The Old English Foot and Resolution in *Beowulf*

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1. Introduction

This paper attempts to provide a correct characterization of the Old English foot on the one hand and test the validity of resolution as a metrical principle in *Beowulf* on the other. The first section deals with how to achieve metrical coherence without expanding the foot inventory. Within the framework of Optimality Theory, a moraic trochee is proposed as the canonical foot and its apparently inconsistent manifestation is viewed as resulting from interaction with other constraints. The second section reviews some problems in positing resolution as a reliable metrical principle and provides a constraint-based account of the invocation and suspension of resolution in *Beowulf*.

2. The Old English Foot

This section aims at the characterization of the Old English foot within the framework of Optimality Theory as proposed in McCarthy and Prince (1993a, b). Two main theses that the ensuing analysis purports to focus on are: metrical coherence and foot typology. Metrically coherent system is the one in which a particular type of foot invariably manifests itself in a variety of processes. For instance, there is one and only one foot that a number of processes crucially refer to. As pointed out by Dresher and Lahiri (1991), a metrically coherent system can be regarded as not only more expressive with respect to phonological description but also more plausible in view of language acquisition. As for the foot inventory, the present analysis obviates any expansion of foot types as proposed in Dresher and Lahiri (1991), maintaining the foot typology as limited as those in various works on the issue (Kager 1990, Hayes 1995).

2.1. *Moraic Trochee*

Directionality of foot parsing in procedural accounts must be interpreted differently in Optimality Theory since it is a theory of constraints on the well-formedness of representations rather than a theory of rules or procedures deriving representations. Thus, as a constraint-based theory, it must encode directionality in different ways. By the same token, other principles often assumed essential in serial accounts such as Maximality, Free Element Condition, Syllable Integrity need to be encoded in a way to fit in a constraint-based account.[1] In McCarthy and Prince (1993a), directionality of foot-parsing emerges from the interaction between a faithfulness constraint PARSE-δ and an alignment constraint ALIGN (Ft, L/R, PrWd, L/R). In addition, Old English requires other constraints for regulating the minimal and maximal size of feet. The definition of these and other relevant constraints and the proposed ranking among them are given in (1) and (2).

(1) Constraints

a. PARSE-σ = P/σ
: Syllables must be parsed by feet.

b. FOOT-MINIMUM = Ft-Min (F/Min)
: Feet must have at least two moras.

c. FOOT-MAXIMUM = Ft-Max (F/Max)
: Feet must have at most two moras.

d. ALIGN (Foot, L, Prosodic Word, L) = AlignFt/PW (A/F_{PW})
: The left edge of every foot must be aligned with the left edge of a prosodic word.

e. ALIGN (Foot, E, Syllable, E) = AlignFt/Syll (A/F_{σ})
: The edges of every foot must be aligned with the edges of a syllable

(2) Constraint Ranking

AlignFt/Syll >> Ft-Min >> Ft-Max >> PARSE-σ >> AlignFt/PW

1) Sohn (1994) derives these procedural principles from a group of independently motivated constraints.

PARSE-δ requires that every syllable must be parsed by a foot and, in conjunction with the foot-size constraints such as Ft-Min and Ft-Max, it forces iteration. Ft-Min, as a constraint on the minimum size of feet, requires each foot to have at least two moras, penalizing exclusively monomoraic feet. On the other hand, Ft-Max regulates the maximum size of feet such that every foot has at most two moras. Only feet larger than a bimoraic foot incur violations. Such decomposition of the standard foot-size constraint FtBin by which monomoraic and trimoraic feet are treated alike incurring one violation is empirically motivated by the fact that monomoraic (degenerate) feet are more strongly disfavored than trimoraic feet. Note that the Ft-Min and Ft-Max constraints as they stand regulate the size of a foot and do not concern the prominence relationship within a foot. For the latter, I assume an additional constraint Align (HeadSyllable, L, Foot, L) as a special subconstraint of the general AlignHead, which requires the alignment of the left boundaries of every head and of its mother constituent. The AlignFt/PW constraint demands the perfect alignment of the left edge of every foot with that of a prosodic word and it urges every foot to be located as near the left edge of a prosodic word as possible. AlignFt/Syll has the effect of protecting the syllable boundaries and preventing a foot from dissecting a syllable.

2.1. High Vowel Deletion

In numerous works (Keyser and O'Neill 1985, Riad 1990, Dresher and Lahiri 1991, Sohn 1994), the most compelling evidence for Old English foot structure comes from how to account for High Vowel Deletion in Old English. Thus it seems necessary to demonstrate how the constraints in (1) and the ranking in (2) conspire to explain the deletion and retention pattern of high vowels.

Let us first take the words beginning with LL and HL. L and H represent a light and a heavy syllable, respectively. Take the words given in (3).

(3) bisen + u ('example' ō-Stem Fem. Nom. Sg.) → bisen
lenden + u ('loins' a-Stem Neut. Nom./Acc. Pl.) → lendenu

In the tableaux, a critical violation is marked by !. ☞ indicates the optimal candidate. Square brackets indicate prosodic word boundaries and parentheses foot boundaries, respectively.[1)]

(4)

Candidates		F/Min	F/Max	P/σ	A/F$_{PW}$
1a ☞	[(bise)nu]			*	
b	[(bise)(nu)]	*!			**
c	[bi(senu)]			*	*!
d	[(bisenu)]		*!		
e	[(bi)se(nu)]	*!*		*	**
f	[bi(se)nu]	*!		**	*
2a ☞	[(lin)(denu)]				
b	[(lin)denu]			*!*	
c	[linde(nu)]	*!		**	**
d	[(linde)nu]		*!	*	
e	[(lin)(de)(nu)]	*!*			***
f	[(linde)(nu)]	*!	*		**

The candidates 1b, e, and f are eliminated since they contain one or more non-bimoraic feet, violating the highly ranked constraints Ft-Min and Ft-Max. Between the remaining candidates, 1a and 1c, the alignment constraint AlignFt/PW plays a decisive role in choosing la over 1c. Notice here that the ranking of Ft-Min and Ft-Max dominating AlignFt/PW is crucial for selecting 1a as the optimal output over 1d. The reverse ranking would select 1d as the optimal output since it has no unparsed syllables and the left edges of every foot are perfectly aligned with those of the prosodic word.

Next, let us turn to words beginning with LH.

1) Note that all candidates in (4) satisfy the AlignFt/Syll constraint and syllable integrity is implicitly assumed here.

(5) færeld + u ('journeys' a-Stem Neut. Nom./Acc. Pl.) → færeld

Candidates	F/Min	F/Max	P/σ	A/F$_{PW}$
[(færel)du]		*!	*	
[(fæ)(rel)du]	*!		*	*
☞ [fæ(rel)du]			**	*
[fæ(reldu)]		*!	*	*
[(færeldu)]		*!*		
[(fæ)rel{du)]	*!*		*	**
[(fæ)reldu]	*!		**	

As illustrated in (5), the ranked constraints posited so far would select [fæ(rel)du] as the optimal output, with the primary stress on the second syllable. However, in Old English, the primary stress always falls on the initial syllable of a prosodic word. The initial light syllable receives the primary stress and the immediately following heavy syllable is stressless. In order to pick out the correct output, an additional constraint such as follows needs to be assumed to be ranked higher than Ft-Min.

(6) ALIGN (Prosodic Word, L, Foot, L) = AlignPrWd (A/PW)
: The left edge of every prosodic word must be aligned with the left edge of a foot.

The AlignPrWd constraint penalizes any foot that is not located at the left edge of the prosodic word. The relatively highly ranked constraints, namely, Ft-Min and Ft-Max can be violated to satisfy the higher-ranked constraint AlignPrWd. Also note that a bimoraic foot which consists of the initial light syllable and the first mora of the following heavy syllable would be impossible without violating the AlignFt/Syll constraint, which I assume is inviolable. This implies that the initial LH sequence forms a foot as a whole such as [(LH)...]. By ranking AlignPrWd higher than Ft-Min, the correct output [(LH)...] is to be selected as shown in (7):2)

(7)

Candidates	A/Fσ	A/PW	F/Min	F/Max	P/σ	A/F_{PW}
☞ [(færel)du]				*	*	
[(fæ)(rel)du]			*!		*	*
[fæ(rel)du]		*!			**	*
[fæ(reldu)]		*!		*	*	*
[(færel)du)]	*!				*	
[(færeldu)]				*!*		
[(fæ)rel(du)]			*!*		*	**
[(fæ)reldu]			*!		**	

Given the constraints in (1) and (6) and the proposed ranking among them, the foot structure of HH sequences is quite obvious as illustrated in the tableau (8):

(8) hlāford + u ('lords' a-Stem Masc. Mom./Acc. Pl.) → hlāford

Candidates	A/PW	F/Min	F/Max	P/σ	A/F_{PW}
☞ [(hlā)(for)du]				*	
[(hlā)fordu]				**!	
[hlā(for)du]	*!			**	*
[(hlāfordu)]			*!**		
[(hlā)for(du)]		*!		*	**
[(hlāfor)du]			*!*	*	

Contrary to what the constraints and the ranking among them predict, the actual output forms are not **bise**, **færel** and **hlōfor** but **bisen**, **færeld** and **hlōford**. To get the correct output forms, I assume an additional constraint which requires that every segment be parsed by a syllable.

2) In the tableau, the solid line indicates a critical ranking and the dotted line a tied ranking, respectively.

(9) PARSE-SEGMENT = Parse-Seg (P/Seg)
: A segment is parsed by a syllable.

With the ranking in which the Parse-Seg constraint is lower than Ft-Min but crucially higher than Ft-Max, output forms with more parsed segments win over those with less parsed segments.

(10)

Candidates	A/PW	F/Min	P/Seg	F/Max	P/s	A/F$_{PW}$
☞ [(bisen)u]			*	*	*	
[(bise)nu]			**!		*	
☞ [(færeld)u]			*	**	*	
[(færel)du]			*!*	*	*	
☞ [(hlā)(ford)u]			*	*	*	
[(hlā)(for)du]			*!*		*	

The set of constraints as proposed in (1) and (6) does not account for why only unparsed high vowels get deleted. Nonhigh vowels, although construed as unparsed in our system, do not delete and appear in other inflectional forms such as **færelde**, **hlāforde** (Dat. Sg.), **færelda**, **hlāforda** (Gen. Pl.), **bisene** (Gen./Dat./Acc. Sg.), and **bisena** (Gen. Pl.). To distinguish high vowels from nonhigh vowels with regard to vowel deletion, I assume that the sonority of the vowel in question determines whether it is to be deleted or not. If it is less sonorous than mid vowels ([e] or [o]), it cannot survive by means of stray adjunction whereas nonhigh vowels with greater sonority remains in spite of its unparsedness. Stray elements are those which are not locally parsed and yet parsed by nonlocal prosodic categories such as the prosodic word or phonological phrase. Thus any vowel can survive by being parsed locally and nonhigh vowels can by being parsed either locally or remotely. Unlike local parsing which guarantees the surface realization of a vowel irrespective of its sonority, nonlocal parsing requires sonority minimum. To incorporate such sonority-dependent nonlocal parsing into our constraint-based system, I assume the following constraint.

(11) STRAY-MINIMUM = Stray/Min·
: Stray elements must be sonorous than high vowels.

The Stray/Min constraint bans high vowels from being parsed by a nonlocal prosodic constituent. To see how the Stray/Min constraint interacts with other constraints, consider the following tableau:[3),4)]

(12)

Candidates	Stray/Min	P/Seg
☞ [(bisen)]u		*
[(bisen)u]	*!	
☞ [(bisen)e]		
[(biden)]e		*!

3. Resolution in Meter

3.1. Resolution as a Metrical Principle

As explicitly described at the outset of Bliss (1958) and of Stockwell and Minkova (1997), two primary roles of meter are of mnemonic and aesthetic nature. For the sake of the mnemonic value alone, it would be desirable for all of 6,364 verses in *Beowulf* to be able to be classified as one of the eight Basic Types of Bliss' at their face value without further modifications. On the other hand, for aesthetic purposes, eight Basic Types of Bliss' as they stand are not so flexible as to allow colorful variations which have been the source of intellectual pleasure.

Most of the metrical analyses of *Beowulf* involve a great number of metrical accommodations by means of which numerous sets of subtypes are related to

3) For the sake of simplicity, irrelevant constraints are not included here.

4) Unlike its assessment in the tableau (10), the P/Seg constraint is interpreted as specifically relevant to the nonlocal paring here.

their Basic Types. The primary reason for invoking such metrical adaptations is to simplify the entire inventory of possible verses, thus making it much more plausible and manageable to understand the nature of metricality and complexity. Numerous mechanisms of such metrical accommodations have been proposed and no theory of the meter of *Beowulf* can dispense with at least some of them.[5)] Although their usefulness has never been seriously challenged, the lack of precise definitions and the inconsistent applications of these metrical accommodations have provoked many criticisms and led to the outright rejection of the theory itself. Such skeptical attitudes toward the wanton use of metrical adaptations can be expressed in the following comment:

(13) Donoghue (1987: 70)

> ... so many intractable verses are made regular only after invoking the mysterious operations of anacrusis, elision, resolution, in order to make them conform to Sievers's five metrical types or to another set of abstract patterns. It all can seem so arbitrary.

The present section aims at demystifying such cryptic operation of one of metrical accommodations by providing a more principled way of accounting for their applications. Among various metrical accommodations frequently cited in the literature, resolution emerges as one of the most important and frequently employed adaptations in that it displays a far-reaching effect on the scansion and classification.[6)]

3.2 Mefrification

The metrical component is assumed to have its own categories and hierarchy. The metrical category Line (L) matches an actual line in *Beowulf*

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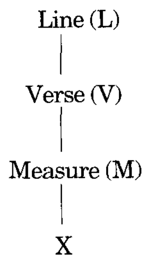
5) The only exception is the quantitative meter proposed by Golston and Riad (1996). They plainly repudiate the use of any metrical adaptations but, as pointed out by Sohn (1998) such otherwise desirable theoretical simplicity must assume a dual-weight system and can lead to empirically incorrect predictions.

6) A comprehensive and succinct summary of other metrical accommodations recurrent in the literature can be found in Stockwell and Minkova (1997).

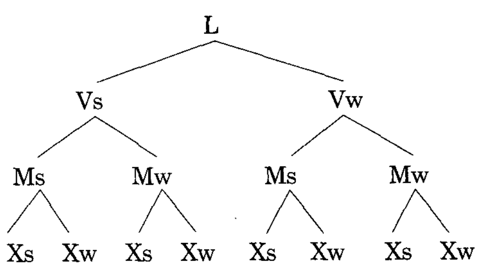
and it dominates the metrical category Verse (V). The metrical category Verse refers to a self-contained syntactic group and is separated by an emphatic space in the most of the edited texts.[7] The Measure refers to a purely metrical constituent which in turn dominates an abstract metrical category X:[8]

(14) Metrical Hierarchy



In accord with the long-held view on the metrical structure (Sievers 1885, 1905, Bliss 1958, Keyser 1969, Russom 1987, Golston and Riad 1996), I assume the following metrical structure for a line in *Beowulf*.

(15)

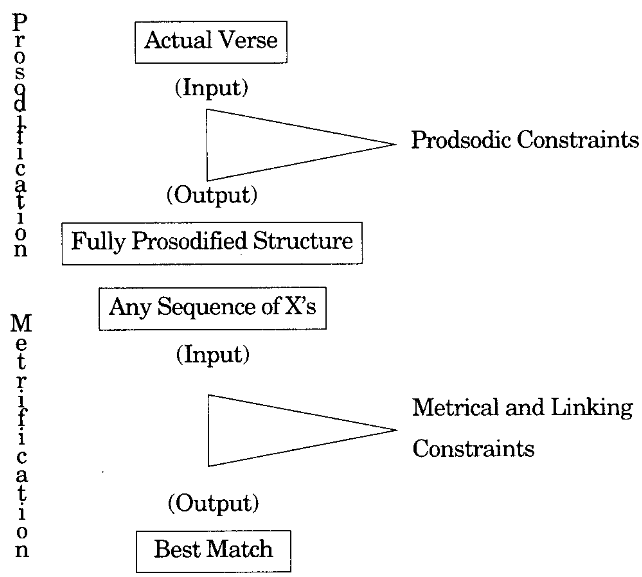


7) Verse divisions in lines do not suffer from such editorial inconsistencies often found in the quantity and metrical treatment of certain vowels. Numerous edited texts (Chambers 1933, Klaeber 1950, Dobbie 1953, Wrenn 1958, Chickering 1977) do not vary in most part regarding the identification of verses. Stevick (1968) also confirms the reliability of such verse divisions based on the relative differences in spacing in the original manuscript.

8) To avoid unnecessary terminological confusion, I use the term *measure* to refer exclusively to a poetic (metrical) *foot* and the usual term foot is reserved for a linguistic (prosodic) foot. The term *measure* has been most extensively used in the temporalist approaches (Pope 1942, Creed 1966) but the choice of it does not indicate any connection between the present analysis and the temporalist view.

Linguistic material in actual verses is prosodified in conformity with the prosodic constraints and abstract metrical patterns are regulated by the metrical constraints (see Sohn 1998). These two structures are then associated with each other by a set of linking constraints. The interactions among these structures governed by three distinct sets of constraints assumed in the present analysis are schematized below:

(16)



First of all, we have to be able to regulate the way in which linguistic material can be associated with abstract metrical positions. Linking between terminal metrical nodes (abstract metrical position: X) and linguistic material is governed by the following constraints:

(17) Linking Constraints

a. Fill-X

: No unfilled metrical positions are allowed. (undominated)

b. ^{m}Parse- σ

: A syllable must be parsed by a metrical position.

(undominated)

c. Fill-Foot/X = Fill-Ft/X

: A foot must be parsed by a metrical position.

d. Fill-Lift = Fill-Lft

: A lift must be filled by a head foot.

The Fill-X constraint prohibits unfilled metrical positions and is assumed here to be undominated. The ^{m}Parse-σ constraint requires that every syllable be linked with a metrical position, strong or weak. Every syllable, stressed or unstressed, has to be metrically licensed by being associated with a metrical position. The Fill-Ft/X constraint requires that every foot must be linked with a metrical position. Fill-Lft requires that a lift (a strong metrical position) is linked with a head foot. A head foot refers to a foot which is the most prominent in a given prosodic constituent. In prosodic domains of prosodic word and phonological phrase, the head foot is the leftmost foot.

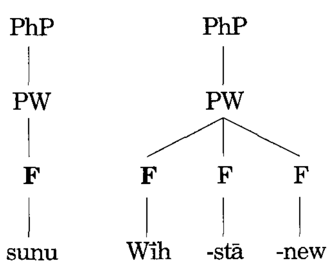
To illustrate how the actual verse is to be metrified by the linking constraints given in (17), I cite a verse belonging to ([S][SWW]).

(18)

sunu	Wīhstānes	[2752b]
son	Weohstan's	
'Weohsta's son'		

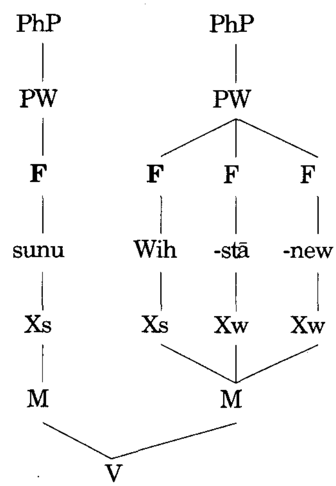
In the prosodic structure of the verse given in (19), head feet are emphasized in boldface.

(19)



The representation in (19) depicts the prosodic structure of the verse **sunu Wihstānes** fully prosodified in accord with the prosodic constraints. It is this prosodic representation onto which a metrical structure is mapped. The linking constraints assumed in (17) regulate the mapping.

(20)



(20) represents a fully metrified structure in which the prosodic structure in (20) is mapped onto a metrical structure. There are no unfilled metrical positions, satisfying the undominated constraint Fill-X. Every syllable is licensed by a metrical position and every foot is licensed by a metrical position. And finally, all lifts are filled by a head foot.

3.3 Analysis of Resolution

As an important metrical device since its introduction by Sievers (1885), resolution refers to the metrical equivalence between a light (stressed) syllable followed by a syllable of any quantity and a heavy (stressed) syllable.[9] The

9) As hinted in the previous section, resolution is not a purely metrical convention and, in Old English phonology itself, there are a number of processes that require the equivalence between a heavy syllable and a stressed syllable followed by a syllable of any quantity. Particularly numerous works (Riad 1990, Dresher and Lahiri 1991, Sohn 1994) have identified the same equivalence as essential for the correct definition

primary role of resolution is that it distinguishes metrically ignorable unstressed syllables from metrically relevant ones. In one of the metrical accommodations often called expansion, each addition of unstressed syllables counts metrically, resulting in a creation of a new subtype. By contrast, in resolution, an unstressed syllable that is resolved with its preceding stressed light syllable does not carry any metrical significance. As a result a massive generalization can be achieved by dint of resolution. Representative verses to which resolution applies are given in (21). The sequences of resolved syllables are underlined.

(21) a.	æpeling	ǣrgōol	[130a]
	king	good	(*from old times*)
	'(their) good king'		
b.	āngan	eaferan	[1547a]
	only	kinsman	
	'(her) only kinsman'		
c.	atelīc	egesa	[784a]
	drealful	fear	
	'horrible fear'		

Resolution occurs in the first two syllables of the first measure in (21a) and of the second measure in (21b). In (21c), two initial syllables of the first and second measure are resolved. The primary function of resolution in the meter of *Beowulf* is that we can unify a variety of verses as a single type. Consequently, verses with more than four syllables can fit nicely into four metrical positions. Thus all verses in (21) can be scanned as [SW][SW], instead of [SWW][SW] for (21a), [SW][SWW] for (21b), and [SWW][SWW] for (21c). Since its introduction, the metrical equivalence between a light stressed syllable with a following syllable and a heavy stressed syllable has been taken as a major metrical device massively employed for scansion and classification of types in most theories.[10] Most metrists, however, have failed to formalize

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of high vowel deletion. The phonological grounding of resolution has also been evidenced in Calabrese (1993) and Kiparsky (1997) for Sievers' Law and in Kuryłowicz (1948) and Mester (1992) for Classical Latin iambic shortening.

such metrical equivalence and continued to use the rather cumbersome phrase such as "a long stressed syllable and its resolved equivalents." Such failure seems to be due in part to their recognition of syllable count as the fundamental theoretical basis and in part to the non-availability of the prosodic category foot.[11] Since every lexical word is footed as assumed in Selkirk (1995), we have a prosodic category readily available to be referred to as a formal counterpart of the metrical equivalence between a long stressed syllable and its resolved equivalents. It is the prosodic constituent foot (moraic trochee) rather than the prosodic constituent syllable traditionally employed that is to be associated with a metrical position. In (22), syllable and foot boundaries are indicated by parentheses and square brackets, respectively.

```
(22) a.  l¯eofra    manna    [1915b]      '(for the) beloved men'
           X          X        X        X
           |          |        |        |
         [(l¯eof)]  [(ra)]  [(man)]  [(na)]   'boar- struck' crets
     b.  eoferas   cnysedan  [1328a]
           X          X        X        X
           |          |        |        |
         [(eofe)]   [(ras)] [(chyse)] [(daw)]
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As illustrated in (22), every foot is linked to a metrical position, satisfying the alignment constraint Fill-Ft/X.

Viewing resolution as a natural consequence of the mapping constraint Fill-Ft/X has a couple of empirical implications. First, the application of resolution is the unmarked option. Unless the Fill-Ft/X constraint is dominated by some other constraints, resolution occurs by default. There are, however, some instances in which the application of resolution has to be blocked. Consider the following verse:

10) Based on editorial and distributional evidence, Keyser (1969) and Hoover (1985) argue for the total rejection of resolution as a reliable metrical principle. For a critical review of their arguments, refer to Suzuki (1995).

11) In the generative metrists tradition (Hanson 1993, Hanson and Kiparsky 1996), the notion of foot-based meter has been fully developed and exploited.

(23)

lēof	lēod cyring	[54a]
dear	ling of people	
'(the) dear king of people'		

The verse consists of four syllables **lēof**, **lēod**, **cy**, and **ming** but three feet **lēof**, **lēod**, and **cyning**. As our Fill-Ft/X forces every foot to be linked with a metrical position, there remains one metrical position unfilled. Here the number of feet is not sufficient enough to fill all metrical positions in a verse. In cases like this, resolution is suppressed and the prosodic category of syllable takes the place of the foot and fills the empty metrical positions instead. Traditionally this has been treated as "suspension of resolution" and many metrists have attempted to describe the context in which otherwise omnipresent resolution does not apply. In our system, the suppression of resolution can be viewed as the outranking of the Fill-Ft/X by some dominating constraint. The force that curbs the resolution in the particular context, of course, is the requirement for all metrical positions to be filled by a prosodic category. As we assumed in the assessment of the linking constraints, the undominated Fill-X constraint is ranked higher than the Fill-Ft/X constraint and a violation of the latter is tolerated to satisfy the former.

(24) Constraint Ranking
Fill-X >> Fill-Ft/X

If we assume that the Fill-X constraint outranks Fill-Ft/X, it can force the violation of the latter when the constraints conflict with each other. Thus, otherwise freely applicable resolution does not occur if and only if it produces unfilled metrical positions.

(25) a. lēof lēofcyning [54a]

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X         X         X            X
|         |         |
[(lēof)]  [(lēod)]  [(cy)(ning)]
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b.

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  X          X          X       X
  |          |          |       |
[(lēof)]  [(lēod)]    (cy)   (ning)
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Second, in majority of the analyses in which resolution is accepted as a reliable metrical accommodation, it is implicitly assumed that only lexical words are subject to resolution and function words are not metrically resolved.[12] We assume that nonlexical words lack the foot structure whereas lexical words are parsed by foot. Since they are not parsed by a foot, function words are not subject to resolution to which the existence of a foot is a prerequisite. Thus, in the system proposed in this paper, it naturally follows that resolution applies only to lexical words and no additional stipulations are needed.

4. Conclusion

It is demonstrated that, within the framework of Optimality Theory, the normal moraic trochee emerges as the canonical Old English foot. The bimoraic foot is expanded to trimoraic foot only at the left edge of the prosodic word to satisfy the higher ranked constraint AlignPrWd. And the invariable manifestation of the bimoraicity elsewhere results from the Ft-Min and Ft-Max constraints' dominating other constraints. Moreover, by positing the moraic trochee as the Old English foot, we do not need any discrete processes to account for high vowel deletion and its context falls out naturally as unparsed segments. Based on the moraic trochee, resolution in *Beowulf* is explained as an epiphenomenon of the Fill-Ft/X constraint. Thus resolution is the unmarked option in that it applies to all cases except when its application leads to a violation of the higher constraint Fill-X.

12) The issue is explicitly raised in Keddie (1995) and Russom (1995).

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