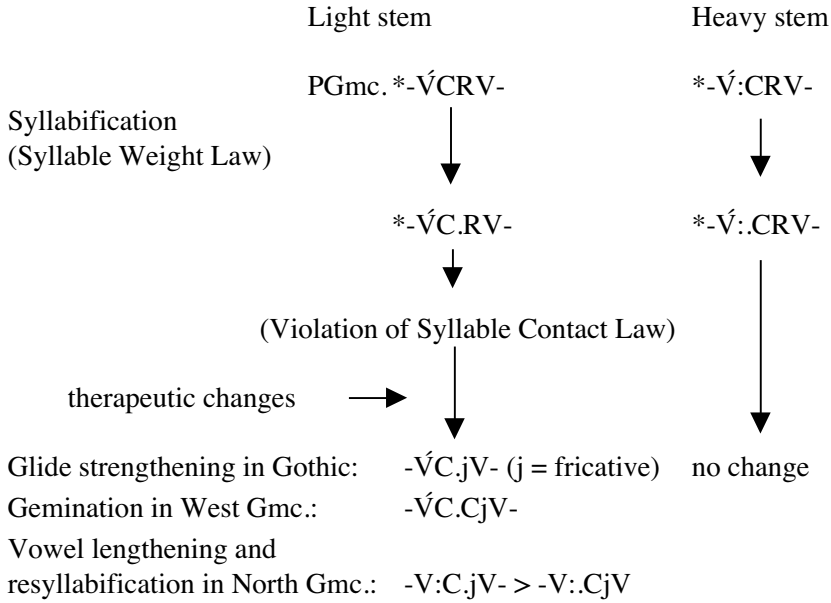
In contrast with Sievers' syllabification of a -VCRV- sequence as -V.CRV- (where R is a resonant and syllable boundary is marked by a dot < . >), MV claim that Proto-Germanic words containing *-VCRV- are syllabified as -VC.RV-. In their syllable theory, this syllabification in Proto-Germanic is derived from the Syllable Weight Law, which states that "the preferred stressed syllable has exactly two moras" (Murray and Vennemann 1983:526). In accordance with the preferred bimoraic condition for stressed syllables in Germanic, they assume that the consonant between a stressed short vowel and a glide is parsed as a coda of the initial stressed syllable. However, this syllabification comes into conflict with another syllable preference law, the Syllable Contact Law.[12]

[12] "The preference for a syllable structure A.B, where A and B are marginal segments and a and b are the Consonantal Strength values of A and B respectively, increases with the value of b minus a" (Murray and Vennemann 1983:520).

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MV argue that the violation of the Syllable Contact Law is fixed by three therapeutic measures later in the Germanic dialects: glide strengthening in Gothic, gemination in West Germanic, and vowel lengthening and resyllabification in North Germanic, as shown in 5.

(5) PGmc. syllabification of *-V́CRV- and resulting therapeutic diachronic changes[13] (Murray and Vennemann 1983)



In MV's diachronic view, depicted above in 5, the alternation of [i] and [j] in Gothic is produced by the application of Glide Strengthening as a measure of fixing less preferred syllable contact in the light-stem words. The Proto-Germanic glide /i̯/ is strengthened to the fricative [j] in syllable-initial position in accordance with the Syllable Contact Law, otherwise /i̯/ is combined with the immediately following suffixal *i* to form the long vowel [i:]. In North and West Germanic, the undesirable syllable contact is repaired by resyllabification and gemination, respectively.

[13] I replace MV's diacritic /i̯/ for a PGmc. palatal glide with /j/. However, it must be noted that in MV's analysis, [j] on the surface is not a glide but a fricative in Gothic.

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The advantage of MV's analysis is that Sievers' Law in Gothic is accounted for in a unified way with other phonological processes such as West Germanic Gemination and vowel lengthening in North Germanic, which occur in different dialects and at different times, based on independently established principles of syllable theory. In MV's analysis, the apparently different phonological rules have the same goal, that is, to achieve a more preferred syllable structure. They show how the syllable as a prosodic unit plays a role in historical phonology.

Nevertheless, their syllable-based approach has some problems. One problem comes from their Syllable Weight Law, by which the bimoraic condition of stressed syllables is enforced. MV claim that syllabification is made in accordance with (or guided by) the Syllable Weight Law. In other words, syllabification is conditioned by stress. It implies that stress exists even before syllabification. In such a case, it is not clear how stress is assigned because prosodic structures do not exist when stress occurs.[14]

Another problem is related to the syllabification of word medial -Cj- in short stems. MV assume that -Cj- is heterosyllabified in light stems and tautosyllabified in heavy stems in accordance with the Syllable Weight Law. As evidence for heterosyllabic -Cj- in short stems, they argue that there are no Gothic words beginning with Cj- and that consonant clusters ending with *j* are always divided before *j* in the scribal practice of the Gothic manuscripts (see Schulze 1908). This syllabification is adopted by studies such as Calabrese 1994, Kiparsky 1998, and Pierce 2000, among others. However, there has been disagreement on the syllabification of medial -Cj- among treatments of Sievers' Law in Gothic. Following Sievers' syllabification, Dresher and Lahiri (1991) and Barrack (1998), for example, claim that there is no reason to heterosyllabify -Cj- in light stems. In particular, Barrack (1998) argues that the scribal convention in Gothic texts merely indicates morphological boundaries within words.

[14] In Germanic, stress is placed on the initial syllables of roots or certain (nominal or adjectival) prefixes (Bennett 1972:103, Prokosch 1938:120). The definition of the domain of stress can vary depending on phonological theories. In metrical phonology, the domain of stress is the syllable or the foot. That means the syllable or the foot must exist before stress is assigned. Even for descriptive purposes, some prosodic unit must be specified before stress assignment. In any case, MV need to clarify when and how stress is assigned in connection with their Syllable Weight Law.

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Barrack's rejection of MV's syllabification can be justified by examining some differences between noncompounds and compounds with regard to word divisions in Gothic manuscripts. Collitz (1906) notes that word divisions are placed differently in compounds[15] and noncompounds in Gothic manuscripts.[16] According to her, when two vowels are separated by a consonant cluster in noncompounds, word divisions are placed before the last consonant of the cluster (e.g., *band|jan*, *waurst|wa*, *bid|ja*) regardless of the number of preceding consonants. By contrast, in the case of compounds, morpheme boundaries determine word divisions, e.g., *ga|brak*, **gab|rak*; *swa|swe*, **swas|we*; *suns|ei*, **sun|sei*; *us|bliggnandans*, **usb|liggnandans*. Therefore, MV's preference laws for syllabification (the Syllable Weight Law and the Syllable Contact Law) do not apply in compounds, and syllabification always coincides with a morphological boundary. However, as indicated above (e.g., *band|jan*), syllable and morpheme boundaries do not coincide in inflectional morphology.[17] If word divisions in Gothic manuscripts truly reflect syllabification and syllable structures in Gothic, it is hard to explain why different conventions are used in compounds and noncompounds or in derivational and inflectional morphology. That is, MV need to clarify the relationship between syllabification and morpheme boundaries in compounds and inflected words. Therefore, it is hard to justify MV's argument that the scribal conventions manifest syllabification in Gothic. As Barrack correctly points out, it is safer to assume that the scribal practice merely indicates morphological boundaries within words.

[15] Collitz includes affixed words in the category of compounds.

[16] Collitz also argues that the scribal practice of Gothic manuscripts reveals syllabification in Gothic. In line with this argument, Lutz (1986) claims that word divisions in Old English texts reflect syllable structures in the language.

[17] Vennemann (1987) revises MV's early position regarding syllabification of intervocalic consonant clusters that muta cum liquida clusters in Gothic are tautosyllabified (e.g., *fa|dreinais, af|tra*), while -Cj- or -Cw- remain heterosyllabic (e.g., *waust|wa*). He claims that the distinction between liquids and /j,w/ with regard to syllabification in Gothic is attributed to glide strengthening in pre-Gothic. According to him, glides in pre-Gothic became fricatives by glide strengthening, and the consonantal strength of fricatives /j,w/ in Gothic was comparatively strong enough to make -Cj- and -Cw- sequences heterosyllabic in accordance with the Syllable Contact Law.

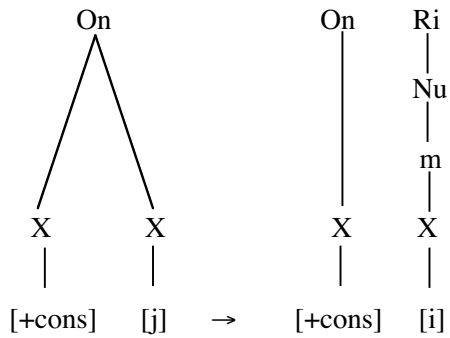
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3.2. Foot-based Approaches.

Unlike syllable-based analyses where the syllable constitutes the main domain for the application of Sievers' Law in Gothic, foot-based approaches assume a higher prosodic unit, namely the foot, for the analysis of Sievers' alternation (Dresher and Lahiri 1991, Calabrese 1994, Suzuki 1995, Barrack 1991, 1998). The type of foot and the rules for the alternation proposed in foot-based analyses vary, however. Some of them are reviewed critically below.

Dresher and Lahiri (1991) (henceforth, DL) postulate the Germanic Foot[18] and claim that Sievers' Law in Gothic can be accounted for within the domain of the foot. They syllabify /sōkjis/ (heavy stem) and /mikiljis/ (polysyllabic stem) as [sō.kjis] and [mi.ki.ljis], respectively, and argue that [j] in these stems is vocalized to [i] when preceded by a tautosyllabic consonant in the onset (e.g., [sō.kjis] > [sō.kiis], [mi.ki.ljis] > [mi.ki.liis]). They formulate a vocalization rule as in 6.

(6) Sievers' Law and vocalization (Dresher and Lahiri 1991:265)



According to DL, after vocalization occurs, the two high vowels (the vocalized vowel and the following suffixal high vowel) merge to form a long vowel (e.g., [sō.kiis] > [sō.ki:s], [mi.ki.liis] > [mi.ki.li:s]). However, DL argue that the light stems do not undergo the vocalization rule even though they have [j] preceded by a tautosyllabic consonant in the syllable onset (e.g., /nasjis/ > [na.sjis] with no vocalization).[19] According to them,

[18] "From left to right, build binary, quantity-sensitive left-headed trees whose left branch contains at least two moras" (Dresher and Lahiri 1991:255).

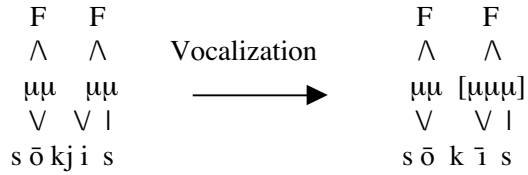
[19] DL follow Sievers' syllabification of a short-stem word: -VCjV- > -V.CjV- (cf. MV's syllabification).

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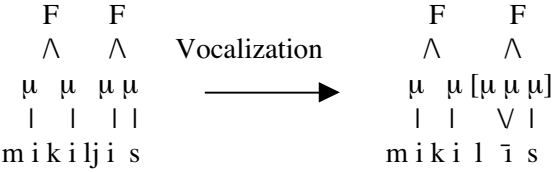
this asymmetry between heavy stems and polysyllabic stems on the one hand, and light stems on the other, is captured in the structure of the Germanic Foot they propose as shown in 7.[20]

(7) Metrical structure of long, polysyllabic, and short stems (Dresher and Lahiri 1991:266–268)

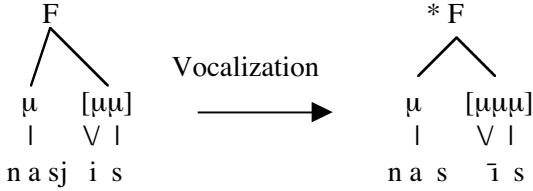
a. Heavy stem



b. Polysyllabic stem



c. Light stem



DL argue that vocalization of /j/ adds one mora to the second foot of the heavy-stem word (7a) and the polysyllabic word (7b) without affecting the first foot. However, the light stem in 7c cannot undergo vocalization because the two syllables of this word are bound together under a foot. According to their foot system, the weak member of a foot is "frozen" and cannot be strengthened by acquiring an additional mora. Consequently, they claim that the difference in metrical structure between heavy and polysyllabic stems, versus light stems, adequately accounts for why light stems fail to be vocalized while the other stems do not.

[20] I have slightly modified DL's original representation.

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The advantage of DL's foot-based analysis is to account for Sievers' alternation with a wide range of Germanic phonological rules in a unified way, namely in the prosodic domain of the foot, without relying on the problematic syllabification adopted in MV's syllable-based approach. However, their trochaic foot composed of a light plus a heavy syllable ($[LH]_F$) is not crosslinguistically attested. Furthermore, this type of foot is a typical pattern of iambs (Hayes 1995). There is no independent reason for Germanic languages with trochaic stress patterns to allow an iambic foot pattern. Another problem is that they cannot account for the failure of vocalization before suffixal mid or low vowels (e.g., *sōkjan* vs. *sōkeis*). Their foot algorithm and vocalization rule cannot make a distinction between genitive forms (*sōkeis*) and infinitive forms (*sōkjan*). It is shown in section 4 that these problems are eliminated in this paper and that the Sievers' alternation and its morphological factor are explained in the well-attested bimoraic foot structure within the framework of Lexical Phonology.

Using the metrical grid theory developed by Idsardi (1992), Calabrese (1994) provides a synchronic analysis of Sievers' Law in Gothic. He observes that the underlying suffixal high vocoid /ɪ/ appears as the glide [j] before a vowel and as the vowel [i] (merged with the desinential *-i-* into a long vowel) after heavy stems or polysyllabic stems.

To explain Sievers' alternations in Gothic, Calabrese proposes two rules and one filter: the Nucleus Incorporation Rule (NIR), which merges a high vowel into the nucleus of the preceding vowel; the Glide Formation Rule, which resolves a hiatus situation where a high vowel precedes another vowel by making the preceding vowel a glide, [j]; and one filter that disallows complex onsets containing the palatal glide [j] as a second member.[21] Calabrese claims that the Glide Formation Rule applies after the NIR takes place. Consider how the alternation of Sievers' Law is derived by the rules and the filter in the foot structures of the words in 8.

[21] As evidence for the filter, Calabrese (1994:164–165) argues that the complex onset with a palatal glide is absent in word-initial position.

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(8)	a. Light stem	b. Heavy stem	c. Polysyllabic stem
Foot construction			
	*	*	*
	[* *] *	[*] * *]	[* *]* *]
	na. si. is[22]	sō. ki. is	mi. ki. li. is
NIR	———	sō. kīs	mi. ki. līs
Glide Form.	n a s. jis	———	———
Outcome	nasjis	sōkīs	mikilīs

The NIR, which is sensitive to foot boundaries, cannot affect the light stems in 8a because the two vowels in sequence are separated by a foot boundary. In contrast, the two relevant vowels of the heavy and polysyllabic stems in 8b and 8c are incorporated into a long vowel by the NIR because they are within the same foot. And then the Glide Formation Rule transforms the first one of the adjacent two high vowels in 8a into a glide.

One problem with Calabrese's foot-based analysis is related to the motivation for the Glide Formation Rule, which, he argues, is to resolve an underlying hiatus situation. However, there are a number of Gothic words, such as *saei* 'who, which' and *saian* 'to sow', where two vowels in sequence are allowed.[23] Furthermore, in Calabrese's analysis, the Glide Formation Rule only affects a high vowel preceding another vowel. Therefore, the Glide Formation Rule is not independently motivated but only invoked to account for the alternation of Sievers' Law in Gothic. The motivation for this rule can thus not be justified.

3.3. Optimality-theoretic Approaches.

Optimality Theory claims that a grammar is a ranking of universal constraints (Prince and Smolensky 1993). Within an OT framework, Sievers' Law in Gothic has been examined in Rice 1994, Kiparsky 1998, Bermúdez-Otero 1999, and Pierce 2000. Even though they differ in terms of the constraints and rankings they propose, these studies commonly take the view that an optimal form between [i] and [j] is selected by a

[22] In accordance with the filter disallowing a complex onset with a palatal glide [j], /nasɪɪs/ is syllabified as [na.si.is], not as [na.sjis].

[23] In the time of Wulfila, *ei* of *saei* represented the long high vowel [i:] and *ai* of *saian* represented the long mid vowel [e:].

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ranking of constraints. Below I briefly review Kiparsky 1998 as a representative example of an OT approach.

Kiparsky (1998:345) proposes that Sievers' alternation in Gothic is derived as a result of prosodic parsing (foot formation and syllabification) that is ensured by a ranking of four constraints: FAITHFULNESS > *Cj > ONSET > FOOT-FORM. Optimal forms are selected by the ranking of the constraints without any special rule.

This optimality-theoretic analysis yields a conceptual gain by obviating the need for abstract levels (forms) or any language-specific rules. However, this advantage becomes weak by allowing a language-specific constraint, *Cj. Relying on scribal convention in Gothic manuscripts, Kiparsky proposes that Cj is not allowed as an onset cluster in Gothic (cf. Calabrese 1994, Murray and Venneman 1983, Murray 1988, among others). However, it is hard to see the constraint *Cj as being universal. As mentioned before, it is even hard to prove that heterosyllabic Cj exists in Gothic.

Above, I have selectively reviewed the work of previous investigators on Sievers' Law in Gothic. Even though they examined Sievers' alternation from the perspective of different theoretical frameworks, they commonly saw this phenomenon as a process sensitive to prosodic structures, either the syllable or the foot. However, it was shown that these analyses relied on problematic prosodic structures or unmotivated phonological rules (exceptional syllabification of light stems in MV's syllable-based approach, ad hoc foot parsing in DL's foot-based approach, unmotivated phonological rules in Calabrese and Kiparsky's foot-based analyses). Furthermore, absent from these studies is any formal treatment of morphological and diachronic aspects of Sievers' Law. In the following section, I offer an alternative analysis where these three features of the phenomenon are handled in a motivated way.

4. Sievers' Law in Gothic as a Prosodic and Morphological Phenomenon.

4.1. Sievers' Law in Gothic as a Lexical Rule.

Let us remember that the Sievers' alternation in Gothic is shown regularly only in a limited range of word categories, that is, in masculine *ja*-stem nouns and *ja*-stem verbs. Furthermore, it occurs in a derived environment, that is, only when specific morphological suffixes (*-is*/*-ip*) occur. The alternation is not straightforwardly regular in other *ja*-stems such as neuter *ja*-stem nouns, thus yielding exceptional patterns. However, there has been no formal treatment of the morphological sensi-

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tivity of the alternation. That is, previous analyses of this phenomenon have not explained why Sievers' Law deriving the [i]/[j] alternation occurred in a limited range of morphological categories and why it only affected certain forms (e.g., *sōkeis*) with suffixes, *-is*/*-iþ*, and not others (e.g., *sōkjan*). They merely observed that Sievers' Law in Gothic applied to members of specific morphological categories, and then formulated the alternation rule in the prosodic domain without systematically showing how the rule only affects the relevant morphological categories. If it is true that Sievers' Law in Gothic is no longer a regular phonological process but a morphophonological process, there should be a theoretical mechanism to distinguish Sievers' Law from other regular phonological rules and to make it apply only to the relevant morphological categories.

It has been observed in traditional generative phonology that some phonological rules are sensitive to morphological and lexical environments while others are not. Kiparsky (1982) incorporates these early observations into the framework of Lexical Phonology where word formation rules and lexically sensitive rules are grouped into series of LEVELS or STRATA. In this model, each level has lexical rules that apply cyclically after each morphological operation (e.g., affixation, reduplication). After all morphological operations and the lexical rules have taken place in the lexicon, postlexical rules apply. According to Kiparsky (1982, 1985), some phonological rules (lexical rules) that apply in the lexicon are sensitive to lexical affixation or lexical properties of the words they affect. That is, a lexical rule has access to the lexical information of words and applies only when there are specific morphological factors (e.g., morpheme, word category) conditioning the rule.

In line with this view, I claim that the alternation in Gothic is produced by a lexical rule that applies only to *ja*-stem nouns and the present indicative of *ja*-stem verbs after suffixation of *-is*/*-iþ*. Since the lexical rule does not affect other morphological categories, the alternation does not appear in other word classes. In a similar way, as this rule does not apply after affixation of suffixes other than *-is*/*-iþ*, the alternation does not occur before low or mid vowels (e.g., infinitive forms ending in *-jan*). These theoretical assumptions need not be stipulated; they follow from basic tenets of Lexical Phonology.

This approach has important implications in historical phonology for understanding sound change. Under the influence of the Neogrammarian precept that sound changes are purely phonetically conditioned, regular, and exceptionless, many assumed in historical phonology that all

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diachronic phonological processes affect every word of comparable phonological shape. Any exceptions are simply ascribed to analogy or dialect borrowing. The empirical fact that the application of some phonological rules (e.g., Sievers' Law in Gothic) at a certain period is limited to certain morphological categories, while other rules apply more broadly, has not been treated in a principled way in the historical literature. It is just assumed that analogy creates (or modifies) new phonological or morphological patterns on the regular pattern present in a language. It has not been clarified exactly under which circumstances analogy occurs and by which mechanism new patterns become established. Thus in such works, descriptive or theoretical, to handle the lexically-limited synchronic phonological rules, morphological stipulations are invoked to limit the application of phonological rules to certain morphological categories.

On the other hand, in a Lexical Phonology-based model, diachronic phonological rules can be assigned to two groups according to their features or regularity: lexical and postlexical. That is, if the phonological rules during a period appear sensitive to the morphological structure or category of certain words, they may be viewed as lexical rules. Their morphological sensitivity can be easily accounted for in an independently motivated way within the framework of Lexical Phonology without relying on morphological stipulation. Furthermore, their exceptions can be understood in accordance with the nature of lexical rules, namely that lexical rules may have lexical exceptions. On the other hand, some diachronic rules apply regularly, affect all words meeting their phonological conditions, and therefore may be viewed as postlexical rules. By proceeding in this way, we can better understand sound change, and capture a distinction between two kinds of phonological phenomena in a motivated way.

Let us briefly consider the diachronic aspect of Sievers' Law in Gothic. Recall that Sievers' alternation occurs whenever its phonological condition is met in Proto-Indo-European, while it is limited to certain specific morphological categories in Gothic. Kaisse (1993) and Zeč (1993) examine changes of phonological rules over time within the framework of Lexical Phonology.[24] They suggest that phonological rules

[24] McMahon (2000) examines phonological rules in the history of English within Lexical Phonology and argues that knowledge of the historical development of phonological rules (diachronic shift of their domains of application between the

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are added postlexically first and later become reanalyzed as applying in the lexicon proper.[25] It can be argued that how consistently phonological rules may move up to the lexicon differs depending on the dialect. In some dialects, a postlexical rule becomes a lexical rule and thus its application comes to be limited to some morphological domain, while in other dialects, it remains in the postlexical domain, continuing to apply regularly. If we adopt this view, it is simple to understand the change from Proto-Indo-European to Gothic with regard to Sievers' Law. Sievers' Law in Proto-Indo-European is a postlexical rule that applies across-the-board and then becomes lexical in Gothic. Therefore, Sievers' alternation applies to certain specific morphological categories in Gothic. Dialectal differences with regard to the application of Sievers' Law in Indo-European languages can be understood as comprising a continuum of the bottom-to-top shift of the domain of the relevant rule.

4.2. Sievers' Law as a Remedial Prosodic Process.

By way of considering Sievers' Law as a remedial prosodic process, let us begin by considering the foot in Germanic. Crosslinguistically, three basic foot types are suggested in McCarthy and Prince (1986) and Hayes (1985, 1987): syllabic trochee (as in Pintupi), moraic trochee (as in Cairene Arabic), and iamb (as in Seminole/Creek). These investigators observe that these basic foot types differ in terms of prominence (initial or final) and quantity-sensitivity (quantity-sensitive or quantity-insensitive). Based on these typological observations, Hayes (1995) posits the asymmetric foot inventory given in 9 where a heavy syllable is marked with H, a light syllable with L, and a foot with [ ].

(9) Asymmetric foot formation (based on Hayes 1995:71)
   a. Syllabic Trochee [σσ]
   b. Moraic Trochee [LL] or [H]
   c. Iamb [LH] or [H]

---

lexicon and post-lexicon) is helpful in understanding the interaction of synchronic and diachronic phonological processes.

[25] Change of phonological domains over time can occur in the opposite way. For example, borrowing of phonological rules or features occurs item by item and then spreads through the lexicon (Kiparsky 1995:643), finally yielding regular phonological processes.

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The syllabic trochee is employed in stress systems insensitive to syllable weight, while the moraic trochee and iamb occur in quantity-sensitive stress systems. Further, Hayes (1987, 1995) argues that trochees are durationally balanced, containing two members having the same duration[26] (e.g., two light syllables or one heavy syllable composed of two moras), while iambs are durationally unbalanced, thus containing one light syllable and one heavy syllable.

It must be pointed out that the foot inventory sketched above is motivated by phonological phenomena referring to the foot template as well as the typology of stress systems. For example, certain morphological operations (e.g., reduplication, infixation) refer to a foot template in many languages. Even segmental changes appear to operate to yield the canonical shapes of feet at the surface (Hayes 1985, 1987, and McCarthy and Prince 1986). In Kim 2000, I showed that different phonological phenomena (consonant gemination in West Germanic, Old English High Vowel Deletion, and Open Syllable Lengthening in Middle English), occurring in different languages and at different periods in Germanic linguistic history, may be interpreted as reflexes of the same favoring of a canonical type of foot. I argued the moraic trochee in 9b played a role in Germanic and that the bimoraic foot served as the phonological domain for stress assignment and other related phenomena. The employment of the bimoraic foot as a domain for phonological processes offered a unified and coherent account for a set of otherwise unrelated phenomena in historical phonology.

The parameters of the foot are described in 10.

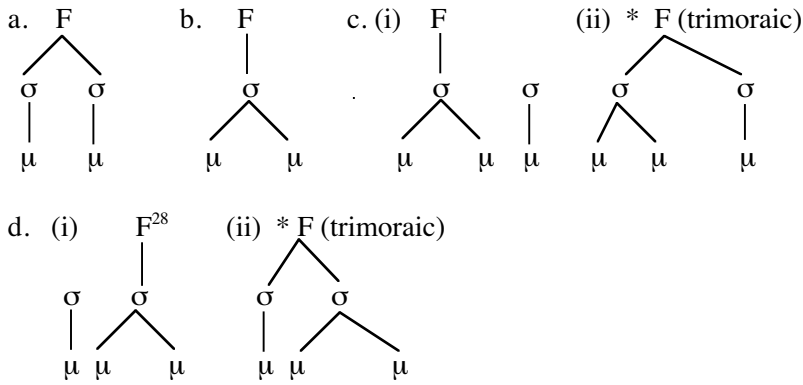
(10) The parameters of the foot in Germanic (the bimoraic trochee)
  a. Feet are bimoraic.
  b. Feet are parsed from left to right.
  c. Feet have initial prominence.
  d. Foot construction is iterative.
  e. Degenerate feet are not allowed.
  f. Stray moras or syllables can be refooted by some phonological process.

[26] Dresher and Lahiri (1991, 1999) propose the bimoraic trochee, which can be composed of durationally-unbalanced members such as a heavy syllable plus a light syllable for Germanic. This modified trochaic foot type has been criticized by Hayes (1995), Calabrese (1994), and others.

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The bimoraic requirement in 10a limits the possible number of patterns of feet to only two: $[[\mu\mu]_\sigma]_F$ or $[[\mu]_\sigma, [\mu]_\sigma]_F$, disallowing $*[[\mu\mu]_\sigma, [\mu]_\sigma]_F$ [27] and $*[[\mu]_\sigma, [\mu\mu]_\sigma]_F$, which consists of three moras, as illustrated below in 11.

(11) Foot formation in Germanic



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

[28] Foot formation of a word-initial syllable sequence of the form [LH-] is highly controversial. Since stress is mostly placed on the word-initial syllable in Germanic, the initial light syllable of the sequence must form a stressed foot. Riad (1992) claims that morphologically sensitive main stress in Germanic is placed in the domain of the bimoraic foot before secondary stress assignment, and proposes exceptional syllabification of the [LH] sequence in order to form a bimoraic main stress foot: #-VCV:- > #-VC.V:-. According to him (1992:57), after the bimoraic condition is satisfied by the mapping of the main stress foot, resyllabification occurs, thus reparsing the consonant in the coda of the first syllable to the onset of the second syllable to fulfill the onset principle: #-VC.V:- (bimoraic condition of the main stress foot) > #-V.CV:- (the onset principle of the second syllable). That means the bimoraic condition only applies at the intermediate abstract level of derivation. More evidence needs to be provided for the existence of the exceptionally syllabified stressed syllable at the initial stage of derivation (See Kim 2000:40–41 for a critical review of Riad's Germanic stress system). Dresher and Lahiri (1991, 1999) propose a modified moraic trochee, $[LH]_F$, to account for main stress assignment on the initial light

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The monomoraic syllables in 11c(i) and 11d(i) are skipped in the process of foot formation because trimoraic feet would otherwise be generated as in 11c(ii) and 11d(ii). According to the parameter in 10e disallowing degenerate feet, a bare syllable remains unfooted. However, stray syllables can be repaired by certain processes (e.g., lengthening of consonants as in West Germanic Gemination). Otherwise, since stray syllables are not prosodically stable, the segments in such syllables can be deleted (e.g., Old English High Vowel Deletion).[29] I show below that Sievers' Law in Gothic is just such a remedial process.

I propose that Sievers' Law in Gothic is one of several possible prosodic processes to repair an unfooted syllable by making it a bimoraic foot. Let us look at how the alternants [i] and [j] are derived from /j/ and why the derivation is prosodically motivated. Some sample words are given in 12 in my proposed bimoraic foot structure. I assume word-final consonants in Gothic are extrametrical.[30]

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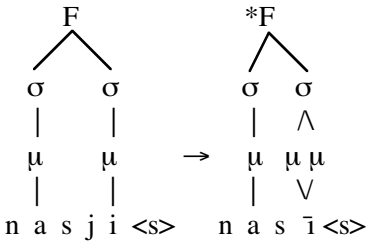
syllable followed by a heavy syllable. As I pointed out, DL's foot parsing is a typical pattern of iamb (see 9c) and is empirically unattested. The avoidance of $[LH]_F$ in the trochaic languages is observed by Kager (1993) for Australian languages and Finnish. According to him, in such trochaic languages, $[LH]_F$ is avoided by Skipping (Gooniyandi, Guugu Yimidhirr, and Yindjibarndi), Shortening of the second syllable (Latin, English), or Lengthening of the first syllable (Finnish). In Kim 2000, I argue that morphologically sensitive (syllable-weight insensitive) main stress in Germanic is assigned at the syllable level and phonologically sensitive (syllable-weight sensitive) secondary stress on the foot level. In this way, asymmetry between main stress and secondary stress in Germanic is accounted for without having any exceptional syllabification or ad hoc foot parsing. Since main stress is assigned at the syllable level, there is no need for any degenerate foot-repairing process to account for main stress placement on the [LH] sequence.

[29] See Kim 2000 for relevant prosodic analyses of Old English High Vowel Deletion and West Germanic Gemination.

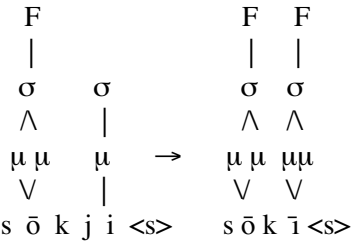
[30] Riad (1992) makes a distinction between sonorants and obstruents in Gothic in terms of their moraic value based on a sonority scale. He states that only sonorants have moraic value and thus obstruents are not linked to a mora. On the other hand, he continues that their distinction is eliminated in a stressed syllable and thus both sonorants and obstruents are moraic in a stressed syllable. However, it is hard to see the phonological difference between sonorants and obstruents in the word-final syllable or in an unstressed syllable in Gothic. For example, preterite plural endings of strong verbs in Gothic, *-um* (1st person) and

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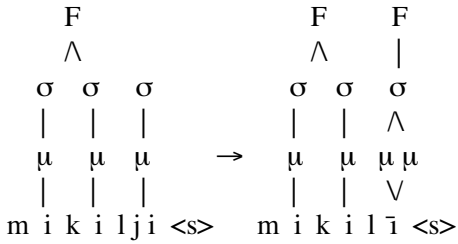
(12) a. Light stem
/nasjis/ → [na.sjis][31]



b. Heavy stem
/sōkjis/ → [so:.ki:s]



c. Polysyllabic stems
/mikiljis/ → [mi.ki.li:s]



-uþ (2nd person), do not show any significant difference in terms of vocalic change, syllabification, and so on. Therefore, without any negative evidence, it may be safer to assume that all word-final consonants are extrametrical in Gothic.

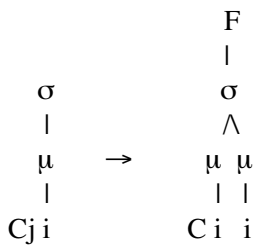
[31] An anonymous reader questioned why the feminine abstract nouns from the first class of weak verbs such as *naseins* [nasi:ns] were allowed in the bimoraic structure whereas **naseis* [nasi:s] in 12a was not. As I pointed out in section 2, leveling occurred to the light stems of the feminine abstract nouns in pre-Gothic and thus in Gothic they appeared to have the *ei* variant: *naseins* 'salvation (gen. sg.)' (from *nasjan* 'save') for **nasjins;* cf. heavy or long stems: *dáupeins* 'baptism (gen. sg.)' (from *dáupjan* 'to baptize'), *láiseins* 'teaching, doctrine (gen. sg.)' (from *láisjan* 'to teach') (Wright 1954:73). Therefore, the *i/j* alternation pattern becomes obscure due to leveling or analogy in these morphological groups. Synchronically, the ending *-eins* in *naseins* was not produced by Sievers' Law in Gothic (*j*-vocalization), but existed as an underlying morpheme in Gothic. Therefore, *naseins* is represented in the foot structure of $(na)_{\sigma}[seins]_{F}$, and the prosodic structure $L[H]_{F}$ is perfectly normal in Gothic (cf. 11d and note 28).

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In the light-stem word in 12a, two light syllables form a bimoraic foot and there is no unfooted syllable. Since there is nothing prosodically wrong with this foot structure, no remedial process occurs. Therefore, the underlying /j/ surfaces as [j]. If this glide is vocalized to [i], it would deform the foot by making it trimoraic.

In the heavy-stem word in 12b, the final syllable is not footed because it has only one mora. According to the Germanic foot parameter in 9f, stray moras or syllables can be footed by certain phonological processes. Remedial processes may vary depending on language-specific aspects. I claim that vocalization occurs as a remedial process to refoot a bare unfooted syllable in Gothic. In order to reform a bimoraic foot from the monomoraic syllable, one more mora is needed. The extra mora is acquired by the vocalization of the glide in the onset of the syllable, by which process the weightless glide becomes a short vowel with one mora. Consequently, the final short vowel and the newly derived vowel merge into a long vowel with two moras, forming a bimoraic foot. Therefore, the vocalization of the glide is interpreted as another process to fix bare syllables into a bimoraic foot. The vocalization rule can be formulated in the prosodic structure as in 13.

(13) Vocalization: Sievers' Law in Gothic



The vocalization rule in 13 states that /j/ is vocalized when: (i) it is in the unfooted bare syllable; (ii) it is followed by the tautosyllabic vowel [i]; (iii) it is preceded by a tautosyllabic onset consonant. Let us discuss what the conditions of this rule imply.

It must be noted that the prosodic environment of the rule is an unfooted bare syllable and that Sievers' Law in Gothic is a remedial process to reparse an unfooted syllable as a bimoraic foot. Unlike MV's syllable-based approach, vocalization of [j] in 13 is not the result of syllabification but of the foot structure. Therefore, there is no need for the controversial syllabification of light stems (CVC.jV-) proposed by MV. Instead, syllabification is consistently made in accordance with the

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Onset Maximization Principle[32] regardless of the weight of the stems, and Sievers' Law applies in the domain of the foot. Furthermore, the bimoraic foot structure is crosslinguistically well supported. Without invoking ad hoc foot parsing as DL do, the vocalization rule is well-motivated prosodically.

Furthermore, the vocalization rule in 13 states that /j/ is vocalized when it is followed by the vowel *i*. Let us remember that Sievers' alternation in Gothic appears only before suffixes *-is* and *-iþ* but not before other suffixes (e.g., the infinitival ending *-an* as in *sōkjan*). I pointed out that DL's vocalization rule in 6 could not account for the failure of the vocalization of /j/ in *sōkjan*. This morphological aspect of the phenomenon was already addressed in section 4.1 in such a way that the alternation was derived by a lexical rule applying only when a specific suffixation occurs. This is reflected in the condition of the rule in 13 showing why the vocalization of /j/ does not affect infinitive forms such as *sōkjan*.

The vocalization rule in 13 also predicts that /j/ is not vocalized when preceded by a tautosyllabic consonant. In other words, vocalization of /j/ does not occur when /j/ is syllabified into onset position. It is not difficult to account for the failure of the vocalization in a sequence of -VjV- (e.g., *stōjis, *stōeis* and **stōeiþ, stōjiþ* 'judge (2/3sg.)'. I claim that the prosodic motivation for the vocalization rule in 13 is overridden by another phonological motivation, that is, the prevention of hiatus and an onsetless syllable at the surface. Even though Gothic allows two adjacent vowels in some words like *saei* 'who, which' and *saian* 'to sow', the two vowels form a sequence by morphological operations (e.g., suffixation). No word in Gothic contains two vowels in a sequence produced by a phonological process. Furthermore, the vocalization of the onset glide /j/ would yield an onsetless syllable (**stōiis*). Therefore, there is a good phonological reason why vocalization does not affect *stōjis*.

Let us return to the polysyllabic word in 12c. The word *mikileis* (/mikiljis/ → [mi.ki.li:s]) is the same as the disyllabic heavy stem *sōkeis*

[32] "Incorporate all consonants preceding each vowel into the onset of the vowel if and only if the incorporation does not violate the Sonority Principle and the language-particular phonotactic constraint" (Kim 2000:25). The Onset Maximization Principle as a basis for syllabification has been proposed by Selkirk (1982), van der Hulst (1984), Itô (1986), and others, and is crosslinguistically well supported.

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(/so:kjis/ → [so:.ki:s]) in 12b in terms of foot structure. Both words consist of one foot and one bare syllable. It is this equivalence in foot structure that explains why the same process (vocalization) happens to both of them despite their difference on the syllable level in terms of the number and weight of the syllable(s) preceding the glide. It again shows that the reflex of Sievers' Law in Gothic should be viewed on the foot level instead of on the syllable level.[33] As a remedial process, vocalization occurs and makes the underlying glide in the onset of the final syllable the high vowel [i]. Consequently, the unfooted final syllable becomes footed by acquiring an additional mora from the vocalized vowel [i].

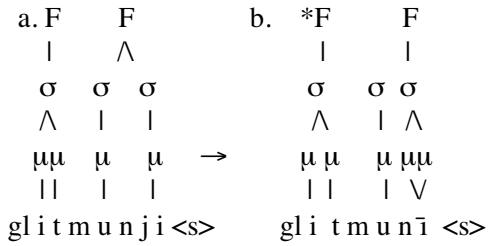
Let us consider Class I weak HL-polysyllabic verbs beginning with a heavy plus a light syllable (e.g., *glitmunjan* 'to shine', *audagjan* 'to beatify', *kaupatjan* 'to slap one's face'), which seem to be counter-examples to my analysis. Wright (1954:153) describes these polysyllabic verbs as conjugated like heavy stems and polysyllabic stems. Therefore, *-eis, -eiþ* for the 2/3sg. pres. ind. are expected. Based on the description of the handbooks, most previous formal analyses predict that HL-polysyllabic stems pattern with heavy stems (Dresher and Lahiri 1991, 1999, Murray and Vennemann 1983, Calabrese 1994).[34] However, under this analysis, there is no prosodic motivation for vocalization in these HL-polysyllabic verbs as shown in 14.

[33] MV characterize the Sievers' alternation as the consequence of two phonotactic constraints (Murray 1991:206–207): (i) complex syllable heads are avoided; (ii) overweight syllables (three or more moras) are avoided. As Suzuki (1995:237) rightly points out, MV's syllabification of polysyllabic words (e.g., *mi.ki.l̥i̯is* > *mi.ki.leis*) is in conflict with the constraints by allowing two consonants in the onset of the last syllable (e.g., *-l̥i̯is* of *mikileis*). In order to obey both constraints, the syllabification *-V.CVC.i̯i-* would have to be chosen and the glide would need to be strengthened.

[34] By contrast, other formal analyses such as Barrack 1998 and Kiparsky 1998 predict that HL-polysyllabic stems pattern with light stems, thus showing [j].

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(14) /glitmunjis/ → *[glit.mu.ni:s]



14a shows the foot structure of this word before vocalization of /j/. As this word consists of two bimoraic feet without any unfooted syllable, there is no prosodic motivation for vocalization of /j/. If /j/ is vocalized into [i], this would deform the second foot in 14a and create a new bare syllable (14b). Therefore, in this analysis, vocalization is not predicted to occur in these HL-polysyllabic words. That means there are two groups of polysyllabic words in this analysis in terms of prosodic structure and Sievers' alternation. The polysyllabic words beginning with a light syllable (e.g., *mikiljan*) contain the long vowel [i:] derived from /j/ like a heavy stem in the 2/3sg. pres. ind., and those beginning with a heavy plus a light syllable (e.g., *glitmunjan*) maintain the underlying /j/ on the surface. This difference between the two groups of polysyllabic words is well represented in my foot structure. The HL-polysyllabic words do not have any unfooted bare syllable and so there is no prosodic motivation for vocalization of /j/ as in 14a. By contrast, the polysyllabic word beginning with a light syllable in 12c has an unfooted syllable in the final syllable and vocalization operates to reparse the bare syllable as a bimoraic foot.

However, according to traditional handbooks, including Wright 1954, all polysyllabic words behave in the same way in heavy stems with regard to Sievers' Law in Gothic. That is, it has been described that all polysyllabic words have the long vowel *ei,* [i:]. However, this traditional claim is not empirically supported. There are no attested HL-polysyllabic stems like **glitmuneis* showing Sievers' alternation in Gothic. In other words, there is no empirical evidence that HL-polysyllabic stems underwent Sievers' Law in Gothic. Erdmann (1972) rightly points out that there are no attested forms of the HL-polysyllabic words containing the long vowel *ei* [i:]. The argument for the prosodic gap in the Gothic polysyllabic words is supported by Barrack (1998:108–113) who shows different behaviors of Old English polysyllabic words with regard to the West Germanic Gemination and Sievers' alternation. Since there are no

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attested HL-polysyllabic stems (**glitmuneis* vs. **glitmunjis*) in Gothic telling us something about Sievers' Law, the only way to distinguish glides from vowels is from comparative Germanic data.

According to Barrack, HL-polysyllabic stems behave like light stems in Old English. That is, they show double consonants for the West Germanic Gemination: **kunjas* > **kunnjas* (WGG) > OE *kynnes* 'kin'; **wōstinjas* > **wōstinnjas* (WGG) > OE *wēstennes* 'desert' (Dahl 1938:74). On the other hand, polysyllabic words beginning with two light syllables in sequence pattern with a heavy stem and do not undergo the West Germanic Gemination: **wītias* > OE *wītes* 'punishment'; **aþalias* > OE *æþeles* 'nobility' (ibid.). If the traditional account of polysyllabic stems is correct, it is hard to explain the correlation between WGG and weight distribution within polysyllabic stems. If Barrack and Erdmann are right, significant prosodic symmetry between light stems and HL-polysyllabic stems or between heavy stems and non HL-polysyllabic stems with respect to the WGG can be explained on a comparative basis, namely in connection with the predicted occurrence of [i] and [j] for Sievers' alternation. Therefore, it may be safer to conclude that vocalization of [j] in Gothic does not apply to both HL-polysyllabic stems and light stems. My foot-based analysis successfully accounts for the different behaviors of polysyllabic words with regard to Sievers' alternation in Gothic in the bimoraic foot structure.[35]

5. Conclusion.

It has been shown that my foot-based analysis of Sievers' Law in Gothic has several consequences. First, morphological sensitivity of Sievers' Law in Gothic is accounted for by assuming that the alternation is produced by a lexical rule sensitive to morphological information of the words it affects in the lexicon. The lexical rule which vocalizes a glide [j] into a high vowel in the unfooted syllable has access to lexical information of the words it applies to and affects the relevant words (e.g., masculine *ja*-stem nouns). The morphologically limited application of Sievers' Law in Gothic in contrast with Proto-Indo-European was interpreted as a result of diachronic change in the phonological domain of the relevant rule: post-lexical in Proto-Indo-European > lexical in Gothic. Second, it works well in explaining the alternation of [i] and [j]

[35] Kiparsky's (1998) optimality-theoretic analysis also predicts that HL-polysyllabic stems do not undergo vocalization of [j].

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without relying on controversial syllabification (cf. Murray and Vennemann 1983, Calabrese 1994, among others), or problematic foot parsing (Dresher and Lahiri 1991, 1999), and motivates the vocalization of the glide. The vocalization was interpreted as one of many processes to therapeutically restructure a bare syllable as a bimoraic foot. Third, the similarity between the disyllabic and polysyllabic words in the alternation of [i] and [j] was addressed on the foot level where they are represented in the same way. Fourth, the asymmetry of two groups of polysyllabic words observed by Erdmann (1972) and Barrack (1998) is well accounted for. Under this analysis, the polysyllabic words have different foot structures, depending on the weight of their first syllable. The application of vocalization of /j/ was computed in the foot structures of the words.

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